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INDUSTRIAL LOCATION AND REGIONAL POLICY IN
ECONOMIC DEVELOPMENT

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I. INTRODUCTION

Most of the human race lives in developing countries. There is in these countries an extraordinary range of circumstances and conditions, many stages of development, and many modes. Thus, most statements about the location of industry in these nations must be couched in the conditional. Some of the considerations that will be mentioned may appear a somewhat offensive caricature to someone from a nation already on the road to development, but I believe they will be recognizable to many from countries which are just starting this journey. The differences, however, are ones of degree, and the factors discussed appear to play a part in all countries, including the developed ones.

Further, many of the factors affecting the location of industry in developing countries are of singular interest to developed ones. In developed countries, regional planning has traditionally concerned itself with regions which are backward or depressed in economic and social terms. Many of the programs that have been tried have failed because they did not recognize the nature of the problem, namely, that these poor regions are poor because they are imperfectly integrated into the national space-economy.¹ The

¹The term economic integration refers to the geographic and sectoral mobility of factors. See B. Balassa, The Theory of Economic Integration (Homewood, Ill.: R. D. Irwin, 1961), and J. R. P. Friedmann, Regional Development Policy (Cambridge, Mass.: M.I.T. Press, 1966).

problems of regional development and the considerations affecting the location of industry in these islands of poverty are comparable to those which occur in developing countries, involving scarcities of technical and managerial inputs, antiquated social institutions and practices, uncertainties, and lack of information. Thus, the following discussion may be read either in terms of developing countries where the modern areas are few and small and the more backward hinterland is vast, or in terms of developed countries where the hinterland is the lesser part of the space-economy. In both cases we are dealing with relative development as a factor in location. Most of the analysis will be couched in terms of a highly simplified set of alternatives: the big city or a hinterland location.

Given the immense variety of industries, resources, and conditions which might be considered, it would be hopeless to multiply cases and examples. Rather, I have focused on this issue because it seems the most important one both for scholars trying to understand the evolving spatial structure of developing nations and for those making the location decisions. From the point of view of the businessman or the project analyst, the choice typically narrows to a consideration of two or three locations, one or two of which may be indicated because of the presence of raw materials, sources of power, a very localized and specialized market, or other such factor, but the other possible location will almost always be one of the larger cities in the country--and in many cases, there is only one large city. In most countries, moreover,

the paramount issue of territorial planning concerns the possible overdevelopment of the major cities and the backwardness of the rest of the country.

This polarity is the spatial manifestation of the lack of integration of a dual economy. Major cities bear a similar relation to their hinterland as do developed nations to underdeveloped ones. The lengthy literature on "obstacles to development" which usually poses these problems at the national scale could be repeated almost unchanged at the regional scale. Thus, nations which try to develop their backward areas at the same time that they seek national economic development face a compound load of obstacles: those at the national scale ~~and~~ those at the regional scale.

The infant practices of regional planning and applied industrial location are often ill-informed of the realities of the location process or of the true dimensions of the policy issues. Otherwise excellent studies of developing economies treat the issue of location superficially. It is frequent to find, within the same discussion, contradictory statements: (a) that further concentration in the cities increases national polarization and income disparities, and (b) that this same concentration is uneconomic and leads to a slowing of national growth. It is unlikely that both of these can be simultaneously true. Or it will be asserted, always without proof, that cities of 5,000 or 25,000, or 250,000, or some other population are big enough to provide external economies. In the body of this paper considerable stress is laid on these economies, but the fact of the matter is that there is no reliable knowledge of relevant urban sizes. Finally,

the most common error perhaps is the bland statement that industry does or should locate so as to minimize transport costs. Except in special circumstances, this is true neither in theory nor in practice.

Section II of this paper presents a brief and non-technical overview of the abstract theory of industrial location. Section III deals with other factors of location which are usually slighted in abstract theory, and the discussion proceeds from the point of view of the businessman or the project director. Section IV raises some questions concerning the evaluation of locations from the point of view of national interest, and Section V suggests some considerations regarding regional planning as a factor in location. These last two sections only sketch some of the dimensions of the problem, since neither theory nor practice is sufficiently advanced to permit a persuasive summary.

A number of important issues will not be discussed. Among these are the priorities or linkages of agricultural and industrial development or of infrastructure and directly productive investment. Neither will there be explicit treatment of industrial estates or growth centers. The former have been discussed extensively in many United Nations publications, and the latter, which is closely related, is as yet only a way of thinking about problems rather than a documented technique of development.

II. BRIEF REVIEW OF CLASSICAL LOCATION THEORY

The formal theory of location of industry originated in Germany in the nineteenth century and remains to this day a classical theory in that it assumes economic rationality, complete information, a static situation, and ignores the complexities of the broader framework of nation and region. Thus it is poorly suited to the conditions of developing countries. Most contemporary discussion of the location of industry in developing countries does not deal with the subject as such, but consists of passing references to particular aspects of location within discussions of economic development in general. Thus, many writings touch upon the overall geographic structure of a nation, upon urban and regional policies (for instance, industrial parks, poles of growth, urban decentralization), or upon transportation planning.

This paper will try to draw together many of these scattered insights into the forces acting upon industrial location in developing countries. Although classical location theory is ill-suited to developing nations, it will be useful to have a brief, non-technical review of it at this point to start the discussion.² Further, this exercise is of interest because its deceptive straightforwardness molds the thinking of many practitioners and scholars

²A more formal and complete summary is available in W. Alonso, "Classical Location Theory," in J. Friedmann and W. Alonso, Regional Development and Planning (Cambridge, Mass.: M.I.T. Press, 1964).

of development, principally through the half-truth that the rational location for industry is that which minimizes transport costs.

The most classic problem in the literature is that of choosing a location for a factory. It is assumed that the sources of materials are known, as are the location and size of markets, the necessary quantities of the several materials per unit of product, and the relevant transport rates. When the problem is stated in these terms, everything but transport costs is held constant; consequently, the best location is, quite obviously, that which minimizes transport costs. We shall see later on that other things do not stay constant, so that this objective must be heavily qualified. For the moment, however, we will accept the classic formulation.

Consider the costs of assembling materials and distributing the product of a manufacturing plant at each possible location. These costs will vary from one location to another, and taken together they will describe over the national territory a fairly smooth surface of transport costs, shaped like a bowl. The lowest point of that surface must fall within the polygon formed by drawing lines joining the locations of markets and materials at one of the vertices of the polygon. The point of least transport costs may be the lowest point on that surface, but the surface is likely to have pits at each material or market location. This is because locating at such points will avoid the terminal costs of loading or unloading, taking of insurance, arranging for shipment, etc. for a material by locating at its source or for the product

by locating at its market. These pits may be lower than the bottom of the bowl and may thus represent locations of lower transport costs.

There is another type of location where savings of this type are possible: namely, ports and other points where there is transshipment or break-of-bulk. It is often advantageous to process materials at the time they are taken, say, out of trucks to be loaded onto a ship. This, of course, is one of the principal reasons for the development of port locations as industrial centers. In the terms we have been using, port locations often represent deep pits in the surface of transport costs.

Classical theory recognizes that transport costs are not usually the only consideration. Certain locations may have lower wage rates, preferential tax treatment, or some other advantage that lowers the costs of manufacturing from the businessman's point of view. The savings per unit of product may be subtracted from the height of the transport surface at that point, causing another pit which should be compared to the others.

In short, this simplest formulation of the theory amounts to no more than a systematic consideration of all possible locations, calculating transport and production costs at each location, and choosing the lowest. It may be noted that it is more of an engineering than a true economic model, at least in this simple form. The shallowness of the conclusion that the best location is that which minimizes transport costs may be illustrated by analogy. Consider a firm for which we know all revenues and costs except those of capital. Then, the optimal quantity of capital would

be the minimum. Yet it would be obviously ridiculous to say in consequence that the optimal solution will minimize the amount of capital investment if we allow the other factors to vary. Similarly, the commonly accepted role of minimizing transport costs does not take into account economic considerations such as factor substitution, the elasticity of demand, economies of scale, or the consequences of alternative pricing policies. Full consideration of these would take us to a complex mathematical analysis,³ and only a suggestion of these effects is possible here.

Diverse locations will result in different delivered prices for materials, and many manufacturing processes will therefore adjust their factor proportions. For instance, a steel-making plant at a location distant from a source of coal will find coal relatively more expensive, by reason of its additional transport costs, and would probably choose a production process that used relatively less coal and more of something else. Thus, the classical theory studies substitute only among transport inputs, whereas in reality there often exists possibilities of substitution between transport and other inputs. The objective of minimizing transport costs must be broadened to the minimizing of total costs, and this only if we take total revenues as fixed.

But total revenues are not fixed if the quantity to be sold varies with the price. If the product is sold at different prices in different markets because of differences in delivery costs or for other reasons, the profitability of the enterprise

³The interested reader is referred to William Alonso, "A Reformulation of Classical Location Theory and Its Relation to Rent Theory," Papers of the Regional Science Association, XIX (1967).

will generally be greater by locating near those markets which are sensitive to price variations. Thus, a large market which has an unvarying rate of sales will exert less attractive force than a smaller one where slight reductions in delivered price result in large variations in the quantity sold. The quantity sold at each market may thus vary from location to location of the plant and also with pricing policy adopted. This point is very important for it is profit, not the minimizing of costs, which is a truer objective of most economic activities. The reduction of transport costs is only a partial objective, and the firm will normally be willing to spend more in order to make more. Otherwise, in the extreme case, transport costs would be minimized by not producing at all.

It must be recognized, however, that the classic theory's problem of production to a predetermined quantity and price may be more suited to conditions common in developing countries: scarcity, imperfect articulation of the pricing system, and socialized production. It may be argued that in those cases, the problem is to engineer production rather than to identify demand, in relative contrast to the free-market situation of affluent economies. But such an argument and the objections to it lead to rather difficult and as yet poorly defined areas of economics. A simpler and, to my mind, more forceful argument for a location which minimizes transport costs is that the analysis is simpler, less demanding of limited technical manpower, less apt to attract the push and pull of political and other interests, and therefore likely to be less time-consuming, so that the project may get underway

more quickly at a satisfactory location even if that location is not the best in terms of profitability, contribution to national product, or some other more fundamental objective. It may be noted that different objectives will sometimes result in different locations. This will be discussed in Sections IV and V.

Under the terms of the theory which has been presented, the location of the firm may be viewed as responding to pulls from markets or materials. In the simplest case, where all quantities are fixed and only transport costs vary, the pull of a source of material is equal to the weight of that material per unit of product times its transport rate. The pull of a market is equal to the fraction of total production sold there times the weight of the product times the transport rate. If we allow substitution among production factors, the pull of a material is weighted by the sum of cross-elasticities between this factor and the others. Under certain methods of pricing, the pull of a market is weighted by the price elasticity of the demand at that market. But, such complexities aside,⁴ we may imagine these various pulls operating on the location: the optimal location will be at that point where these forces balance each other and equilibrium is achieved.

This simple, physical analogue of the forces of location is quite instructive. The force that pulls toward a location is called the ideal weight.⁴ Where one ideal weight is large in

⁴Actually, ideal weight is the name of the magnitude of the force (excluding direction) in the simple case. No general name exists for the more complex directed force.

relation to others, it pulls the location of the plant towards it, and the industry is said to be oriented towards it. Thus, processes that lose weight (such as the reduction of ores) result in a material-orientation. On the other hand, processes that increase in ideal weight tend to be market-oriented. The increase in ideal weight may be, as in the case of beer and ink, due to the addition of a universally available ingredient (water), or, as in the case of boxes and automobiles, due to the increase in bulk which increases the freight per mile, or as in the case of newspapers and baked goods, due to the high perishability of the product which requires rapid and expensive transportation.

Even these rudimentary considerations begin to shed light as to whether industry will be attracted to resources. Thus, iron ore has typically a low ideal weight in relation to coal and other factors that go into iron and steel; the higher the grade of ore, the less likely it is to attract industry since it is easier to move. Oil has an ideal weight nearly equal to that of its first-stage products; therefore, petrochemical industry is free to locate either at the source, or at the market, or at some intermediate location which is convenient because of transportation, availability of funds, political safety, or any other pertinent reason. One may generalize that most physical resources attract little industry. Their first elaboration does not greatly add to their value and is seldom labor-intensive, and later transformations are likely to be oriented to other locational pulls. On the other hand, coal is weight-losing in most of its uses, and electricity is expensive to move over long distances. Hence their ideal weights are high and they may attract industry.

In comparison with industries in developed countries, most industry in developing countries is simple in that relatively few raw materials are required. Thus, the steel industry will devote itself to the basic steel types rather than to more specialized alloys. At the same time, the markets for the products will be concentrated in a few locations, typically the major cities or, in the case of foreign markets, the ports of export will serve as the terminals within the national territory, equivalent in a sense to a market. A complex process that uses materials derived from many primary sources and secondary producers and which produces a wide line of goods which sell in a multiplicity of markets is subject to many locational pulls and often finds itself relatively free as to where it shall locate since an increase in distance to one market or material is likely to be compensated by a smaller distance to another. In other words, the bowl of the transport surface for processes using many materials and yielding several products is likely to be rather flat. By contrast, where the locations of markets and materials are few, the transport surface is likely to have a very distinct low point, and therefore it is likely that there will be a much more definite optimal location in the case of developing countries. This tendency is strengthened by the fact that the ratio of the value of materials to the value of final product is typically far higher in developing countries. That is to say, the value added in the production process being lower, the location of the plant is more likely to be determined by differences in transport costs. We shall see, however, that a host of other factors in developing countries counter the importance of transportation.

III. LOCATION OF INDUSTRY IN DEVELOPING COUNTRIES FROM THE POINT OF VIEW OF THE FIRM OR THE PROJECT

This section deals primarily with the firm, although almost all of the criteria presented will apply also to government industrial projects if they are viewed as projects only, rather than as part of a general policy of national spatial development.

(Subsequent sections deal with changes in some of these factors when viewed from considerations of national policy.) These criteria apply particularly when a firm is both owned and operated by an individual or a family, as often happens in developing countries. Some of the factors discussed, such as the personal space preferences of managers and technicians, operate less strongly when the firm is operated by persons other than the owners, and it will matter less whether the owner is the nation or some larger corporation or a group of shareholders.

Further, we will deal with firms which may be said to be "located"; firms for which the location decision is made consciously. Little will be said about what may be called "spontaneous" industry; that is, industry which owes its location to the happenstance of the place of residence of the man who started it and to his ability to see or to create his opportunities. Although a great many countries, both developed and developing, have shown the phenomenon of regions or cities in which new industries spring up

from local sources, little seems to be known about the reasons for this fertility. Much of the fundamental work belongs to an earlier generation of economists. Among present day students interested in this phenomenon, Everett Hagen holds an important place.⁵ In general, the conditions that bring about this ferment appear to involve a certain tension or restlessness, a dissatisfaction with things as they are or some threatened changes, which cause certain groups or individuals to look for opportunities and ways to introduce change. A racial or religious minority, an uprooted section of the farm population, a threatened landed aristocracy have all, on occasion, played the entrepreneurial role. Yet, generalizations as to the spatial incidence of this spontaneous industrialization are most difficult, and no way is known to plan for it. It may be noted, however, that where such spontaneous industrialization is successful, it is likely to lead in time to the professionalization of management and to the separation of management from ownership. As the scale of operations increases, the location decision will become more explicit, especially for branch plants, and what starts as a "spontaneous" industry may become a located one.

We are dealing here with differences of the location decision between the classical theory and the conditions of developing space-economies. It will be seen that the principal differences may be termed differences in information, which involve uncertainty, knowledge of opportunities, technical and

⁵See, for instance, his Planning Economic Development (Homewood, Ill.: R. D. Irwin, 1963).

managerial capacity and supply, and other factors. Most broadly, it can also involve the movement of goods as well as ideas. The classical location theory, by assuming perfect information and predictability and unlimited managerial and technical energy, ignores the strongest factors which operate in a context of development. Similarly, classical theory is for the most part static, in effect assuming that things happen in an instant. We shall see that in developing countries time plays a crucial role.

We shall begin by examining the effects of the spatial structure of developing countries upon transport costs, and then generalize the discussion to include some vital but neglected factors.

The Transport Network and Concentration of Markets

The transport networks of developing countries reflect their economic history of being traditionally exporters of primary products. The resulting transport networks resemble drainage systems converging toward the coastal ports which became the major cities. These served as transshipment points not only for exports, but also for the distribution of imported finished goods. The transport network, therefore, is typically shaped like a fan or a tree.⁶ In developed countries, by contrast, the shape of transport networks is a fuller lattice which, by offering

⁶ See P. Haggett, Locational Analysis in Human Geography (New York: St. Martin's Press, 1966), in particular for his discussion of the works of Taaffe and Kansky. The most detailed and thorough documentation is in B. J. L. Berry, Essays on Commodity Flows and the Spatial Structure of the Indian Economy, Department of Geography Research Paper No. 111 (Chicago: Department of Geography, University of Chicago, 1966).

more nodes or points of confluence, permits a more even distribution of locations. A glance at world maps of population concentration shows a striking pattern of coastal cities ringing the developing continents, while the hearts of the continents remain virtually empty. In some cases, a navigable river permits some development of a city further inland, but this is really a fortunate penetration by the sea into the continent. If instead of concentration of population, the concentrations of industry, income, education, or other forms of economic development are examined, this ring effect is even stronger.

The consequence of such coastal concentrations and fan-shaped movement systems is that the point most accessible to the country as a whole is not its geographic center, but a point on the edge, which is the functional center of the country in terms of economic distances. It may be noted that the physical eccentricity of these functional centers results in longer average distances among points in a country of a given size; on the other hand, the extreme concentrations of economic activity that characterize these countries reduce the distances which are effectively travelled.

One consequence of this strong directional veining of the national territory is that in the preliminary analysis of location, distances must be considered in terms of specific routes; in developed countries, they may be taken more abstractly. In a developed country--in Europe and North America--one can be relatively certain that the effective road distance between any two points on the map will not exceed the air distance by more

than 20 per cent. In developing countries, two relatively neighboring locations may lack a connecting road and be joined only at some distant major city. The technical elaboration of this concept is beyond this paper, but the point being made is that full analysis of location in developing countries will involve either more difficult geometric transformations of physical space into economic space than is the case in developed countries, or that more specific and detailed (and therefore more demanding) analysis will be needed in the preliminary stages of planning.⁷

The large coastal cities are thus the most central locations for distribution of goods to the population at large, and this is a factor of prime importance for industries producing consumer goods if the scale of their market is nationwide, as is likely due to the limited demand.⁸

⁷William Warntz has presented orally a most interesting way of looking at this. Human modes of interaction respond to the difficulties of overcoming distance (Haig's "friction of space"), and any one mode of interaction, such as bank transfers or the travel of persons, forms a hypersurface which may be visualized as crinkled cellophane over the geographic surface of the territory. The distance between any two points in a system or mode of interaction is the geodesic (least distance path) on that hypersurface. Economic development and technological innovation tend to cause these hypersurfaces and geodesics to conform increasingly with conventional maps and geographic distance. Glimmers of these concepts appear in Warntz' "Global Science and the Tyranny of Space," Papers of the Regional Science Association, XIX (1967). It will be apparent that this conceptualization, while more abstract, coincides with Hirschman's cycle discussed below, with the concepts presented in this writer's "Urban and Regional Imbalances in Economic Development," Economic Development and Cultural Change (forthcoming), and with Friedmann's and Belassa's concept of integration of the space economy.

⁸On the other hand, consumer industries which can operate effectively at small scale can and should be distributed more widely over the national territory.

The large coastal cities or principal nodes will also be most central for industries that depend on one material assembled from dispersed sources, or that combine diverse materials from diverse sources. This centrality is reinforced by the port function, of course, when some of the materials, components, or equipment are imported, or some of the product exported. Further, the concentration of demand at that point is often preponderant, both because income is always more concentrated geographically than population and because manufactured products are typically income-elastic, so that demand is more concentrated than income. Similarly, industrial demand for producer goods will typically be concentrated at these points.

We can see, therefore, that transport-oriented industries will often find their most advantageous location at these coastal nodes. It is a contention of this paper, however, that the minimizing of transport inputs is a lesser factor in the location of industry in developing countries than in those which are developed. Rather than transport orientation, there is an attraction to production economies of a subtle type most often associated with externalities, which serve as powerful magnets, drawing location to the big cities. This is not to say, of course, that many industries do not determine their location by the classical location factors associated with transport costs. Most typical of these is first-processing of materials, which is a weight-reducing process, and therefore binds the location to the source of the material. Sargent Florence cites among these the earlier processes of metal refining, cotton ginning, bacon curing,

seed-crushing, sugar refining, sawmilling, rice milling, and cement and brick making.⁹

Distance as Time

Often, time rather than cost is the prime consideration in distance. This is well known in the case of those industries which deal with perishable commodities. In developing countries, however, other factors make time important for many more industries.

The time consumed in simple shipments can be surprisingly long. It is not uncommon for weeks to be consumed in moving commodities or materials over relatively short distances, with days wasted in confusion, breakdowns, lay-overs, unavailability of carriers, labyrinthine paper work and authorizations, occasionally washed-out roads or tracks, and a thousand other contingencies that defy the imagination. Sometimes, after weeks of waiting for a shipment, it is discovered that the order was misplaced and the shipment has not left. Or the shipment itself may be lost, in the sense that it has arrived at some place and no one has been notified of the fact. The probability of these occurrences will vary greatly from country to country, but it may be generalized that in developing countries shipments take longer on the average and that there is greater uncertainty as to the time of arrival.

Under these conditions, the time consumed in transportation is likely to be an important consideration for many industries. At distant locations, it will be necessary to have substantially greater inventories of materials to insure continuity of production

⁹P. S. Florence, Economics and Sociology of Industry (London: C. A. Watts & Co., 1964), p. 151.

and also necessary to have large inventories of the product at the markets to insure prompt and predictable deliveries. Even the inventory of spare parts for the production machinery will have to be greater. This considerable item has been estimated at about 20 per cent of total machinery and equipment investment in developing countries.¹⁰

These delays, then, require considerably larger investments of capital for inventories at distant locations, to cover both the longer lead times involved in the length of normal trips and the possibility of unforeseen delays. The additional capital costs, given the high interest rates that prevail in these countries, can easily exceed savings in transport costs as such. The first type of cost, involving lead times, is unavoidable, especially in the absence of complex and sophisticated inventory techniques. The second type, arising from uncertainty, is avoidable only at the probable cost of idle production lines if materials or spare parts fail, or of dissatisfied customers and unfilled orders if the product cannot be delivered.

Personal Space Preferences of Managers and Technicians

This factor, perhaps because it is so human, seldom receives adequate recognition, yet it may be in some ways the most powerful one in operation. Managers and technicians typically belong to certain social classes, such as the aristocracy or an emerging upper-middle class, have usually had a relatively good education, and expect a way of life which can be had only in

¹⁰M. Bryce, Industrial Development (New York: McGraw-Hill, 1960), p. 125.

the principal cities. Varied restaurants, movies, clubs, interesting friends and well dressed people, fashionable shops, bookstores, television, a sense of being where things are happening: these are felt to be necessary by the majority of these men and the overwhelming majority of their wives. A location away from the big city is often regarded as exile.¹¹ Family links, which are of great importance in many developing societies, will often be another anchor to the big city, unless the man or his wife happens to have family at the alternative location.

Aside from these ties to the big city (which this man, even if born elsewhere, will regard as his home since he probably spent many years there as a student), there are likely to be serious problems of personal and family adjustment at the new location. These may include ethnic or religious differences, a different dialect, a local aristocracy to which he will be an outsider, different customs, different food, etc. It may be hazarded that the family's adjustment will be made more difficult by their feeling superior to their new environment; they are likely to view it as not merely different, but also as provincial and old-fashioned.

To get managers and technicians away from the big cities, very often substantial inducements must be offered, including higher salaries, company-provided houses and automobiles, lengthy vacations, and paid trips. Even at that, it seems likely that first-rate men will often not be obtainable for they have ample

¹¹This phenomenon is not limited to developing countries. A recent survey of this issue by the Wall Street Journal (February 23, 1966) found it a considerable factor in determining locations for American industry.

opportunities in the big cities. In developing countries, where the newness of situations and the lack of an institutional matrix call for the highest order of resourcefulness, energy, and inventiveness in these positions, a second-rate man can be far more costly in lost efficiency and missed opportunities than any differential in transport costs. More will be said about the special calls on management and technical staff in emerging industries. It seems clear, however, that such personal preferences will play a greater role in firms owned and managed by an individual or a family than in plants which are part of enterprises with a more abstract ownership, as in the case of government projects or publicly held private corporations. In these, management is professionalized into a career, and the decision about where to locate a plant is usually made by people who will not go there to live.¹²

Spatial Distribution of Information and the Cost of Time in the Location Decision

A common feature of developing countries is that reliable information about possible hinterland locations is often difficult or impossible to obtain. Not only may it be hard to find out about transport facilities and schedules and the availability of supporting services and facilities, but it may be difficult to learn about

¹²See A. Lauterbach, "Managerial Attitudes and Economic Development," Kyklos, XV, No. 2 (1962). While making similar although non-locational observations, Lauterbach observes that industrial enterprises of powerful families in Latin America are often associated with their agricultural background and holdings. Thus, they tend to develop canneries, sugar refineries, coffee roasting, meat freezing, and wool and cotton mills. Both the economics of location and the space preferences of some of these families may often favor hinterland locations.

possibly important features such as the properties and availability of water, local woods, clays, and other materials. Local variations may require redesign of equipment and processes, often involving scientific investigation which may be lengthy and not necessarily successful. There is frequently the possibility that something that has been taken for granted will not be available and that the firm will be put to the expense and waste of energy of going into these activities to supply itself. The possible list of things that may be missing is too varied to do more than illustrate it. The firm may be forced to become its own trucking and shipping firm, a warehouser of office supplies and repairman of office equipment, a real-estate manager and general store for some of its employees, its own jobber for certain materials and components, etc. These, of course, are the opposite of external economies and may be termed diseconomies of forced internalization. Several countries which have essayed industrial decentralization policies have discovered that large firms can more successfully adapt to the conditions of small cities and distant locations. Their size affords them economies of scale for internalizing these externalities.¹³ We shall discuss below other factors, such as the predictability of demand and stability of production processes, which affect a firm's ability to adapt to a hinterland location.

A particular point deserves discussion here, although it might be reserved for the final section. Aside from classical factors such as lower transport costs or localized advantages, one of the principal reasons for advocating the location of industry

¹³See below, under "External Economies."

in the hinterland is the national goal of equity, which tries to minimize differences in income and employment among regions. Experience in both developed and developing countries, however, indicates that frequently much of the labor for a new enterprise must also be brought into a laggard region because the local population lacks necessary skills. In these cases, except at the most superficial statistical level, the goal of interregional equity is not served for the newly employed are not, except post facto, the residents of the region. The original population may receive no benefit except for multiplier effects, which will be small because of sparse intraregional sectoral linkages and which may, in fact, reduce local welfare by resulting in sharp sectoral imbalances within a region with low productive adaptability. In other words, the resulting increases in demand for food, construction materials, and the like, may raise their price to the local population.

The most common advantages of distant locations may lie in lower transport costs, lower rents, lower wages and a labor force which is less set in its ways, and in fewer costs of congestion. Contrasted to these are such disadvantages as the risk of unforeseen costs arising from local conditions and the costs of internalizing functions which normally would be external and for which the firm may lack efficient scale. These costs are largely unknown at the time of making the location decision, and they are evaluated probabilistically in any rationally made decision. Since profits are, ultimately, the difference between costs and revenues, greater uncertainty as to the upper limit of costs

will require a larger difference for safety, especially since revenue is usually more predictable from the price of competitive products. In consequence, the known advantages of the distant location will have to be very large to offset the probable, but unknown, disadvantages. In other words, uncertainty or possible error is not symmetrical about the most probable estimate of costs, but rather is strongly skewed in the positive direction. The probable profits, therefore, are strongly skewed in the negative direction, and any sort of strategy for minimizing losses or maximizing profits will tend against situations with higher uncertainty. Thus, the neglect by businessmen of peripheral locations is based on probabilistic rationality.¹⁴

The very high output-capital ratio and rates of interest which normally prevail in developing countries provide yet another force toward the known environment of the large city. Even if it were possible to get the information necessary to remove all uncertainty about a distant site, it would probably take months or even years to do so. Thus, to explore this possibility involves a delay in getting started. When returns to capital and entrepreneurship are very high, delay may be quite costly in terms of foregone production. Thus, the choice will often be reasonably made in favor of the known opportunities in developed locations now, even where it is recognized that there exists a strong possibility that another location would be better if there were time to look

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This estimate of the rationality of favoring location in the major centers differs from A. Hirschman's in The Strategy of Economic Development (New Haven, Conn.: Yale University Press, 1958), p. 185. See below, under "Location of Industry from the Point of View of Public Policy."

into it. Vigor and decision can be better than careful thought if a satisfactory alternative is available and finding the optimum causes delays.

Returning to the matter of labor costs in the perspective of time, it must be noted that only in a relative long-run is cheaper but less-skilled labor usually an advantage. In the first years, as labor is being trained, one may expect it to be inefficient not only because of lack of specific skills, but also for lack of industrialized attitudes. Although subtle in their fundamental forms, attitudes may manifest themselves in such expensive specifics as high rates of absenteeism, tardiness, turnover, spoilage, and poor maintenance of equipment.¹⁵ Given the very short financial planning horizons which are typical of developing countries, a delay of a very few years in reaping the benefits of lower wages will destroy the attraction of that factor. On the other hand, as will be discussed later, public policy, which often operates with longer-range planning horizons and should be interested in things other than the balance sheet of a project, may regard the creation of modern attitudes in the population as important as the physical production of goods.

External Economies

These economies, which are among the most important determinants of location in developing countries, are the most difficult

¹⁵ Although these phenomena are commonplace and familiar in developing countries, it is interesting that some of the most precise documentation is for a developed one. See W. F. Luttrell, Factory Location and Industrial Movement (London: National Institute of Economic and Social Research, 1962).

to treat. There exists no comprehensive systematic categorization of them nor sharp tools for their analysis or the measurement of their effect. There is an ample descriptive literature, but it is limited primarily to the developed countries. We shall see that certain aspects are of particular importance in developing countries. Although they are hard to measure, they must not be underestimated. There is considerable evidence that in many cases they can more than compensate for higher costs of transport, labor, or other factors of production from the point of view of the firm or the project. From the point of view of national regional development policy, an understanding of the elements of external economies probably contains the answer to the crucial questions of whether the principal cities are too big, of how big secondary growth centers must be to enjoy self-sustaining growth, and of what types of industry are proper subjects for a policy of decentralization and at what stage of their evolution. These policy issues will be mentioned in greater detail in a later section.

We may begin by following a classic statement of external economies. Hoover points to three elements in external economies: multiples, massing of reserves, and bulk transactions.¹⁶ These are amplifications of the same concepts which had been applied to the efficient size of firms. In the case of the firm, the concept of multiples implies that, since machinery is designed to operate

¹⁶ E. M. Hoover, The Location of Economic Activity (New York: McGraw-Hill, 1948), pp. 120-121. Hoover refers this categorization to P.S. Florence (The Logic of Industrial Organization [London: Kegan, Paul, Trench, Trübner & Co., 1933]), who applied it to the firm.

at certain capacities, the minimum efficient size for a firm is that which insures that no piece of equipment is underutilized. By way of illustration, imagine a three-step process: If one machine at step C accommodates the output of two machines of step B, and one machine at step B accommodates the output of three machines of step A, the minimum efficient size of a plant would consist of six machines of step A, two machines of step B, and one machine of step C.

The same logic applies to a city. A certain minimum size is required for the efficient use of an airport, a transport system, or other forms of infrastructure. Smaller sizes will mean over-capacity in performing one of these functions, and therefore greater unit cost. At the same time, and perhaps more importantly, certain sizes must be reached to justify the coming into existence of specialized supporting services, such as specialized shippers and jobbers, financial agencies, trade publications, repair services, specialized printing, consulting services, equipment leasing, advanced education facilities, laboratories, etc. It should be noted that the principle of multiples, in its full sense, may result in higher productivity not only through the avoidance of idle capacity, but also by permitting firms to specialize more narrowly and thus increase productivity. A firm could print its catalogues at a printer who is especially set up and experienced in that type of work; it could seek advice from a lawyer who is particularly knowledgeable on the issues at hand; it could get its machines repaired by men who know them well and have the proper tools, and so forth.

The principle of massing of reserves is an actuarial principle. Imagine, for instance, that there are five firms, each of which plans to use ten units of a material, but each of which, because of the possibility of spoilage or unexpected orders, considers that there is an even chance that it will need an additional two units. If these firms are separated in space, each must have twelve units of material for that level of safety, and the five will need a total of sixty units. This constitutes a reserve of ten units or 20 per cent. On the other hand, if all five are close together and use a common supplier or have an understanding to assist each other, only four and one-half units or 9 per cent of the material will be needed as a reserve for the same level of safety.¹⁷ The same logic applies to the advantages of larger pools of skilled labor, larger markets for the product, and larger or more numerous suppliers of the factors of production, repair, and other services. The application of this principle to labor is of particular importance, for it means that, aside from economy-wide cyclical fluctuations, a low rate of unemployment in a big city provides its industries a greater margin of safety in labor reserves than does a higher rate of unemployment in smaller centers. Conversely, layoffs by one firm in a small city are far less likely to be absorbed by other firms. Therefore, nations which seek growth together with full employment should recognize that a policy of decentralization is likely to carry with it a higher rate of idle labor.

Whereas the principle of multiples refers to the determinate advantages of particular combinations, the principle of massing

¹⁷This is based on the independence of each firm's need for extra material.

of reserves deals with the probabilistic advantages of sheer size. It is based on the fact that uncertainty, when spread over large numbers, is more predictable and therefore less risky. Looked at another way, large numbers permit much greater flexibility and adaptability to changing and often unforeseeable circumstances because more opportunities are open. For instance, if a firm changes its production process and thereby finds itself with a new waste product, it is far likelier in a large city that there will be some other firm which can make use of it than in a smaller city, thus transforming the waste product into a byproduct. The converse holds true if the new process calls for some new input.

The third element in this formulation is the principle of bulk transactions. In the case of the firm, this is based on the fact that buying or shipping in larger quantities usually results in lower unit prices.¹⁸ In the case of the city, the large scale of operations may result in lower rates and more frequent and convenient service for large-scale transfer and terminal facilities. The same may apply to other public and commercial services, principally because fixed costs may decline per unit and because more efficient processes can be used at larger scales. It is frequently suggested, however, that many functions in large cities operate under diminishing returns, principally because of congestion, either internal to the function or among functions. This point has not been settled by empirical research and constitutes the principal bone of contention between those who argue

¹⁸This is equivalent to T. Scitovsky's "pecuniary external economies" in his classic "Two Concepts of External Economies," Journal of Political Economy, (April, 1954).

for and against big cities. We shall have more to say on this later.

The principle of bulk transactions has a less equivocal advantage, already encountered under the principle of multiples. A very large scale of operations permits specialization and increased productivity: the very large number of events and transactions make it possible to handle a wide variety of needs in a standardized, and therefore more efficient and less costly, manner. We have reference again to specialized shippers, repairmen, professionals, subcontractors, etc. This does not contradict our argument below that the large city is particularly hospitable to the unstandardized producer. The reason for this is that the unstandardized producer has greater need for supporting services and associated activities which are found in the big cities; further, in large cities they will be more specialized and standardized and therefore easier to use.

The subtle but enormous importance of face-to-face relations is not sufficiently recognized in the preceding formulation of external economies. Yet these personal contacts are crucial in developing countries for many reasons. At the most obvious level, developing countries have poorer communications systems. Telephones are scarcer and less dependable, mail is slower and may fail to arrive, air connections are rarer. Consequently, distance between persons is a more formidable barrier to communication and this leads to the spatial concentration of those who must do business together.

Social forces, however, may exert an even stronger force toward spatial concentration. In developing countries most

messages are less impersonal and standardized than in developed countries where much information is transmitted by trade journals, catalogues, government publications, and other means. At the same time, in developed countries, contracts, terms of finance and details of payment and delivery, specification of the product, and a thousand other forms of contact tend to follow established forms. In developing countries, communications depend far more on word of mouth, and procedures are far less standardized and call for discussion and negotiation. These circumstances require people come together. Further, the rituals of social contact when two-way communication is necessary are more elaborate. In many countries considerable time must be devoted to expressions of mutual respect, and no haste to get to the substance of the meeting may be shown. Even the substance of the conversation must be treated with a subtlety and indirection which often baffle those used to procedures in developed countries. There are ways of saying yes which mean no, price and time estimates which mean something else, gentle probings and subtle hints. An order blank, a long-distance telephone call, a cable or a business letter are instruments which are too blunt and insensitive for these complexities.

Mechanical problems of communication and the customary modes of contact are not the only forces of this type which draw firms toward the city. The social and institutional matrix of communication and information also exerts pulls. Personal relations enter more frequently and more pervasively into human contacts of all types, including business relations. In developed countries,

contacts are more segmented into well defined roles which are limited to the issues at hand.¹⁹ In developing countries it is often more important to cultivate sources, to establish a commonality of attitudes or class positions. Information on new developments becomes available at irregular intervals, and channels must be kept open to be certain of being informed. Since the information is unpredictable, often taking the form of rumors or confidential reportage, it is important to be in contact with many people and to see them even when no particular business is at hand. Conditions in developing countries change frequently and unpredictably: regulations are changed, ministries are reorganized, the relative costs and availability of production factors and financing shift suddenly. It is therefore often crucial to be at the centers of influence, decision, and information. The heavy bureaucratic maze of permits and licenses requires that papers be personally shepherded from one official's desk to another. This is not only because rules and procedures are often confused or even contradictory, or because many an overbureaucratized machine needs to be lubricated by flattery, persistence, and great resources of persuasion, including bribery, but also because the low standards of professional competence of many government officials below the very top levels make it likely that papers will get lost on some desk or dusty file in the depths of a ministry.

¹⁹This, of course, is a matter of degree. For instance, even in developed countries, salesmanship is very often pursued by warming the personal aspects of relations in the sharing of meals or leisure.

We have argued that the fluidity of the situation, the lack of standardization of procedures, and the personalization of contacts pull forcefully toward the city. This pull is magnified by the scarcity of entrepreneurs and managers. In most firms, one or a few individuals have all the responsibilities of management, including general management, marketing, finance, purchasing, production, and long and short range planning. For the reasons discussed, the management functions are pulled toward the city, and they bring the production functions with them. The advantages of flexibility, adaptability, and the conservation and efficient use of the scarce time of the management are likely to wash out any advantage of a few percentage points in transportation, labor, or some other cost at an alternative location.²⁰

It is enlightening to compare these attractions to industry in developing countries with the history of new industries in developed countries.²¹ There new industries most typically spend their early years in the large cities for reasons which are similar to those which we have been discussing: neither production nor demand is standardized and situations change rapidly; ownership, management, and technical functions are combined in one or a few

²⁰ Related ideas are discussed in H. Leibenstein, "Allocative Efficiency vs. 'X-Efficiency'," American Economic Review, (June, 1966).

²¹ See R. Vernon, Metropolis 1985 (New York: Doubleday Anchor, 1963), and R. M. Lichtenberg, One Tenth of a Nation (Cambridge, Mass.: Harvard University Press, 1960). Valuable documentation and related ideas are found in A. Pred, The Spatial Dynamics of U. S. Urban and Industrial Growth, 1800-1914 (Cambridge, Mass: M.I.T. Press, 1966).

individuals; the instability of demand and frequent changes in technology or the cost or availability of production factors put a premium on contacts and adaptability; investment per worker is low since larger commitments become wise only when the situation and the processes are stable and predictable enough to justify with safety extended runs of identical items; in the early stages of the industry, it is vital to have access to common services and inventories outside the firm, to sources of finance, and to complementary producers. In short, these new industries are very open systems, oriented to external economies.

With time, demand becomes more predictable, production processes and product lines are stabilized, the various functions of management become professionalized, specialized, and distinct, and this greater stability permits the routinizing and internalizing into the firm of some of the services and steps of production which earlier were done outside. In short, the firm becomes more of a self-contained system, internalizing many of the functions for which it depended on externalities. At this time, the industry often moves out of the large city toward a location which may offer cost advantages in transportation, labor, or some other factor. Even the activity of innovation often becomes institutionalized in research sections staffed by professionals who work systematically toward defined objectives, and this activity may be quite free from locational constraints, if not from locational preferences. It is also frequent to see the formation of branch plants separated from the head office, since the professionalization (depersonalization)

of roles and the routinization of communications permit control of production, deliveries, etc. by standard messages.²²

In a newly-industrializing country most industries will be "new industries." Even those which in developed countries are well established and standardized may, in the developing country, be expected to undergo an extended period of adaptation as management, technicians, and skilled workers learn their business, as production methods are adapted to local conditions, and as demand defines itself. The most commonly noted of these adaptations arises from the differences in relative costs of factor prices in developing countries. Typically labor will be less expensive and capital more expensive, and the technology may have the often difficult adaptation to a more labor-intensive process. During this period of adaptation, the city will typically be the most hospitable seedbed. As the industry matures, it will exhibit a greater tendency to seek other locations, although it may be detained by the factors already noted of poor communications, traditions of direct personal contact, etc.

Countries which are starting on the road toward industrialization will, by definition, have a larger proportion of "new industry" that will contribute to an apparent over-urbanization of excessive concentration. With development and a larger base of established industry, the new industry that seeks the externalities of the

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It may be hazarded that most countries, both developed and developing, which have tried to decentralize industry have had more success with distant locations for large, integrated complexes which are largely self-contained than for smaller industries, in spite of techniques such as the industrial estate.

city will constitute a smaller proportion of all industry, and the location of industry as a whole will become more decentralized. At the same time, as the nation advances toward economic development, one may expect changes which will facilitate such relative decentralization. Thus, the quality of infrastructure and of information about local conditions will become more even across the national territory, as will the adaptability of the population to modern conditions of production by reason of increasing literacy and habits more suited to the required roles.²³ A sectoral shift may be expected in the structure of the national economy, with a typical relative shift from the dominance of raw materials for export and easily-produced consumption goods to a more significant level of processing materials within the national territory and, ultimately, to greater production of intermediate and capital goods. Insofar as the productive structure de-emphasizes imports of intermediate goods and consumer goods and as exports of materials decrease in relative importance, the great cities will lose some of their attractive powers as ports. On the other hand, the tendency toward relative decentralization may be slowed by the shift to nationally-produced intermediate goods which are likely to find both their materials and their markets within the large existing concentrations, and therefore to be very much oriented toward the existing centers of production. Further, the national

²³This argument is that associated with A. Hirschman; see his chapter "Interregional and International Transmission of Economic Growth," in The Strategy of Economic Development, *op. cit.* It is developed in some detail in W. Alonso, "Urban and Regional Imbalances in Economic Development," Economic Development and Cultural Change (forthcoming).

market for these products will be probably relatively small, so that production runs will be typically short and tailored to the particular order. As we have discussed above, such a dependence on close contacts and on externalities will lead to concentration of these industries in the existing centers. In spite of the possible effects of some sectoral shifts, however, the maturation of industries and of physical and social infrastructure argues for a natural process of relative dispersal of development to secondary centers.²⁴

²⁴A dissenting view appears in P. Hauser (ed.), Urbanization in Latin America, United Nations, Economic and Social Council (Belgium, 1961). It is argued there that producer goods and capital goods tend to choose production sites close to the necessary raw materials. This view seems to slight not only the great pull of the market, but also the fact that most of the inputs into these activities are themselves manufactures rather than "raw materials."

IV. LOCATION OF INDUSTRY FROM THE POINT OF VIEW OF PUBLIC POLICY

Most of the considerations outlined in the preceding pages regarding private enterprise apply with equal force to projects in which the location decision is the responsibility of government. Thus, it has been suggested that managers tend to overestimate the profitability of the center relative to the hinterland because they lack objective knowledge about conditions in the periphery, because of the relative ease of making new investments at the center, because of the strong preference for the metropolitan environment, and because of lack of interest in the periphery per se.²⁵ In this paper, taking a very similar list of considerations, it is argued that such behavior by entrepreneurs is quite realistic, using a probabilistic logic which discounts the unproven expectations of the hinterland in proportion to their uncertainty and the delays in their coming to fruition. Economic models that assume full information are unsuited to the conditions in developing countries; the lack of information should not be treated as an accidental complication. In point of fact, the lack of information is a structural aspect of underdevelopment. Data presumes records, a paper culture, a sophisticated and technically competent bureaucracy, and sufficient demand for the information from

²⁵A. Hirschman, The Strategy of Economic Development, op. cit., p. 185.

government and private decision-makers and technical staff to justify the heavy investments necessary to gather, store, and retrieve the information. These conditions are not met in developing countries.

Bryce points out that in developing countries, where the economic base is small and precarious, the appropriate strategy is one of production rather than innovation.²⁶ One of the profound disadvantages of underdevelopment is that, since resources are few, enterprises with high probability of failure must be avoided if safe although less profitable alternatives are open. One of the advantages of the larger size of developed countries is that it permits them to assume the risks of innovation, since enough experiments are undertaken to guarantee that the failures will be more than compensated for by the successes. In the same sense, the choice of a hinterland location in a developing country may be regarded as an innovation. Only nations whose economy has become sufficiently large and secure will be able to afford the risk of failure. Similarly, large firms consisting of several plants will be those most likely to take the chance.

The identical logic applies to the location decision by a governmental agency entrusted with one or a few projects. Rational programming at the level of the individual agency will lead to location decisions which are virtually indistinguishable from those of private enterprise. It is only when agency programming is informed by national policy considerations that the location decisions may vary. The following pages will sketch some of the problems and techniques of linking national policies and agency programs.

²⁶Bryce, Industrial Development, op. cit.

The national government in many countries is engaged in a great many enterprises and, by comparison to the individual agency, may have more of the advantages of size just mentioned and thus be able to afford a more adventurous policy, risking a few failures in exchange for greater overall returns.²⁷ The problem is how to transmit this overall strategy to the programming agency. One possibility is to require that agencies examine alternative locations before arriving at the decision. Such a policy is not without costs, in spite of its deceptive modesty. It may stretch very thin the technical resources of the operating agency; it may delay the initiation of projects; it may invite irrational decisions by stirring up a hornets' nest of political pressures, and it may cost a surprising amount of money. Yet this policy may be indicated if there is an expectation that enough advantages will be uncovered to compensate for these costs.

²⁷Size makes it possible to take advantage of risky situations. Thus, the rich countries, the large companies with several plants, and the government as the representative of the national economy are big in comparison to the single-plant enterprise and are better able to chance distant locations. This has to do with the notion that, under diminishing marginal utility, a possible loss of a given size is more hurtful to a smaller actor. The first discussion of this principle is by Daniel Bernoulli, whose "Exposition of a New Theory of the Measurement of Risk" (1730) appears in translation in H  observed "that a man who risks his entire fortune acts like a simpleton, however great may be the possible gain," and that "it may be reasonable for some individuals to invest in a doubtful enterprise and yet be unreasonable for others to do so." A great deal of current interest in this line of reasoning has resulted from its presentation in J. von Neumann and O. Morgenstern, The Theory of Games and Economic Behavior (2nd ed.; Princeton, N.J.: Princeton University Press, 1947, Ch. III and Appendix, "The Axiomatic Treatment of Utility."

The principal reason for this possible divergence between national policy and private or agency decisions is that the national government is, or should be, concerned with national profitability rather than with project profitability. The costs of examining alternative locations compared to the probable benefits may be excessive when they are calculated for individual projects, but costs and benefits may be quite different if we consider a large number of projects simultaneously. This is only one of many instances of this principle. Its basis is that the national government represents the nation and therefore should take into account the external effects of actions while the single public project typically carries its books in a manner quite similar to that of a private enterprise. The next few pages will mention some of the principal ways of introducing a consideration of economic costs (as distinct from money costs) into the location decision by the agency.

The most general influence upon the location decision flows from a possible difference in the interest rate applied to capital costs and the discount rate applied to future profits.

The appropriate rate upon which to calculate interest costs on public investment has been the subject of considerable recent discussion. The arguments are complex and there is no unanimity on the proper rate, but a substantial number of economists hold that a rate should be used substantially below the interest rate prevailing in the free market. Obviously, such a lower rate would favor alternatives which use more capital than the alternatives which would be chosen by free-enterprise or by government using higher rates. If agencies in charge of projects

were directed to base their calculations on cheap capital, it might favor distant locations when such locations required larger investment in infrastructure. Similarly, a policy which made capital relatively cheaper would favor investment in plant and machinery, which, we have argued, is more typical of standard-product industries with long production runs.

It has also been argued that the rate of discount to be applied to the future stream of income should be lower for public projects than that used (often only implicitly) by private entrepreneurs. Among the arguments for this proposition is the permanence of institutions and the society they represent, compared to the briefer and more uncertain lives of individuals and private concerns. If public agencies are directed to apply a low rate of discount to future earnings, they will be less influenced by delays in the realizing of the advantages of distant locations. As has been mentioned, these delays may stem from the length of time necessary to develop the labor force, or from a lengthy period of adaptation of production processes to local conditions, or from the time it takes to establish efficient regular procedures of communication with suppliers and customers.

These three simple directives from a central planning agency to operating agencies might alter the location decisions in some projects, and it may be conjectured that they would favor to some degree hinterland locations. On the other hand, it must be recognized that in reality many developing countries are politically unstable, and that a particular government, or some officials within a government, may want to obtain even quicker results than

private entrepreneurs. In such cases they will have a very high discount rate and favor projects with very quick returns.

They will shun distant locations because the exploration of alternatives would delay the project and because projects built near the centers of population have greater show-case value.

Whether or not such considerations are valid, they are certainly present in many cases, and no technical means exist to evaluate the relative value of political stability.

Still, the decisions to explore alternatives, to use a low rate of interest, and a low rate of discount are only a beginning toward the assessment of economic costs and benefits which reflect the national interest, as opposed to the assessment of money costs and benefits which characterizes private and most public-project accounting. Other steps can be taken, some of which are relatively simple. For instance, if one of the inputs bears a government tax, its economic cost would be obtained by deducting the tax from the purchase price;²⁸ conversely, if one of the inputs receives a subsidy, the cost of the subsidy should be added to the price. The general principle is that taxes and subsidies are transfer payments and should be eliminated from the money costs in order to arrive at the economic costs. The cost of land (exclusive of improvements upon it) presents a particularly difficult theoretical and practical problem in this respect. The purchase of leasing or land for a project is, of course, a money cost, but insofar as the transfer of money only transfers the

²⁸In some cases the tax may be, in effect, a charge for services or facilities. In such cases, the tax should not be deducted.

asset (land) from one holder to another, it is not an economic cost, and should not be counted among the economic costs. But it may also be argued that the price of land represents the opportunity costs which are foregone by excluding some alternative use for that land; if this view is accepted, land costs should be taken into account. Thirdly, it may be argued that the price of land, particularly if it has been unoccupied or little used, is some measure of its productivity in the intended use (say, as a location differential rent) and consequently should be counted as benefit rather than as a cost. The matter is far from clear, and this author is inclined to disregard the cost of idle land either as a cost or as a benefit from the public point of view. Land which is in use should be treated as a cost to the extent of its advantage over an alternative location for the use being displaced and the costs of transferring it.

The techniques of cost-benefit calculation are only now evolving in the developed countries, and they encounter new difficulties in their adaptation to the developing ones. There are practical reasons for this, such as the scarcity of technical personnel who know how to employ these techniques, but there are also fundamental theoretical reasons. Two will be mentioned here. First, the economic cost of an input is the marginal cost of producing it and delivering it. From economic theory and ease of procedure, if not from empirical observation, it is commonly assumed in the developed countries that the price of an input is the marginal cost of production. This assumption is far shakier in a developing economy, where the pricing mechanisms are

more capricious, the economy less integrated, and money a less certain medium (in part because of inflation). Thus, the assumption that price equals marginal cost is less tenable. Second, because of the small size of underdeveloped economies, the calculations of cost-benefit analysis may be regarded as a partial differential of a general equation for national income, in which the final net benefit is the net of the effects on the various sectors of the national income of introducing a change: the project. That is, it is a sum of marginal effects. In a developed economy, with a large national income, any one project will be small in its effects and these marginal effects may be normally taken to be constant rates. But in a developing country, starting from a small economic base, a project is likely to be large and to have profound structural effects, changing, for instance, prices and rates of output. Such considerations make the application of cost-benefit techniques in developing countries more difficult, but it may also be argued that the relative scarcity of capital makes them more necessary. In using these techniques, there is call for a greater awareness of their limitations and of the many important factors which do not enter into the calculations.

The calculation of marginal costs can be difficult, but its difficulty can be exaggerated. For instance, if the transport system is under-utilized, the actual transport costs are likely to be lower than the freight charges, and an educated guess may be sufficient if an exact measurement is not possible. Or, if the transport system is overloaded, the marginal costs may be far higher. A precise evaluation may be impossible because it involves,

for instance, the costs of congestion borne by others. It may be sufficient operationally, however, to use money costs inflated by some very rough estimate or money costs may be used merely with a warning that this is an underestimate.

Far more difficult is the evaluation of external effects. For instance, the location of a particular project in some particular locale may make it possible for other enterprises, either public or private, to come into existence, and this should be counted among the benefits. Of course, the wages of labor which would otherwise remain unemployed should be counted as a benefit from the national point of view, but it may be more difficult to estimate the increase in economic activity that this increase in demand causes. The use of a multiplier is indicated, but it would be far less reliable than in a developed economy in that the response to increased demand may result in sharp price effects because of inflexibility on the supply side.

The problem of city size has been discussed by many, and often forms a cornerstone of location policy in both developed and developing countries. In general, most nations seem to feel that their principal cities are excessively large; consequently, they follow policies of decentralization, particularly for manufacturing industry. The factual basis for this policy is lacking: no one knows when a city becomes too big. Nonetheless, this concern is so central to so many countries that some of the theoretical aspects will be discussed here. In general, it is based on a belief that some set of costs rises after cities reach a certain size. Among the costs mentioned are those of traffic congestion,

water and sewage disposal, shelter, policing, and some social costs. While it must be emphasized that there is no empirical verification of the fact of rising costs, the argument, in one of its most sophisticated forms, runs thus: any particular businessman or government agency, in moving into a congested center, will pay only the prevailing or average costs for labor, food, movement, utilities, etc. The addition to the size of the city of this new activity will change these costs only imperceptively for any user. The marginal costs (that is to say, the addition to total costs) of the new arrival, however, will be much larger than average costs. Thus, if costs are rising with urban size, new activities will continue to be attracted to the city far beyond the point at which the increasing marginal costs begin to make this a relative or even absolute loss from the point of view of the national economy. A cost-benefit analysis would use the marginal costs produced by the external diseconomies of congestion, etc., in evaluating that location. If we knew what these costs were, the central planning agency might require operating agencies to use them in their calculation and the government might charge private businesses the full costs by some form of taxation.

It was pointed out in an earlier section that there are reasons to believe, however, that productivity may also increase with city size. Among the factors mentioned was the facility of communications and the availability of information, the availability of specialized services, the richness of inter-industry linkages, and the principle of massed reserves. If productivity increases with urban size, then the project or the businessman

will take into account only the effects of these externalities upon his firm, which in a sense may be termed the average productivity. But the project will not take into account, under normal procedures, the external economies that it produces for other activities. In other words, the symmetrical analysis should be performed on the benefit side as on the cost side, and the public agency should take into account the marginal effect on total production in the city. If productivity is rising with size, marginal product will be considerably larger than average product. No more do we have reliable information as to whether productivity rises with urban size, but a great deal of corroborating evidence suggests that it does. The magnitudes involved in terms of per capita income, net regional income, value added per industrial worker, local government expenditures, and cost of living indexes for those few countries in which they are available, suggest to this writer that marginal product is far greater than marginal cost for large cities, and consequently that anti-urbanization policies are in error with respect to the goal of national production, for they compare marginal cost to average product.

The external benefits of a hinterland location are even more elusive. The contribution of the project to the external economies of the location must usually be estimated not for an existing center of economic activity, but for a future one to which the particular project will contribute. Clearly, if we find it difficult to evaluate the external effects in cities that exist, it will be even more difficult to do so where the development is yet to come. This is particularly true if we believe that there

is a minimum critical threshold or take-off size for a growth pole. Current models used to calculate growth in a local economy as a result of new industry, whether simple multipliers or more complex input-output or money-flow models, might be called incremental growth models and do not lend themselves to the study or prediction of the quantum jump implied in the concept of critical size. Other important considerations do not lend themselves easily to measurement. Three will be mentioned here. First, the project may contribute to the transformation of society in the less advanced parts of the country to new attitudes, new awareness, and new patterns of behavior better suited to economic advancement. In other words, a hinterland location may be viewed as an investment in human resources which may be of greater significance than the located project itself. Second, the location of a project in the hinterland will usually promote knowledge about that locality and help integrate it into the information web of the more advanced sectors of economic activity. The increase of information will reduce the discount arising from uncertainty which is applied to other possible projects at that location. In so doing, it lowers the threshold at which local opportunities become attractive, and several new enterprises may become feasible. Third, it was mentioned earlier that most developing countries, especially those with a colonial background, feature their most important development in coastal cities. In some of these countries a turning inward, towards the "empty" hinterland, may have significance as a symbolic act of national identification, creating a new frontier to call forth the enthusiasm and energy of the people.

from outside the region may raise the per capita income of the region but lower the welfare of the original inhabitants if it introduces shortages or higher prices. Similarly, a project located outside a region, by draining off some of its surplus labor, may in fact raise per capita incomes both for those who leave the region and those who remain behind. Further, a policy of developing growth centers in backward regions may (or may not) decrease the inequality of incomes between regions, but increase them within regions. It is unclear in many cases whether the objective is to decrease inequality of income distribution for the national population as a whole, with the region serving as an instrumental concept for the guiding of policy, or whether the regions are viewed as organic entities so that the equalizing of incomes among regions is itself the objective. A full discussion of these issues is clearly beyond this paper and is unavailable elsewhere. Only a few observations will be made.

In mixed economies, the use of lower rates of interest, government loans or insurance of capital investment, or direct investment by the government are among the common devices to induce industry to locate in the hinterland. It should be noted that there is a certain irony in the use of these inducements, for they will operate most strongly for industries which are capital-intensive, and, if technical substitution is possible, it will encourage them to substitute capital for labor since they make capital cheaper. Such industries will tend to rely on skilled labor, which will often be brought in from outside the region, and will usually be large-scale industry, which, as has been

V. REGIONAL POLICY AS A LOCATION FACTOR

Regional policy is not commonly regarded as a location factor in its own right. Rather, regional policy is viewed as the basis of particular programs and actions which modify other factors. Thus, capital may be made cheaper in certain locations by preferential rates, or the disadvantages of a distant location may be mitigated by a subsidized transport rate, or, in more extreme cases, certain locations will be forbidden and others may be made mandatory by government decree. But regional policy in itself may operate as a location factor in developing countries, over and above particular government actions to modify the other location factors.

Much of the preceding discussion was based on the failure of the conditions assumed by classical location theory to match the conditions in developing countries. Among the divergences are the following: (1) in developing countries there is a general scarcity of information and a greater scarcity in the less developed areas of those countries; (2) in a country undergoing development, the modern economic base will be relatively small; therefore, changes are likely to be relatively swift and radical, so that there is more structural fluidity and less validity to the traditional assumption of "all other things being equal"

of the traditional theory; (3) the shortage of entrepreneurial, managerial, and technical personnel in and out of government is one of the principal constraints upon development.

Given these departures from the world of classical economics, the very existence of a regional policy may affect the location of some projects. For instance, an announced and publicized decision to develop some provincial center may call the entrepreneur's attention to that center as a possible location independently of the concrete steps taken to develop it, whereas if no center were designated by the government the entrepreneur would not know where to look in the provinces and he would be more likely to settle in the principal cities. If there is some degree of confidence in the constancy and efficacy of government action, the general statement of regional policy serves for the analysis of projects to reduce uncertainty about the structural changes that may be expected in the nation's economic landscape, thus lowering the discount applied to expected returns to allow for uncertainty. Of course, the simple fact that regional plans normally contain a collection of information about the region will serve to increase available knowledge about it. Thus, the regional plan will play a role in reducing uncertainty about present circumstances and future structural changes.

This suggested effect of a regional plan is in some ways similar to the French concept of indicative planning: when diverse activities have common interests, it is sometimes sufficient to point to a common goal, without need for either commands or special inducements. Imagine that several projects are about to be undertaken,

some by the government, some as plants of private concerns. In the absence of a plan, some will locate in the principal city and some will locate here and there in the interior. Designation of a locality as a growth locality may inform several of these activities of the opportunity of coming together and benefiting from mutually induced externalities.

It must be understood, however, that such a function of the plan does not absolve the government from a responsibility for concrete action or from the need to study and prepare for the complementarity of needs of the participating activities, including governmental investment in infrastructure.³⁰

The indicative function of the regional plan is not without problems. The plan itself will be drawn in the midst of uncertainty as to what is possible or even desirable, and will probably need frequent revision as more is learnt about actual circumstances and opportunities. The success of the indicative function, however, depends in large measure on the confidence of the participators in the stability of the plan and the commitment to specified objectives. If these change frequently, the utility of the plan as an instrument to reduce uncertainty will be negated.

³⁰ Among regional planners, balanced regional growth usually means either that all regions grow at the same rates or that the slower regions grow faster to catch up with the more developed ones. It has recently been pointed out that the "big-push" sectorially-balanced growth strategies of Rosenstein-Rodan and others, which stress the complementarity of certain sectors, is likely to result in sharp differences in regional rates of growth, with a bias toward the more developed centers, thus leading toward greater regional inequality and "unbalanced" regional growth. See W. F. Ilchman and R. C. Bhargava, "Balanced Thought and Economic Growth," Economic Development and Cultural Change (July, 1966). In the terms developed above, balanced sectoral growth is oriented to the goal of national growth, and balanced regional growth to the goal of equalization.

The shortage of entrepreneurs, managers, and technicians represents a narrow national capacity to collect and evaluate information. The common injunction that location decisions in each case be made after a careful examination of a multitude of variables is not realistic. Alfred North Whitehead has observed:

It is a profoundly erroneous truism, repeated by all copy-books and by eminent people when they are making speeches, that we should cultivate the habit of thinking of what we are doing. The precise opposite is the case. Civilization advances by extending the number of important operations which we can perform without thinking about them. Operations of thought are like cavalry charges in a battle--they are strictly limited in number, they require fresh horses, and must only be made at decisive moments.

Thus, one of the principal functions of regional planning may be the economizing of scarce project-planning energy. It achieves this by indicating probable decisions for classes of projects and by foreclosing other decisions. A plan may indicate what types of industry may decentralize and what types should continue to concentrate; it may indicate the likeliest locations for industries with certain characteristics; it may insure rates of return on locations that suit certain general objectives, etc. Mention has already been made of indicated rates of interest and discount which might be made to apply for public projects. Similarly, shadow prices³¹ or techniques for computing them may be indicated by a central agency for some commonly used inputs so that these do not have to be recalculated by each project which undertakes a cost-benefit analysis. And, of course, certain information can be provided and distributed, including projections of basic variables for general use.

³¹Economic costs when they differ from money costs.

Two aspects may be distinguished in the use of regional planning to economize on the demands placed upon the managerial and technical resources. The first is the production and distribution of information which can be used by more than one project. The second is the ability to take an overall view of the evolving spatial structure of the national economic landscape in the process of development. Overall patterns may be discernible in the whole which are not apparent in the individual examination of projects. Examples of this are information on the success or difficulties of certain types of locations for certain types of industries, or a long term perspective for the growth of particular localities such as secondary centers in the interior, or aggregative projections of traffic volume on certain arteries which can indicate when saturation may be expected. If a long-range view is taken of the economic macro-geography of a developing country, it is certain that there will be fundamental structural changes, although there normally will be considerable uncertainty about the precise form of these changes. Project analysis, on the other hand, tends to work within a constant structural matrix while focusing in greater detail on the specifics of the action being considered and to use short-run curves. The rapid change of the econo-geographic matrix when development occurs makes the use of short-run curves and partial analysis less valuable for developing countries than for developed ones.

In the absence of limitations on technical resources, both the aggregative macro-geographic and the detailed project studies should be carried out in full. But since sharp limitations

exist, the aggregative analysis can usefully substitute up to a point for the detailed analysis, and a mixture of these approaches will be more fruitful than exclusive concentration in either one. If only detailed project analyses are carried out, their joint effects and their longer run consequences will not be anticipated, and important opportunities will be missed from lack of awareness of broader trends. If only the generalized analysis is pursued, many projects may have disastrous results from having overlooked important details, or equally important, the nation may find itself with excellent general policies, but without concrete programs or specific projects to give substance to the policies.³² In short, the lack of information in specific cases, the lack of technical personnel, and the rapidity of change in developing countries place a special premium on rules-of-thumb, general guidelines, and policy.

Although profound changes are certain in the structure of the economic landscape of the nation, our present knowledge is too tenuous to permit anything but guessing as to the nature of these changes. It is necessary to make these guesses, but new information and the fact that any vision of the future is a compound of judgment and opinion will result in a tendency to instability of regional plans. It must be re-emphasized that frequent changes will reduce the importance of regional policy as a surrogate for information by undermining the confidence of project planners in the validity of that vision of the future. At the

³²This vital point is documented in A. Waterston, Development Planning: Lessons of Experience (Baltimore, Md: Johns Hopkins Press, 1965).

same time, when new and better information and fresh insights become available, new visions of the future will arise. Thus there is a tension between the function of the plan as a stabilizer in an excessively fluid situation, and the logic of continuing planning, feedback, and revision in the light of increasing understanding. No easy solution presents itself to this dilemma.³³

It may also be noted that, insofar as regional plans both produce and substitute for information about the national economic landscape, they will be of greater influence as a factor of location for mature industries than for industries that are getting under way. The latter still face uncertainty as to processes, relations to complementary activities, and other factors which call for adaptability rather than predictability, and therefore they will continue to favor the principal cities. On this basis, it may be hazarded that the influence of regional policy per se as a factor of location will be strongest in the middle stages of economic take-off, after the beginnings but before maturity, when the patterns have become clearer and information a matter of course.

In conclusion, two general points must be made in regard to national regional policy. The first is that in geographic terms, economic development may be viewed as the integration of the economy over the national territory. By this is meant the elimination of irrationalities in the production and exchange of

³³A particularly thoughtful discussion of the relation of scientific knowledge and the exigencies of the actual situation in regional planning is available in J.R.P. Friedmann and W. Stohr, "The Uses of Regional Science: Policy Planning in Chile," Papers of the Regional Science Association, XX (1967).

goods and services throughout the country, overcoming ignorance, prejudice and inertia, and facilitating the means of exchange among diverse parts of the nation.³⁴ In this respect, the nation must look not only to the production and even the immediate external effects of any project, but also to its modernizing influence upon the local population and its force as an integrator of that part of the nation and its human and natural resources into the fabric of the modern nation which is trying to come into existence. Needless to say, there are no quantitative or other scientific methods to evaluate the trade-off between economic efficiency of a project and its long-range effect in the making of a modern nation.

The second has to do with the fact that in most countries, regional planning is done by the executive branch, and budgetary and perhaps substantive approval is reserved to the parliamentary branch of government. The executive branch is divided principally into sectoral or functional divisions such as ministries. The legislative branch, almost without exception, represents territorial divisions. The technical planning function is usually housed within the executive branch, and most national plans thus far have been sectoral plans, formally or less formally representable in an input-output or some other social accounts table. The emergence of national regional planning in the past few years presents a formidable problem: as a technical matter, it belongs to the executive branch; as a territorial decision favoring or denying growth, it becomes of immediate and concrete importance

³⁴ See B. Balassa, The Theory of Economic Integration, op. cit., and J.R.P. Friedmann, Regional Development Policy, op. cit.

to individual legislators. It is therefore clear that the function of regional planning, in contrast to that of sectoral planning, will be continually disrupted and enriched by the introduction of local voices into the rumblings of professional technical discourse.

VI. SUMMARY

The location of industry has been discussed principally in terms of a choice between a principal city and hinterland locations. Classical location theory was reviewed briefly but it was stressed that, even within the terms of this theory, the objective of minimizing transport costs is a poor substitute for some real objective, such as maximizing of profits.

However, the assumptions of classical location theory relating to unlimited managerial resources, full information, predictability of the future, and "all other things being equal" are unsuited to developing countries. After consideration of the form of the transport network, we discussed the consequences of distance as time, of the personal space preferences of management, of lack of information about hinterland locations and the pressures for rapid development, and of some aspects of the labor force at hinterland locations. A broad definition of external economies included consideration of the principles of multiples, massing of reserves, and bulk transactions, relating them to city size, as well as the effects of the ease of communication, of national customs, and of the lack of standardization of procedures. These common considerations for the location of industry in developing countries were compared to those for infant industries in developed countries. It was suggested that much of the apparent overconcentration

of development in new nations is a functional aspect of the early stages of development.

Location of governmental industry will not differ significantly from that of private industry when only one project at a time is considered and calculations are based on money costs. It was suggested that directives to project managers to examine alternative locations and to use lower rates of interest for capital and lower rates of discount for returns might result in more hinterland locations. Some further considerations were outlined for evaluating location in terms of economic costs in the framework of cost-benefit analysis. It is unclear whether these considerations will alter the net balance of locations away from the principal centers, although it may change the locations of some industries. Reference was made to the public objective of inter-regional equalization as distinct from that of aggregate national growth.

Finally, regional policy per se as a location factor was considered as a substitute for and generator of information and as a useful device to conserve and stretch scarce technical manpower. Regional policy may also affect the logic of location decisions when it gives consideration to longer-run effects and the economic macro-geography of development.