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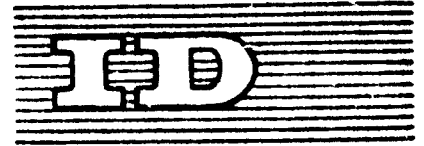
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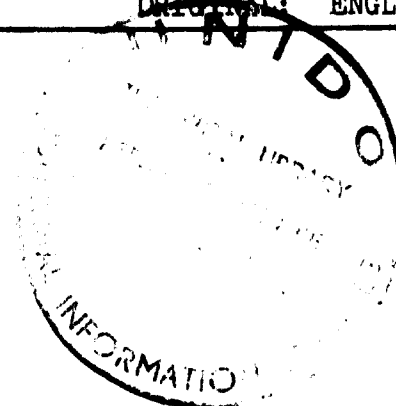
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5 July 1968

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United Nations Industrial Development Organization

Interregional Seminar on Industrial Location
and Regional Development
Minsk, August 1968



RELEVANCE OF INTERMEDIATE INDUSTRIES AND INDUSTRIAL
SERVICES FOR CORRECT LOCATION PLANNING ^{1/}

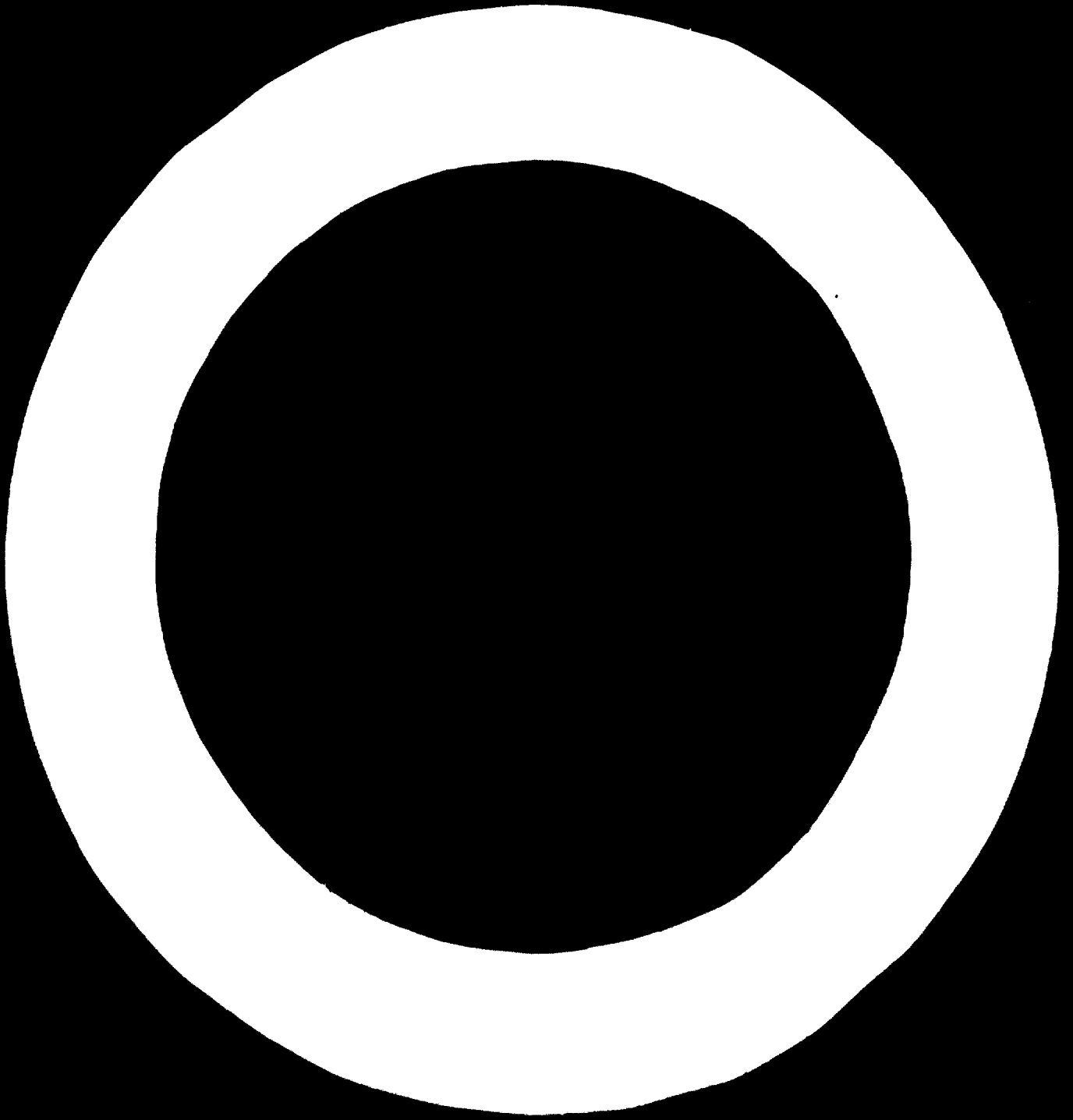
SUMMARY

by

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* This is a summary of a paper issued under the same title as ID/WG.9/12

^{1/} The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO.



1. In chapter 1 the author observes that interindustry relations, excluding macro-economic analyses, is a field that is little explored as yet. A brief description is given of auxiliary industries and industrial services. Next, an examination is made of the modern role of interindustry relations as a location factor in various types of industries, taking account of other industrial location factors as well.
2. Chapter 2 discusses concrete problems concerning location and the retardation of industrial development because of the lack of auxiliary industries and industrial services in the regions of southern Italy, the Mezzogiorno. This great region is taken as a case study, presenting as it does certain interesting aspects for many developing countries. Chapter 2 also contains an examination of the goals and limits of the industrialization policy in such backward regions, as well as the findings of a recent EEC study by Italconsult, and supervised by the author of this paper, concerning the setting up of an industrial pole of growth in the Mezzogiorno in accordance with new approaches and new policy instruments.^{1/}
3. Chapter 3 deals with location problems and industrial development in developing countries, with special reference to the effects of inadequate intermediate supply. An attempt is made to establish the limits and conditions for extending European experience in peripheral backward regions to such countries. The study concludes by examining how industrial poles of growth may be constructed and promoted in developing countries, following the new concepts and approaches, bearing in mind regional policies and problems of industrial location and of economic integration between member countries of a common market.

^{1/} EEC - Italconsult study on the promotion of an industrial pole of growth in southern Italy, now being published in Brussels.



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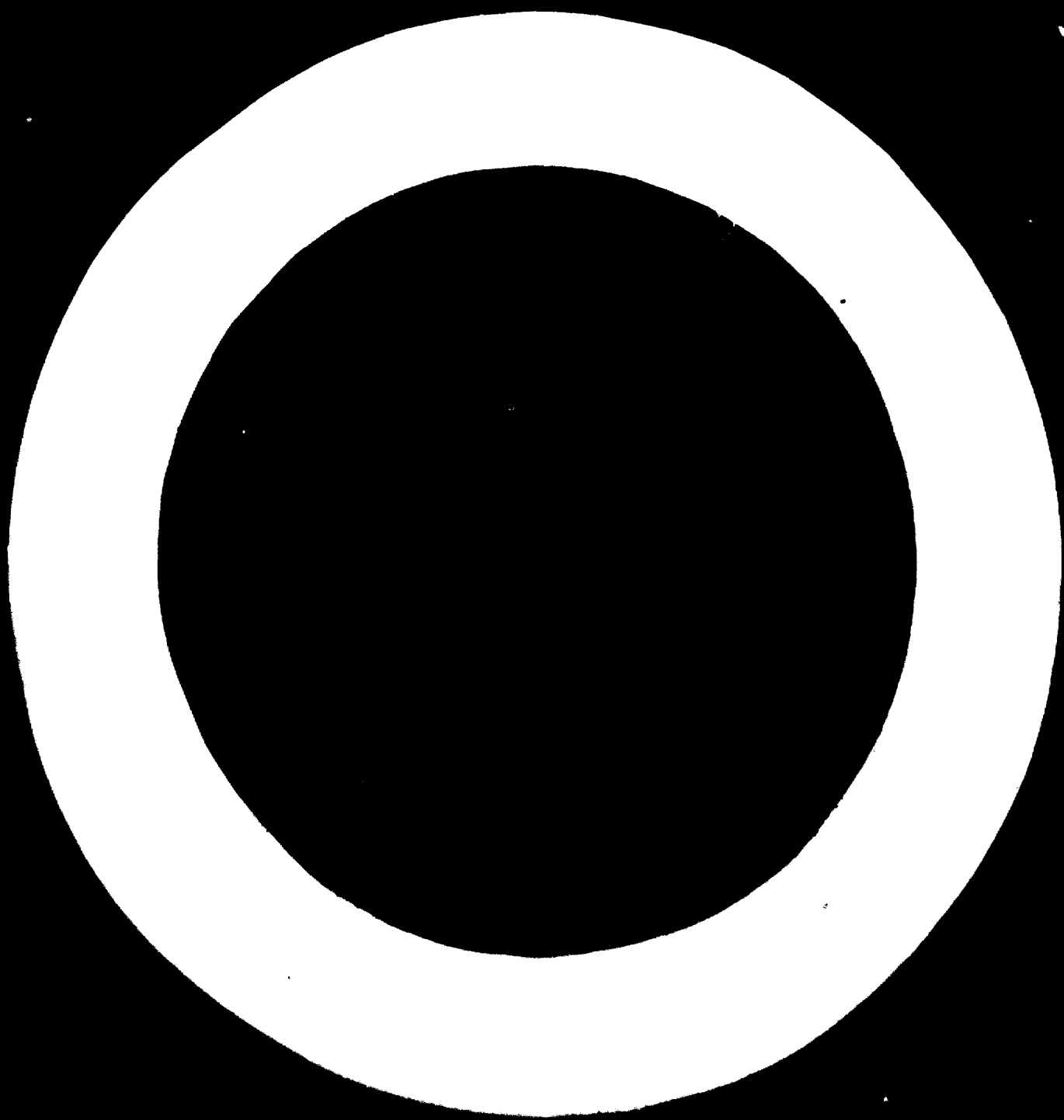
RELEVANCE OF INTERMEDIATE INDUSTRIES AND INDUSTRIAL
SERVICES FOR CORRECT LOCATION PLANNING ✓

by

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I. THE ROLE OF AUXILIARY INDUSTRIES AND INDUSTRIAL SERVICES AS AN INDUSTRIAL LOCATION FACTOR

General

1. Technological specialization is a modern feature of factory industries in developed countries. Other things being equal, it enables investments in machinery and plant to be reduced, plant and equipment to be more fully utilized, the proportion of skilled manpower to be reduced and the level of stocks of materials to be lowered. In short, it enables productivity to be stepped up.
2. A large number of the numerous interindustry relations that derive from technological specialization, exert an influence on industrial location independently of transport cost considerations. Here it is a question of the need or convenience for factory industries to be located near auxiliary industries and industrial services. These requirements, felt to a greater or lesser degree by various industries, constitute the interindustry relations factor which, together with transport costs, infrastructure and site requirements, the labour supply and public industrial policy, make up the ensemble of industrial location factors.
3. The subject of Annex 1 is how, in time, interindustry relations have gained in importance as a location factor. Although this is a historical analysis, the careful reader may find in it explanations of the lack of success of current industrial policies which are based on growth structures and patterns that belong to the past. For an examination of this interindustry relations factor within the framework of other location factors, see Annex 2.
4. Interindustry relations which operate as location factors concern:
 - Specialist units for maintenance and servicing of machinery, equipment etc., and related facilities;
 - Subcontractors and process-specializing units;
 - Intermediate industries or local depots supplying standard and catalogued products;
 - Various technical and commercial services for industry.
5. Maintenance units, subcontractors and process-specializing units represent auxiliary industries within the framework of the broad range of intermediate industries, and are distinguished from the industrial services which, strictly speaking, are local commercial depots etc.; broadly speaking industrial services may also be taken to mean in this study all those interindustry relations

(of intermediate supply and demand) which have a direct influence on industrial location.

6. Specialist units for repair and maintenance provide services to maintain the means of production of customer industries in good working conditions. In particular, specialist units for maintenance deal with the repair and maintenance of tools and gauges, machinery, processing installations, vehicles and buildings. These units are distinguished from general repair shops, which provide for the repair of any machinery. There are many different types of units for maintenance and they vary according to the different classes of tools, machinery etc. with which they deal.^{1/} This expresses itself in the varying composition of the highly skilled manpower they use and in the different machinery and other means with which they must be equipped. Specialization of the maintenance units is therefore one of the conditions guaranteeing the efficiency and low cost of the services they provide.

7. The specialization of these maintenance units is reflected in the make-up of their clientele. The majority of these work for specific sectors and only a few types provide services for most industries (maintenance units for buildings etc.).

8. The specialist units for maintenance require, in turn, the services of supplementary specialized units which supply them with made-to-order parts and processes (welding units, heat treatment processes etc.) Moreover, maintenance operations call for the presence of local spare-part depots.

9. Maintenance services are generally required by all industries; the industries' own internal services are normally restricted to servicing in the intervals between overhauls.^{2/} The outside maintenance supplied by the specialist units refers to non-routine-type maintenance and to periodic overhauls.

10. Contrary to what is frequently stated, such services are normally not self-supplied in large plants; the periodic overhaul of machinery and installations is

^{1/} The needs of specialization for certain types of machinery are such that the makers themselves supply the relevant repair and maintenance services through their own workshops in the various centres.

^{2/} Most industries' internal service consists of normal checking and adjustment of machinery and equipment and replacement of quick-change parts. Obviously there are exceptions; some types of industries, for example, are self-contained as far as maintenance of certain specific processing installations is concerned. However, even these industries have recourse to specialist units for the maintenance of machinery, means of transport etc.

subject to considerable seasonal variations.^{3/} The fact that, in a number of large plants engaged in certain industrial sectors, maintenance and overhaul are effected exclusively by internal concerns derived from the exogenous elements which are analysed in paragraphs 30 - 55.

11. Maintenance units must be located near customer plants so that workmen and technical staffs can reach them within a short space of time and so that maintenance materials can be delivered quickly. Contacts between customer units and maintenance units are also frequently necessary, for in the intervals between periodic overhauls, operations have to be arranged (preparation of materials etc.).

12. The radius of the economic utilization of the maintenance units is hence limited. It varies according to a number of factors including the speed of transport and communications in a given area. Generally speaking this radius may be up to 50 km (for certain types of units, even up to 100 km).

13. Subcontractors and process-specializing units produce materials or components or supply processes which are incorporated in the articles produced by the customer firms. These processes are made-to-order according to particular specifications. In general, the subcontracts and process-specializing units operate for a clientele consisting of industries within a single sector.

14. For this class of auxiliary industries, the activity is explained in terms of specialization and hence of lower costs. In many cases it concerns processes which, if effected by the customer units - even those of large size - would hardly ever reach the levels attained by the specialist units, since they receive orders from large numbers of customers and can fully utilize the most productive sort of machinery and equipment. In other cases, subcontractors are called in even when the customer units possess types of machinery with which the requisite processes could be performed, because it would not be possible to utilize fully all the necessary machinery. There are also other technico-economic reasons for which given industries consider it convenient not to carry out accessory processes within their own factories, but entrust them instead to specialist firms.^{4/}

^{3/} The periods differ according to the type of servicing (major, intermediate or minor overhaul) and according to the type of machinery. In Europe the periodic overhaul of general service systems and specific processing installations generally takes place when the factories are closed for holidays.

^{4/} See Chap. 4.2 of the EEC-Italconsult Study.

15. The use of subcontractors and process-specializing units results in production schedules and product quality coming to rely very heavily on such auxiliary units. Reliance on these units gives rise to the need to carry out a constant qualitative check on production, on the regularity of deliveries within established periods etc. Thus there is need for frequent contact, sometimes daily, between customer firms and the auxiliary industries.
16. The radius of the economic utilization of subcontractors and process-specializing firms is limited in order to render such contacts easy (not because of transport costs). Within varying margins, according to the characteristics of the transport and communications system inside a given area, the maximum for such a radius may be placed at 100 km, a distance which permits close contacts and a shuttle service. For certain processes which have fixed time limits, the maximum distance might be extended to 200 km.
17. Similar location requirements obtain with regard to plants in a multiplant firm when each unit turns out a part of the same product or products. Analogous to the case of subcontractors is the so-called domestic out-working. This generally concerns hand assembly of components or work with small-scale machinery. Frequently the cause for out-working is the need of finding labour, especially female, and/or the convenience of paying lower wages.
18. Factories use inputs provided by intermediate industries producing standard and catalogued products. These materials and products, utilized on a large scale in industry, generally correspond to well defined classes of goods complying with national or international standards (standard products), or determined by the individual firms producing them (catalogued products).
19. In view of the characteristics of these products, there is no call for frequent contacts with the manufacturers, as is the case with respect to subcontractors, since made-to-order products or materials are not involved. Thus there is normally no need to be near intermediate industries which are manufacturing for the national or international market, nor is proximity necessitated by transport cost considerations. Many of these products are quoted at nationwide prices; for the remainder, the incidence of transport on total production costs is not significant for the majority of manufacturing industries.
20. Although the need for contacts and transport costs reasons do not enter into it, firms in industrial centres benefit from local depots supplying standard and

and catalogued products which together stock the whole range of such products in sufficient quantities to meet the most widely-varying demands in good time. These local depots may be the commercial branches of the producing firms or wholesale commercial distributors etc.

21. The advantage of local depots are numerous: the internal stocks required in customer factories can be reduced, mistakes in supplies may be corrected almost immediately, and production stoppages or imbalances can be avoided in the event of infrequently-used products becoming urgently necessary.

22. Raw materials, too, have a homogenous market similar to those for standard and catalogued products. The raw material depots in industrial centres offer similar advantages.

23. The item entitled various technical and commercial services comprises a variety of technical, administrative and commercial services provided by specialist firms for industries in specific sectors or for industry in general. The nature of these services implies the need for contact, and their adequate utilization is conditioned by their relative proximity.

24. Auxiliary industries and industrial services locate in large industrial concentrations because their economic dimensions are such that they can operate only if supported by demand from numerous customers. Equivalent demand conditions may occur however in smaller agglomerations of industries of a given sector or sub-sector (specialized concentrations). This is the case with certain textile districts, shoe industry districts and electronic industry districts. The availability of auxiliary industries and industrial services is therefore an aspect of the economies of concentration, i.e. the external economies occurring in industrial concentrations.

25. In Annex 3 the role of interindustry relations is examined in the formation of external economies, taking account of the other factors that integrate them. There is an explanation in this Annex of how these economies may be grouped under two headings: "general external economies", deriving from the purely quantitative fact of an agglomeration of industrial activities, and "sectoral external economies", which derive from the agglomeration of industries with homogeneous inputs, viz. belonging to one and the same sector.

26. General external economies refer not only to the advantages of infrastructure and site (standard requirements) and of labour supply (including skilled labour,

but limited to types of jobs which are widespread in various industries), but also to a few types of maintenance units common to the majority of manufacturing industries, to those depots for standard and catalogued products for which there is more extensive demand in industry, and to industrial services of a general nature.

27. Sectoral external economies refer not only to specialized infrastructures, the possibility of special site requirements, and to skilled labour supply, but also to the availability of the whole system of interindustry relations which an industry in a given sector requires (sectoral services).

28. Sectoral external economies and in particular sectoral services are the basic attraction of large industrial concentrations to factory industries characterized by a high degree of technological specialization.^{5/}

29. Finally, it should be noted that the large concentrations in developed economies are complex economic spaces constituted of industrial centres whose radius of utilization of their own sectoral services often overlaps, thereby covering entire regions and spreading in parts to adjacent regions.

The varying need for auxiliary industries and industrial services in different industries

30. The need for auxiliary industries and industrial services varies according to the field of activity of the processing industry. In general, needs are greatest in the factory industries where technological specialization prevails, and lesser in the basic industries, due to emphasis on technological integration. Such needs vary widely, however, within the factory industries themselves, with diverse effects on the question of location which is obviously influenced by the relative weight of other location factors.

31. It is important therefore to know the extent to which various industries need to call on auxiliary industries and industrial services, and to determine in which industries the interindustry relations factor tends to be predominant in the choice of location.

^{5/} In large industrial concentrations there are numerous other advantages that could be included, apart from the external economies mentioned above, such as easier sales and after-sales services for a large proportion of the customers. Even in the case of industries that sell to the domestic and international market, location in a large concentration means they have a considerable number of customers in the immediate region - obviously a great advantage. It should be noted, however, that among these advantages, the reduction of transport costs in delivery is, as a rule, of very little importance.

32. Industries may be grouped as shown below, bearing in mind that the concept of the predominance of one factor does not signify that the other factors are not taken into consideration.

<u>Groups of industries</u>	<u>Predominant factor</u>
Market-oriented industries	Transport costs
Material-oriented industries	Transport costs (and special site requirements)
Sectoral services-oriented industries	Interindustry relations
Other industries	None

33. The market-oriented industries are defined as those industries in which each plant normally produces for a regional or local market^{6/} because of a high transport cost in relation to the value of the product (e.g. many standard food products and drinks, various woodworking products, construction materials and bulky containers).

34. In this group of industries, the need for services from auxiliary industries is generally limited to those provided by maintenance units; the need for local depots of materials and products for use in their processes is also reduced. Location, in regional terms, is thus not influenced by the availability of such industrial services, but by the market. These industries utilize the services available and may even provide them with their own plants. In locating a plant, account must be taken of the availability of these services, as well as of other factors and corresponding facilities within the economic space involved.

35. The wide range of industrial activities, characterized by a service element, that need to be near their clientele may be placed within the group in question. These are mainly small-scale activities operating for the local market (small mechanical workshops repairing all manner of machinery, vehicles and domestic equipment; shoe repair units, tailoring, dressmaking, small furniture works etc.) and having very limited need for industrial services. This group of industries is also known as scattered pattern industries or geographically protected industries.

36. Among the market industries one could include the auxiliary industries themselves (specialist units for maintenance, subcontractors, process-specialising

^{6/} The size of the market served by these industries varies according to the products, the distribution of the clientele, the ease of the transport system, the commercial organisation of the firms and so on.

units) in relation to the industries of the sectors which they specifically serve.

37. Material-oriented industries are industries which produce for wide markets (national and international) and whose transport costs for hauling bulky raw materials comprise a relatively important part of the total production cost. Such industries thus locate near domestic supplies of raw materials (extractive materials or agricultural produce), or close to certain transport facilities (ports etc.) if they rely on imported raw materials. In the latter case the factor "special requirements of infrastructure and site" may become determinant (e.g. in the case of a refinery, deep-water berths are required for the tankers). ✓

38. The basic industries belong to the group of material-oriented industries (steelmaking, heavy chemicals, petrochemicals, mineral oil refining and so on), as do certain other industries (some metalliferous products, paper mills, certain food industries such as vegetable oil mills, grain mills and sugar factories). ✓

39. In general, the group of material-oriented industries is composed of technologically integrated industries (complexes) and of plants with continuous processes requiring only certain specialist units for maintenance, but not subcontractors.

40. However, the zone chosen because of transport cost considerations and special site requirements would certainly not be rejected for lack of such auxiliary industries. If these do not exist in the zone, they are provided within the establishments. The additional cost involved is irrelevant when considered in relation to the total cost of production. For example, some petrochemical complexes which have sprung up in virgin zones are self-contained in respect to these needs; others, located near industrial centres, limit their internal maintenance facilities to those required for emergency repairs and routine maintenance.

41. Some material-oriented industries such as the food industries may find it convenient to have available not only specialist units for maintenance but also a few other auxiliary industries (special containers etc.) and/or certain technical services (specialist laboratories etc.) and local depots of certain materials which are used in their processes. Technical services exist in zones where there

✓ For some industries in this group, special site requirements also depend on the processes used.

8/ Industries such as the aluminium industry which, although influenced by the supply of raw materials, are energy-oriented, may be included among the basic industries.

is already a certain agglomeration of such industries, as in the case of some vegetable oil refining districts, food canning districts and so on, but the advantages of location relative to the transport costs of raw materials remain predominant. This explains the presence in a number of zones of the kind of factory which can operate economically without the support of such services.

42. Sectoral services oriented industries are the factory industries for which the predominant location factor is interindustry relations. In other words, they are industries having processes that involve extensive technological specialization. Their output is generally destined for the national market and abroad. The most important industries in this group are the metalworking industries (sectors of general engineering, the electromechanical industries including electronics, and precision engineering), the textile industry (wool, cotton, other natural fibres, synthetic fibres), the hosiery industry and the shoe industry.

43. In order to be competitive, these industries need numerous types of specialist units for maintenance, subcontractors and special-process units, local depots supplying standard and catalogued products, and other industrial services. Consequently, they must locate in areas where there is already an agglomeration of industry of the same sector, i.e. in large industrial concentrations or in specialized concentrations.

44. The phrase "agglomerations of industry of the same sector" does not necessarily signify a geographic pattern differentiated from the remaining economic space (except in the case of specialized concentration). On the contrary, in some small countries (geographically speaking) with an old industrial tradition, such as England, there are to all intents and purposes no concentrations of metalworking industries; in reality there are a considerable number of larger and smaller metalworking centres whose over-all areas of influence cover most of the country.

45. When considering the question of location, once the conditions concerning the interindustry relations factor have been satisfied, much importance is given by many types of metalworking industries to the labour supply factor (skilled workers and/or workers with special characteristics) and to special site requirements. The need for these important factors leads to a preference for locating in various possible industrial centres or even justifies locating on the fringes

of such centres when the industries concerned are still within the radius of utilisation of their sectoral services.^{2/}

46. In general, metalworking industries must be relatively close to numerous types of toolshops, specialist units for maintenance, foundries, forges, auxiliary industries providing metal chipping and pressing facilities etc., as well as to numerous depots supplying standard and catalogued products.^{10/} There are, however, some types of light engineering and electronics industries in which assembly and simple repetitive work prevail. These industries have less need for auxiliary industries and are interested in labour supply, especially female. Such industries

^{2/} Generally the incidence of the additional transport costs on materials and for delivery between such centres or areas is negligible.

^{10/} In detail, the auxiliary industries for metalworking industries consist of various types of toolshops which repair, modify or construct specific tools used for metal-cutting, metal-forming and assembly maintenance and overhaul units for general service systems, specific processing installations constructions, electrical machinery, electrical parts of various machines, metal-cutting machinery, metal-forming machinery, store equipment and transport equipment. Various supplementary units see to the supply of specific materials and processes required by the toolshops and maintenance units (weldings, stampings and forgings, metal treatment etc.). The numerous classes of metalworking auxiliary industries are flanked by subcontractors and "process-specialising firms", i.e. foundries and forges which supply the client with made-to-order castings, hot-stamped items, hot-forged items, for production, normally in series; units which provide heat treatment processes, cutting-processes, forming processes which fabricate geared items, nuts and bolts, special heat hardened elements and thermoplastic items, extrusions, sintered products, microcastings etc. Most of the various auxiliary industries are at the service of all sectors of metalworking industries, but there are some which are specific to determined sectors. The trade depots supplying standard and catalogued products stock the output of numerous types of intermediate units. Some of these intermediate industries themselves belong to the metalworking ones (producers of standard nuts and bolts, hardware, metal tapes, springs, radiators, hydraulic cylinders, bearings, steel ropes, flexible piping, roller chain, I.C. engines, electric motors, compressors, electric and electronic materials for industrial use etc.), whilst some belong to other sectors of industry (industries making fabrics, vegetable stuffing and felt, artificial leather etc., plywood and semifinished wood items, tyres, inner tubes and cushions, various rubber articles, belts, linings, welded articles, insulating materials, various chemical products such as paints, mastics etc., normal and plate glass products etc.).

frequently locate in small towns which may be distant from the large concentrations where metalworking industries tend to set up.^{11/}

47. Textile industries, depending on the sector involved, locate in areas served by various types of specialized maintenance units - including the services of the largest specialized machinery suppliers - as well as by various auxiliary industries such as dyeing and finishing specialists, plus certain suppliers' and buyers' services.^{12/} Areas where hosiery industries locate offer similar auxiliary industries and services.

48. The centres in which the shoe industry tends to locate offer units specialized in the maintenance of shoe-making machinery, units for closing uppers etc. as well as depots supplying materials and various commercial services to the sector.

49. The group of other industries may be considered to consist of all those industries with a wide market, and for which, in general, no clearly preponderant location factor obtains. This group contains a wide range of factories producing consumer and intermediate goods (certain food industries and wood manufacturing industries not included in the preceding groups, tobacco, clothing, leather goods, rubber and plastic products, paint and varnish, detergents, pharmaceuticals, various light chemicals etc.).

50. The industries in this group need few auxiliary industries apart from those concerned with maintenance. A paint factory, for example, may consider locating near a unit producing printed metal cans; a medium-sized detergent unit near a paper carton producing unit, etc. As a rule, the incidence of transport costs for raw materials and other materials is not high in this group.

^{11/} When an analysis of the metalworking-sectors field is made in greater depth, various types of industries having particular location aspects appear. The same would also be true in other groups of industry. For example, as shipbuilding must be located on the coast, it may have to organize itself, in part, as a self-contained unit if certain auxiliary industries are not available in the area. With both shipbuilding and heavy structural steel work, the high volume of iron and steel inputs means that the transport costs of such materials account for a considerable proportion of total production costs. This is not generally the case in most metalworking industries.

^{12/} The spinning and weaving of synthetic fibres have less need of auxiliary industries than has the traditional textiles sector.

51. Notwithstanding these and other conditions which might lead one to suppose that there would be a considerable autonomy of location (greater spatial flexibility), industries in this group generally tend to set up in existing large concentrations. This is because the requirements concerning various location factors are better satisfied here, thanks to the advantages called "general external economies". Among these advantages is that already noted of having an important proportion of one's customers in the immediate region (facilitating sales and customer services). This aspect is closely considered when industries in this group choose a factory location, especially those types of industry which normally are not large.

52. On the other hand, industries within this group which require a large quantity of general and female labour may find the advantages offered by the large concentrations out-weighted by those offered by areas with a supply of this type of labour.

53. In conclusion, it may be affirmed that the availability of auxiliary industries and industrial services within a reasonable radius constitutes a location factor for all industries. It becomes predominant only in determined sectors in which it is a fundamental condition for efficiency and competitiveness.

54. These sectors have, however, great importance in the general framework of industry and condition the level and rhythm of development. In developed economies, sectoral-services oriented industries contribute about half the total product and employment of the manufacturing industries. Metalworking industries alone can contribute up to 40 per cent of the total and also have one of the highest rates of industrial growth.

55. In developing regions and countries, these sectors, especially those engaged in metalworking, constitute a determinant potential for future industrial development.

II: AUXILIARY INDUSTRIES AND INDUSTRIAL SERVICES IN THE
LOCATION AND DEVELOPMENT OF INDUSTRIES IN THE MEZZOGIORNO -
A CASE STUDY OF INTEREST TO DEVELOPING COUNTRIES

The lack of auxiliary industries and industrial services as an obstacle to the
location of investments in the Mezzogiorno

56. The southern region of Italy - known as the Mezzogiorno - is characterized by the following points: a relatively low per capita income (about half that of the developed regions of northern Italy and of the EEC average); a considerable part of its labour force still engaged in agriculture; an insufficient level of industrial activity, many sectors of which have limited competitiveness; and a low availability of skilled manpower. With the creation of the European Economic Community the Mezzogiorno was faced with the problem of increased competition from regions which are among the most highly industrialized in the world and which, within the new framework, exert an increasing attraction for industrial investments.
57. Most of the industries in the Mezzogiorno are typically market-oriented and are located in the main towns. In per capita terms they reach only 40 to 60 per cent of the level of corresponding industries in northern Italy. This may be considered adequate if account is taken of the per capita product and/or per capita income in the Mezzogiorno and that in the North (indeed, market-oriented industries operate for a demand which is a function of the regional product and income).
58. Among the material-oriented industries, basic industries have expanded considerably in the Mezzogiorno, especially during the last ten years. Important steel plants have been built, and the petrochemical industry has reached a per capita product of more than 80 per cent compared with the industry in the North. The creation of large industrial complexes (basic industries) in the Mezzogiorno, favoured by the regional development policy, has been made possible by the discovery of natural resources (methane etc.) and by new port facilities for the importation of raw materials (oil, coal, iron ore, etc.). The agricultural processing industries (vegetable oil refineries, grain mills, canneries, etc.) in the southern region reached a higher level than those in the North.
59. However, all the material-oriented industries taken together make but a limited contribution towards the product and employment position of the Mezzogiorno (this applies also to developed economies).
60. The industrial gap between the southern and the northern regions of Italy becomes even more apparent upon consideration of the industries which in this study are classed into the groups "sectoral services oriented industries" and "other industries". On average, these two groups reach a per capita output of

barely ten per cent of that of corresponding industries in the North. These are the indices, in the first group, relating to metalworking industries (excluding small mechanical repair shops) and to traditional textiles and synthetic fibres. In the second group, the indices of the manufacturing industries which use materials supplied by the petrochemical industry are of the same order; in others they rise to a maximum of 20 per cent. Notwithstanding the completion of certain new establishments of considerable size - some of which owe their existence to public holdings - the flow of investments in these sectors in the Mezzogiorno is insufficient to bridge the gap.

61. In brief, the Mezzogiorno (and other similar regions on the periphery of the EEC, such as SW France) is characterized by geographically protected industries (local-market-oriented industries and material-oriented industries) and a lack of attraction for other industries.

62. In order to ascertain the reason for this lack of investment flow towards the Mezzogiorno it is necessary to refer briefly to the ways in which the industries in question expand, i.e. industries which at present are located mainly in the large concentrations of the more developed regions.

63. One element which tends to favour the present geographic pattern and results in the industries remaining in the large concentrations (quite apart from conditions regarding industrial location in the Mezzogiorno and other regions), is that only one third of the investments of these industries is spent on building new plants. Two thirds of the investments are used for the expansion of existing plants, thus avoiding the problems involved in establishing new factories and in making economies of scale possible. Even in cases where it is not feasible to enlarge the existing plant, there are many advantages^{13/} in building a new plant as near as possible to the old one.

64. It is not always possible to increase production by such solutions because of reasons such as lack of sufficient building sites nearby; local labour shortages and so on.^{14/} It is only in such cases and similar ones, estimated in the EEC

^{13/} Possibility of using the same suppliers; ease of moving materials between the two establishments; facility of management and supervision; less staff and training problems such as transfer of key workers.

^{14/} In some areas industrial activity may grow faster than the population of the city, centre and so on.

to amount to less than one fifth of all investments - that, among other alternatives, location of industries in peripheral regions as for instance the Mezzogiorno may be considered.

65. In practice, preference is given to locate new plants on the fringes of existing industrial concentrations, in nearby regions and in depressed regions (regions with an industrial tradition but undergoing a structural crisis) where industrialists can find not only space and/or labour (skilled, or with special characteristics) but where they can also count on auxiliary industries and industrial services.^{15/}

66. On the fringes of industrial concentrations, a new plant is still within the economic radius of utilization of the sectoral services of one or more centres of industry. In depressed areas such sectoral services may be readily available for the relocated metalworking industries.

67. Although given groups of industries move mainly because of local labour shortages and/or because they need more manufacturing space (during periods of general economic expansion), these are not the main location factors for many important sectors such as metalworking industries. For the latter the prime factor is interindustry relations (availability of auxiliary industries and industrial services) which peripheral regions are unable to supply.^{16/}

^{15/} For certain industries, one of the additional advantages to be gained from location in such areas is that of remaining close to a large part of their clientele.

^{16/} The results of surveys made in recent years in some European countries (the United Kingdom, France etc.) on the reasons underlying plant location point to the labour factor as being the most frequent cause for relocation. When firms have to make a choice between alternative locations all offering the required sectoral services (although with greater or lesser facility), it is obvious that in this context labour supply may be the determining factor. In some European countries such as the Federal Republic of Germany and the United Kingdom the geographical field of choice covers most of the country (though perhaps discontinuously) because of the number and distribution of existing industrial centres and the radius of utilization of their services. There is some truth, therefore, in the statement of some economists that there is a trend in industrial development which shows a growing share of "footloose" industries (metalworking industries and, in general, the factory industries) but this "footlooseness" is not directed towards the peripheral regions.

68. Comparative analyses of the conditions of location in the large industrial concentrations of the EEC area (and its zone of influence) and comparative studies of the conditions and operating costs of industries show that the lack of auxiliary industries and industrial services (which for the moment cannot be overcome) is the main reason why the Mezzogiorno is not attractive to locating industries.^{17/}

69. The EEC study shows that in the most important industrial areas of the Mezzogiorno, the infrastructures and site requirements comply with European standards. In these areas there are the undoubted advantages of general labour and female labour supplies. The study acknowledges the organizational difficulties in selecting and training local workers in the Mezzogiorno, but notes that, at times of relatively full employment, these problems and costs must be faced when locating large plants, even when these are sited on the fringes of the large concentrations and in adjacent regions.^{18/} Workers in the Mezzogiorno learn quickly and well, and if the job is done by firms experienced in setting up new establishments, the time required for training, construction and start up can be kept within acceptable limits.^{19/} Supported by numerous statistical data, the

^{17/} For the EEC study a number of major firms were asked about the main factors affecting the location of their new plants. The most frequent replies to this question were: labour and site requirements. However to the specific question as to why they had not considered the possibility of setting up in virgin regions, such as the Mezzogiorno, almost all the metalworking firms pointed to the lack of auxiliary industries and industrial services essential to them; to this they added the problems of selecting and training local workers.

^{18/} For metalworking industries setting up in the Mezzogiorno, the additional costs of selecting and training local workers plus those incurred during the start up period (over and above what these would be for setting up similar establishments in the North, but not right in the firm's "home district") amount to 1-2 per cent of the total value of the investments. In practice, these increased capital costs are more than offset by capital grants to new industries setting up in the Mezzogiorno.

^{19/} See also "The problems of the development of metalworking industries in Southern Italy and experiences thereon of interest to developing countries" by V. Valletta, President of Fiat.

study states that the increase of transport costs for most of the factory industries (non-material oriented and having wide markets) in the Mezzogiorno on the average amounts to less than one per cent of the total cost of production.

70. It is in the field of interindustry relations that conditions in the Mezzogiorno appear to be decidedly negative. While large industrial concentrations offer efficient systems of auxiliary industries and industrial services, these are missing or inadequate even in the most important areas of the Mezzogiorno where there is a certain agglomeration of industry. This deficiency causes serious production difficulties, increases production costs and cancels out the effects of incentives.

71. The fact that metalworking industries in the Mezzogiorno have, in many cases, to look to toolshops in the North (more than 800 km away), makes delivery delays more frequent etc. Delays in the availability of new specific tools or in the repair of specific tools make it necessary to use emergency tooling if production is not to be halted even though this may involve a longer flow cycle. Alternatively, it may be necessary to stop production of the component involved, while continuing to produce other parts which have to go into stock, or to assemble an incomplete finished product (with similar effects on stocks). In the first case, labour costs increase, while in the other two cases - apart from overtime payments in order to catch up on the rhythm of production - there increased financial charges occur due to producing for stock and not for sale. Establishments which carry out the repair of their own specific tools also incur higher costs because they have to equip themselves with machines and skilled labour which are underemployed to a considerable extent as the calls for their services are intermittent and variable.

72. The need to look to the North for machinery and equipment maintenance services because of the lack of such units in the South is likewise a cause of delays, stoppages and production upsets with damaging consequences of the kind described above. Firms which provide men and equipment to carry out their own overhaul and maintenance work again have to face higher costs.^{20/}

^{20/} It should be noted that when establishments see to their own repairs of specific equipment and to the maintenance of all the machinery, there arises the additional problem of the lack or insufficiency of supplementary units which should supply the materials necessary.

73. Excluding "craft" units, there are not sufficient foundry and forge services in the Mezzogiorno. It is either a case of obtaining supplies from the North or from local self-contained metalworking plants which also turn out supplies on a discontinuous basis for other establishments. This results in delays and losses, which can be partially avoided by carrying heavier inventories of such materials. On the other hand, it is not an economic proposition to equip an establishment with its own forge and foundry. The same applies to processing-treatment needs.

74. Higher production costs normally arise from the insufficiency or complete lack of subcontractors, which leads to additional investments in machinery that cannot be fully employed etc. In the Mezzogiorno it is also necessary to carry more stocks than in similar establishments in the North, in order to make up for the insufficiency or complete lack of local depots carrying standard and catalogued products.

75. From inquiries made for the EEC study, it appears that on the average the inadequacy of the auxiliary industries and industrial services in the Mezzogiorno results, either directly or indirectly, in increased costs of production amounting to ten per cent or more (depending on the various metalworking activities, the size and productive organization of the plants). To this must be added the problems and the difficulties which assail the managers and technicians, even though these are not quantifiable factors. If account is then taken of the fact that as regards the other cost elements, taken as a whole, there are no great differences between North and South,^{21/} and it is considered that the various incentives offered by the industrial promotion policy reflect on operating costs to the extent of two to five per cent (lower depreciation rates, lower interest charges, etc.), it is not surprising that there is no great flow of investments to the Mezzogiorno.

76. It is only in certain types of metalworking activities where interindustry requirements are relatively negligible and the need for unskilled or female labour is high, that there is a net advantage, after taking the effect of incentives into account. This explains the location of a number of structural steelwork plants, light metalworking industries and electronic factories, where assembly is all-important, in the Mezzogiorno.

^{21/} For detailed statistical analyses, see the EEC study already mentioned and particularly the projects which contain comparative analyses of the operating costs of similar projects in the North (Milan area).

77. The main reason for the lack of auxiliary industries in the Mezzogiorno is the absence of intermediate demand in the individual areas. There are few metalworking industries; the incipient agglomerations of industrial areas are formed by heterogeneous industries, in terms of inputs. It should also be stated that in the one industrial area of the Mezzogiorno (Naples) where metalworking activities have reached a certain level of importance, many essential types of auxiliary units are missing.

78. To remedy the present situation, the metalworking industries, especially the larger plants, formed an internal organization to make up, as far as possible, for these missing services. Such an organization requires considerable additional investments, which must be amortized in the course of time, and an additional pool of skilled workers. While the shortage of services persists, machinery and special equipment have to be renewed continuously. The situation has been accentuated by certain policy measures (preferential supplies to the State etc.). These measures permit, however, the industries in question to operate with a certain degree of profitability notwithstanding the lack of auxiliary industries and industrial services.

79. As far as the textile industry is concerned, there are no great obstacles for the location of synthetic fibre plants in the Mezzogiorno, because the synthetic fibre sector has less need for auxiliary industries than the traditional textiles sector. The advantages of labour supply and the effect of incentives have indeed led to the setting up of some important establishments. The fact that there are still not as many industries of this kind in the Mezzogiorno as in the North, probably reflects a tendency to locate in traditional areas even though the primary reasons for doing so no longer exist. On the other hand, the development of the hosiery industry in the Mezzogiorno, although favoured by the existence of female labour supply, is slowed down by the lack of suitable industrial services.

80. Finally, although it is not mainly the lack of industrial services which impedes more industries belonging to the "other industries" group from setting up in the Mezzogiorno, the interindustry relations factor has an indirect effect on many of these. In fact, a number of the industries in this group produce intermediate items, especially for the metalworking industry, and as almost all their domestic clientele are in the North such industries are not anxious to locate in the Mezzogiorno (even though transport costs on delivery do not play an important role in the total production costs).

81. It may be concluded that the lack of auxiliary industries and industrial services is the prime reason (either singly or together with other reasons) why industries in the Mezzogiorno are mainly local market oriented or material oriented, and these, as such, cannot ensure a high level of employment and industrial output in the economy.

Experience with the industrialization policy for the Mezzogiorno - a pilot study for the EEC

82. During the last decade, the Mezzogiorno has been the object of an intensive industrial development policy. The instruments of this policy are those used in other European countries: public expenditure on infrastructures, the creation of industrial estates in industrial areas, grants and other incentives to new industries, direct investment in industry by public holdings (IRI etc.).^{22/}

83. The goals of this policy include the provision of a modern and efficient system of general infrastructures, a necessary premise for the industrial and economic development of the area. The present transport system provides an adequate link between the main industrial areas of the southern region and the large centres of industry and consumption in northern Italy and in the EEC countries. The huge port installations may be considered determinant for the basic industry complexes. The industrial estates offer not only suitable manufacturing sites, they also provide solutions to urgent problems of town planning and regional physical planning. Various measures deal with the problem of the lack of local manpower. The direct participation of the Government through public holdings helped to increase the activity in important sectors (steel complexes, petrochemical and metalworking industries etc.). Above all, for the first time in the history of the Mezzogiorno there has been a break from the traditional economic and social structure.

^{22/} Tax relief, contributions from sinking funds, financial aid; share participation by State, capital grants, etc. for new industries setting up in the South. Among the various incentives offered, is that of the Mezzogiorno supplying a guaranteed percentage of the central Government's requirements from industry. Considerable funds are allocated for the creation of infrastructures in the areas of industrial development, including the industrial estates. Funds are also allocated for the industrialization nuclei to foster smaller industrial agglomerations.

84. Although good results have been obtained in market-oriented industries and material-oriented industries located in the Mezzogiorno, those in other industrial sectors leave much to be desired. It has been possible to get an industrialization process under way, but this process suffers from sectoral imbalance, which restricts industrial development. The EEC study - made with the collaboration of the Committee of Ministers and of the Cassa del Mezzogiorno - aims at identifying the limits of this policy and includes suggestions for new guidelines and measures. The results of this study are worthwhile summarizing here inasmuch as these limits concern the field of interindustry relations.

85. The areas of industrial development were selected with the objective of progressively creating industrial concentrations in the Mezzogiorno which, with their increasing economies and multiplying effects deriving from the interrelations of their industries, could make accelerated industrial development possible. However, the areas of industrial development, inspired by the British experience of development areas, did not prove to be sufficiently attractive for sectoral services oriented industries especially as regards the dynamic and vast field of metalworking sectors and industries directly or indirectly connected thereto, because of vicious-circle problems. It is interesting to note that in the United Kingdom too, the Scottish Highlands, which like the Mezzogiorno are underdeveloped industrially, have received practically no incoming industries from the development areas policy. If this policy has been successful in other parts of that country, it is because these development areas corresponded to old industrial districts. Although for various reasons (unemployment etc.) these areas were in a depressed state industrial bases (auxiliary industries, industrial services etc.) already existed and hence new plants could be established without difficulty.^{23/}

86. In the implementation of the industrial areas policy in the Mezzogiorno reference has been made to well-known theories on regional economy inasmuch as steps have been taken to promote the creation of a leading firm as a nucleus

^{23/} W. F. Luttrell (1962) Factory Location and Industrial Movement, vol. 1, National Institute of Economic and Social Studies, London, p. 346.

(usually a steel complex, a petrochemical complex etc.) to induce industrial investments. The EEC study shows, however, that such a complex (apart from its positive economic and social effects on the zone) has limited multiplying effects. In certain cases, the establishment of just one part of the whole cycle of a steel or petrochemical complex and the successive completion of the whole operational unit cannot be considered a real process of induced investments.^{24/} The creation of a complex may, at the most, give rise to a few plant and construction maintenance units. Industries which use products from the petrochemical complexes as raw materials are, in view of the high value of such materials, not material oriented in general. It may be thought that the existence of a steel complex would generate the establishment of metalworking industries; however, transport costs on iron and steel are no longer determining factors for the location of metalworking industries.^{25/} Similarly, the possibility of a large metalworking plant acting as a leading industry in the way indicated, must also be excluded.^{26/}

87. In other words, without the creation of an industrial environment any incentives remain inoperative. While present conditions persist, it will be difficult for the areas of Mezzogiorno to expand more rapidly and to become modern industrial centres.

^{24/} Sometimes only part of the cycles of a complex may be set up (e.g. hot-roll mill for a steel complex or a chemical complex producing only intermediate synthesised products). Then later, if the required conditions arise (possibility of a market etc.), the complex can be completed (e.g. with the inclusion of a cold-roll mill or the production of basic materials such as resins). This step-by-step implementation of the various integrated cycles cannot lead to the original unit being considered as a 'prime mover'. In reality, it is the beginning of a chain which, if supplemented (perhaps without being completed), has well-defined limits. Finally, it should be remembered that it is irrelevant, as far as this case is concerned, whether the units of the complex belong to the same firm or to different firms.

^{25/} The mere presence of a new steel complex does not automatically lead to the establishment of a whole range of new industries, but more frequently to the creation of limited production lines such as the production of concrete from blast-furnace slag.

^{26/} Such conditions may be satisfied only by the creation of a really huge plant, e.g. a factory producing (not just assembling) 1000 to 2000 cars a day. Such an industry would allow numerous auxiliary industries and subcontractors to set up in the area. This, however, is a rare case.

88. The EEC study proposes a sectorally differentiated policy with preferential use of incentives. Support should be given mainly to industries which can only move to the Mezzogiorno with considerable difficulty (i.e. precisely those industries characteristic of the developed economies). The various industries of metalworking sector should be given priority as they present the best possibilities for development. The policy of industrial development should be geographically concentrated during the initial period, so as to favour the rapid formation of industrial agglomerations and thus of general external economies.

89. Another general guideline is the creation of a sound productive structure for the poles and nuclei which takes account of the interindustry relations factor, and of specialization criteria that favour the emergence of sectoral external economies.

90. The implementation of this new policy requires both the selective utilization of present incentives and the creation of additional ones. A new instrument proposed concerns the development of the sectoral services oriented industries and the breaking of the vicious circle problems which derive from the lack or insufficiency of auxiliary industries and industrial services in the Mezzogiorno. This concerns mainly the development of sectors or subsectors of the metalworking industry, but can apply equally well to other sectors such as textiles and shoe manufacturing.

91. The policy action consists in the determination, direct promotion and simultaneous creation in a given area, of an "ensemble" of main establishments belonging to one homogeneous sector or subsector, along with the essential auxiliary units. The new main establishments must be present in sufficient number (and size) to sustain, with their demand for inputs, the economic dimensions of the new auxiliary units and to justify the installation of local depots of standard and catalogued products (in principle it is not necessary for the intermediate industries producing these materials to be near the industries which use them).^{27/}

^{27/} To reduce the difficulties of promotion, the number of main units (taking account of the size necessary to operate competitively in Europe) has been kept down to that required to sustain the auxiliary units. The latter are limited to the most essential units only. For example, the following auxiliary units are essential for large and medium general metalworking concerns: toolshops, specialist maintenance units, foundries, forges, treatment units, metal-cutting and metal-pressing processes suppliers units etc. The absence of units specializing in extrusions, sintering and microcasting should not create operating problems, as the user industries can turn to suppliers in the North or in other regions. Furthermore, the auxiliary units are conceived as being as small as possible and as having the lowest degree of specialization which may be encountered in similar units operating competitively in the large concentrations.

92. The fact that the main industries belong to a given homogeneous sector or subsector makes it easier to achieve a satisfactory level of inputs from essential auxiliary industries and to serve the specific requirements of the clientele involved. The homogeneity of the demand extends to other inputs, thus facilitating the creation of local depots of standard and catalogued products and other industrial services. It also helps the formation of a skilled manpower market. At a second stage, with the expansion of the original activities, the homogeneity of the demand increases the possibility of investments in the area by intermediate mechanical industries and of other sectors (light chemicals, rubber etc.) which make such standard and catalogued products and materials.

93. Within the sector or subsector chosen on the basis of areal specializations, the new main establishments must be selected by means of suitable criteria (relatively low skilled labour requirements etc.) from the production lines showing the greatest growth trends, always providing that these establishments can compete with similar establishments in the North. Individual feasibility projects are drawn up for the main plants and for the auxiliary units.

94. In reporting to the Committee of Ministers and the Cassa, the promotional agency submits projects for expanding firms in Italy, the EEC and abroad. The agency offers adequate assurances regarding the implementation of the whole ensemble of projects, and especially of the auxiliary industries (use of direct investments by public holdings etc.).^{28/}

95. The final composition of the ensemble, influenced by the free choice of the private firms participating in the programme, may turn out to be different from the ensemble originally planned. However, it must have an equivalent (or higher) level of inputs from the auxiliary units as envisaged in the original plan.

96. The promotional agency also ensures that industrial sites are available to the firms taking part in the programme, as well as any additional technical infrastructures and social infrastructures (housing for workers etc.), together with such facilities for training local labour etc. as may prove necessary.

^{28/} For the main units, promotional work is directed towards that part of investment in new plants which for various reasons must be outside the home district and which at the present time relocate on the fringes of the large concentrations or in nearby regions. When promotion is directed towards the auxiliary industries, the fact of their having an assured market through the establishment of main industries on the same spot is a great help.

97. It is important to emphasize that by the setting up of an ensemble it is possible to create operating conditions in part of a virgin region similar to those which a given industrial sector or subsector can only find at present in the large concentrations of highly developed regions. These conditions may favour not only the main plants of the ensemble but especially those which may come in later (the present major obstacles having been eliminated and the incentives exploited) in an autonomous development process. This is a new conception of an industrial pole of growth, and as such must be promoted by new methods.^{29/}

98. In order to test the new policy instruments, the EEC study presents, as a guideline, a complete programme for the promotion of an interrelated ensemble of projects which could constitute the embryo of a large industrial centre in the Bari-Taranto pole. The ensemble of projects comprises eight modern main plants, the size and technical characteristics of which are in keeping with European standards. The plants belong to the general metalworking sector and the total investments are in the order of 80 million US dollars (added value of production 40 million dollars; 5900 employees). In addition, there are 23 auxiliary units

29/ The following aspects single out this new conception of an industrial pole of growth:

- The creation, in a given area, of an industrial environment typical of that which exists in highly industrialized areas, right from the very outset, by means of an ensemble of interrelated projects.
- The distinction between interindustrial relations which require the geographic proximity of the industries involved (relations with auxiliary industries) and relations which are technically and economically feasible with considerable distances intervening between customer and supplier (relations with basic industries and with intermediate industries supplying standard and catalogued products).
- The consideration of the specific sectoral nature of many auxiliary industries.
- Ensuring that the pole has the minimum initial dimensions capable of guaranteeing its feasibility.

requiring a total investment of 47 million US dollars (added value of production 16 million dollars; 2300 employees).^{30/}

99. The programme, which has already been approved by the Italian Government, entered the promotion phase in the second half of 1966; this phase was planned to last for one year, followed by the final design, construction and erection phases (over two years).

100. Similar studies for the selection, determination, promotion and creation of an interrelated group of main industries, auxiliary industries and industrial services are presently being undertaken by Italconsult in the Uelva-Cadiz-Seville pole (Spain) and in the San Nicolas pole, along the Buenos Aires-Rosario axis (Argentina). Similar studies are envisaged for two further countries.

^{30/} The eight main units cover the following production lines: heavy structural steelwork; stoves, baths, central-heating radiators and pots and pans, all in sheet steel; centrifugal pumps and oil burners; agricultural machinery; machine tools for working metals; excavators, mechanical shovels and self-propelled cranes; large cranes and transporters; lift trucks. The 23 auxiliary units include: a malleable iron and steel foundry with pattern shops; a cast iron foundry with pattern shops; a non-ferrous foundry with pattern shops; a forge producing stampings and forgings; a metal-chipping unit for large and medium items; a metal-shipping unit for medium items; three metal-chipping units for small items; two gear making units; two metal-pressing units, one for large and medium items and one for small items; two heat treatment units; one galvanizing unit; a unit producing nuts and bolts; a toolshop for large and specific tools for metal-chipping machinery; two similar toolshops for small tools, gauges etc.; a toolshop for specific medium and small press dies; two units for the maintenance and overhaul of machinery and equipment (general services systems and specific processing installations), organized in sections, according to main types of machinery and equipment involved.

III. AUXILIARY INDUSTRIES, OTHER INTERMEDIATE INDUSTRIES AND
INDUSTRIAL SERVICES IN INDUSTRIAL LOCATION PROGRAMMES
OF DEVELOPING COUNTRIES

The shortage of intermediate supply as one of the main obstacles to industrial growth in developing countries

101. In order to be geographically protected and have a ready market, typically market-oriented industries remain predominant in the framework of the limited manufacturing activity in developing countries.

102. In larger and medium-sized countries with a certain degree of development - apart from various material-oriented industries including the basic industries - almost all manufacturing sectors are present, even though they may make but modest contributions in terms of output and employment to the national economies with their production, restricted to the less complex products.

103. Except for material-oriented industries, a large part of industrial activity in the developing countries is located in just one or a few centres, generally large cities, where economic activity is concentrated and where there are better infrastructural facilities.^{31/} In the larger developing countries, this has given rise to sizeable industrial agglomerations, despite the low per capita level of the national industry. In many developing countries the geographical pattern of industry is thus one of the causes of serious town-planning problems and of considerable regional disequilibria.

104. The existence in the larger and medium-sized developing countries of relatively diversified manufacturing activities and of sizeable industrial agglomerations does not derive from a modern, rapidly growing industry. The relatively diversified manufacturing activities are explained by the fact that a large part of the industries, not geographically protected, exists and operates thanks to tariff barriers, which enable firms to reap large profits even if they produce at high cost due to their inadequate size, and often with obsolete machinery and equipment, and outmoded techniques and organizations. But this implies that their output is limited to the domestic market, with limited consequent demand, even when it is a question of types of industries which in developed countries are geared to production for wide markets.

^{31/} Typically market-oriented industries (except those which are strictly local) are also less scattered geographically, other things being equal, than the corresponding ones in developed countries.

105. This situation is not to be put down solely to customs protection (which is justifiable and necessary, up to a point, for a country's industrial development), or to entrepreneurs who consider investment opportunities in an easy domestic market as the only safe ones (there are numerous local entrepreneurs with modern outlooks and foreign resident firms which in their home countries own factories which compete actively on the international market).

106. In fact, in the field of those industries which in developed economies are termed sectoral services oriented, entrepreneurs in developing countries find themselves up against problems which are in many respects similar to those in the Mezzogiorno (paras. 56-81). In these countries, such problems extend to the whole of intermediate supply, to which other unfavourable conditions must be added (lack of skilled manpower etc.). A new plant by itself cannot bring about the creation of the auxiliary industries and industrial services which it requires. It has to be set up as self-contained or adapt itself to the inadequate conditions of existing supply. Vicious circle problems, similar to those in the Mezzogiorno, tend to perpetuate the unfavourable production structures. Under such operating conditions, production costs are necessarily high and therefore investment opportunities remain limited to industries catering for the protected domestic market.

107. In the developing countries these problems affect mainly the metalworking industries. The textile industries and other sectoral services oriented industries often manage to balance out these problems by the advantages of low-cost manpower, at least as far as certain low-quality products are concerned. It is therefore worthwhile to examine the effects of the shortage of intermediate supply on metalworking firms in larger and medium-sized countries (in the smaller countries, such activities are confined practically to general repair workshops).

108. In many medium-sized developing countries the production lines of the metalworking sector are still limited (on the average, over three quarters of the domestic demand for mechanical products have to be met by imports), covering various types of activities such as assembly of durable consumer goods and production of simple articles for the domestic market. These industries are forced to turn to non-specialist workshops for maintenance needs or to carry out the maintenance themselves. The same applies to all processes which in developed countries are dealt with by process-specializing firms and subcontractors. As opposed to the Mezzogiorno, industries in developing countries have

possibility of turning to specialized units in large modern centres in the more industrialized regions of their country, however distant. In addition there is a lack of adequate local depots of standard and catalogued products. The majority of these products have to be imported, which results in considerable transport costs and slower times of supply. In other words, whereas in the Mezzogiorno it is not absolutely necessary for some types of auxiliary industries to be located nearby the metalworking industries, in developing countries the basic problem is their total absence within these countries; the problem of local depots is, in practice, that of the lack of firms inside the country to manufacture these standard and catalogued products.

109. Even in larger metalworking plants, adequately equipped and organized, the operating conditions described above lead to large increases in costs if compared with equivalent plants (in terms of output) operating in industrial centres in developed countries. This is because, even with the comparatively low unit cost of local manpower compensating the higher unit cost of key workers and technical staff, there is still a higher total cost of direct and indirect manpower (additional and under-utilized workmen), an increase in depreciation rates (additional and non-saturated machinery and equipment) which involves the self-contained organization, and/or higher costs for the inadequate auxiliary services which may be obtained within the area of location. Transport costs for imported materials and intermediate products and the financial burden caused by the larger stocks of materials that have to be kept in the plant must also be taken into account. To these higher costs must be added those deriving from delays and imbalances in factory programmes due to the inadequate supply structure, which cause further increases in manpower costs and financial charges.

110. On the basis of feasibility studies for metalworking industries carried out in developing countries, it can be claimed that - given acceptable sizes, adequate organization, etc. - such a structure imposed by external conditions implies increased over-all costs of production up to 20 per cent and more according to the type of industry.

111. In larger developing countries where the metalworking industries cater for about 50 per cent of the domestic demand for mechanical products (durable goods and, to a lesser extent, capital goods), the production conditions are similar. Metalworking industries, including those which operate in industrial centres, have to face serious problems in the shortage of intermediate supply and in particular of auxiliary processing. Not all types of auxiliary industries

necessary are available. The intermediate supply, offered by the existing auxiliary industries, is generally insufficient to meet the demand. Their degree of specialization is low and this is one of the reasons why the cost of their services is high. The proportion of standard and catalogued products imported remains high. Moreover, the presence of various factories manufacturing standard and catalogued products for domestic demand only and protected against foreign competition, does not help to reduce the costs of such supplies. Often the low quality of such intermediate products contributes towards the low quality of the final products. The higher production costs for the metalworking industries that ensue, as compared with similar industries in developed countries, are of about the same range as those for medium-sized developing countries.

112. These increments to normal production costs indicate that, even if the general problems of capital shortage, cost financing and training of manpower, etc., should be solved, and with entrepreneurs prepared to accept the risks and the cost of setting up engineering plants with adequate organization, dimensions, equipment and technical know-how, external conditions would still exist in developing countries which would prevent the majority of these industries to take part in international competition.

113. It is not unrealistic to suppose that these general problems will be overcome. Already in a number of countries more organic and efficient industrial development policies are introduced and international collaboration between developed and developing countries is being strengthened. Even without taking these macro-economic aspects into consideration, it must be acknowledged that when sound industrial projects are involved, their financing is not very difficult. The higher cost of training basic manpower, key workers and key personnel may be compensated by the lower cost of general labour, and the know-how and organization may be assured by a joint-venture or another form of collaboration with large foreign concerns in establishing important new plants. Thus these problems may be solved within the framework of the promotion of important individual projects. This does not apply, however, to the problem of intermediate supply, which is a question of external structure and one which, in the final analysis, proves to be the real limiting factor.

114. In developing countries the group "other industries" - apart from certain requirements which cannot conveniently be met with regard to auxiliary demand

and industrial services,^{32/} and more difficult and costlier supplies of other materials and intermediate products - often lacks sufficient domestic demand to sustain competitive plant sizes at international level (low yield per capita for those industries in this group which produce consumer goods, and scanty industrial activity, especially in the metalworking customer sectors, for those which turn out intermediate products). In this context it must be borne in mind that in the developed countries, export-oriented plants in this group of industries are not very frequent; support is generally required from a considerable amount of domestic market sales.

115. An important aspect of the present role of intermediate industries on the level and composition of manufacturing activities in developing countries is their favourable effect on the geographical pattern of industry in these countries. The presence of auxiliary industries and industrial services, even though inadequate, in certain centres or agglomerations constitutes - with the general external economies available there - the main cause for the tendency of industrial investments to be concentrated only in a few areas.

116. The role of the auxiliary industries, other intermediate industries and various industrial services becomes even more important when the future industrial growth of developing countries is considered.

117. Without underrating the unexploited opportunities of local market demand in some developing countries, mention should be made of the hampering effect of the protected local market system on industrial initiative in developing countries with a certain level of industrial development.

118. After the boom in the first stage of development occurring in such surroundings, and despite the take-off invariably proclaimed, industrial growth and that of the economy slows down and incentives seem to lose their effect. This situation is often accompanied by a worsening in the balance of payments.

119. To speed up industrial development, industrial effort must be aimed at wider markets with rapidly expanding demands. The typical market-oriented industries taken as a whole, however, are able to expand only in parallel fashion to a country's general economic rate of growth. The same applies to many material-

^{32/} The requirements in this group are lower than for metalworking and other sectoral services oriented industries, though still relatively important.

oriented industries.^{33/} The group of industries with large markets and good expansion prospects consists mostly of metalworking and related industries.

120. Producing also for export means achieving competitive conditions in the industrial sectors involved, which again depend, among other factors, on adequate intermediate supply.^{34/} These are difficult but unavoidable problems for all developing countries. (The experience of industrialized countries shows that many types of their industries depend to a considerable extent on exports.)

121. Even with the enlargement of the internal market through association with other neighbouring countries, e.g. forming a common market, these problems of competitiveness persist. In the ideal case all member countries should benefit from such an economic integration to the extent that the industries of less-developed countries reach a level of competitiveness comparable to that of the relatively more advanced countries forming part of the association. In fact, however, only the stronger industrial centres benefit if unbalanced development takes place among member countries and regional imbalances within a community become more pronounced. Intergovernmental agreements on industrial location are difficult to reach and are opposed, at least on a medium-term basis, to ensuring the maximum exploitation of the available economic resources and to attaining the maximum increase in production and income.

122. Nevertheless, a common market conceived solely as a wider internal market, the demand of which is not supplemented by exports (such a concept occurs, in

^{33/} Among the basic industries, petrochemicals have a high rate for demand in the international market. However, it has earlier been remarked that in certain countries, if the possibilities exist, their creation or expansion (although constituting a sizeable contribution for the zones where they will be operating) does not lead to more than a limited contribution towards employment and production at national level. It should also be remembered that in general basic industries (iron and steel complexes, heavy chemicals etc.) produce above all for an internal market and hence depend on the country's industrial growth. Furthermore, in view of the considerable proportion of exports that often becomes necessary to sustain the size of such complexes, it must be borne in mind that the international market is very difficult for these products.

^{34/} It is obvious that in every country, given the limited economic and human resources and bearing in mind the economic sizes of the industries etc., industrial policy should limit this effort towards expansion of demand and participation in the international market to a number of sectors or sub-sectors. In other words, to the extent that the objectives of a high degree of self-sufficiency are sterile, the aim of promoting the whole range of industries in the most dynamic sectors and with wide markets, is unrealistic. Hence the affirmation of the need for specialization.

fact, when no profound change is made in the productive structures and hence of intermediate supply to achieve objectives of competitiveness) means the setting up of a new economic space with restricted marketing opportunities. Here, too, after an easy boom during the initial stage in which various plants may be established in new activities, the pace has to slow down and conditions and problems of development similar to those described for the larger developing countries are encountered.

Possibilities and limits of applying the experience of the Mezzogiorno to developing countries

123. The importance of intermediate industries and industrial services with regard to the industrial growth of developing countries indicates the need to apply in these countries the technological guidelines of industrially more advanced countries. Such guidelines are reflected in the recent industrialization policies of developed countries for their backward regions (technological specialization in the factory industries, technological integration in the basic industries, etc.).

124. The question is to what degree developing countries should and can apply the technologies of developed countries. The analyses set out in paras. 101-122 imply in principle an affirmative answer to this question, contrasting with the conclusions reached by other studies, which consider it convenient for developing countries to use a less capital-intensive technology in view of the relatively lower unit cost of labour (unskilled labour). These conclusions are in fact theoretical when assumptions of efficiency and competitiveness are made.^{35/}

125. Precisely because of the shortage of skilled manpower and the need to utilize unskilled labour, recourse must be had to some degree of automation in manufacturing operations in developing countries. In developed countries, on the

^{35/} It is logical that in choosing types of industry to promote in developing countries, those requiring the most difficult technologies and/or a high proportion of skilled manpower, etc., should be excluded. However, the question here is to establish for given industries the application of equal or different technologies from those of developed countries.

other hand, such automation has occurred not only as the outcome of technological progress, but also due to high labour costs.^{36/}

126. To sum up, in the main industries, whose products have to compete on the international market, the same techniques as those used in developed countries are necessary. Bearing in mind various economic reasons (real market outlet capacity etc.), these techniques should correspond, in terms of machinery, equipment, organization, etc., not to those of the larger factories in developed countries, but to those of smaller factories able to compete on the world market (e.g. for certain machining processes, numerically-controlled machines can be used instead of transfer-line machines).

127. For materials and intermediate products, the relevant technologies should be also the same as those in developed countries. A certain margin of variation may be allowed in terms of size and degree of specialization, but only on the condition that there will be no adverse effects on the cost of such supplies.

128. Ruling out - because of the negative experience gained in some countries such as China - the economic convenience of producing with old techniques the necessary materials for the basic industrial complexes, the application of traditional techniques should be restricted to those industries which produce exclusively for local markets.

129. Accepting the need to apply the technologies of the developed countries, at least with regard to key industries, it follows that the European experience in location and industrial development policy should be utilized for the developing countries. The application of the European experience should be limited, however to backward regions (similar to the Mezzogiorno), thus excluding depressed

^{36/} Automation of industries in developing countries should be selective and should be carried out in co-operation with foreign firms. Saving on skilled manpower can be expressed in net terms; the greater requirements for certain types of skilled workers (workers for set-up) or supervisory personnel, will be more than compensated by the decrease in the number of skilled workers in charge of hand-operated machines. Automation in metalworking industries and other manufacturing industries cannot cover all operations of the processes, thus various operations will still need large numbers of semi-skilled workers. The criterion of automation in certain operations, i.e. the reduction of the number of skilled workers, has been taken up in the designs of the factories proposed in the EEC-Italconsult study for the promotion of the Bari-Taranto industrial pole in the Mezzogiorno.

regions. Account should also be taken of the differences in developing countries relative to the degree of economic and industrial development achieved, to the economic system, to the density and distribution of population and so on.

130. Despite the relatively high per capita product and income, European peripheral regions, such as the Mezzogiorno, have various aspects in common with developing countries: limited contribution of industry to the economic activities, predominance of local market industries, scarcity of skilled manpower, and a manufacturing production structure characterized by inadequate intermediate supply. The degree of industrial expansion achieved in some developing countries has not, however, brought about any profound changes in the condition of intermediate supply. The fact that in the larger developing countries important industrial agglomerations have been created implies nevertheless methods of implementing the measures different from those to be applied in other countries with incipient industrial centres. Regarding the differences of economic systems, the experience derived from the industrial policy for the Mezzogiorno can be extended not only to developing countries with a market economy, but also to countries with planned economies, considering that competitiveness and efficiency criteria in using resources tend in practice to coincide. Clearly with such countries, account must be taken of the different policy instruments which may be utilized.

131. As for differences in density and distribution of population,^{37/} from the standpoint of industrial locations and excluding aspects that concern typical local market-oriented industries, the majority of developing countries have to face a faster growth of urban centres as opposed to employment possibilities offered by industry.

132. In view of the vast field covered by industrial location and development policy and of the subject of this paper, attention must necessarily focus on such industries which for their location depend heavily on the interindustry location factor, viz the sectoral services oriented industries. The recent experience in the field of sectoral services oriented industries is that of the industrial poles following the EEC-Italconsult concept presented in paras. 82-100. An attempt to outline an application of this concept in developing countries is the subject of the following section.

^{37/} Differences in population density and distribution give rise to profound policy differences with relation to the utilization of resources and to the times of achieving the objectives of industrial development as compared to those referring to agriculture.

Poles of industrial growth and location planning in developing countries

133. The most interesting application for developing countries of the determination and promotion of poles of industrial growth according to the EEC-Italconsult concept concerns that of a pole based on a given sector or subsector of metalworking industries with a system of auxiliary industries and industrial services. This gives rise to conditions of operation and of interindustry relations fostering the progressive installation in the area of factory industries engaged in various manufacturing activities turning out intermediate and final goods. This type of pole has the advantage of focusing on one of the main targets of the industrialization of these countries, namely the expansion of the metalworking industries, to which is added the expansion of other manufacturing industries with ample markets, with direct and indirect effects on demand concerning the output of important basic industries (steel, chemicals and petrochemicals).²

134. In establishing industrial poles in developing countries account must be taken of the different situations and problems described in the two foregoing sections. A distinction must be made therefore between the design of a pole in countries where the engineering industry is still at an initial stage, and in countries where agglomerations of metalworking industries already exist on a reasonable scale, even though with considerable structural deficiencies. Besides the creation of a system of auxiliary industries and industrial services, which in contrast to backward peripheral regions in Europe is essential for developing countries, other intermediate industries producing standard and catalogued products have to be established. The creation of industrial poles must be examined in relation to problems of spatial co-ordination of industrial and urban growth and problems of spatial co-ordination of economic activities. The latter should be viewed in its dual aspects: the achieving of an equilibrium of product and income among the various regions of a country, and the adequate distribution of industrial activity among developing countries which form a common market.

135. In countries with engineering production at an initial stage, industrial policy should be directed towards the determination and direct promotion, in an adequately equipped area, of an integrated ensemble - however small - of main

^{38/} On the concrete possibility of creating poles based on this concept and of this type in developing countries, see also "The problems of the development of metalworking industries in Southern Italy and experiences thereof of interest to developing countries" - Prof. V. Valletta, President of FIAT.

metalworking projects together with auxiliary units and the most necessary services. In substance it would mean setting up a nucleus to become the prime modern industrial centre in the country; a nucleus which from the very outset offers a modern industrial environment and therefore constitutes a pole of attraction for successive investments in metalworking industries and related activities.

136. The production lines of the new main industries in the ensemble would have to be selected from those lines with market prospects which are also operated successfully by smaller industries in developed countries^{39/} and/or which require a limited number of skilled manpower. These production lines may include certain types of light metal structural work, agricultural implements, metal containers, pots and pans, taps and faucets, etc., and various activities in which assembly predominates, such as the making of refrigerators, deep-freezers, air-conditioners, lifts, elevators, and industrial vehicles with special coachwork and fittings. Should some of these industries, characteristic of an initial stage in engineering activity, already exist in the countries in question, the ensemble of projects in the pole should consider the rationalization and expansion of existing factories in addition to the creation of new production lines in the field of relatively simple chip-removal and presswork processes and assembly.

137. If possible, it would be convenient to include in this ensemble, as an exception to the general criteria of selection, one or two units in mechanically more advanced production lines (such as centrifugal pumps, special agricultural machinery) which would have a certain guiding function in the training of skilled workers and so on.

138. The ensemble of pole projects, including the existing industries, should be adequate to justify economically the creation of the most essential auxiliary units, for example, a toolshop for medium small specific tools with two sections (for chipping and pressing machinery), a repair and maintenance unit based on a number of sections (according to types of machinery and equipment). These auxiliary units should offer more efficient services than those provided by general repair workshops operating in such developing countries.

^{39/} A different criterion was followed in selecting industries for the Bari-Taranto pole in the Mezzogiorno. As this area is situated in one of the largest markets in the world (the European Common Market), there were not such problems of demand. Selecting the production lines from among those which imply large-size factories reduced the number of main units, and hence the promotion difficulties. At the same time the selected activities permit large-batch production, with resultant advantages.

139. The fact that the auxiliary industries reach barely minimum economic dimensions and have a low degree of specialization, leads to 10-15 per cent higher costs in the processes they perform than is the case with average industries in large industrial concentrations; but this represents less than 1 per cent of the total costs of production to the customer industries. Important is the availability of such essential auxiliary industries in the pole area right from the outset.

140. In the field of commercial and standardized products it is unlikely that demand in the initial nucleus of the pole will justify the promotion of even the most essential of these intermediate industries. Nevertheless, it is possible that the creation of units from among industries producing simple products of widespread use (e.g. a nut-and-bolt unit, a hardware unit) will become feasible. To counter the inconveniences which derive from the country's lack of intermediate industries for standard and catalogued products, the setting up of local depots for imported products and materials should be encouraged. The selection of a production ensemble with homogeneous inputs contributes towards this end, creating - despite the reduced number of factories forming the initial nucleus - a greater over-all level of demand for given products and materials.

141. The creation of an initial nucleus in a pole warrants selection and direct promotion of the ensemble and measures to insure the requisite infrastructure (industrial estates, dwellings for workers, etc.) to facilitate the training of local manpower and so on. The examination of such measures, even if connected with the creation of a pole, is outside the scope of the present study.

142. Once the initial nucleus in the pole has been established and favourable operating conditions have emerged in the area, new investment opportunities arise for the creation of new larger industries producing more complex mechanical products.

143. The growth of mechanical activities in the pole should help to increase the demand for inputs and the size of the original auxiliary industries, to create new types of auxiliary industries and to foster greater specialization in auxiliary supply. The increase in the intermediate demand for standard and catalogued products creates favourable conditions not only for the improvement of depots, but also for the setting up of industries manufacturing these products (springs, valves, rubber materials; paints and so on).

144. This natural growth process of the pole should be sustained by a well-defined industrial policy which, among other measures, if necessary, envisages direct promotion of important industrial projects whose delayed creation or non-realization could eventually create a bottleneck in this process.

145. In view of the development of the intermediate industries, industrial policy must give priority to a national system of standards^{40/} based on that of industrialized countries. Measures must be taken to promote co-operation between new factories with mechanically similar products for the adoption in the design of their models of standard components (for example, the same types of valves, joints).

146. For the accelerated expansion of the pole it is important for industrial policy to possess a clear sectoral orientation regarding the metalworking industries and other related industries to be promoted within the area (promotion action concentrated in a given sector or subsectors). This sectoral orientation contributes towards the homogeneity of auxiliary demand and of other intermediate products, it facilitates the training of skilled manpower for specific tasks, imparts that gradual character which is essential for any balanced process of development (progressive extension of activities from general engineering to more complex ones such as precision engineering), and moreover, in accordance with regional policy requirements, permits convenient territorial specialization in the creation of new poles.

147. In developing countries where metalworking industries with diversified production lines already exist, the prime objective in creating a pole is to rationalize and modernize the productive structures of the existing industries. Therefore the pole area coincides with the country's main industrial centre or industrial agglomeration.

148. On the basis of the industrial development policy targets (new production lines and more complex products of existing lines for the local market and for export) the sectoral orientations of the pole are fixed in terms of specific metalworking sectors or subsectors.^{41/}

^{40/} Standard size of metalworking material.

^{41/} The existence of metalworking plants with scanty prospects does not in itself justify such orientations with the inclusion of the corresponding subsector.

149. The modernization and re-sizing of the principal industries in the area in said sectors or subsectors should be studied, and a selection made of new main plants to be promoted. At the same time, the types and sizes should be determined of the auxiliary industries and other essential intermediate units which will be required according to the new structure of production and its degree of technological specialization. As opposed to the statements made on the selection of an initial nucleus of a pole in a country with incipient engineering activities, the new auxiliary industries should right from the beginning show a trend towards relatively advanced specialization and cover, with adequate types of units, the whole range of sectoral services. Also in the field of production of standard and catalogued products the aim should be to fill the major gaps as far as possible. The possibility should also be considered of improving and extending the supply of materials from existing basic industries.

150. The inputs of the major existing industries and of the new plants should be high enough to sustain the activity of the auxiliary industries and to justify the creation of other intermediate industries. To achieve the completion of the system of intermediate supply, project selection should concern production lines with a high demand for inputs of materials and services falling under the auxiliary industries and other intermediate industries which are lacking or inadequate. Already existing workshops, if enlarged and modernized, could become service industries.

151. The promotion of a pole in an existing agglomeration of a certain size is a far more complex operation than the creation of the first nucleus in a newly established pole. This is due both to the amount of investigations, studies and design called for, and to the existence of inertial factors in the productive organization of existing industries. To the extent to which the slow insertion of these industries into the new system is envisaged, there must be a corresponding increase in the number of new plants to be created, in order to ensure the requisite over-all level of intermediate demand to operate the modern new auxiliary industries and services.

152. When the objectives regarding the complementing, rationalizing and modernizing of the pole's pattern of production have been reached, the metalworking and related sectors find new conditions of operation and competition on which is based the quantitative and qualitative expansion characteristic of the great concentrations in highly industrialized countries. Moreover, the increased external economies in the pole area favour the development of the industries of

other sectors. While striving to reach these objectives and in the ensuing phase of expansion, a whole series of industrial policy measures, such as industrial financing, technological research, manpower training, are called for.

153. With regard to the availability of skilled manpower, it must be stressed that the stepping up of the system of intermediate, especially auxiliary, supply is not only essential for the competitiveness of the industries concerned but also - other things being equal - reduces the call for such manpower. With equal output, an ensemble of main plants and its auxiliary units (with a normal degree of technological specialization) involving fuller utilization of manpower, requires (according to the engineering sectors referred to) 10 per cent less skilled workers than a corresponding group of predominantly self-contained plants. The indirect effect which technological specialization exerts by means of the competitiveness which it ensures, should also be added. The achieved access to wider markets permits the creation of larger plants which results in the economic utilization of more productive specific tools, machinery and equipment. From studies made it has been seen that, according to their production lines, large industries employ on average 10 per cent less skilled workers than plants of medium size.^{42/}

154. The creation of poles in developing countries implies considerable efforts both in implementing the programme properly and with reference to general industrial policy measures. Especially concerning the simultaneous carrying out of an ensemble of projects, the inherent difficulties are undoubtedly greater in market-economy countries than in planned economy countries, where the government provides the necessary direct investments. In market-economy countries, the government acts as promoter (selection of the ensemble, drawing up of feasibility projects, etc.), while private entrepreneurs cater for industrial investments. The government takes on direct promotion, contacting private entrepreneurs, a procedure which requires considerable time to get operations under way (gathering a sufficient number of investors). The designed ensemble must be adjusted according to the final choices of the private entrepreneurs. Difficulties occur when changes in the structure of an existing industrial agglomeration are required and the government has to face pressure groups which defend existing, inefficient small industries.

^{42/} "Large" and "medium" sizes, at European level varying in terms of levels of output, employment and investments according to the various production lines.

155. However, government action in market-economy countries does not necessarily stop short with direct promotion, the granting of incentives and the provision of infrastructures. By means of the licensing and selective granting of incentives, the government influences the composition and location of investments in the pole area. The government may have recourse to direct investments in major factories and/or auxiliary units projected which do not gain the interest of private operators, thereby speeding up the completion of the ensemble. Moreover, it can carry out joint ventures with domestic firms and foreign corporations interested in the major projects. The fact that the pole area will possess operating conditions similar to those in industrial centres in industrialized countries, together with adequate incentives, the availability of general manpower (which becomes progressively scarcer in developed economies), advantages on the domestic market and in certain groups of countries (possible common market), etc., make it possible to induce foreign industrial firms to settle into a developing country.

156. The creation of a new pole of industrial growth can contribute towards solving the problems of congested urban areas which occur in many developing countries. The establishment of the initial nucleus of a new pole and the autonomous operational character of an ensemble of projects allows for considerable flexibility in spatial location. In principle, all those areas with a certain amount of urban population and which can conveniently provide the necessary infrastructures (water and electricity supply, adequate transport system, etc.) may be considered as alternative areas. The effective solutions regarding physical planning can be set in the framework of the objectives of regional economic policy.

157. In the case of a pole which is created on an existing industrial agglomeration in a congested area, the urbanistic problem can likewise be solved within the radius of techno-economic utilization of the auxiliary industries and of the industrial services, which is roughly 100 km, given certain transport and communications facilities (para. 16). This therefore makes it possible to create satellite towns in whose industrial estates the main activities of the new metalworking industries and the auxiliary industries are located. The new non-metalworking industries making standard and catalogued products for intermediate demand of the industry (metalworking sector and other industrial sectors), most of which are marked by limited needs in terms of their own auxiliary industries, may be located in satellite centres within a 100-200 km. radius.

158. Besides acting by means of policy instruments (licensing, incentives, building of industrial estates and dwellings for workers, etc.) on the new industrial investment flows and consequently on the population flows from rural areas, such spatial organizations have indirect effects on the congested areas creating forces of attraction to already existing industries. (The recourse to various types of auxiliary industries is obviously easier at a distance of 20 to 30 km. than at the fringes of the above-mentioned radius of utilization - 100 km. - where the pre-existing industries are sited.) Planning of spatial organization is not a simple matter. There are not only urbanistic problems to be solved; account must also be taken of specific requirements for sites for different types of industries and of the spatial implications of numerous technical restrictions deriving from interindustry relations.^{43/}

159. The creation of industrial poles of growth can assume an important role in the regional policy of especially medium and larger sized developing countries. In general, however, during the first stage of a country's development the limited human and economic resources make it necessary to concentrate spatially all industrialization efforts, in contrast to aims of balanced regional industrialization. Judging by the experience of European backward peripheral regions, there should be no wishful thinking about future processes of spatial self-equilibrium of production and income. The conflict of sectoral and regional approaches in developing countries has to be faced.

160. This conflict can be settled only by a policy of territorial specialisation of industry. In determining and creating a first pole or in restructuring the pole of an existing agglomeration, its specialization must be fixed in terms of given subsectors or the metalworking sector. These limits in the pole's fundamental productive structure (apart from encouraging the relatively swifter forming of external economies, thereby shortening the period in which the pole acquires autonomous expansion characteristics) make it possible to go on to the creation of new poles based on other subsectors or sectors, when the promotional effort and the implementing of projects have been terminated and experience of this type of operation acquired.

161. The inclusion of spatial planning in policies of industrial development is not a new idea, but the poles of industrial growth, as defined in the present

^{43/} An instance of the distribution of the various main and auxiliary industries in two centres forming a single pole, bearing in mind these relations and other factors, is given in the EEC study cited.

study, do represent a new instrument to arrive at such objectives, in line with criteria of techno-economic efficiency. The productive specialization and the operational nature of a pole make it possible to distribute geographically sectoral programmes on metalworking and other industrial activities.

162. A country which has already reached a certain stage of economic growth could consider the establishment of two or more poles in different regions in the course of its national development plan. Among these poles, in accordance with appropriate criteria (degree of development, special resources, geographical position of the areas involved, etc.) the programmes of metalworking expansion must be distributed per homogeneous sector. Intermediate industries manufacturing standard or catalogued products may be distributed among these poles, provided a system of local depots and an efficient national transport system exist. In particular, the large group of intermediate non-metalworking industries can locate in a number of satellite nuclei of the poles or autonomous nuclei, spreading the direct territorial effect of the industrialization process. Similar location possibilities can also be offered to industries which produce consumer goods for broad markets and which are not strictly sectoral services oriented.

163. Typical market-oriented industries must be located in the major centres of population and consumption (centres which in practice coincide with the area of the poles). Any new basic industries, especially complexes, provided for in the national development plan may represent a contribution towards the industrial activities and the employment situation in zones not included in the areas under the direct influence of the poles.^{44/} These must be zones, however, where adequate sites and the necessary facilities for raw material supplies exist. Lastly there are the possibilities offered by the creation of specialized concentration of certain sectoral services oriented industries such as textiles, hosiery, shoe manufacturing, which can be located in zones suitably selected from among those not covered by other industrial activities.

164. In short, even if a process of dispersed industrialization, so favoured by sociologists, is impracticable, thanks to the creation of poles and nuclei of growth it should be possible to extend the field of industrialization considerably in a geographical sense, at the same time introducing advanced techniques and competitive criteria

^{44/} An industrial contribution to a number of other zones may be given by new non-basic material-oriented industries, such as is the case with factories processing agricultural produce close to poles of agricultural growth.

165. What has been stated with regard to settling the conflicts in sectoral and regional approaches to industrial location can be applied, mutatis mutandis, to the problem of allocation of industrial investments among the member countries in a common market, especially as far as the small member countries are concerned which are relatively less developed industrially.
166. Provided minimum needs of a common transport system in the common market are met, there is no reason to rule out the setting up of a pole of growth, even in small member countries. The creation of a pole - i.e. the presence of auxiliary industries and industrial services, the supplementary measures regarding the training of the labour force, the laying down of specific items of infrastructure, etc. - eliminates, as far as the industrial location of individual factories of a given sector or subsector is concerned, the main causes of differentiation with the more favoured regions in the larger member countries.
167. The problem of determining a common industrial policy on balanced development among member countries leads to difficulties in the location of all those industries which are not typically local market oriented. The creation of poles of growth with high external economies and with a specialized productive structure can provide a logical basis for intergovernmental agreements on industrial location. One criticism of current industrial location policies among member countries is that any decision not based on economic choices (principles of comparative advantages) and not implemented with economic policy instruments (licensing, differentiated incentives, etc.), reduces industrial efficiency and hence the economic development of the member countries considered as a whole. With the creation of poles of growth the variations in the comparative advantages for a large part of the industries in the sectoral services oriented group and many previously classified as "other industries" can be drastically reduced in practice.
168. Considering a common market of several countries and hence comprising numerous industrial centres, the necessary specialization of the poles in terms of metalworking activity cannot occur sectorally to the same degree that would be possible in a single country. Sectoral specializations must and can be made by taking into account the degree of development already achieved. Only in the poles of larger countries where a metalworking tradition already exists, can certain subsectors of precision metalworking, certain general metalworking industries and/or electromechanical industries characterized by the complex nature of their products, be inserted. Widespread differentiation can also be attained within a given subsector in two poles (in different countries of the common market) by the

selection and location of different types of industries, i.e. different production lines. Within a single important industry (e.g. production of agricultural machinery or production of machine tools) such differentiation between poles may occur through product specialization. In this respect, it must be remembered that criteria of model restrictions in new (or already existing) plants have, like technical unification, the same effect as increasing the size of plants, with the ensuing advantages. This type of factory specialization is admissible with the increased demand of the common market and the export possibilities which are assured by such industrialization carried through with competitive aims.

169. In the formulation of intergovernmental agreements on industrial location, it is convenient to seek some form of specialization for intermediate industries (standard and catalogued products) and for industries producing consumer goods for large markets (although in principle the industries in question can be located in different poles). However, for the intermediate industries producing standard and catalogued products for a common market, it is important to establish a common system of standards and for the most important of these products (especially materials for the metalworking sector) to be quoted, as in industrialized countries, at common market delivery prices in all the poles.

170. Finally, the creation of poles can contribute little or nothing to the problem of the distribution of material-oriented industries among various member countries with similar local sources of raw materials and similar site facilities. Nevertheless, it is reasonable that, of these industries, the basic ones should be allocated to the larger countries, where industrial input is higher.

Annex 1

INTERINDUSTRY RELATIONS IN THE HISTORICAL EVOLUTION
OF INDUSTRIAL LOCATION FACTORS^{1/}

1. Before the industrial revolution, transport costs were the predominant factor for the location of industry. Industries, including the production of iron and steel (furnaces using wood for fuel), were generally scattered in small centres of production set in plains or valleys where transport was easy and where there were groups of non-agricultural labour (fertile areas with agricultural surplus production) or in regions with a rapidly growing population offering ample supplies of low-cost labour.
2. With the industrial revolution there was a changeover from the mobile and scattered iron and steel industry based on wood, to one using coal for fuel and reduction. In view of the incidence of transport costs and the large quantities of coal that the new processes required, the steel industry - which now needs heavy investments - settled in certain sites in coal basins which in Europe stretch from the Saar-Ruhr across to England. Furthermore, these areas possessed the additional advantage of river transportation facilities. Because of the cost of transport of the raw materials, industries dependent on iron and steel tended to settle in these areas. Similar trends appeared in the glass and ceramics industries and the like, as well as in other industries requiring considerable quantities of fuel. In this way, what were to become the greatest industrial centres in Europe grew up.
3. The emergence of iron and steel and metalworking centres created concentrations of population and hence manpower resources and local markets which attracted manufacturing industries. These economic concentrations justified and determined the creation of vast infrastructural works. Thus, to the industrial location factor "transport costs", were added new factors determined by the spatial concentration of industry, the economies of concentration or rather the external economies offered to firms by the existence of adequate infrastructures, labour supply and so on.

^{1/} The text of this Annex has been taken in part from Chapter 3 of the EEC-Italconsult study, suitably condensed and modified for the purposes of the present study.

4. The nineteenth century and the present century experienced the expansion of these great concentrations. Their power to attract industrial investment continues, although there are now profound changes in the role of location factors, which began to become manifest, first slowly, then rapidly during the last fifty years.

5. Indeed, new sources and forms of energy are used, and there are vast improvements in systems of transport. Markets broaden and competition grows. Under the impetus of the need for greater productivity and technological innovation, technological specialization becomes ever more important in the manufacturing industries, and forms the basis for modern mass-production methods. Such technological specializations, which were once peculiar to the textile industry, spread to the metalworking industries and numerous other factory industries. In the basic industries and other industries operating continuous processes, these objectives are attained by technological integration (steel, heavy chemicals and so on).

6. Technological specialization in the factory industries renders recourse to auxiliary industries and various industrial services essential. These must be located near the factory industries either because such services must be immediately available and/or because frequent contacts are required. Because of their size, the auxiliary industries and industrial services require a huge clientele in order to operate. Hence they are only to be found in the large industrial concentrations.^{2/}

7. Though for most manufacturing industries transport costs no longer have a decisive effect on production costs^{3/} and although convenient energy supply is also available in other areas, new investments continue to be directed towards the existing concentrations, notwithstanding these new conditions which favour greater mobility.

^{2/} With some industries, such as textiles, which have developed in traditional centres, auxiliary industries and related services grew up organically in these specialized agglomerations.

^{3/} With auxiliary industries etc. the importance of the distance factor does not reside in the transport costs involved, but in the immediacy of such services and personal contacts.

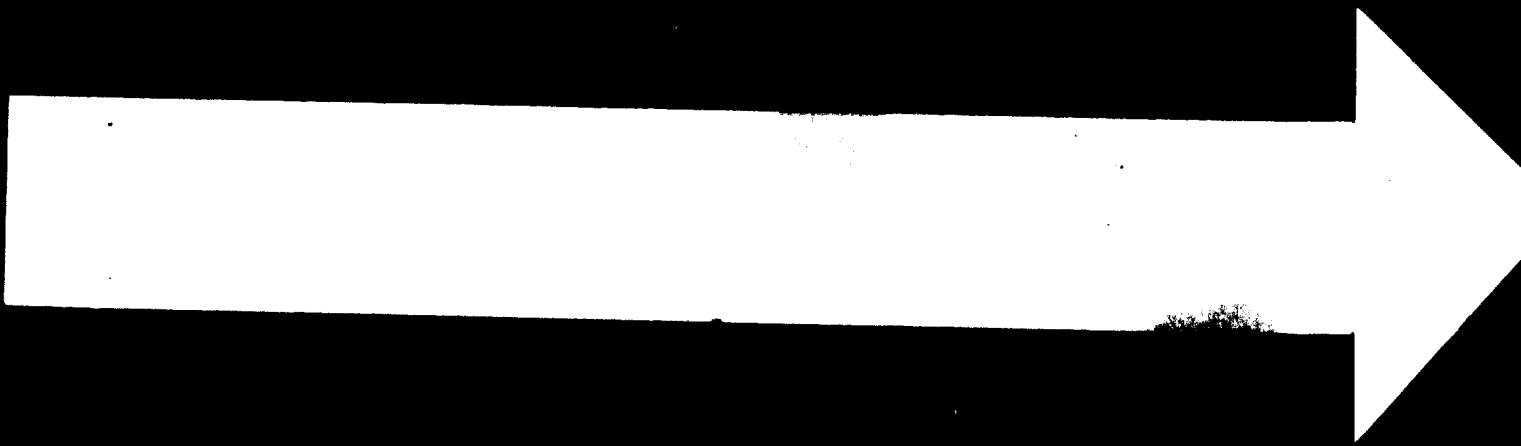
8. As far as manufacturing industries with widespread markets are concerned, interindustry relations have become the predominant location factor. Availability of labour and more spacious sites are the most frequent reasons why expanding industries decide to move. But because of the interindustry relations, such movements generally occur within or around the borders of industrial concentrations, i.e. within the radius of utilization of the auxiliary industries and industrial services.

9. Originally, the industrial accumulation process in the concentrations was essentially of a quantitative nature, but this has become mainly qualitative. The external economies which once stemmed solely from the general agglomeration of industry, now derive principally from the specific interindustry relations which occur in the great concentrations because of the presence of units belonging to the same and complementary sectors.

10. Transport costs are still the predominant location factor for a few industries such as those using bulky raw materials, e.g. the basic industries, and for those faced with high costs for transporting their manufactured articles, destined therefore for local markets (standard food products, soft drinks, some construction materials etc.). In particular, as supplies of raw materials (coal and iron ore) which gave rise to the concentrations of industry in Western Europe become insufficient or less economic, and as new materials (oil etc.) which need to be imported have been introduced, the expansion of basic industries is being directed towards the coasts for ease of transport, or to parts of Europe where deposits of such materials (methane etc.) have been discovered.

11. Large steel industries, petrochemical industries, refineries, etc. spring up in the peripheral parts of Europe which previously were left out of the industrialization process, and could count only on small industries, serving the local market.

12. Unfortunately, as the ties of location which once united the manufacturing industries to the basic industries no longer exist, these complexes do not give rise to new industrial centres, despite the presence of infrastructures and the regional development policy incentives introduced during the last decades. These regional policies, derived from a decline in the belief in the principles of a spatially self-balancing free economy, mark the introduction of macro-economic criteria of industrial location in the European countries.

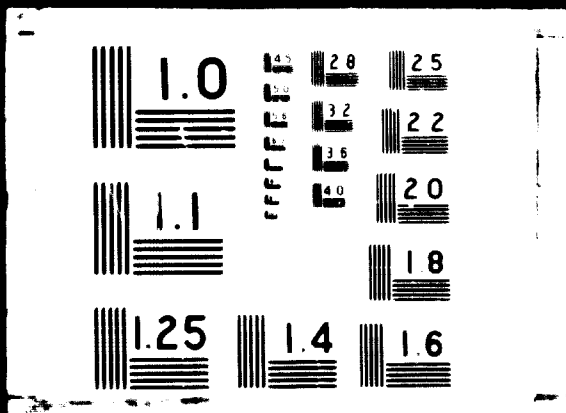


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13. The profound historical changes in the relative importance of the various location factors described above have not however greatly changed the industrial features of Europe. By and large, industry remains located in a central block. Within the course of time, the large concentrations have extended to the adjoining regions while the peripheral parts of Europe have continued to have a low density of industry and an agricultural economy. In view of the different rhythms of expansion which characterize these two types of economic structure, the gap between the developed regions and the peripheral regions has become more pronounced.
14. Without doubt, one of the major causes of the present lack of development in the backward regions is inadequate interindustry relations factor, and more specifically the lack of an efficient system of auxiliary industries and industrial services.

Annex 2

INTERINDUSTRY RELATIONS IN THE CLASSIFICATION
OF INDUSTRIAL LOCATION FACTORS

1. An ad hoc classification of the industrial location factors used in this document has been made for the sake of clarity in presentation and in particular to highlight interindustry relations as an autonomous location factor. The following five major headings were adopted:

I. Infrastructure and site requirements

This refers to general technical infrastructures (transport, communications, water supplies, etc.) and social infrastructures (housing, schools, amenities, etc.) in the district where industry is to be located, and to facilities concerning the site on which the plant is to be built (availability of building plots, connexions to the required water supply, power supply, etc., access to transport systems, etc.).

In this respect two sub-headings may be considered:

- I.(a) Standard requirements: normal infrastructure and site requirements needed by most industries,
- I.(b) Special requirements: special requirements relating to infrastructures and/or sites for certain heavy industrial plants, to industries using particular processes, etc. (water access requirements and deep-water berths for overseas shipments: special requirements in quantity or quality of water or electric or gas supply etc.; special requirements relating to size of plot and/or the nature of the ground etc.).

II. Transport costs

These include not only transport costs but also communication costs. They refer to the cost of transport from the source of raw materials to factory and of products from the factory to the markets.

III. Labour Supply

This covers the availability of labour (workers and other personnel) and the rates involved. Labour supply may be referred to, according to the characteristics, under three sub-headings:

- III.(a) General labour;
- III.(b) Skilled labour;
- III.(c) Labour with special characteristics (female labour etc.).

IV. Interindustry relations

Interindustry relations refer to industrial linkages limited to those which need to be located nearby the relevant industries, but not because of transport costs or other factors. Such industrial linkages may refer to the need to have close:

- IV.(a) Specialist units for maintenance and servicing machinery and equipment including not only these specialized workshops but also units supplementary to these and local spare parts depots. Many types of such repair and maintenance units work specifically for given sectors of industry, while others, such as those concerned with the maintenance of general service systems of plants and constructions operate on behalf of industry in general.
- IV.(b) Sub-contractors and process-specializing units comprising workshops turning out made-to-order products or engaged in special processes satisfying specific requests from industry. Most of these industries work specifically for certain industrial sectors.
- IV.(c) Other intermediate industries or local depots supplying standard and catalogued products. Intermediate industries which produce materials used on a vast scale industrially. This sub-heading excludes basic industries inasmuch as their supplies to the factories do not normally necessitate one being close to the other; in a few cases, when this is necessary, it is due to the effect of II. (transport costs).
- IV.(d) Various technical and commercial services. These may be grouped according to whether they serve industry in general or given sectors.

V. Public industrial policy

This item includes instruments and measures of an industrial policy which influence the location of industry (controls, incentives, etc.). They tend to introduce in the market economies macro-economic criteria of industrial location.

2. It should be emphasized that in the classification adopted, interindustry relations as location factors are limited to the need for auxiliary industries (IV.a and IV.b), other intermediate industries (IV.c) and services (IV.d). Among the other numerous interindustry relations that appear in the input-output matrixes, the linkages with basic industries and the aspects of vertical integration of production (steel complexes, petrochemicals, etc.) are excluded as location factors. Apart from the fact that nowadays the factory industries do not, as a rule, locate near the basic industries, such a type of location should however be related to the predominant influence of the transport costs factor. With certain exceptions, there are no real technological reasons requiring the factory industries to be near the basic industries.

3. Steel and petrochemical complexes and other basic industries are generally material oriented, that is to say, their location is predominantly influenced by the transport costs factor. Some of these complexes may set up only a part of their processing cycle, the rest of the cycle being completed elsewhere in another part of the same firm or even in nearby establishments of another firm. However, these are cases of technical integration of one given, though complex, operational unit. Although in such cases, the location of investments for completing the cycle could be considered as the effect of the interindustry relations factor, in this document it has been preferred in general to consider the steel or petrochemical complexes as an operational unit, be this effective or potential. As far as the agro-industrial complexes are concerned, this is rather a case of typical processing industries located near raw materials of agricultural origin, or in other words, located mainly in consideration of transport costs.

4. To summarize, as it is wished to avoid duplication and confusion in the classification, interindustry relations have been defined independently from other factors. This criterion is satisfied only in regard to the need for auxiliary industries and industrial services. The client industries tend to locate in their proximity, not because of transport costs but because of the needs for immediacy with regard to services and personal contacts. In other words, the distance factor has a notable influence here, but not in traditional terms of transport costs (paras. 1-29 and Annex 1). Indeed in the first draft of the classification, an attempt was made to include interindustry relations under a

wider heading called the "distance factor", independently of transport costs. This heading would also have referred to other cases such as the advantages enjoyed by the factories (in respect to their commercial organization) in finding themselves near their clientele or an important section of this, the requirements of internal organization of multiplant firms and so on.

5. However, in respect to the internal organizational requirements of multi-plant firms, it could be objected that this is a question of general aspects that concern the problem of the convenience or otherwise of centralized or autonomous management. The case of plants of such firms operating as auxiliaries of the others is covered by sub-headings IV.a and IV.b of the classification.
6. The classification does not include under separate headings the following factors affecting the location of single industrial plants: the availability of natural resources, the availability of capital and scale economies.
7. On the question of the availability of natural resources, it should be mentioned that the classification refers to processing industries excluding mines since their location is determined by the deposits. In the field of processing industries, the availability of natural resources is covered by the factor Transport costs of raw materials (II) or by the factor Infrastructures and site requirements (I), as far as water supply, climate, etc. are concerned. Availability of capital has not been taken into consideration as a real factor bearing on the location of individual plants, in view of the existence of national and international sources of finance, and considering the mobility of this production factor, especially when sound projects are involved.
8. Scale economies are undoubtedly an element to be considered when the problem arises of whether to expand the production of an existing establishment or whether to create another plant, duplicating the range of products or suitably splitting the processes between the new plant and the existing one. Up to this point, the scale-economies considerations have inhibited decisions regarding the possible movement of an industry. Should it be decided to set up a new factory, its location will be chosen on the basis of an examination of the various cost factors (from I to V) in relation to site needs and of easiest operation.
9. Finally, it should be noted that the classification is framed in such a way as to permit easy reference to the external economies offered to firms which locate in industrial agglomerations. This subject is dealt with briefly in Annex 3.

Annex 3

INTERINDUSTRY RELATIONS AND EXTERNAL ECONOMIES

1. Interindustry relations form part of the external economies which in any given location may benefit the operations of firms already there or which settle there. External economies generally refer to the existence of adequate infrastructures, interindustry relations, a labour market and other conditions.
2. These external economies, by their very nature, are available to industries in industrial concentrations or agglomerations, but not to those in rural zones. From this it follows that external economies are identified with the so-called economies of concentrations.
3. The necessity has been felt in the present study not only of defining these in terms of the various location factors, but of distinguishing the general external economies deriving from the purely quantitative fact of an agglomeration of industry, from those which derive from the presence of a sufficient number of industries belonging to the same sector, or of industries with a relative homogeneity of inputs. The convention has been adopted of calling this class of external economies "sectoral external economies".
4. The distinction does not serve solely for ensuring easier analysis but also reflects the different conditions which may be observed in reality. In backward regions of Europe and in many developing countries one may encounter, in incipient industrial areas, agglomerations of heterogeneous industries which being so integrated, can offer only a certain degree of general external economies. In the great concentrations of the highly industrialized regions of west-central Europe and in those of other economically developed countries, it is possible to add to the general external economies the more important sectoral ones.
5. General sectoral economies include infrastructure and site requirement facilities, as far as standard requirements are concerned; the facility of supplies of general and skilled labour such as is used by many different industries (electricians, certain types of mechanics, etc.); the availability of a few types of maintenance units used by the majority of industries (maintenance units for general service systems of plants, for constructions, for vehicles etc.); the presence of local depots supplying the materials most extensively used in industry; and the availability of other technical and commercial services which operate for industry in general (see table 1).

6. Sectoral external economies may refer to infrastructure and site facilities which satisfy special requirements of determined industries; to the availability of skilled labour and labour with special characteristics; to the availability of subcontractors and process-specializing units; to the availability of all the special units for maintenance; the presence of local depots supplying standard and catalogued products and of various technical and commercial services which are required specifically by the industries of the sector considered. Interindustry relations thus belong mainly to this class of external economies, and for many industries and sectors (metalworking, textiles, etc.) which are characterized by a high degree of technological specialization, they represent the weightiest component.

7. In practice, in an agglomeration of industries, general external economies may vary in quality and level, according to the extent and the composition of the agglomeration itself. On the other hand, an agglomeration which contains numerous industries belonging to the same sector may not offer all the external economies described, especially as far as auxiliary industries are concerned. The presence of industries belonging to the same sector constitutes, in fact, a necessary but not a sufficient condition for the operation of such auxiliary industries and services. Because of the existence of inertial factors which are described in the text (paras. 56-81 and paras. 101-122) industrial agglomerations already of considerable size exist in some industrial areas in backward parts of Europe and in the larger developing countries. Such agglomerations contain numerous industries belonging to the same sector, but they cannot, however, count on the required auxiliary industries and specific services.

8. Instead, in the great industrial concentrations in the developed countries, industries can find every class of external economies; for certain sectors such economies are available in specialized isolated agglomerations (e.g. textile districts, shoe manufacturing districts).

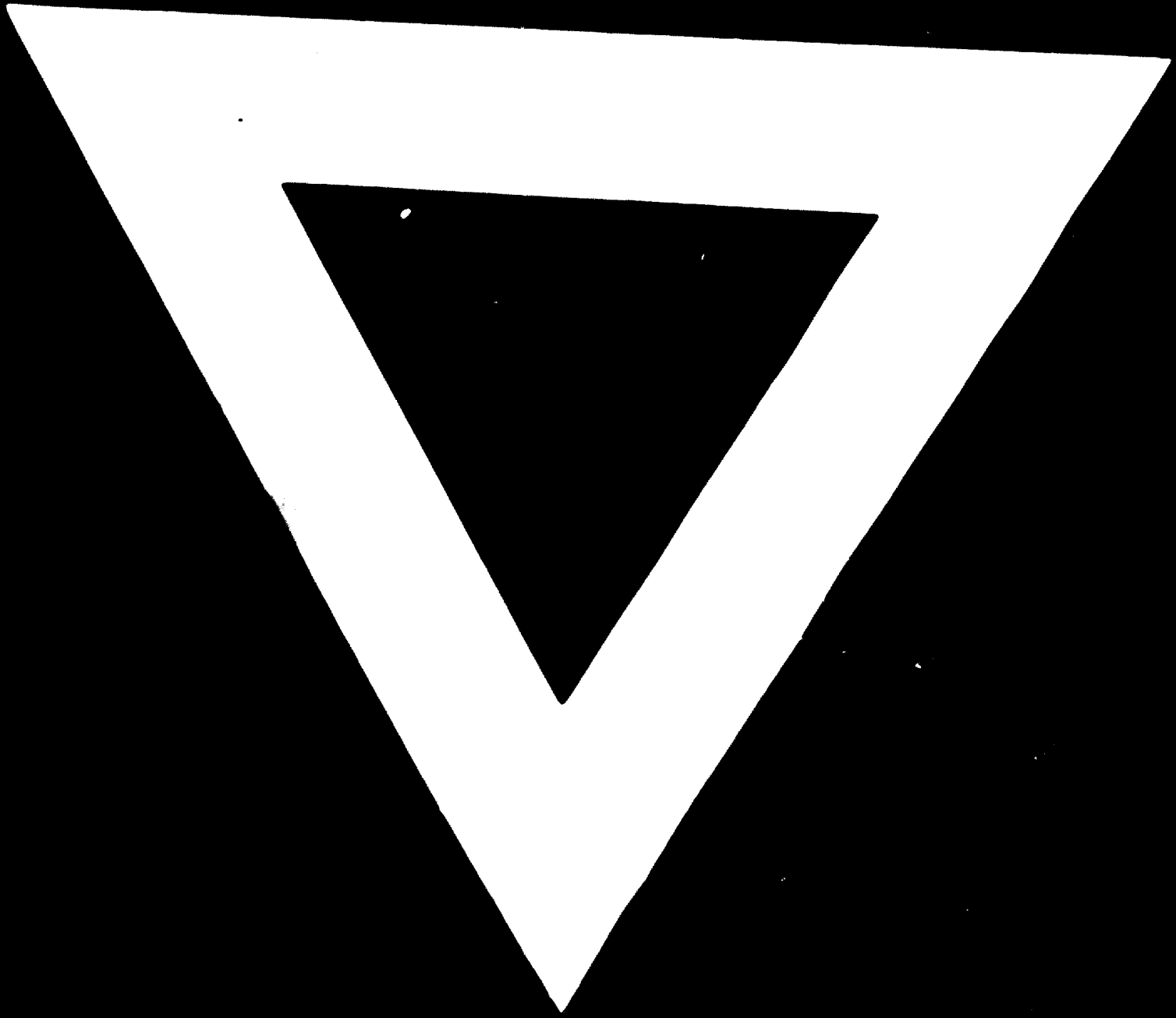
9. Apart from the advantages which the large concentrations offer to industries such as complex economic spaces (general and sectoral external economies), due to the fact that they are the geographic seat of a great number of industries, and consequently the seat of great centres of population too, they also offer additional advantages to many industries which produce for the intermediate demand

(standard and catalogued products) and for consumers. Although these are industries which produce for wide markets (national or international), and delivery costs do not usually play a large role in the total cost of the product, the fact of having an important part of their clientele in the immediate region facilitates the commercial organization of sales and customer service. This is one of the general external economies proper to the great concentrations. Furthermore it is precisely in the great concentrations that the continuous formation of a pool of managers and technicians occurs, and where the faster transmission of technical and administrative know-how takes place.

Table 1
Industrial location factors and external economies

<u>Industrial location factors</u>	<u>External economies</u>	
	<u>General</u> <u>(general agglom.</u> <u>of industries)</u>	<u>Sectoral</u> <u>(agglom. of industries</u> <u>of same sector)</u>
I. Infrastructures and site requirements		
1. Standard requirements	E	-
2. Special requirements	-	E
II. Transport costs		
III. Labour supply		
1. General	E	-
2. Skilled	e	E
3. With special characteristics	e	E
IV. Interindustry relations		
1. Special units for maintenance and servicing machinery and equipment	e	E
2. Subcontractors and process-specializing units	-	E
3. Other intermediate industries or local depots supplying standard and catalogued products	e	E
4. Various technical and commercial services	e	E
V. Public industrial policy	-	-

Note: The symbol (E) indicates the facilities corresponding to the indicated location factors. The symbol (e) indicates the possibility of facilities limited solely to a few aspects.



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