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Allocation of Infrastructural Facilities

by Dr Olaf Hübler, Hanover *

Problems of geographical distribution of infrastructural facilities in LDCs cannot be tackled without reference to development strategies. This should mainly be based on the answer to the question whether development ought to radiate from a given centre of growth, or whether a broader distribution over the whole territory is preferred.

There is a comparatively wide choice of available distribution strategies for building up the infrastructure of LDCs¹. Which of them will be selected depends on the ultimate aims on the "lead time" anticipated, and on the question which preconceived intentions are to be served: those of world trading policies, or strengthening a given national or regional economy. Determining the kind of strategy to be applied requires also consideration of the level of development already reached by the region, the size of, and economic structures prevailing in, the region concerned, etc. Making decisions about the geographical distribution of infrastructural facilities must, moreover, not be carried out without reference to the overall development strategy pursued. In the present article, it is intended to discuss three different strategies on the distribution of infrastructures: promoting the historically-grown centres; supporting the peripheral growth of smaller centres; and creating a peripheral network well distributed over wide open spaces.

It might be argued that promoting development by building up the strength of historically-grown centres, in contrast to different strategies has definite advantages:

- ☐ In the historically-grown centres existing in LDCs, the standard of living is, locally, the highest, and they have already reached an elevated degree of development;
- ☐ By the relative density of population in such centres, and the contiguity of diverse branches of the economy, costs of communication and transport may be kept comparatively low, and marketing risks there are less dangerous than among the widely distributed, thinly settled rural population;
- ☐ More innovations turn up in conurbations than outside them, and they also enjoy there the highest degree of probability of becoming established.

This also suggests that building a modern infrastructure in the capital cities and other big centres, if they exist in LDCs, should be given priority. Already in-built advantages flowing from centres could be reinforced². In order to draw the benefits from a new infrastructure rationally, it is usually necessary to set up its facilities in larger and indivisible units, and therefore their concentration in areas with a high population density appears essential. There the required input, relative to output, is smaller than in sparsely settled districts. To concentrate, for example, improved education and vocational training in the most highly developed districts, that have grown naturally during the given LDC's earlier history, is advisable since bigger towns and cities where, generally speaking, the highest, locally-developed technology exists, can make the best use of superior levels of skill and education.

Before these problems will be discussed in greater depth, it has to be emphasized that growth of metropolitan infrastructures also strengthens the centres' attraction. More people will be drawn into them. Space use per surface unit by a growing population becomes denser, which is not at all an unmixed advantage. Growing pollution of the atmosphere and of all watercourses, more noise and traffic jams are among its disadvantages, and this list could be easily extended. Many research workers, for this reason, believe that they can assume an optimal size of towns and cities; which means that town growth, in its beginning, produces mainly beneficial effects superior to the deleterious influences that grow

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¹ Infrastructure is being subdivided into economic, social and institutional facilities; for this classification by branches of activity, cf. O. Hübler, *Probleme der wirtschaftlichen Infrastruktur in Entwicklungsländern* (Problems of the Economic Infrastructure in LDCs). Doctor's Thesis, Berlin, 1974, p. 16. The present discussion is focussing mainly on economic infrastructure.

² cf. F. Buttler, *Wachstumspole im Konzept der Entwicklungsplanung* (Growth Poles in Planning Development), in: *Voraussetzungen einer globalen Entwicklungspolitik zur Kosten- und Nutzenanalyse* (ed. R. Meimberg), Berlin, 1971, p. 186.

more slowly. After a while, however, the harmful consequences prevail, whilst the advantages at some hypothetical moment in time, reach their maximum³.

In examining the influence of infrastructural growth on inter-regional economic relations⁴ it is necessary to study its impact on both supply and demand of the two potential economic partners. In the case in question, this means a scrutiny of the effects upon the aided, already most developed part of a given LDC, and upon the areas situated on its periphery. As far as new infrastructural facilities are set up merely within a centre, possibly only improving communications and transports within such a centre, this will not, initially, influence the peripheral areas that do not receive any aid. As already stated, within the centres, there will be new growth of demand for resources non-existent within or near these centres, consisting mainly of raw materials and farm produce, and the chances for increasing exports will be improved.

This alone will not do much to foster expansion of inter-regional trade. The improvement of transport system between the peripheral areas and the centres will lead to an increase of production only in so far as distant inland provinces are linked to the centres and can now, for the first time, increase their demand for metropolitan products. But this will only be possible by a reduction of marketing of native products.

This, on the whole, will permit allover growth of a national economy only via strengthening demand for the products of peripheral areas. Building up a new infrastructure for the centres is a positive contribution to this aim. The only dubious question, however, remains whether this will increase the volume of supplies available in marginal areas.

On the other hand, pure raw material producers will receive certain motivations from the growth of the centres. If the demand of urban industries for raw materials rises, this will create increased employment at the source of the required commodities, subsequently raising income that will be translated into higher overall demand of the periphery. While farming frequently drags along the feudal shackles, raw material production will be able to grow parallel with increased demand. Raw material exploitation cannot occur without traffic connections between the places of com-

modity extraction, and the economy of the centres, so that the latter will reap the benefits of the increase of their own demand. They will be able to absorb part of the increased revenues of the raw material producers through supply of urban products. On the whole, this will cause growing imbalances within the region concerned. Apart from its natural resources, the periphery cannot offer anything useful to the centre. That again means that its demand for products of the centre will aim merely at machinery and tools for supporting raw material output, and at goods needed by the ultimate consumers. All this restricts long-term economic growth within narrow bounds.

As shown in the discussion of a strategy aiming at centralized foci of development, its most aggravating shortcoming is its trend towards increasing the sharp contrast between economic centres and marginal areas. Any overall and integrated growth will be hampered by it. It should be possible to obviate such distortions by a strategy of widely distributed help, based on dispersed investments in new infrastructures in those areas that have remained most underdeveloped.

However, it is the question whether the scarcity of capital funds existing within LDCs allows an equitable distribution of investments by the authorities over backward areas, which could engender visible improvement. Advice against such a strategy might be drawn at least from the initial phase of supporting Southern Italian economic growth (1951–57), when new infrastructural facilities were set up in the Mezzogiorno without concentrating help on certain selected centres⁵. Investments in a new infrastructure can only create tangible benefits, together with other measures, on condition that their volume rises above a certain minimum⁶. In order to promote national integration towards greater social mobility and more equitable regional distribution it would, consequently, be necessary to support deliberately the growth of medium-sized towns in areas which appear most capable of economic growth⁷.

Locally concentrated new infrastructures, at any rate, will make medium-sized towns more attractive to immigrants. Migration, in itself, however, will be more strongly stimulated by an infrastructure traversing larger areas. Whether such popu-

³ Such assumptions have been empirically tested, e.g. by T. Hermansen, in: *Development Poles and Related Theories: A Synoptic Review*, in: *Growth Centers in Regional Economic Development* (ed. N. M. Hansen), New York, 1972, p. 192 et seq. — However, so far, any convincing proof is missing that there is an optimal size for towns and cities; cf. F. Buttler, *Entwicklungspole und räumliches Wirtschaftswachstum* (Development Poles and Economic Growth in Space), Tübingen, 1973, p. 90.

⁴ Economic relations with foreign countries are not to be discussed here.

⁵ cf. H. B. Chenery, *Development Policies for Southern Italy*, in: *The Quarterly Journal of Economics*, Vol. 76 (1962), p. 515.

⁶ cf. E. von Böventer, *Die räumlichen Wirkungen von öffentlichen und privaten Investitionen* (Regional Effects of Public and Private Investments), in: *Grundfragen der Infrastrukturplanung für wachsende Wirtschaften* (ed. H. Arndt and D. Swatek), Berlin, 1971, p. 187.

⁷ For example E. Egnér advocates this approach in his "Regionalpolitik in einer unterentwickelten Volkswirtschaft" (Regional Policies in Underdeveloped National Economies) inferred from examples in Latin America, in: *Probleme der Wirtschaftspolitik in Entwicklungsländern* (ed. W. Guth), Berlin, 1967, p. 118.

lation movements are desirable cannot be determined in advance by *a priori* reasoning. For making up one's mind about such questions, it is indispensable to know which areas of a known economic structure will lose parts of their population by emigration. Wherever a given LDC's farming operations are characterized by hidden or openly visible unemployment — as often is the case — the flight from the land may have beneficial effects, provided, however, that in the medium-sized towns, which attract such migration, economic activities are stimulated that set up new jobs. It is necessary to examine such processes with virtually unmerciful caution and scepticism. A mere creation of a new infrastructure will not be sufficient to set up the desired employment effect. Least probable is the growth of industries subservient and complementary to existing branches of a given economy which are particularly important to further development. For unskilled native entrepreneurs ventures of this kind are too risky⁸. In some cases, evolution of such light industries fails to begin because only such manufacturers take the plunge to open up business in medium-sized towns who are independent of (non-existing) other industries likely to become their clients. New industries will also seek independence from intermediate materials which they would have to buy from other manufacturers⁹. The latter two reservations might even operate in larger agglomerations, though there the risks of marketing might be less threatening.

These weaknesses of medium-sized towns can be overcome only by building new roads and/or other means of transport, upon which fast growth of trade is conditional. There is a difference between new access roads from medium-sized towns with their hinterland, and those from medium-sized towns to big cities, or between several medium-sized towns.

The expansion of trade with the hinterland will, in the case of a medium-sized town, have to overcome similar obstacles as in the case of historically grown big centres. But roads and/or railways leading from medium-sized towns to big centres will bring far greater advantages to the latter than to medium-sized settlements. In this case, it will be more likely than with the promotion of the centres that an evolving periphery develops a higher demand for the products of the big city. This trend had already been recognised in our discussion of probable effects of new traffic links between big cities and smaller, peripheral ones. This will be especially the case

when, for utilizing the new infrastructure set up on a local basis in the smaller centres, it is necessary to buy new facilities and equipment which are available only in the metropolis or in industrialized foreign countries. When producers resident in medium-sized towns import new technologies, this may only aid rationalisation of their processes and not the expansion of their productive capacities. If that is the case, the growth induced on the metropolis will be short-lived, unless producers in smaller centres are compelled by competition to continue to invest all the time in order to improve their technology.

Even after development in medium-sized towns has made a start, the big cities will keep their progress within bounds. Enlarging or creating industries of the same kind as those operating in the metropolis will be possible only if competitive advantages of producing in the bigger cities are not considerably superior to those prevailing in smaller towns. However, if metropolitan businessmen participate immediately in the promotion of peripheral zones, in the case discussed: the medium-sized towns, it cannot be safely predicted when and how the economic differential between centres and marginal areas can ever shrink. If that is so, it may be worth considering to abstain from creating new connections between the big cities and the outlying areas during the first stage of economic development, or even to cut existing traffic arteries. After such a measure has been taken, it may be the case that metropolitan companies fall behind with their own trade with smaller centres, which could persuade them to migrate to medium-sized towns or to set up branches of their own there¹⁰. Where there are ample traffic links between big centres and medium-sized towns, there will, on the one hand, be emigration of labour to the centres tending to abolish the wage differential between differently developed areas, and on the other hand, the relative importance of transport costs will be reduced.

What remains then, will only be the expansion of trade among medium-sized towns. If the goods exchanges through this are mainly substitutive, this might create keener competition, enforcing the introduction of better manufacturing processes. Should smaller centres be distributed over the whole area relatively evenly, geographical distance and transport costs generally become prohibitive, and there will be absence of true competition between the regional centres.

Demand will rather grow more quickly through the exchange of goods that supplement each other, which means that smaller centres special-

⁸ cf. H. Körner, Industrielle Entwicklungspole als Instrumente der Regionalpolitik in Entwicklungsländern (Industrial Development Poles as Tools of Regional Policies in LDCs), in: *Kyklos*, Vol. 20 (1967), p. 694.

⁹ F. Büttler in his "Wachstumspole, . . .", *ibid.*, p. 185, points this out.

¹⁰ J. R. Lasuén indicates the possibility of such trends in: *On Growth Poles*, in: *Growth Centers in Regional Economic Development* (ed. N. M. Hansen), New York - London, 1972, p. 35.

ize in different manufactures, yet this may again suppress the incentives for technological improvement. An economic strategy favouring small production and trading centres is in a dilemma: apart from the possible insufficiency of the initial ignition the distances between them are too wide.

The obstacle consisting of over-large distances can be overcome by setting up smaller trading centres as a tighter network. But since LDCs are weak in their funding capacities, it follows that only one large space can be planted with a number of small centres. This necessitates decisions about the following questions:

- ☐ where to locate the large space to be aided;
- ☐ how many trading centres are to be built and of which kind they are to be;
- ☐ how large the maximum distance may be from centre to centre.

Once the problem of maximum distances is overcome, a further question remains to be answered: Given that building of an infrastructure is to precede industrial development¹¹, in order to attract settlers, there is the alternative of preference for a local traffic network and infrastructure or for traversing whole areas. The latter will lead to population movements which do not favour bigger centres, whilst the former will attract people to the local towns, which means that it is to be preferred for an overall development of large spaces. As already stated, a new infrastructure, by itself, will not set up sufficiently strong incentives for attracting private investments in the desired strength. It will be necessary to build up at least one major and several smaller industries in every centre for promoting economic development of a large space.

During the initial stage of development, little scattering of spending for consumption will take place, and this will have more a centralizing than a decentralizing effect. On the other hand, once there have grown agglomerations that are not yet too big, their effect will tend to favour lateral growth. This makes transport costs the first dominating influence determining geographical spread. Only at a later stage, also spending of incomes earned will be scattered more widely and will thus cause a more widely spaced distribution of production plants¹².

Lateral expansion of marketing, especially of complementary goods, and all the other centri-

fugal forces will strive, for reasons of proximity and the relative potential of demand, mainly to reach neighbouring small centres of trade. In this way, the diverse trade centres will tend to coagulate into larger centres. Integrating a larger economic space is desirable, not only to improve marketing facilities, but because the flow of information is strengthened within its boundaries. In highly developed industrialized countries, the flow of information is less dependent on geographical contiguity, because there exist mass media, and individual businesses tend to spread both laterally and into diverse sectors of the overall economy. Growing capital concentration also favours increased speed of transmitting information. For LDCs, on the contrary, lateral integration is of supreme importance¹³. The lower the development of a given economy, the more information will travel along inter-personal links, separated by the speciality of their jobs and/or professions. Spread of information will travel quicker and reach furthest, the nearer the individual messengers carrying information dwell to each other. The nearer such bearers of news are living, the lower will be the costs for carrying information.

Large space strategy is superior to widely scattered aid, because it sets up a larger number of local centres of approximately the same economic strength, each not very far away from the next. This favours innovation through competition and a quick flow of information. As the integrated space is not too narrow, the individual sizes of production plants will not necessarily be too small which makes their operations uneconomic. Specialization will also be encouraged.

Admittedly, also this kind of strategy carries risks and dangers. It is possible that the main weight of a big space's economy migrates from its smaller poles to a large, centrally-situated one, which would deprive the originally-laid connections between peripherally-situated poles of their importance, causing under-use of their capacities. This would mean that infrastructural investments have been sunk in the wrong places. But it will be even more important than accurately predicting such adverse developments to find the correct size of aid. The said strategy will always balance along a narrow ridge of success, aside of which there lurks failure. If aid is too puny, no true development effect will result and peripheral centres will founder in provincial isolation. Too lavish support relative to other backward regions might vitiate their own later development. This would give the developed regions dominance over their neighbours and increase inter-regional imbalances.

¹¹ On the relation between developing immediately productive facilities (i.e., mainly industrial plants) and an infrastructure, cf. O. J. Hübner, *Probleme der wirtschaftlichen Infrastruktur*, etc., *ibid.*, p. 237 et seq.

¹² About different trends towards spreading, cf. among others F. Voigt, *Wirtschaftliche Entleerungsgebiete in Industrieländern* (Regions of Economic Depopulation in Industrialized Countries), Cologne, 1969, p. 30. — However, it must not be forgotten that Voigt does not argue the case of LDCs.

¹³ cf., for this purpose, J. R. Lasuén, *On Growth Poles*, etc., *ibid.*, p. 30.