PLANNING

A SYSTEM OF

REGIONS

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Methods and Techniques of Interregional Planning

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"The time has come", the Walrus said,
"to talk of many things:
of shoes, of sealing-wax and ships,
of cabbages and kings."

Lewis Carroll

C O N T E N T S

PREFACE

The original (mimeographed) version of the present document was prepared in 1973 as part of a mission which the author was appointed by the United Nations Office of Technical Co-operation to carry out in the Universidad Nacional de Rosario, Argentina.

The favourable comments of an appreciable number of specialists who had an opportunity to read the original text, and the conviction that a study of this kind will fill a considerable gap in Latin American literature on regional development, appeared to warrant the publication of the document in a more formal guise, obvious though several of its limitations were.

Probably the chief of these limitations derives from the author's own professional training, strictly associated with economics as a basic discipline. Personally speaking, it is somewhat frustrating to be convinced of the interdisciplinary nature of regional planning and at the same time to feel the impossibility of possessing an equally thorough mastery of geography, sociology and town planning, to mention only three of the principal disciplines that play a part in the professional training of a regional planner. I may plead in excuse that wherever relevant I have attempted to accord due recognition to the contribution that can be made by the above-mentioned sciences to the drafting of a regional plan.

I imagine that criticisms may also be levelled at the supeficial or quasi-superficial treatment meted out to certain topics, particularly those covered by the general discussion in chapter I. It is mainly imputable to my feeling that these topics (such as, for example, concentration, regional disequilibria, dependence, etc.) have in some cases been the subject of specific studies, while in others they are too familiar to students of regional development for anything more than a mere generic comment to be justified on the present occasion. I may likewise point out that as far as most of these questions are concerned, a detailed study of them can be better made in the context of regional analysis than in the more normative context of regional planning.

I fully realize how modest is the result achieved in comparison with the far-reaching scope of the field of study propounded in the title. This does not imply a petition for the reader's indulgence, but merely a warning that the present work should be regarded as a first step to a much more ambitious intellectual undertaking in which, I am sure, other Latin American specialists are or will be taking part. Thus, one way of evaluating the present study, up to a point, is to consider it as a challenge whose worth as such will be judged in accordance with the type and quality of the responses it calls forth.

It is also needful, however, to recognize some notable gaps that are observable in relation to publications dealing with nationwide regional planning. While it is true that an appreciable number of valuable contributions does exist, almost all of them are restricted in character and an effort at synthesis still remains to be made.

Despite the considerable ground gained in the last two decades by regional planning as an instrument for the monitoring and orientation of development from the standpoint of how it affects the geographical space, the literature on nationwide regional planning methods is not particularly plentiful. The opposite

might be said of the literature on regional analysis techniques, which is swelling at a rate almost impossible to absorb. This is partly because nationwide regional planning efforts are of fairly recent date, and perhaps there has not been time to distill a more or less universal methodology for tackling the problem.

If we turn to the strictly limited universe of published books (or rather texts) on regional planning (not on analysis or on specific techniques) which go beyond the presentation of case studies, we find that it is almost entirely constituted by Friedmann's classic work on Venezuela (with the addition of his later book on urbanization, planning and national development), Hilhorst's excellent book of more recent date, the well-known study by Boudeville and the volume —old by now— which stemmed from the Bellagio Conference and was edited by Isard and Cumberland in the early 1960s.

Since both Friedmann's book and Hilhorst's are strongly influenced by the two authors' experiences in Latin America (as is Boudeville's too, up to a point), we are faced with the paradox that this subcontinent has furnished a wealth of raw material which has been processed by specialists from outside, while its own specialists, whose number and quality is beyond question, have not been capable of performing a similar task. There is no need to resort to facile analogies to show that the situation described is only one of the manifold facets of the drama of development in Latin America. The participation of a European specialist —Stöhr— has also been necessary to realize what is up to now the only comparative analysis of the various Latin American experiments in regional development.

Manifestly, then, in Latin America there is a variety of empirical situations which should at least facilitate inductive thinking on the subject of regional development; and there are likewise the necessary talent and scientific qualifications to formulate an autochtonous doctrine in this field. Yet the result is but meagre in terms of original creation. Perhaps this may be partly due to diversification and duplication of effort and to the lack of adequate interchange between different groups of specialists. Obviously, a drive towards concentration, exchange of experience and publication of findings is required. Fortunately something is being done in this direction; the activities of the Latin American Council for the Social Sciences (CLACSO) and of the United Nations through the Economic Commission for Latin America (CEPAL) and the Latin American Institute for Economic and Social Planning (ILPES), as well as the publications policy of the Inter-American Planning Society (SIAP), are slowly beginning to bear fruit. Even so, a great deal more could be done in this field.

In my own experience, whether as a staff member of a planning agency, as a lecturer on regional planning or as a consultant and international expert, I have always encountered exactly the same problem at the outset: the difficulty of rapidly establishing with colleagues, students or counterparts in the countries concerned, a common language and an identical perception of the nature of development and regional planning. There is nothing surprising in this, since we are not talking of Newtonian physics but of a complex discipline where the processes of elaboration and distillation are in full swing. While, therefore, too much attention should not be paid to the difficulty in question, it does at all events constitute a serious handicap in any group activity and in some cases may prove of decisive importance for the success or failure of an undertaking.

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I should like to think that this book may make a direct contribution to solving, in some degree, the problem of professional language in inter-disciplinary groups, especially in view of the shortage of literature in Spanish. I hope, too, that students of regional development, whether beginners or experts, may benefit by this work of synthesis.

In the introduction to his book on regional planning, Hilhorst warns the reader not to seek in vain for a discussion on planning techniques. The same warning might be issued in relation to Friedmann's book and, in a lesser degree, to Boudeville's. The three authors lay legitimate emphasis on the theoretical and conceptual aspects of regional planning.

At the oppossite extreme, as its title clearly indicates, the present work concentrates almost exclusively on the methods that can be used in formulating a nationwide regional development plan. It is, in a sense, almost a regional planning 'handbook', in which the main concern has been to offer a logical and coherent synopsis of the ways to tackle the task of drafting a regional plan. In this connexion it is useful to broach a side issue.

In recent years, and particularly in Latin America, we have witnessed a sort of disparagement or denigration of the planning function, or at least of some of its most outstanding aspects. It has been pointed out, in a good many cases, not without cause, that planning activities have been reflected in little practical success (as if economic and social growth were univocally linked to planning), and that in most instances planning has become a costly exercise for the production of long-winded plans which nobody reads, still less applies.

Part of the criticism has centred of late on revision of the role of the planner himself; the suggestion has been made that he be turned into an 'agent committed to social change' and, of course, it has been proposed that he be assigned a more active role in the decision-making process. Implicitly or explicit-ly, 'not so much paper and more action' has been advocated.

Whatever the role that the planner himself must play, from that of 'neutral' technician to that of 'committed' technician, I am absolutely opposed to minimization of the formal aspect of planning, i.e., the preparation of plans.

It does not much matter whether the 'plan' takes up ten pages or twenty volumes. What does matter is the content of these pages in terms of rationality of action. If the planner is to intervene directly in economic and social processes (as in the case of the 'committed' planner), all the more does the rationality of his analyses and of his activities acquire vitally important connotations. The fewer the decision-making levels that lie between the plan and political action, the greater must be the consistency and rationality demanded of the plan and of the planner himself.

From this standpoint, the task of drafting the plan, which might be called the procedural process of planning, equals or exceeds in importance the action itself which will shape economic policy. It could hardly be otherwise, since planning is by definition the rationalization of a decision-making process. Nor should it be forgotten that planning activities involve a learning process within which the formal preparation of the plan constitutes in itself the mainspring of the generation of information that in turn permits of increasingly close and accurate approaches to development problems.

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It is important to define clearly from the start the set of hypotheses that implicitly appear throughout the whole book. Some of them are essentially technical while others are institutional or ideological in character.

In the first place, regional problems, regional development and regional planning are envisaged on a nationwide scale, which in turn implies a systemic view of them (in terms of system analysis). Such an approach shelves a number of local problems and situations which are by definition point-bound problems of regional development. In consonance with this hypothesis, intra-regional planning will be discussed only somewhat incidentally and more in order to close the circuit of interregional planning than out of regard to its own merits. The justification of this approach to the problem becomes plainly apparent when the topic itself is touched upon.

Secondly, the analysis is structured on the basis of an ideological hypothesis which must be clearly established. It presupposes that regional problems are not mere geographical mappings of global or national problems. In other words, the assumption is that they have a specificity of their own, although of course they are not absolutely independent of national problems. After all, nationwide regional underdevelopment can be found only in globally underdeveloped societies. The hypothesis postulated is tantamount to maintaining that a country's spatial structure problems can be resolved, up to a point, without the inevitable necessity of previous or simultaneous changes in the political superstructure. Of course the hypothesis and the opinions deriving from it are of a relative character.

Thirdly, an institutional hypothesis is formulated to the effect that regional planning is only one of the several levels incorporated in a multi-decisional planning system. As will be noted in the relevant discussion, this hypothesis presupposes a planning process organized on bases different from the so-called 'stepwise planning' introduced into the literature by Timbergen. Specifically, what is postulated here is the existence of a regional planning subsystem with a level of authority and hierarchy essentially similar to that of the traditional subsystem of sectoral planning.

Lastly, regional development planning is analysed on the basis of the assumption that this activity is a deliberate effort promoted by the State itself, and is of a comprehensive nature, i.e., one in which the physical, economic and social aspects of development are inseparably combined.

From the purely formal standpoint, the work is divided into four chapters.

The object of chapter I is to provide a frame of reference for the problem under study. To this end, it defines the nature and content of regional problems, examines some of the most typical problems linked to regional development, and defines and places regional development planning activities. This is, clearly, an introductory chapter with a high level of generalization.

Chapter II discusses in depth the mechanics of the formulation of an interregional plan. For this purpose plan formulation is presented in four consecutive stages: the preparation of the diagnosis, the determination of objectives and targets, the designing of the strategy and the formulation of regional development policies.

Chapter III relates primarily to the actual implementation of the regional plan. To this end, it discusses in some detail the institutional organization of the

regional planning system and the selection of regional development policy instruments or media, concluding with a brief presentation of the stage of plan control, evaluation and iteration. Here stress is laid on the circular nature attributed to the planning process.

The fourth and last chapter contains a proposal for intra-regional planning which serves the twofold purpose of closing the regional planning circuit and offering a more realistic alternative for structuring the planning process at the regional level under a system of formal decentralization and real centralization of decision-making, which seems to be in keeping with the situation prevalent in most of the developing countries at the present time.

Since the study is concerned with regional development planning, there should be nothing surprising in the fact that the treatment accorded to different topics is far from balanced. For example, the discussion of polarization phenomena might be considered disproportionately long in comparison with the space allocated to other subjects. I think the disequilibria partly reflect the relative importance of the topics, but it would be idle to attempt to hide a personal bias which is almost unavoidable in books of this type.

Most of the examples with which some of the discussions are illustrated have been drawn from the author's practical experience in several Latin American countries, in particular Brazil, Chile and Panama. I hope they will do something towards clarifying ideas and enlivening the presentation of the subject.

I entertain the hope (pretentious perhaps, perhaps realistic) that I shall not have to revise this text for some long time, and therefore I cannot let slip the present opportunity of thanking a countless number of colleagues and friends who indirectly or directly have had something to do with the work now presented as the outcome of a professional experience. They share in its merits; its mistakes are the responsibility of the author. For brevity's sake, I want to mention only a few of those persons with whom I have been in most recent contact; in any event it would be impossible to name everyone, and I apologize for any involuntary omissions. John Friedmann, Walter Stöhr, Anatole Solow, Charles Boyce, Josef Hilhorst, Rubén Utria and Carlos de Mattos have helped in one way or another to sharpen the outlines of my ideas. I owe a special debt of gratitude to Antoni R. Kuklinski, by whose exceptional capacity for promoting international dialogue on regional planning I have benefited exceedingly.

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Chapter I

DISCUSSION OF SOME BASIC CONCEPTS

A. Justification of regional planning

The scientific treatment of economic problems in so far as they relate to geographical space (and to the associated concepts of distance and transport costs) began in Germany in the dawn of the nineteenth century, with the appearance of the classic locational studies by von Thünen and Weber, the first dealing with the analysis of agricultural location and the second with that of industrial location.

The development of locational analysis, or of spatial economic theory if preferred, follows a little in the rear of the thematic evolution of economics in general. From the original type of partial-equilibrium analysis it subsequently moves on to the formulation of general constructs (Christaller, Lösch, Isard, etc.), and then incorporates the discussion of growth problems (Perroux, Tiebout, Hirschman, Myrdal, Friedmann, Siebert, Hilhorst, etc.), culminating —mainly in the last two decades— in the treatment of normative situations linked to the need for ordering, controlling and guiding the development process in its spatial manifestations, a trend which is particularly marked in developing countries.

This evolution is, of course, far from corresponding solely to mere theoretical speculation. Quite the contrary: the need for territorial organization of a number of economic and social processes is grounded precisely on a range of problems —products of development in some cases, of underdevelopment in others— which beset developing countries and which cannot be properly handled by means of the classic systems and mechanisms of global and sectoral planning.

In the specific case of Latin America it is important to underline the following facts or situations which help to account for the increasing importance that governments and institutions of various kinds are attaching to regional development planning.

Latin America is the region that has the fastest rate of population growth in the world (an average annual increase of 3%). This high growth rate, which implies that the population doubles every 20 years, is accompanied by a mass exodus from the rural areas to the towns. These two forces —the growth of the population in absolute terms and its spatial redistribution— are changing economic, social and political systems so radically and at the same time, in a sense, so chaotically, that the future of society in Latin America is completely unpredictable unless the present proves capable of modelling the future.

The swift and haphazard urbanization of Latin America is reflected not only in the exceptional foreseeable increase in the urban population, but chiefly in the fact that a substantial proportion of this increase is and will continue to be concentrated in the large cities. For example, a recent study by the Inter-American Development Bank describes the position in respect of 19 cities with more than 1 million inhabitants, situated in Argentina, Brazil, Chile, Mexico, Peru and Venezuela. In 1950 these cities housed 21.2 million persons, while by 1970 they contained 52.6 million inhabitants, and projections for 1980 raise this

figure to 76.9 million. Thus, as the study points out, the increase in the population in an interval of only 10 years (1970-1980) will amount to some 24 million persons, and will exceed the total number of inhabitants in those same cities 30 years before (Fox, 1975). Some of the population projections for several cities in the year 2000 (and this is not futurology) are simply terrifying: the population of Mexico City is likely to reach 31 million inhabitants and that of São Paulo 25 million. Despite the mathematical soundness of these projections, however, it is perfectly obvious that Mexico City cannot attain such a size and neither can São Paulo. This means, therefore, that the growth of the other components of the national urban systems will be encouraged, and it is not of course a matter of indifference, from the standpoint of the general operation of the economic and social system, whether this growth affects only secondary centres, all urban centres, smaller centres alone or any combination of these. Thus, in Latin America a problem of spatial distribution of the population clearly lies ahead.

It would, however, be a historical error to envisage this as a typical 'urban problem' merely because the population increment will be primarily located in urban areas. Consequently it would also be a mistake to think that the situation could be controlled by means of urban planning pure and simple.

The awkward but solid fact (to paraphrase Perroux) is that urban growth on such a vast scale cannot be rationalized (channelled and controlled) or even maintained unless at the same time the agricultural production sector is set in order and given incentives. This view derives from a few quite elementary considerations.

On the one hand, the mere fact that a major proportion of the population is settled in urban centres and is consequently engaged in secondary and tertiary activities means that the productivity of rural labour must be increased so that a smaller number of agricultural workers can feed a population that is not only growing fast but is also rapidly becoming urbanized. This is of course a truism in economics, and moreover, a rule to which, in a world characterized by food shortages, there can be no exception, since increasing imports of foodstuffs cannot be kept up over the long term. But it is not enough for the population remaining in agriculture to be capable of feeding itself and the urban population; for a time at least, foodstuffs must be produced and sold to town-dwellers at low prices, so that the urban worker can allocate a growing proportion of his income to consumption of non-agricultural goods.

But low prices for food products may also mean low incomes for farmers, and in this way the rural population may be left on the sidelines of the trade economy in general and the market for urban-industrial products in particular, the cumulative effect of which is a lower rate of overall economic growth. Hence the crux of the matter is the productivity of the farmer. There is nothing new in all this, except that the problem of the productivity of the worker has traditionally been approached from an angle and with instruments that are typically sectoral (credits, technical assistance, etc.). This has sometimes been combined with more or less ambitious projects for changes in the structure of agricultural land tenure, but the results still fall far short of needs and expectations.

There is, however, one element which has been conspicuous by its absence in the management of agricultural problems in Latin America, and perhaps the

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relative stagnation of the sector is partly linked to this fact. The problem of the modernization of agriculture has never been envisaged as one of spatial organization.[1] Yet the exceptionally wide dispersion of the rural population in many developing countries —even in those of small geographical size— renders it indispensable to begin the handling of agricultural problems with a process of population concentration that will make co-operation between farmers viable, as well as the provision of technical assistance and of basic social services such as health and education facilities. It is on the basis of this process of redistribution of the population over the rural space that more specific supporting and promotional measures can be determined, such as changes in the structure of land tenure, credits, marketing systems, etc.

The concentration of the rural population really implies the creation of 'rural towns' and 'inanimate centres',[2] hierarchically defined and spatially organized, and interlinked by means of extensive transport and communications systems, so as to form a rural continuum perfectly linked with the urban network proper. This is precisely what lies behind the concept of organization of rural space.

But the organization of rural space is not solely the logical counterpart of the organization of urban space —deriving in its turn from the need to accommodate in more rational fashion the swelling mass of urban population— because of the necessity of stepping up agricultural productivity, as pointed out above.

In practice, the organization of rural space merges with the organization of urban space in relation to the situation of some medium-sized towns which possess a large but undeveloped rural hinterland.

If part of the urban population increment will have to be located in second- or third-rank towns, the towns in question must broaden their economic base so as to be in a position to offer productive employment to the new urban population contingents. In a good many cases, this expansion of their economic base can be achieved only through the dynamizing of activities in their rural hinterland, a situation which often arises where national resources are scarce or where the possibilities of deconcentrated industrialization are limited.[3] As has already been shown, the dynamization of farming is based on the organization of rural space.

Much of the foregoing argument is designed to demonstrate that the harmonious development of the urbanization process calls for a parallel development of agricultural activities, and the achievement of this latter entails adopting the concept of organization of rural space. The argument works both ways, and it can be shown that the organization of rural space presupposes the parallel organization of urban space.

[1] See E.A.J. Johnson, *The Organization of Space in Developing Countries*, Cambridge, Mass., Harvard University Press, 1974 (second edition) —a classic in this field— and a no less important book by R. Weitz, *De campesino a agricultor*, Mexico City, Fondo de Cultura Económica, 1973.

[2] See R. Weitz, *op. cit.*

[3] This type of situation and the action strategy deriving therefrom is clearly exemplified in Panama in the case of the country's third largest city, Santiago de Veraguas. See ONU/OTC, *Estrategia de desarrollo regional a mediano y largo plazo de Panamá*, Panama City, 1975.

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In the first place, a better organization of rural space generally implies the transfer of the rural population surplus to the urban sector. As has already been shown, this will usually signify a rechannelling of the migratory flow in such a way as to divert it towards urban centres other than the great metropolitan city or cities. This rechannelling, however, cannot be achieved by coercive measures; real incentives must be the means adopted, i.e., in the second-, third- and fourth-rank centres productive employment must be offered in living conditions comparable at least to those existing in the large urban centres. Productive employment basically means industrial employment, so that the organization of rural space implies industrialization of the medium-sized urban centres, or, in other words, a spatial deconcentration of industry. The location of the manufacturing sector is one of the items grouped under the head of organization of space.

Secondly, the modernization of rural life (accepting the vagueness of the concept) presupposes —if the large urban centres are taken to be the focal points of the modernization process— the possibility of transmitting innovations from these focal points throughout the whole of the space. This in turn implies a continuous urban system connected, as stated above, with the system of rural settlements. It is common knowledge that many of the urban systems of Latin American countries are not continuous, approximating more closely to a primate than to a rank-size structure. Accordingly, the organization of rural space and the modernization of agriculture involve the need to 'fill the gaps' in the structure of the urban system, i.e., they presuppose a different organization of urban space.

Thirdly, up-to-date and efficient agriculture presupposes a rising level of income for farmers, which in turn depends upon increasing and well-distributed urban income. A growing body of empirical evidence suggests that the average level of per capita income is appreciably higher in large urban concentrations than in smaller cities. Given the low income-elasticity in consumption of food products, a concentration of income deriving from over-concentration of the population in one or two big cities implies a reduction in potential demand for agricultural commodities. If in addition account is taken of the usual dephasing —at the level of the larger cities— between population growth and growth of employment which is reflected in the existence of great masses of marginal population, the conclusion may be drawn that it is the farmers who have the biggest stake in the attainment of a more harmonious structure of the urban system.

Granting, then, the simultaneity or parallelism of the problems of organization of urban and rural space, it is obvious that what is in question is simply a problem of organization of space at the national level, and this is precisely the specific subject of regional planning. Hence the conclusion is reached that in developing countries the necessary framework for solving urbanization problems as well as the problems of backwardness in agriculture is a system of regional development planning.

But as regards justification of the need to incorporate the regional dimension in overall development programmes, the foregoing discussion is not exhaustive. Additional considerations of no less importance must be introduced into the analysis.

One of the essential characteristics of any developing country is the considerable heterogeneity of its economic and social structures. Computer centres and nuclear power stations *vis-à-vis* an agricultural sector in which traction power is still for the most part generated by human beings and draught animals; ultra-modern cities girdled by 'poverty belts'; intellectual élites over against high percentages of illiteracy; abysmal income gaps between sectors and between individuals; no 'spatial friction' whatever for high-income groups, contrasted with absolute geographical immobility for the majority, etc. In other words, the familiar press picture of underdevelopment in Latin America.

In face of this caricatural state of affairs, economic planners and those generally responsible for the design of economic policy have gradually become aware of a phenomenon largely unnoticed in the past.

The vast majority of the usual instruments of economic policy, for example, taxes, subsidies, exchange rates or others of a similar kind, were conceived to operate in appreciably homogeneous economic and social environments, typical of more or less competitive situations which in their turn are characteristic of well-integrated and developed economies. Very different is the economic and social milieu of developing countries, to some extent characterized, as has been remarked, by significant heterogeneities on the one hand, and monopolistic structures on the other. It should be fairly obvious that in this case averages, on which the aggregate application of economic policy instruments is grounded, are very poor indicators of the real situation, and therefore constitute an inefficient basis for the adoption of economic decisions. What is more, the administration of a country on the basis of average-oriented judgements and homogeneous measures tends to become administration of the more developed areas,[4] thus accelerating the cumulative concentration process.

In conditions of extreme heterogeneity, consideration ought practically to be given to the use of almost individual instruments of economic policy; this obviously is not feasible, and that is why the region is an efficient economic and geographical unit for the administration of an economic policy which takes the middle way between the inefficiency and injustice of a homogeneous aggregate and the impossibility of perfect discrimination.[5]

To illustrate the problem, suffice it to take the case of income distribution. It is imposible to consider a national redistribution policy if the distribution patterns differ significantly in terms of large geographical areas, and particularly if the causes of regressive income distribution are substantially different in, say, metropolitan areas and rural areas. Even in a country whose territory is small, like Panama, this situation is clearly apparent. In a study prepared by the National Statistics and Census Department, Panama was divided into two major areas —the metropolitan area and the rest of the country— and the inequality in income distribution in the two areas was quantified. A summary of the findings is given in the following table:

[4]It is not difficult to produce mathematical proof that in such situations a national average value is closer to the average for a larger metropolitan area, for instance, than to the figures for the rest of the country.

[5]The traditional political-administrative divisions are of no use for this purpose. See in this connexion W. Stöhr, *El desarrollo regional en América Latina. Experiencias y perspectivas*, Buenos Aires, Sociedad Interamericana de Planificación (SIAP), 1972.

Table 1

PANAMA: INCOME DISTRIBUTION BY TERRITORIAL UNITS, 1970

Categories of recipients	Percentage of income received by each category		
	Whole country	Metropolitan area	Rest of country
Top 10%	43.0	40.0	42.0
Bottom 20%	1.6	2.3	1.8

Source: Statistics and Census Department, *Panamá en cifras,* 1974.

The foregoing table shows a significant difference between the income distribution pattern in a highly urbanized zone like the metropolitan area and an essentially rural area like the rest of the country. More important, however, is a fact which is not directly revealed by the summarized table and which relates to the difference in the causes underlying the two patterns. While the distribution noted in 'the rest of the country' is due to factors linked to land tenure, the distribution pattern in 'the metropolitan area' is primarily associated with disparities in the levels of skills of the economically active population. What possible meaning, therefore, could a uniform redistribution policy have in this case?

Similarly, in most of the Latin American countries a traditional income redistribution policy operating through wages (as has been the usual practice) ends by generating worse inequalities within the poorest segment of the population. There are two similar reasons for this: on the one hand, many of the 'agricultural poor' derive their income from prices and not from wages; on the other hand, a large mass of urban manpower consits of own-account workers, particularly in the services sector, and these are not covered by any redistribution programme. This is still more serious for the 'agricultural poor' when a policy of wage increases is mistakenly accompanied by absolute or relative freezing of agricultural prices as a means of raising real urban wages.

There is yet another point of view from which it is possible to show the inefficiency and injustice of homogeneous policies applied in a heterogeneous context. A good example is afforded by the traditional handling of exchange policy. The exchange rate is usually manipulated to encourage exports, a praiseworthy aim from the national standpoint. But what happens if the differing structure of foreign trade in the various regions is disregarded? Clearly, in this case the 'exporter' regions are being subsidized and the 'importer' regions penalized, and if no compensatory mechanisms exist this could be reflected in an aggravation of the differences in welfare from one region to another. Considerations of this type at least make it essential to carry out detailed regional studies.

Another important consideration which helps to explain the real need for regional planning in development countries relates to the exhaustion of the traditional forces that have sustained economic growth in the Latin American countries. The necessity of expanding the economic base —either through the incorporation of unexploited lands and resources into the economy or through the economic integration of huge segments of traditionally marginal population— has become particularly striking in Latin America since the mid-1950s. In

some countries, notably those that were the first to enter upon the phase of import-substituting industrialization, the momentum imparted by an 'inward-directed' growth strategy is beginning to slacken, not so much because the so-called 'easy substitution' period has come to an end as owing to the saturation of a market kept artificially small by income distribution. In this instance, the broadening of the economic base must be effected through the incorporation into the market of large population groups that lack real purchasing power. Usually, to a significant extent, this unincorporated population is located in clearly-defined areas rather than proportionally distributed over the national territory. In all cases, its incorporation into the consumer market calls for much more specific measures than any that might be contained in an overall plan; the aim will be in some instances to raise the economic level of an entire region, and in others to shift the population when there are no possibilities of local development. As any measure that may be adopted will have positive and negative effects on other parts or regions of the same country, it is indispensable that these measures be framed in the broader context of a nationwide regional development plan, as the only way of guaranteeing a minimum of efficiency in the government's action.

In other countries, which are in the majority in Latin America, the necessity of broadening their economic base primarily finds expression in the need to push their internal economic frontier, or, in other words, to narrow the gap between their political frontiers and their economic frontiers. This normally signifies the implementation of programmes for the settlement and development of virtually uninhabited areas. In Latin America the most conspicuous cases in point are the development of the Guayana region in Venezuela and, more recently, Brazil's penetration programmes in the Amazon Basin.

The opening-up of such regions —even when the implicit criterion is the development of the country as a whole and not the development of the region *per se*— entails the use of information, of methods of analysis, and above all of institutions, which do not generally have a national counterpart and whose conceptual and methodological sources are not to be found in the classic arsenal of the global economy. It is precisely the blind endeavour to scale down the concepts and methods of overall planning in order to apply them to subnational units, as if these were small countries, that has made a number of local development efforts barren of results. In relation to State planning in Brazil, one author calls this scaling-down procedure a 'polar model of formalistic planning' (Da Costa, 1971). Acordingly, in these cases too it is clearly necessary to resort to new methods and new institutions, designed in relation to spatial organization problems rather than in the light of purely economic considerations.

But it is not only economic or development-administration questions that justify the need for regional development planning. Political considerations are no less important.

For the maintenance of a democratic system of government many very difficult conditions are required. One simple but basic requisite is the existence of a social consensus in the sense that each individual deems the relation between his contribution to the development process and the recompense he obtains from that same process to be a fair one. In a world characterized by the increasing diffusion and translucency of information it is impossible to conceal

the sharp differences in per capita income (and in welfare) between inhabitants of different regions. For example, what consensus of the type referred to could be achieved in Brazil, where per capita income in the State of Maranhao represented (in 1966) only 28% of the national average, while per capita income in the State of Guanabara was equivalent to 239% of that average? (Andrade, 1971). Or in the case of Chile, again, what consensus could be generated if the average inhabitant of Region XI was receiving (in 1967) an income equivalent to 200% of the national average, whereas the income received by the average inhabitant of Region VIII was equivalent to only 43%? (Achurra, 1973).

A devotee of classical economics would minimize the problem by arguing that over the long term incomes tend to be levelled up through the mechanism of spatial mobility of the factors of production. The truth is, however, that even in post-industrial societies like the United States, which show a very high degree of spatial mobility, this levelling-up does not take place. Neither do large contingents of the unemployed move to regions where manpower is in short supply nor do enterprises seek locations in regions with unemployment problems so as to take advantage of the low cost of labour. Thus, it is not through automatic mechanisms that the problem can be solved.

The problem of political instability which necessarily arises where there are sharp interregional differences in levels of welfare has been clearly grasped, for example, in Brazil. The major development efforts made in the North-East are accounted for in part by straightforward political reasoning to the effect that it is impossible to maintain a measure of institutional stability if one-third of the country's inhabitants (about 30 million people) is at a disadvantage beside the rest of the population. It is not of course by chance that guerrilla groups in Latin America look for their supporting base precisely in the relatively more backward areas.

The persistence of situations characterized by extreme differences in interregional levels of welfare does not only militate against the maintenance of internal political order but in some circumstances also represents a potential danger to a country's actual territorial integrity. This happens when markedly backward areas border upon more highly developed countries, which penetrate and economically dominate the areas in question. Thence it is only a step to the emergence of separatist sentiments —especially in countries which are still at the nation-building stage. Incidentally, the situation described is relatively common in Latin America.

But a democratic system is not only grounded on the result of a sort of economic balance-sheet which every individual implicitly draws up. A democracy also implies the possibility of participating in the exercise of power, if not in an individual capacity, at least through agencies which serve as intermediaries between the individual and the State. Some of these intermediary agencies are typically functional (guilds, trade unions, etc.), while others are of a territorial nature (states, provinces, municipalities), these latter being defined in the countries' constitutions themselves. Thus, regional development planning is linked with the political problem of the distribution of power precisely through such territorial agencies.

From this point of view the situation prevailing in Latin America is as negative as it can be. To avoid entering upon an analysis in depth of the problem

of the centralization of decision-making (an aspect of the question which in any event will be taken up again later on), suffice it here to reproduce the results arrived at by Stöhr when he studied the centralization of budget administration in 15 Latin American countries on the basis of an assumption that there is a close correlation between the distribution of power and the distribution of financial resources in the public sector (Stöhr, 1972, 71-77).

Table 2 summarizes the findings of Stöhr's study:

Table 2

CENTRALIZATION OF BUDGET ADMINISTRATION IN LATIN AMERICAN COUNTRIES

(Percentages of public expenditure by administrative level)

Country	Year(s)	Central government[a]	Subnational government[b]	Municipal- ities
Federal States				
Argentina[c]	1963	68.86	22.98	8.16
Brazil	1966	57.99	34.01	8.00
Mexico	1958	90.50	7.10	2.40
Venezuela	1964-68	87.06	10.46	2.48
Unitary States				
Bolivia	1958	97.80	–	2.20
Chile	1966	97.80	–	2.52
Colombia	1958-60	70.60	17.00	12.60
Costa Rica	1966	95.60	–	4.40
Ecuador	1963	81.00	1.00	18.00
El Salvador[d]	1967	96.80	–	3.20
Guatemala[d]	1960-67	89.69	–	10.30
Honduras[d]	1966-67	90.50	–	9.50
Nicaragua	1962	95.20	–	4.80
Peru[d]	1962	95.62	–	4.38
Dominican Republic	1966	88.70	11.3[e]	–

Source: W. Stöhr, *El desarrollo regional en América Latina. Experiencia y perspectiva,* Buenos Aires, Sociedad Interamericana de Planificación (SIAP), 1972.

[a]Including autonomous and decentralized agencies, public utility corporations and social security institutions.

[b]State, provincial, territorial or departmental.

[c]Current expenditure only.

[d]Capital expenditure only.

[e]It was not possible to distinguish between municipalities and other subnational levels.

While, therefore, formally speaking, in all Latin American countries there are intermediary territorial agencies and in many countries of the region any individual whatsoever can be elected to the exercise of power within these agencies, it is no less true that from a more realistic standpoint this is nothing but a legal fiction. As will be discussed in the last chapter, the position can be accurately described in terms of a juxtaposition of real centralization and formal

decentralization of the decision-making system which is typical of most Latin American countries.

It would be a mistake, however, to take a romantic stand, in the light of the situation described, in favour of 'restoring power to the commune'. The centralization of decision-making and of financial resources has a partly techno-logical origin proper to the twentieth century, and the inability of local adminis-trative levels to resolve problems is explained —again in part— by an increase in the scale of problems and of their solutions, which necessitates transferring the responsibility for these solutions to higher decisional bodies. Once again, at bottom it is a question of finding a territorial dimension which will make viable the emergence of intermediary agencies with real power. In short, such agencies as may break down over-centralization but transcend destructive atomization. The concept of the region seems to be the answer to this problem.

Several other arguments can be put forward to justify the emergence of regional planning in developing countries. For example, it would be possible to develop the thesis that overall plans have had less success than was originally estimated owing to their high level of aggregation and their lack of specificity, from which might be inferred the necessity of introducing a spatial dimension; or the need for regional planning can be more closely tied in with the operation of supra-national integration programmes in Latin America; however, the argu-ments presented in the foregoing pages should be sufficient as an introduction to the topic. At all events, throughout the book additional arguments will be incidentally presented.

B. Spatial planning and regional planning

In any attempt to construct a theory one of the basic tasks is the structuring of a language which will enable symbolic representations of ideas to epitomize the same concepts for different interlocutors. All the more so if the resulting theoretical construct is immediately to serve the purpose of orienting specific measures intended to influence economic and social processes. Since this is exactly the case with the present work, it seems indispensable to begin by offering a few definitions aimed precisely at contributing, if not to the creation, at least to the standardization of a professional language.

Although in current usage the term regional planning is very broadly and liberally applied, strictly speaking the concept of regional planning denotes only one of the several geographical levels at which a planning methodology can be applied. In this sense, 'regional' appears as an additional category in the classic division of political economy: the international economy and the national economy.[6] Thus, the development and planning of an agricultural micro-area, of a province or state, of a river basin, all appear under the head of 'regional development and planning', without there being the slightest difference between the planning blueprints and instruments applied in each of these cases and the blueprints and instruments used in overall planning projects.

[6]The international agencies themselves have contributed to the linguistic muddle by using the term 'regional' to refer to groups of countries situated in one and the same geographical area of the world. An outstanding case in point is afforded by the Regional Economic Commissions of the United Nations.

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Strictly speaking, therefore, the concept of regional planning relates to a geographical area, a part of one or several countries, and not necessarily to the conceptual content of the planning exercises; in other words, it relates to the object and not the subject, to what is formal and not to what is substantive.

The planning exercise can be approached from three different points of view, according to the type of phenomenon and the type of relations to which the study is addressed —that is, according to the subject of planning. Thus, the term global (or overall) planning is used when the subject under study is constituted by the macro-economic aggregates and their interrelationships, as for example, national income, prices, wages, balance-of-payments positions or overall growth models. The variables considered in this case and the policies drawn up to influence the course of these same variables are of a comprehensive nature and as a rule are not susceptible of internal differentiation. In normative terms, what is of importance in a global conception of planning is to place the economy on the production possibility curve. Similarly, sectoral planning is talked of when the subject under study is constituted by subgroups of activities, phenomena or relations pertaining to components of the economic system which are characterized by a high degree of homogeneity and reciprocal interrelationship: for example, the 'industrial' sector and the variables and relationships discernible in it, such as 'industrial' wages, 'industrial' productivity, 'industrial' capital coefficient, 'industrial' exports, etc., etc. In defining the sectors (and therefore in defining the scope of sectoral planning) maximum internal homogeneity and maximum inter-sectoral heterogeneity is sought, the production process being the key factor in the establishment of this differentiation; i.e., the functional association is the determinant in this case. Sectoral planning is more technological than economic in character, since it primarily implies a question of combination of resources rather than of selection of ends. Lastly, spatial planning is referred to when the subject under study is constituted by the set of economic activities located in the geographical space, the phenomena and relations observable among them over the geographical space, such as flows and interchanges, and the effect of spatial friction on the economic and social organization of the space itself in terms of use of resources, distribution of human settlements and of production, mobility, etc.

As can be seen, the concept of spatial planning is a good deal broader than the traditional concept of physical planning, taking this to mean a marshalling of the physical elements in a territory irrespective of the interrelationships between physical, economic, social and political phenomena.[7]

From the definition of spatial planning it can be deduced that this is an activity of an essentially systemic nature, since it considers the national economy as a set of elements (settlements), of communication channels (networks), and of interrelationships between the elements or their attributes (flows); thus, general systems analysis and the concepts of general economic equilibrium represent two of the important methodological bases for spatial planning.

To sum up, what typifies spatial planning is neither a specific geographical area nor the mere ordering of physical components, but the consideration of

[7]Planning of the territory or territorial planning is another term in common use, stemming from the French concept of *aménagement du territoire*.

economic and social processes as elements in a localized mesh of activities and relationships on which space imposes a friction that in its turn determines the intensity of these activities and relations.

To place the discussion on its most elementary level it is enough to recall that primers of economics usually declare economics to be concerned with replying to such questions as "what to produce", "how to produce" and "for whom to produce", a list in which one last question is conspicuous by its absence: "where to produce". Economic location theory, from a positive standpoint, and spatial planning, from a normative standpoint, seek to provide an answer to this question.

The following matrix shows the interrelations which are produced when planning is considered both from the angle of its subject and from that of the geographical or jurisdictional area where it is applied.

PLANNING BY AREAS AND TYPES

Areas \ Types	Global	Sectoral	Spatial
National			
Regional			
State			
Metropolitan			
Local			

As can be seen from the preceding matrix, space —the definitional element in spatial planning— can be incorporated into the analysis in relation to different geographical categories or areas. The table also serves to make it clear that the mere fact of the geographical frame of reference being a subnational unit is not enough to determine the 'spatial' character of planning.

These notes are essentially concerned with analysing those aspects of the question that come to the fore when space is considered in terms of a national area within the task of planning. As will be discussed later, this may or may not imply the introduction of an exhaustive and exclusive system of regions. In the absence of a national system of regions (as may be the case in a small and highly developed country whose topography is not significantly irregular), planning is defined as nationwide spatial planning; if a national system of regions is introduced, the definition applicable is interregional spatial planning, or simply interregional planning, or, still more commonly, nationwide regional planning (de Mattos, 1970). In the end, by virtue of the law of minimum effort (which has exerted so much influence on spatial analysis through the original studies by Zipf), regional planning alone is talked of, but the preceding discussion should make the concept itself perfectly clear.

From a complementary angle, it is useful to close this initial discussion by offering a definition —formal this time— of what is understood in the context of the present book by regional development planning. If the purpose of the foregoing discussion was to examine the idea of regional planning from a conceptual point of view, the definition now put forward is formulated from a decisional standpoint.

The concept of development will be used to denote a secular process of economic and social change, both quantitative and qualitative.[8] This process of change may be accurately visualized as a permanent and sequential process of decision-making on the part of the agents and social groups concerned, as, for example, the government, individuals, enterprises, social groups of diverse kinds, etc.

The term planning will be used to describe a technique intended to rationalize the above-mentioned decision-making process. As such, it is a concept which from the ethical and ideological standpoint is neutral, even though this neutrality does not necessarily extend to the planning expert as such. Planning is, of course, a political activity, especially when it is a matter of nationwide regional planning.

On these bases, regional development planning (or simply regional planning) will be defined as the set of measures designed to rationalize the decision-making process which originates and controls economic and social change in a spatial system.

C. Nature of regional problems

The first task that must be tackled in the formulation of a regional development plan is that of identifying and characterizing the 'object of study', in this case, the so-called 'regional problems'. Clearly, this task is not the exclusive responsibility of regional planning; it merely constitutes the elementary methodological requisite for any action, whether it be the study of a phenomenon or intervention in it.

Thus, what is the peculiar nature of regional, or, to be more precise, interregional problems? What is it that differentiates them from economic problems of other types sufficiently to delimit a specific field of action?

The essence of the problems that may be described as 'regional' lies in the role played by geographical space in actually determining their nature. Only if the phenomenon under consideration (whether economic or social) is dependent upon the way it is related to a given geographical space can the existence of a 'regional' problem be asserted. In other words, if space acts as a differentiating element of a variable or a phenomenon, then in that case a typically regional question arises. For example, human mortality in a given country is not a

[8]The formal simplism of the foregoing definition must not be allowed to conceal the tremendous complexities involved in a modern conception of 'development'. Suffice it to point out that in this context 'more' may be equivalent to 'worse', and *vice versa*, and, of course, implicit in the idea of 'change' is a direction of change which the definition does not identify. This means nothing less than calling in question one of the basic assumptions of the whole of the contemporary economic construct: the positive character of marginal utility. Since this is not the place for a discussion of the concept of development *in extenso*, it is enough to alert the reader to the ideological and ethical background of any definition of economic and social development.

'regional' phenomenon, since whatever the partition of the national space, it always occurs in the same way. Of course the case is different if we talk of a mortality rate, which may show perceptible variations according to the way in which the national space is divided up (from major regions to a topographical network). To take a different example, income distribution or its degree of inequality can generally be visualized as a regional problem (apart from other dimensions), since the degree of inequality is not invariable in relation to alternative ways of dividing up the national space.

Of course, since the approach to regional development planning adopted here is a systemic one, it leaves out of account a whole range of regional problems whose nature is essentially local, such as, for example, the high rate of infant mortality in province A, which does not recur in other parts of the country.

Reverting to the problem of income distribution, if at the national level the top 10% of income recipients receive 60% of total income, while the lower 90% receive only the remaining 40%, the picture presented is clearly one of unfair and regressive distribution. But if in each of the regions of this imaginary country the proportion is appreciably similar, one cannot strictly speak of a regional income distribution problem, even if at the level of one region in particular the situation described is regarded as the problem of the region. In this instance, therefore, to draw up a regional redistribution policy would be meaningless, and only an aspatial conception of a functional or personal policy would fit the case.

The above way of conceptualizing regional problems implies acceptance of the idea that they are not mere territorial mappings of national problems, or, in other words, of the fact that such problems have a specificity of their own. Similarly, the distinction implicit in the foregoing argument between aspatial national problems or phenomena and problems or phenomena which show spatially differentiated behaviour is an essential requisite for forming an accurate conception of a regional development policy and demythologizing regional development planning.

Not all of a country's socio-economic problems find territorially differentiated expression, and consequently the resolution of some major national problems may leave the structure and operation of the regional system untouched. Conversely, the opinion —relatively common in some circles— that regional problems can be resolved only in the broader framework of the solution of national problems is not entirely valid.

If a systemic view of the matter is taken, it will quickly be recognized that the system of regions (or the functioning of society as seen in a spatial perspective) is simply one of the several complex open subsystems which compose and determine a larger system, i.e., a country, considered in all its manifold aspects. Any of these subsystems (whether it be the regional subsystem, or the juridical or the productive) has —at any given moment— a certain degree of functionality in relation to the system as a whole. This functionality can be improved within certain limits without there being any change in the essence of the entire or global system. Thus, efficient or inefficient regional systems are conceivable in a form of organization such as the capitalist system (in its several versions), just as it is equally possible to imagine efficient or

ineficient regional systems in the institutional framwork of a socialist society. In other words, the nature of the political superstructure does not *per se* determine an efficient system of regions.[9]

From another standpoint, the foregoing conceptualization of regional problems immediately places them in relation to the stage of economic and social development and the degree of internal homogeneity that the country has attained. Given the approach adopted, it is possible to conceive of countries in which 'regional' problems are non-existent, at least in any significant form, because the internal differentation present in such countries is so slight.

This means, then, that the existence and the intensity of regional problems depends upon the overall level of development of the countries concerned. Some writers, including Friedmann (Friedmann, 1960), have formalized this dependence, and if it is admitted that interregional differences in per capita income constitute a synthetic expression of regional problems, it is possible to arrive – as Williamson does (Williamson, 1965)– at a functional description of the relation between the level of development and the magnitude of regional problems.

Thus, in a pre-industrial or agricultural economy which has not so far entered upon the phase of differentiation typical of economic development, regional problems do not yet appear, at least on a national scale. It is when industrialization is in full swing (implying rapid migration and urbanization, proletarianization and the formation of large bodies of opinion) that these problems make themselves felt by generating contradictions with the overall development of the economy. On the other hand, in a phase which Friedmann dialectically calls post-industrial, and which is characteristic of highly mature economies, regional problems (in the sense accepted here) tend to disappear or to be converted into point-bound problems linked to very special local situations (depressed areas in the industrialized European countries, for example) or to environmental questions.

If the level of development (according to any one of the usual indicators) is measured on the horizontal axis of a quadrant and the intensity of regional problems (according to some index of interregional disparities in per capita income) on the vertical axis, it will be possible to plot a curve similar to distribution X^2 (chi^2) which can accurately depict the nature of the relation between the two phenomena. This particular curve has the advantage of showing the unequal acceleration in its two segments; that is, it will show that from a given point onwards regional problems increase rapidly in intensity until they reach a peak from which their intensity slowly declines.

An exercise like the foregoing would also help to illustrate the idea that there is a certain span of time in the course of a country's overall development when one may expect the viability of a nationwide regional development and

[9]For the necessary observation on the need to define the concept of efficiency in this context, see Alejandro Rofman, *Desigualdades regionales y concentración económica. El caso argentino,* Buenos Aires, SIAP, 1974, p. 17. The simplest, although not the only, definition of efficiency in a given multiregional system would be couched in some such terms as these: a regional system is "efficient" when it is not possible to improve the result of the operation of the system (whether what is called the result be the gross product, interregional differences in welfare, social solidarity or anything else) by means of the expedient of reallocating resources among regions.

planning effort to be maximized. That is, a national policy for regional development must not only be characterized by intrinsic technical efficiency but must also show a high degree of technical and political functionalism, without which it has not the remotest possibility of success in a broad sense of the word.

Technical functionalism must be taken to mean the degree of coherence between global and regional economic objectives. Prior to the so-called industrial phase, regional problems (if they exist at all) are completely subordinated to the great national problem of growth (which will usually imply marked geographical concentrations at the outset), and, therefore, an attempt at nationwide regional development and planning will fatally miscarry. Even when this phase is left behind the consonance of global and regional objectives must still be checked. It will not be difficult to imagine a situation in which global objectives aim at economic growth based mainly on the expansion of a set of international-type services (for example, financial markets, transport intermediaries, etc.) which can only be developed in the 'centre', whereas, concurrently, regional policy is designed to strengthen agricultural activities —the main activity in the 'periphery'—, so that a definite incompatibility is generated, or a low degree of technical functionalism, which comes to the same thing. If, for example, we look at the situation of a country like Panama, halfway through the present decade, the above hypothetical example acquires thoroughly realistic connotations.

At the other end of the spectrum, that is, after the industrialization phase, a nationwide attempt at regional and planning is likely to represent a waste of effort and of resources.

Quite as important as its degree of technical functionalism, or more so, is the degree of political functionalism of nationwide regional planning. It should be noted that there are only three possible ways of financing systematic and steady development of the 'periphery': (i) channelling of external resources that are not competitive with the 'centre'; (ii) discovery (preferably without prior expenditure on exploration) of easily exportable natural resources which are internationally in great demand, such as petroleum, for example; and (iii) transfer of resources from the 'centre' to the 'periphery'.[10] The first two mechanisms represent the exception rather than the rule and consequently are of no great interest in the present context. What normally happens is that a nationwide regional development policy is based, implicitly or explicitly, on a transfer of resources from the centre to the periphery. Incidentally, the more explicit this mechanism becomes, the better.

It is here that the problem of political functionalism arises, for obviously this transfer can never materialize unless the political forces (i.e., the power and pressure groups) are structured in such a way that the interests of the periphery prevail over the interests of the centre.[11] This has little to do with ideological

[10] The principle of "pulling oneself up by one's own shoestrings" perhaps embodies an important moral axiom, but has little economic significance.

[11] Herein lies, moreover, the basic difference between a nationwide regional planning programme and a programme on an intra-regional scale (for one or several regions considered individually). 'Central' interests may realize the desirability of a region's development as a means of guaranteeing the subsequent development of the centres. Examples in Latin America seem largely to point in this direction.

struggles, nor does it necessarily mean that political power is transferred to the periphery. It is possible that the politically dominant groups may be awake to the fact that geographically more harmonious development constitutes over the long term the best life insurance for any political system. Part of the work of regional planners consists in showing that the development of the periphery is a technical and political requisite for steady and non-conflictive development of the country as a whole.

A nationwide regional development and planning programme implies action of a different type at the two extremes of the spatial economic structure: promotion in the periphery and control in the centre (which usually coincides with the national metropolis or metropolitan region). It is naturally to be expected that in most cases the economic and political groups linked to the activities of the centre will use their influence and their power to prevent any form of control which may imply a reduction of the centre's rate of growth, and experience tends to show that the main economic argument which these groups will use will be the social cost of regional development in terms of a reduction of the country's overall economic growth rate.[12] In no few developing countries this argument is based on a false premise, so cunningly concealed that even the regional planners themselves end by resigning themselves to the idea that regional development is a long-term affair. As Keynes pointed out in a telling metaphor, the long term is the best gravedigger of many macro-economic projects.

The pitfall in economic arguments against regional development lies in the fact that in this context no-one ever inquires into who are the beneficiaries of the overall growth that is to be sacrificed. Given the development style prevailing in most of the Latin American countries, there can be no doubt that the benefits of economic growth end up primarily in the hands of a tiny segment of the population.

This assertion is not a value judgement. Let us take, for instance, the case of Brazil during the 1960s —an example of successful overall growth which is outstanding even at the world level— and examine the distributive effects of the period. Table 3 shows internal income distribution in the years 1960 and 1970 by categories of income recipients.

The figures in the foregoing table show that while there was a blanket increase in income, the major share of this increment benefited to a disproportionate extent the 5% of the population occupying the summit of the income distribution pyramid.

It may accordingly be asked: who would have defrayed the cost of a fairer and therefore geographically more harmonious growth process, since the distribution noted also shows marked geographical inequalities? Not what is euphemistically termed 'the country as a whole', but, as is obvious, a small segment of the population located mainly at a few points in the territory. It is possible to agree with the argument of the 'cost' of regional development only in so far as one is prepared to approve a global growth strategy which is strongly concentrative (in both personal and geographical terms) as the sole viable development option. Clearly this would be difficult to accept.

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[12] A line of argument in which their best allies will be the global planners themselves, with their maximizing approach.

Table 3
DISTRIBUTION OF INTERNAL INCOME IN BRAZIL
(Cruzeiros at 1959 prices)

Social groups (Strata of recipients)	Size		Annual per capita income		Percentage increase
	1960	1970	1960	1970	1960-70
Top 1%	700 000	940 000	64 000	141 000	114.0
Next 4%	2 800 000	3 760 000	21 700	36 800	69.5
Next 15%	10 500 000	14 100 000	10 500	14 300	42.0
Next 30%	21 000 000	28 200 000	5 160	6 110	18.0
Bottom 50%	35 000 000	47 000 000	1 970	2 170	10.0

Source: Realidade, São Paulo, May 1972, p. 84 (special issue entitled *Nossas Cidades*).

The question of the 'cost' of regional development, on which it is worth while to dwell a little longer, has also been clothed in the apparently impeccable technical apparel that is known in the specialized literature as the 'efficiency-equity conflict': a conflict which can only be resolved by an eminently political selection of alternatives, that is, through a value judgement. Alonso (Alonso, 1968), Mera (Mera, 1966) and Coraggio (Coraggio, 1969) are some of the leading specialists who have formalized the problem, and it is true that if a set of highly restrictive hypotheses is postulated the contradiction is clearly evident.

In highly simplified terms, the adoption of a criterion of efficiency in the allocation of resources would imply, from the geographical standpoint, using the said resources to strengthen the development of capitalized regions where the short-term rate of return (marginal output-capital coefficient) would be highest. Conversely, the use of a criterion of equity in the allocation of resources in short supply would mean --still from the geographical standpoint-- earmarking them to promote the development of underdeveloped, undeveloped or depressed regions,[13] so as to narrow the gap between the indexes for these regions and the national average indexes. This would imply accepting smaller short-term returns on the resources, with the result that the magnitude of the country's sacrifice would be highlighted.

Among other hypotheses, this statement of the case presupposes that the regions are appreciably homogeneous in their internal structure and it is therefore conceivable that there may be some regions globally more productive (i.e., with a higher average output-capital ratio) than others. This is not necessarily true: in the most backward regions high-productivity sectors and activities may be found, which, in so far as they coincide with sectors of national priority, make the conflict between efficiency and equity irrelevant. At least it should be perfectly clear that this is a matter which must be empirically investigated before a regional development plan is drawn up.

[13] These three concepts are not synonymous.

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D. Levels of operation of regional planning and relations between national and regional planning

As has been pointed out by de Mattos (de Mattos, 1970) in an important study on regional planning, the approach to attempts at regional planning most commonly adopted in Latin America in the past has been that of formulation of plans and definition of policies for a single separate region. Increasingly often, however, this way of looking at regional problems has given place to approaches of a nationwide character; that is, a change in scale and content has come about in the mode of tackling regional development planning. This change of approach is partly based on recognition of the existence of veritable regional systems in each country.

Kuklinski (Kuklinski, 1967) has worked out an excellent typology of regional activities which it is worth while to reproduce here in order to establish more precisely the content of the present text. Kuklinski defines four types of situation which give rise to an activity that may be termed 'regional'. These typical situations are described as follows:

Situation Nº 1: A specific country attempts to use the resources that might be generated by means of regional development with the aim of nation-wide acceleration of its rate of economic, social and cultural growth. The characteristic features of this situation may be summarized as follows:

(a) The implementation of interregional development programmes is promoted by the central government through a central planning agency;

(b) The interregional development plan is drawn up in such a way as to cover the entire area of the country, frequently in the framework of an overall development plan;

(c) In this case regional development signifies a disaggregation of nationl economic and social policies.[14]

Situation No. 2: Regional development activity is generated through the aggregation of local activities whereby a regional scale is adopted to resolve problems that cannot be dealt with at the local level (for example, a metropolitan authority to tackle problems that transcend the municipal scale).

Situation No. 3: In a given country, a special regional development programme is drawn up and implemented in such a way as to accelerate economic, social and cultural change in a single region that is underdeveloped or depressed. This action may be taken through the established administrative structure or through the creation of a set of *ad hoc* institutions which have no counterpart in other more developed regions (SUDENE for example).

Situation No. 4: The regional development effort is generated and implemented in consequence of purely sectoral investment decisions. In this case the primary motivation for regional development has its root in sectoral forces. An outstanding case in point is afforded by the application of road penetration programmes or land reform programmes.

[14] A regional disaggregation of national policies is not enough. See C. de Mattos, *Estrategias de desarrollo regional polarizado en la planificación nacional en América Latina,* Santiago de Chile, Latin American Institute for Economic and Social Planning (ILPES), 1975.

The discussion embodied in the present work relates almost exclusively to problems that are well typified by 'Situation No. 1' described above, although its characteristics, as portrayed by Kuklinski, will be debated. It should be noted in passing that the first two situations are formally similar, although this by no means implies that they differ only in scale.

The attributes and dimensions of the regional problem having now been clearly defined, brief reference must be made to the relations of regional planning (institutionally understood as a sub-system of the overall planning system) with other forms or levels of planning, in particular global planning and sectoral planning. In other words, it is a matter of examining how these three levels of action are articulated.

One possible way of analysing this relationship is to be found in the stage-by-stage or stepwise planning method proposed by Tinbergen (Tinbergen, 1965). This method distinguishes four sequential stages in the planning process: (i) the macro-economic stage corresponding to a global level of planning; (ii) the sectoral stage as a functional disaggregation of the global postulates; (iii) the project stage; and (iv) the regional stage.

Tinbergen's method does not seem very promising from the standpoint of regional planning interests. In substance, the proposed method implies relegating the regional planning function to a mere locational study of projects, since all but one of the possible degrees of freedom in the overall solution have been exhausted by the time the regional level is reached. It is typically a method whose theoretical roots are to be found in partial-equilibrium analysis. If the stage-by-stage or stepwise planning method is chosen as the frame of reference in which regional planning (as well as the other two planning levels) is to be set, there will be obvious effects on the institutional organization of the regional planning machinery (a tendency towards centralization) and on the techniques of analysis, which will be closer in this case to micro-economics in general and to comparative costs analysis in particular than to more comprehensive planning instruments.

Viewed from an even broader angle, the use of the stage-by-stage or stepwise planning method may mean wasting all the creative potential implicit in the direct and indirect incorporation of regional communities in the work of planning.

A more profitable alternative offers itself if the entire planning process is regarded as a simultaneous solution system, in which global, sectoral and regional questions are all settled at the same time. From the decisional standpoint, regional planning would here appear on the same level with global and with sectoral planning. Clearly, however, given the present state of knowledge and of programming techniques, a simultaneous solution method is only conceivable in theory or at a level of generalization so high as to render it all but useless in practice. Nevertheless, if a final demand vector is assumed to be given, it is feasible to envisage the construction of an interregional input-output model, even though this implies that the global variables have been established exogenously. The truth is that the use of a simultaneous solution method entails not so much a methodological problem as quantitative information requirements (essentially a series of indicators deriving from econometric studies at the national, sectoral and regional levels alike) which are always difficult to meet in countries with elementary statistical systems.

In practice, the best way of resolving the problem of how to link regional planning to sectoral and global planning consists in designing an iterative process in which the final solution (determination of global, sectoral and regional endogenous variables) is reached via the convergence of a number of trial-and-error tests and through the channelling of feedback information. In this case, a global target, for instance (e.g., an annual overall growth rate of 6% determined as a function of restrictions in respect of labour and of internal and external saving), is fixed exogenously for the purpose of serving as a pivot for the determination of a first set of final values. These values are modified in such a way as to adapt them to sectoral and regional objectives, and this modification is fed back into the process so as to affect another global target value, and so in succession. It is also possible that the initial pivot may be established at the regional level −assuming the case of a regional scheme with strong emphasis on a specific region− in which event the process would be reversed.

Clearly, an iterative procedure calls for an efficient information system, and smooth channels of communication between the three planning levels will be an essential requisite for success.

E. Review of certain typical problems

What is the purpose of a deliberate regional planning effort? Not only to accelerate the rate of economic, social and cultural change at the national level (Kuklinski's Situation No. 1) but also concurrently to resolve a series of spatial and regional problems which have been generated by the historial mode and process of growth itself. The regional planner must begin by identifying and understanding a whole vast complex of regional problems for which the plan itself must offer solutions.

It would not be possible, nor is it the intention of the present book, to examine in detail each and every problem for which the regional development plan must provide an answer, but this introductory chapter would be incomplete without a general review of at least some of the most significant.

It is important to begin with the question of territorial economic concentration. [15] From a purely descriptive standpoint the problem is almost self-evident. As far as Latin America is concerned, suffice it to recall the following urban axes and their economic incidence in their respective countries: Buenos Aires-Rosario, São Paulo-Rio de Janeiro, Santiago-Valparaíso, Lima-Callao, Caracas-La Guaira, etc.

The first question to be asked is why a situation of territorial concentration of economic activity is created. A point to note at the outset is the relative character of the idea of territorial concentration and the frequent confusion between concentration of the elements of a spatial structure and concentration of the attributes of those elements, as indicated by Coraggio (Coraggio, 1974, pp. 49-59).

[15] Territorial economic concentration relates to the productive apparatus of an economy and not to the decision-making system.

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Setting aside for a moment explanations of a purely traditional geographical type and of a historical character, the economic answer to the foregoing question is relatively simple.

Suffice it to note that even if the most extreme assumptions of the perfect-competition model are adopted, if a firm operates with a non-linear production function this is enough to generate a concentration process. Or, from another standpoint, assuming that all firms operate with constant returns to scale, it is enough to eliminate the assumption of isomorphism of the geographical terrain for unit transport costs to differ in different directions and for concentration to be brought about by this fact. Once these situations occur, and in so far as technical innovations are introduced which increase productivity and release manpower from agriculture, territorial concentration phenomena necessarily crystallize in urban centres.

Consequently, the second question in this context is why an initial system of urban nuclei develops in such a way that some centres expand more rapidly than others, generating specific spatial and size-class distributions of the whole group of towns. The reply to such a question is not to be found in the restricted field of an urban development theory which studies the physical forms and functional expansion of each individual city separately considered, but rather in the broader context of systems theory; or else, as several authors suggest, the economic theory of information would perhaps be the most suitable framework in which to answer a question of this type.

Systems of towns have of course been traditionally classified in two categories: those that correspond to the formulation of the 'rank-size' rule (according to which the product of multiplying the 'rank' of a town in the urban hierarchy by its population always turns out to be a constant) and those that conform to the so-called 'primate' model of urban structuration (i.e., macrocephaly of the urban system or discontinuity in the first size steps of the urban hierarchy). Both 'models' of urban systems have been considered merely as empirical descriptions of given situations, with no explanatory capacity and no stable relation to an economy's overall level of development, as has been satisfactorily proved by Berry (Berry, 1961). To amplify the explanatory capacity of the empirical regularities observable in the configuration of urban systems, an attempt has been made to link, in particular, the lognormal distribution of towns to the concepts of entropy and of information. Thus, for example, de Souza asserts that the form of a given system of cities must of course result from its oscillation between the states of maximum entropy and of maximum information. In other words, from its oscillation between the unrestricted operation of the stochastic process and the existence of some kind of systematic pressure which makes for organization (de Souza, 1974).

The same author adds that the interpretation of the growth of urban systems in the framework of information theory is not a mere exercise in the use of analogous languages: on the one hand, because the more globalizing tendency of the theory enables the key concepts of the other theoretical propositions to be operationalized and their operational mechanisms formalized in dynamic and more exact models; but mainly because this interpretation brings to light theoretical implications which escape notice in the other propositions, fostering, so to speak, the manifestation of their underlying conceptions of the development process.

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The argument, de Souza goes on to say, is simple. Like other theoretical propositions, the interpretation of the growth of systems of cities as a stochastic process is based on the conception of a social whole governed by spontaneous and self-regulating mechanisms. But it differs from those other propositions inasmuch as it postulates that, in open systems, restrictions on the growth process may involve increasing distortions and frequently frustrate the establishment of a balanced urban system (de Souza, 1974).

Consequently, in the light of the assistance that can be obtained from information theory, to ask why some urban centres expand more rapidly than others (thus generating situations of concentration) is tantamount to inquiring what are the elements that in open systems, such as a system of cities, interfere with the automatic feedback mechanisms that in other circumstances would make for a steady-state system coincident with a lognormal distribution of cities.

At this point of the analysis, Friedmann's proposition (Friedmann, 1972) relating to the role of innovations and the part played by the city in their adoption and diffusion represent an extremely valuable contribution to an understanding of the dynamics of urban systems. To discuss and analyse them, however, is beyond the scope of the present section.

The third question relating to territorial economic concentration, which stems from the foregoing considerations, is perhaps the most important from the planner's standpoint. Is territorial concentration a problem or not? The answer is somewhat equivocal, because such concentration is not a static phenomenon, but on the contrary is a process with considerable internal dynamics. If it is a process that evolves through time, its characterization as a 'problem' must necessarily take into account the way in which it influences at a given moment the development of the milieu in which it is inserted, that is, how it affects processes of a more general kind or of a typically macro-economic nature, such as, for example, overall economic growth, allocation of resources, price stability, etc.

There seems to be a consensus among the majority of specialists to the effect that a certain degree of concentration (both functional and spatial) is an indispensable requisite for economic growth, as being the only way of overcoming the problems of scale and indivisibility existent in much of the current technology. Some degree of concentration can, moreover, be justified from a strictly sociological standpoint. However economic development is defined, it is clearly characterized by norms of behaviour and by values (for example, predominance of impersonal functional relations over personal relationships, acquired status as against adscript status, rationality of interpretation, social mobility, etc.), which are primarily generated in an environment typified by a high level of social interaction.

Furthermore, as will be seen later, concentration constitutes a substantive element in a great deal of regional economic growth theory and is therefore an important strategic option in regional development policy.

Granting all this, the question shifts to the other extreme of the spectrum, that is, to the evaluation of the negative effects of concentration. What is the degree of concentration at which it becomes undesirable?

Since (territorial) concentration necessarily crystallizes in urban centres, as pointed out above, the foregoing question brings up the matter of the size of cities and their distribution in space and by scale. Any idea of defining an

'optimum' size (at least in the light of current knowledge) must be dismissed, and the analysis will therefore have to refer to the supposed adaptation of certain urban size ranks to the country's socio-economic infrastructure.

In line with traditional theory of the neoclassical type, it could easily be postulated that the size of territorial concentrations is appropriate (for the country concerned) so long as the marginal benefits exceed the marginal (opportunity) costs of concentration. An assumption that an evaluation is made at social prices transfers the problem to the definition and measurement of benefits and costs. If it is further assumed that the question is kept at the strictly economic level, the above evaluation can be translated into terms of agglomeration economies and diseconomies, which certainly does not make it any more operational.

An empirical possibility would consist in studies analysing the behaviour of certain variables deemed to be significant (e.g., per capita income, industrial productivity) in relation to different urban sizes, and an estimate might be made of sizes linked to some sort of diminishing returns. What is of interest is that, except in very specific circumstances, the farthest that this will lead will be just to a situation of diminishing, but still positive, returns.

Unfortunately empirical research on this question is scanty throughout the world and particularly so in Latin America. Similarly, such little research as has been conducted in this field is distinctly one-sided, inasmuch as it is primarily focussed either on the costs of urbanization or on its benefits (per capita income, labour productivity, etc.).

One of the most suggestive studies on the subject is the classic work by Mera (Mera, 1970) based on statistical analysis of a large number of countries over a period of seven years. Mera's central argument is that a country's economic efficiency (measured in terms of per capita income) is enhanced as the population of the primate city increases in relation to the total population of the country. If this argument is valid, the inference is that there is an evident strategical option in favour of greater concentration.

From a narrower standpoint, such as that of the analysis of industrial (labour) productivity in cities of different sizes, a research project carried out in Brazil, with a coverage of more than two hundred Brazilian towns, affords empirical evidence that runs counter to Mera's thesis. The conclusion reached is that while the average productivity of industrial labour consistently increases with urban size, variations in average productivity in relation to different urban sizes increase more than proportionally in the case of urban sizes falling within the rank of 200 000 to 500 000 inhabitants, and less than proportionally in that of urban sizes exceeding 500 000 inhabitants (Boisier, Smolka, de Barros, 1973).

If IVA represents industrial value added, AIE average industrial employment and POP urban population, the above-mentioned findings can be formalized in the following expressions:

$$\frac{(IVA)}{(AIE)} = e^{-17.064} \, POP^{1.5654}$$

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$$\frac{(IVA)}{(AIE)} = e^{-1.5616} \, POP^{\,0.29613}$$

The first of the above expressions relates to the urban size stratum of 200 000 to 500 000 inhabitants ($R^2 = 0.531$; D and W test: 2.02687 significant at 5%; standard error: 0.5564), while the second reflects the situation found in the urban size stratum of more than 500 000 inhabitants ($R^2 = 0.6989$; D and W test: 1.96831 significant at 5%; standard error: 0.0695).

In a recent study based on 1967 data for 18 industrial groups located in the Standard Metropolitan Statistical Areas (SMSA) of the United States, relatively similar results are reached, which would seem to prove, or at least to offer empirical evidence, that industrial labour productivity would significantly increase with the increase in urban size. Sveikauskas maintains (Sveikauskas, 1975) that in the SMSA productivity increases by 5.98% when urban size doubles. If it is borne in mind that the lower limit of the SMSA is about 50 000 inhabitants, the enormous differences in productivity that will occur within the United States' urban spectrum can readily be grasped.

As can be seen from the foregoing examples and others that might be added, the empirical evidence is far from being conclusive in one direction or the other. Consequently, this is a subject on which it is urgently necessary to promote additional research.

At an even more practical level, the view may be taken that once the time comes when a city requires —if it is to function in conditions of minimum efficiency— heavy investment in infrastructure involving major technological changes (for example, mass underground transport), this means that its size is growing larger than is desirable, considering the manifest superiority of an alternative productive investment in the periphery.

Lastly, the way in which the concentration process affects the space structure depends upon a constellation of factors, among which attention may be drawn to the following:

(a) Physical and geographical factors, such as, for example, the distribution of natural resources over the geographical space, in particular such resources as water, land suitable for farming, timber, etc., i.e., those that are of the greatest use in the first stages of a human settlement process. Among the geographical elements, the topography of the terrain is a decisive factor in the establishment of new settlements. As can easily be shown, once an initial settlement pattern is established forces are unleashed which tend to perpetuate it;

(b) Historical factors proper, such as the capacity of the initial settlement groups to consolidate their dominion over a given space by the establishment of' political frontiers similar to the economic frontiers. Generally speaking the countries of South America provide a good example of belated consolidation of nation-States, since well into the twentieth century wars still occurred that implied significant territorial readjustments. Chile affords a more detailed instance of the difficulty of consolidating sovereignty even over territories (such as the Araucanian area) that have never been internationally disputed;

(c) Economic and political factors, linked primarily to the way in which some countries have been incorporated in the world system of division of labour

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and to the first attempts at inward-directed development put into practice in the twentieth century. Thus, the littoral location which is characteristic of the urban network in South America is explained not only by problems of accessibility to the interior and environmental difficulties, but also in relation to the twofold role of exporter of primary commodities and importer of manufactured products assigned to these countries in the classic system of international trade.

Most experts seem to agree that the degree of concentration attained by the Latin American economies generates situations that are unfavourable not only to the more equitable but also to the more rapid development of the countries concerned.

Carlos de Mattos summarizes as follows the consequences of the spatial concentration process (the footnotes in the original text are not given):

"From this point of view, it is important to stress the following phenomena resulting from the existence of a spatially concentrated structure:

(a) Generation of conditions favourable to industrialization, inasmuch as the various productive units, on benefiting by the effects of the external economies of agglomeration deriving from spatial concentration, are able to enlarge their scale of production and therefore to increase their productivity and their efficiency. From this point of view, spatial concentration emerges as a favourable condition —it might even be said as a necessary requisite— for industrialization and, consequently, for the economic growth of the Latin American countries;

(b) Relative deterioration of the living conditions of large sectors of the population located in peripheral regions which are not favoured by the geographical distribution of the fruits of economic growth. Hence, in terms of general living conditions, the gap between these regions and the centre has tended to widen. This situation acquires particularly striking significance in those countries where there are peripheral regions with a high degree of demographic concentration, as is the case in the North-East of Brazil or in the Sierra of Peru. It is reflected mainly in conditions unfavourable to the periphery in respect of income distribution, employment opportunities and access to goods and services;

(c) Disproportionate growth of the metropolitan areas in most of the Latin American countries. As this phenomenon has not been accompanied by the establishment of suitable conditions for the absorption of the population increment, it has brought about a significant increase in urban marginality. Thus, marginality figures as a problem affecting not only the peripheral regions in each country but also an ever-growing sector of the metropolitan population;

(d) Necessity of investing in the great urban concentrations —basically in infrastructure— an increasing amount of the scanty financial resources available, with the aim of maintaining conditions better suited to the functioning of the expanding metropolis. Presumably, particularly from a medium- and long-term standpoint, these resources might help to increase the overall growth rate if they were allocated to investment in other parts of the geographical space, particularly as from the period when certain thresholds are overstepped beyond which agglomeration begins to generate external diseconomies;

(e) Failure to utilize part of the national stock of resources —particularly natural resources— in the production process. The incorporation of these resources might have contributed to diversifying the economic structure and

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raising the growth rate over the medium- and long-term. This neglect of available resources emerges as one of the negative aspects of spatial concentration;

(f) Aggravation of the environmental pollution problems caused by the disproportionate concentration of activities in the great metropolitan cities of Latin America. In many of these agglomerations pollution has reached such formidable proportions that any proposal to tackle the problem effectively is so costly that very few countries can undertake the task as an integrated whole. Moreover, a proposal of this type becomes really meaningful only if it is conceived and implemented in co-ordination with measures to halt the growth of the metropolitan areas concerned, which in turn calls for the allocation of a considerable volume of resources to other parts of the geographical space." (de Mattos, 1975.) (Unofficial translation.)

In Latin America territorial concentration has often been confused with the capitalist style of production. This partly mistaken interpretation has led to the assumption that any development strategy which is politically 'advanced' enough should aim at territorial dispersion of activities and investment.

This reveals a twofold misinterpretation. On the one hand the real functioning of the economic system in spatial terms is disregarded; on the other, there is a suggestion here of a no less alarming disregard of the *modus operandi* of the socialist economies, which are implicitly considered as 'models'. In the last analysis, no heed is paid to the fact that what is really important is the equitable territorial and personal distribution of the result of economic activity (employment, income, social and cultural services) rather than the location of the production apparatus in itself.

Speaking of the problem of territorial concentration, Porwit remarks:

"Discussions concerning planning sometimes concentrate on the distribution of second-order targets, i.e., those related to output, investment, employment in particular sectors of economy (industry, agriculture, services, etc.). In the earlier stages of economic development, in particular, there is an understandable tendency to consider industrial output and employment as the primordial factors contributing to overall economic development. However, this may lead to policies characterized by deconcentration in a twofold sense: trying to develop simultaneously a too large assortment of products and branches; secondly, scattering new industrial projects over as many localities as possible. Such policies may prove erroneous because of a relatively low efficiency in utilizing resources. From a methodological point of view, the error lies in overlooking the rule that second-order targets should be derived from a consideration of social targets, which are the ultimate motives for all activities subject to programming." (Porwit, 1971.)

A problem closely associated in practice with that of concentration is that of the centralization of power.[16]

Once again considerations may be put forward here which are similar to those propounded with respect to concentration. In the first place, it must be borne in mind that what is in question is a process rather than a static

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[16] The term centralization (or decentralization) relates to the decisional machinery of a society and not to its productive base.

phenomenon. Secondly, it is also necessary to distinguish between centralization along functional lines and centralization along territorial lines.

Centralization does not relate to economic questions but to the way in which power is distributed, and, consequently, a specific situation of centralization cannot be judged in the light of economic efficiency criteria. In theory at least, perfect efficiency is equally possible in an absolutely centralized system and in one that is completely decentralized, and this holds good, of course, for regional development planning. The foregoing opinion, however, does not imply failure to recognize the practical difficulties attending on efficient operation in the case of both systems.

One of the major objectives of most regional development plans is the attainment of a higher degree of territorial decentralization, and it is generally pointed out that the prevailing degree of centralization is an obstacle to regional development. This assertion is not supported by empirical evidence; on the contrary, it would be easy to cite examples to the opposite effect.

Decentralization cannot therefore be associated —simplistically at any rate— with the level of regional economic development.

Since centralization is a phenomenon linked to the distribution of decision-making powers, it must be analysed in relation to a political structure, and in particular to the *modus operandi* of such a structure and the degree of participation it allows. From this standpoint, decentralization appears as associated with the level of democracy at which the system works. Few doubts are entertained as to the direct relationship existing between decentralization and political democracy.

Thus, if the question of participation and political democracy is an important component of the conception of economic and social development that is implicit in a regional development plan, then and only then the degree of centralization (in the power structure) becomes an integral part of regional development planning.

As a general rule, moreover, this is exactly what will happen, since one of the non-economic justifications of regional development (conceived as a conscious promotional effort) consists in its generating a higher degree of social consensus (through greater participation of individuals) with respect to certain major national objectives, and in winning over loyalties to the central level of government.

It is in this typically political context, then, that the existing degree of centralization might be considered as a stumbling-block for regional planning. On the other hand, this does not imply disregard of the obvious fact that once the degree of centralization (or decentralization) with which the system will operate has been defined, it becomes one of the determinants of the structure of the regional development planning process and system.

The level of centralization existing at a given moment may be related —in terms of its origins— to a few explanatory hypotheses.

In the first place, the tendency to centralization (principally in respect of the public sector) which is manifest enough at the world level, may be attributed to the indivisibility of scale of a number of economic decisions, which means that such decisions must inevitably be passed on to higher government bodies. For example, the decision to build rural roads in two neighbouring regions may

be left in the hands of the corresponding local governments; but a decision to build a highway crossing both regions must be transferred to a higher level of government. At bottom, it is a question of internalizing for the system what are individual externalities.

Secondly, (territorial) centralization and (territorial) economic concentration are processes which show a high level of reciprocal feedback, so that the existence of one generates the existence of the other. This makes centralization, within certain limits, an inevitable process.

Thirdly, there are historical elements which are manifested in the process. Particularly in peripheral economies, subject to a powerful cultural influence emanating from the central economies, there is a marked tendency to reproduce administrative systems which, in some cases, are highly centralized. To weigh the truth of this assertion, suffice it to recall the influence of the Napoleonic administration on Latin America.

With respect to this problem, Miller remarks that it is not only the tradition of a unitary form of government that has concentrated power in the centre. It often happens that many decisions and details which could have been handled at lower levels of government have been switched to the centre because of the lack of institutional or financial structures with which to deal with them at the local-regional level. The centre has assumed direct responsibility for these local problems because they could not be dealt with by the local government, and the 'myth' has grown up that these faculties are its own by right. In a psychological ambience of this kind, as new functions have arisen in consequence of increased social complexity and rapid urbanization, they have been absorbed by the centre. Since power over economic resources has also fallen to the centre, the lower units of government find themselves deprived of all possibility of recovering any of their functional responsibilities, even though they may be in a position to institutionalize these functions, and even though there may be enough professionals in the country to begin staffing the institutions. (Miller, 1969.)

Furthermore, certain political conjunctures make it indispensable for the management of the whole decision-making system to be highly centralized. A clear case in point is afforded by conflicts (both external and internal) that affect national security. Once a centralized system is adopted in face of a specific political situation, the tendency to irreversibility may be overwhelmingly strong.

Similarly, from a socio-political standpoint, the degree of centralization (primarily functional) is not unconnected with the domination historically exerted over the production apparatus by a given social class. Naturally, in traditional societies where power is held by an aristocracy or by a bourgeoisie of limited size, the system of control both of the State machinery and of the economic apparatus tends to be in great measure closed and self-generating. This is one of the chief weapons of defence of the established order of things, and naturally constitutes a serious obstacle to a process of change.

Lastly, it would be possible to link the degree of centralization to the relative existence of national resources (mobile at the national level) and regional resources (immobile at the national level). The more abundant the former, the greater is the tendency for them to be centrally managed.

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The diverse degrees of economic concentration and decisional centralization on the one hand, and, on the other, the differing degrees of territorial concentration of the population (as well as territorial heterogeneity in terms of relative participation in the labour force and also of the supply of capital) generate interregional disequilibria in levels of living, or, to put it more succinctly, interregional disequilibria in *per capita* income, perhaps indeed the regional problem *par excellence*.

There is in fact no known regional development plan in which the reduction of these inequalities does not appear as the central objective. It is not always clear, however, why they are generated and how they can be eliminated (should this be really possible or even desirable).

As there is a certain amount of literature on the subject, it is preferable to concentrate comment here on certain points —side issues perhaps, but none the less important on that account— which are often omitted altogether.

In the first place, it is important to indicate a typically statistical problem which usually distorts the presentation and analysis of regional disequilibria. The problem lies in that the index used to measure the degree of disequilibrium is not independent of the division into regions concerned, and the larger the number of regions the higher will be the value of the indicator. This suggests that there is not much point in talking about 'great or small' regional disequilibria, unless careful reference is made to the geographical base in use.

One way of avoiding this problem (which to some extent invalidates any international comparison) is to measure the variables under study (per capita income, for example) in relation to the lowest geographical category possible (communes, for instance) and then to form successions of spaces and measure the differences between these spaces in respect of maximum and minimum values. A curve can then be plotted between the number of spaces (whose internal structure is defined randomwise by the basic geographical units) and the interspatial differences in the variables. The slope of the curve offers a better measurement of the degree of interspatial disequilibrium, with the advantage of being independent of any one given way of dividing up the territory.

A second point worth mentioning is that the undue importance attached to interregional disequilibria generally ends by concealing the fact that the true problem lies not in inequalities between regions (which are almost always analytical categories) but in inequalities between persons, reduction of which is the ultimate goal of development.

Thus, the reduction of inequalities between regions can be fairly easily achieved if investment (for example) is concentrated in the centre of each region. But this may (and often does) prove to be concurrently aggravating the inequalities within the region (between persons), and by this means a reduction in intra-national welfare may be taking place. This type of problem has been effectively formalized by Coraggio (Coraggio, 1969) on the theoretical level, while Barkin (Barkin, 1972) has empirically demonstrated such a situation in the case of Mexico.

Thirdly, regional planners habitually overlook the fact that there are very few degrees of freedom to correct interregional disequilibria without reducing the welfare of some individuals or regions. Schematically, a situation of interregional disequilibrium (in income, for example) may be interpreted in terms of unequal regional shares in national income and in the population. If the two

kinds of participation are compared, some regions will show positive coefficients greater than one, and others positive coefficients greater than zero and less than one.

Assuming population distribution to be constant over the short and medium term, it is obvious that in those regions whose coefficients are less than one a positive change will have to take place in their relative participation in income (their income will have to grow at a higher rate than national income). This necessarily implies that other regions (those with coefficients greater than one) must reduce their share in income, but these are generally the most dynamic regions, which may mean that this reduction of their share cannot be gradual or continuous, and that a downward 'leap' may be necessary (precipitated, for example, by a sudden paralysation of public works), with a counter-productive effect on the system. It may also happen that these regions carry so much relative weight in the national economy that their rapid growth cannot be halted, for the simple reason that this would mean bringing the whole country to a standstill. These facts suggest that there are not many possibilities of correcting regional disequilibria over the short term.

Lastly, if the phenomenon of interregional disequilibria is envisaged as a process, it will at once be seen that they have their origin mainly in the differentiated rates of regional growth which in their turn are linked to the existence in the economy of immovable resources (and to their degree of immovability). Siebert has formalized a series of theorems which explain the phenomenon in relation to technological considerations connected with the nature of the production functions and the spatial mobility of resources (Siebert, 1969).

In the light of this interpretation, there would appear to be little ground for the assertion that regional disequilibria are one of the many byproducts of the capitalist made of production. To begin with, this assertion is not supported by empirical evidence either in the countries with a capitalist structure or in those with a socialist structure. Undoubtedly, distortions in the price system in a capitalist economy may aggravate the problem, just as may the mistaken decisions of central planners in a socialist economy. All this must not be taken to imply any affirmation of the possibility of automatic correction of regional disequilibria (via the market); if such a thing is possible (in practice it has proved so in a number of industrialized countries), it takes such a long time that the market solution is automatically ruled out. On the other hand, it is indispensable to point out that social control of a number of resources (both physical and financial) makes the resolution of problems of this type of a good deal simpler.

The last type of regional problems to be reviewed here is linked to ecological questions. Environmental problems have sprung very much to the fore in recent years, especially in the industrialized countries. They are problems that lend themselves particularly to being handled within the framework of regional development and planning activities. There are two reasons for this. Firstly, because they are problems whose manifestation is highly localized; secondly, because to a large extent they affect the physical environment, and physical planning (an integral part of regional planning) may make a significant contribution to their resolution.

In a report (1971) submitted to the United Nations Conference on the Human Environment (Stockholm, 1972), it is stated that the environmental

problems of developing countries can be classified, generally speaking, in two categories: those which have their origin in poverty or in the very insufficiency of development, and those which stem from the actual development process itself. The environment policy of developing countries must, of course, concern itself with both types of problem.

However, the first type (mainly relating to lack of piped water and sewage, undernutrition and poor-quality housing) tends to be resolved *pari passu* with the resolution of the basic development problem, i.e., economic growth.

What is paradoxical is that concomitantly with the solving of the problems of this first type as a side-effect of the development process, the problems created by development itself begin to appear. These problems almost all relate to the destruction of the existing ecosystems, and the above-mentioned United Nations report groups them in the following categories:

(i)   exhaustion of renewable and non-renewable natural resources;
(ii) biological pollution;
(iii) chemical pollution, arising out of air pollutants, industrial effluencts, pesticides, metal scrap, and detergents and similar agents;
(iv) physical disruption, as reflected, for example, in thermal pollution, silting and noise;
(v)   social disruption, of which congestion and loss of a sense of community are examples.

The need for problems of this type to be resolved within the framework of a regional development planning system is well summarized in the following paragraph from the United Nations report quoted:

"The integration of environmental concern in development planning would require national action by developing countries on a fairly broad front. Some of the major policy areas will include location of industries, land use policy, urban-rural interaction and community development, and sectoral policies..."

As can be seen, most of the aspects mentioned in the foregoing paragraph correspond to very specific fields of regional development planning.

If in addition we recall some concrete examples of major environmental problems —such as air pollution in large urban centres, water pollution in river basins or bays, erosion and desertification in rural areas, and destruction of the biological equilibrium of local flora and fauna— it will be seen that these are problems which call for territorially differentiated treatment, i.e., which possess the basic characteristic attributed here to regional problems.

Hence it may be inferred that regional development plans must include —as a matter of high priority— the preservation and restoration of regional ecosystems which otherwise will be destroyed through the very process of regional modernization. As the cost of this task is sometimes difficult to measure, it will be needful to accept the fact that environmental problems figure as a side restriction or constraint on the objective of maximizing the regional growth rate.

One last word to explain and justify the exclusion from this chapter of a problem which is at the very core of the understanding and management of regional affairs: the problem of urbanization and metropolitanization.

A discussion in depth of urbanization problems as such has been excluded solely because this is a topic which has been widely analysed both at the theoretical and at the empirical level and which it would be completely impossible to summarize in a few lines. The separation between urban problems and regional problems is completely artificial, and can be accepted only as a selective and partial form of analysis. Metropolitanization, as a more advanced phase of urbanization, is now coming to signify in Latin America not the expansion of 'great cities' (which is the strict meaning of the concept of metropolis) but the consolidation of veritable metropolitan regions.[17] Nevertheless, the emergence of metropolitan regions represents a national rather than a regional problem in the sense accepted here, and specific treatment of metropolitan problems will therefore be excluded from the discussion, except in so far as it relates to the identification of major metropolitan regions with the country as a whole (from an economic standpoint) and the loss of flexibility which this implies in the establishment of regional objectives and targets.

Population and transport questions —the former a basic input in a plan and the latter also one of the essential instruments of a regional plan —will be dealt with only in purely circumstantial fashion.

[17]Formed by a metropolis, several metropolitan centres, an inter-metropolitan agricultural periphery and a vast complex of transport and communications networks.

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Chapter II

FORMULATION OF A REGIONAL PLAN

The regional planning process —whose end product is the interregional development plan— will be divided here into two major sections. In the first place the stages making up what may be termed plan formulation will be discussed; secondly, the stages configuring plan implementation will be considered.

Plan formulation traditionally comprises the stages of diagnosis, determination of objectives and targets, drawing-up of strategy and specification of policies. The implementation of the plan, in its turn, implies discussing the institutional organization of the regional planning sub-system, the selection of policy instruments and plan control and evaluation. These stages are not, of course, the only ones conceivable, and, moreover, the order of sequence in which they are presented is relatively arbitrary.

A. Diagnosis and prognosis

It is generally accepted that reconnaissance of the existing situation is the first step in any planning process. The central objective of the stage of diagnosis (and prognosis) in the formulation of a regional plan is to present the planners, and through them, the decision-makers, with a clear picture both of the existing situation (in relation to the structure and functioning of the regional system) and of the causes accounting for the current state of affairs, as well as of trends towards change.

In this sense, diagnosis is an analytical category which is not merely descriptive but also essentially positive. In other words, it does not merely describe, it must also explain.

For the same reason, a well-prepared diagnosis cannot be based on the use of static methods alone. To interpret how a given state of affairs has been reached, it will be a *sine qua non* to rely at least on static-comparative methods and, whenever possible, on dynamic methods of analysis. It follows, too, that a historical analysis, insufficient in itself, is necessarily an indispensable complement to the economic diagnosis.

Jointly with the diagnosis —defined as a description and interpretation of the existing order of things— a prognosis for the situation under study is usually prepared. The prognosis consists basically in an extrapolation of the current situation to some future date. The trends discovered through the diagnosis are projected on the assumption that the forces which have determined them in the past will remain unchanged.

The importance of the prognosis, which in principle whould appear to be a work of supererogation, must not be minimized. From a comparison of the image of the future obtained through the prognosis with the politically-determined overall objectives, the intensity and the form that must be assumed by the planning process can be deduced.

Grosso modo, the smaller the discrepancy between the objective-image (defined by a deliberate act of will) and the prognosis-image, the less intensive will be the intervention brought to bear on the system and the more adaptive in

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character. Conversely, the bigger the discrepancy, the more vigourous will be the intervention attempted and the more innovative in character.

Since the problems under consideration here relate to a system of regions, the diagnosis will have to consist in a description and interpretation not only of the existing situation in each sub-system (in each province or in each region) but also of the situation existing in the whole system (interregional). It will probably be on this latter aspect that the emphasis will have to be placed.

A standard blueprint for a regional diagnosis (in its descriptive phase) might include the following topics:

(i) Description of the basic individual units (which may be communes, districts, provinces, states, etc., depending upon the information available). This description can be prepared in terms of the list of data presented in subsequent pages;

(ii) Analysis of the dynamic functioning of the whole system configured by the units described in the preceding sub-paragraph. In reality, rather than a dynamic analysis, in most cases it will be a static-comparative analysis between two census dates. This type of analysis implies first, selecting the variable or variables on the basis of which the study will be carried out: total population, economically active population and employment are those most commonly chosen, because of the relative ease with which the pertinent statistics can be obtained. If information so permits, more complex variables must be considered, such as the geographical product or income. A variable or set of variables once selected, the next step is to choose a method of analysis; as will be seen later, the method known as calculation of relative variations proves particularly useful for the purposes indicated. The object of this section of the diagnosis is to investigate the direction of change in the system and to identify each unit's relative changes of position within the whole: for example, to determine whether province A is more or less dynamic than the system as a whole and what factors help to account for this situation;

(iii) Description of the system of human settlements both in the urban and in the rural areas. This section of the diagnosis must make it possible to analyse the structure of the system of population centres, defining its morphology (whether the system shows a primate, Paretian, mixed or amorphous distribution) and pinpointing its determining elements or factors.[18] Urban-rural continuity or discontinuity must also be evaluated, and it will be important, furthermore, to look into the degree of dispersion of the rural population, since rural dispersion is generally one of the keys to the explanation of rural marginality and of a low degree of national integration;

(iv) Analysis and description of the transport and communications networks. The diagnosis must include a study of the degree of penetration of the road and rail transport system (density of both networks) as well as of the degree of connectivity of the population centres, and must also comprise an examination of the intensity of use of the network in order to discover possible

[18] See, inter alia, C. Vapñarsky, "On rank-size distribution of cities: an ecological approach", Economic Development and Cultural Change, Vol. XVII, No. 4, 1969.

cases of saturation.[19] Communications networks likewise must be evaluated in the light of the same criteria;

(v) Description of the institutional system linked to the administration of regional development (if it already exists) and of local development. The purpose of the last section of this simplified diagnosis model is to provide a rudimentary idea of the operation of the subnational systems of government and administration in order to ascertain their functionality in relation to a more complex system structured around a nationwide regional development programme. Structure, functions, autonomy and human equipment are important points to be examined.[20]

It may here be remarked in general terms that the definition and delimitation of regions, i.e., the regional partition of the country concerned, is usually regarded as an integral part and immediate result of the diagnosis. Although the specific topic of definition of the regions best fitted for development will not be dealt with here, partly because very few generalizations can be hazarded on the subject, it is nevertheless indispensable to put forward some central considerations.

In the first place, it seems to be a relatively widespread belief that regions are an indispensable requisite for regional development and that the regionalization of the country therefore constitutes the first and elementary step in the drawing-up of the plan.

This is a completely mistaken idea if the context in which the matter is approached corresponds to what has been defined here as nationwide regional development. If the final purpose of regional development is to raise the level of welfare of every human being irrespective of where he lives (the reduction of inequalities in welfare is implicit in the foregoing view), then theoretically there can be regional development without regions. For this the existence of two conditions would suffice: (i) an efficient system of information on geographical co-ordinates; and (ii) an equally efficient decision-making system.

In some practical instances, paradoxical though in principle it may seem, a regional development strategy or plan must shelve any attempt at regionalization and concentrate effort on national integration problems both from the strictly spatial and from the institutional standpoint. A good example of this is afforded by Bolivia at the present time. A recent United Nations report contains a statement that may be (unofficially) translated as follows:

"Another significant fact is that Bolivia looks like a mosaic of disintegrated regions in which geographical mobility of the capital and labour factors is virtually non-existent. This is clearly evidenced by the technology of the regions and the differences in productivity in certain sectors, particularly agriculture. For example, as regards technology, the Altiplano is characterized by using a

[19] The degree of connectivity (or connexion) of a system with 'n' population centres in relation to any network can be measured by comparing the actual connexions with the number $(n^2 - n)/2$ given by the theoretical total of connexions.

[20] For a different approach to the regional diagnosis based more on a study of natural resources and more definitely geared to the use of space, see H. Méot, *Diagnóstico espacial del Ecuador*, Technical Note by CEPAL (mimeographed text), April 1975, as well as other studies by the same author.

large proportion of manpower in relation to the natural factor, while at the other extreme are Beni, Pando and a large part of Santa Cruz, where the potentially productive land is not developed for want of the complementary factors, capital and labour. The 'integrated Subregion' of Santa Cruz (the area adjacent to the city of Santa Cruz) constitutes a sort of halfway-house between 'traditional area' techniques and the north, for although capital has been transferred to it, its supply of manpower is relatively low. This lack of geographical mobility of production factors is one of the major causes of the interregional differences in productivity (and in per capita income): income per economically active person in Santa Cruz is over three times higher than in Beni, 2.5 times higher than in Pando, 2.4 times higher than in Tarija, twice as high as in Potosí, 1.8 times higher than in La Paz and 1.6 times higher than in Cochabamba and Oruro.

"The factors of production (in particular manpower) do not move to where their productivity is higher because there are social or cultural barriers in the way as well as antagonism to geographical mobility among the factors themselves (this is a special case of resistance to change). Insufficient factor mobility is therefore a sign of the lack of national integration. The country figures merely as 'the geographical site' where several independent sub-systems are juxtaposed without being integrated: the traditional area, with its centre in La Paz; the North and the East, uninhabited; Santa Cruz (the city) and its immediate agricultural hinterland; the centre; and the South.

"An illustration can be provided in terms of economic theory. The basic difference between the theory of international economic relations and that of interregional economic relations with a country is that in the former factor immobility is a fundamental hypothesis, so that generally speaking it is reduced to a theory of international trade (that is, movements of goods, which partly fill the place of movements of factors), whereas in the latter the basic hypothesis is factor mobility. The theory of international relations analyses independent sub-systems and is precisely what would be most applicable in the case of Bolivia: the sub-systems are separate, the factors are virtually immobile and 'communication' is effected only through transfers of goods. From the standpoint of the growth potential of the 'whole' constituted by the country and the welfare of its inhabitants, this is a 'social cost': a major inefficiency, since, as is common knowledge, movements of goods are a poor substitute for movements of factors. It must be strongly emphasized that this, of course, is valid if what is being considered is the 'whole' and not one or some of its parts.

"Hence a corollary arises: national integration or the integration of the sub-systems implies an effort to lower the social or cultural barriers which hamper the movements of the factors of production, and particularly of the human factor, among the various regions or sub-systems of the country. If, moreover, integration in territorial terms, on as independent a basis as possible, is desired, it must be 'capital-saving' because of its effects on external indebtedness. Thus there are two conditions that territorial strategy must fulfil: an increase in internal factor mobility and a low capital cost (so as not to increase the economy's external dependence and not to reduce its rate of growth)."[21]

[21] United Nations, *Planificación regional. Conclusiones y recomendaciones del Proyecto DP/UN/BOL-71-010/4*, New York, 1974.

If over and above the foregoing analysis it is borne in mind that in Bolivia steps have been taken to strengthen considerably (with a real allocation of resources) the power of the Departmental Public Works Committees and of the (departmental) Regional Development Corporations, without a concurrrent institutional strengthening of the central regional planning agency (Ministry of Planning, Regional Planning Department), and if the deep-rooted regionalist sentiments of the departments are taken into account, as well as the utterly different ecological systems into which the country is divided, it appears that in this particular case any attempt to impose regionalization would be tantamount to political suicide for regional planning (and for the planners themselves). It follows that in this instance the regional strategy or development plan should be much more spatial and institutional than strictly regional.

As a rule, regions are in reality either analytical or decisional categories; fairly arbitrary categories in both cases. Except where a region is culturally defined by the identification of its inhabitants with a geographical space, by their regional loyalty and by their patterns of local culture, other regions generally represent a response to the needs of the planner rather than to an economic, social and cultural reality.

From this point of view regions must be considered useful but subsidiary elements in the regional development process, means to regional development but no its ends.

In practice, however, and in default of the above-mentioned operational requisites, regionalization becomes *de facto* an important mechanism of nation-wide regional planning. At least four arguments that in practice warrant regionalization can be adduced:

(i) in the first place, regions are efficient geographical units for the purposes of establishing information systems that will help to improve the decision-making process;

(ii) secondly, regions constitute geographical categories which are more useful than the country as a whole for mobilizing the positive forces of the community in support of certain national objectives;

(iii) thirdly, regions make it possible for national objectives and policies alike to be territorially differentiated or distinguished, and this signifies a direct contribution to the attainment of greater efficiency in the allocation of resources and in the equitable distribution of the development effort;

(iv) fourthly, regions form a suitable geographical basis (better than the traditional politico-administrative division) for structuring a decentralized system of government, when this is a national objective.[22]

Once the decision to regionalize a country has been taken, it is useful to bear in mind a number of ideal conditions which should serve as a frame of reference for the regionalization process, even though in practice it is hardly likely that they will all be fulfilled. In any event, these conditions are as follows:

[22] See W. Stöhr, "Metodología para la delimitación de las regiones en Chile", in Centro Interdisciplinario de Desarrollo Urbano y Regional (CIDU), *Manual de Planificación Regional*, Santiago de Chile, Universidad Católica de Chile, 1968.

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(i) *Mathematical conditions.* Regionalization must be exhaustive and exclusive with respect to the national territory. These terms are used here in the same sense in which they are applied in mathematical sets theory;

(ii) *Spatial conditions.* These relate to the principles of continuity and accessibility. That is, regions must be continuous geographical spaces and must possess adequate internal accessibility. Each region must possess at least one urban centre potentially capable of acting as a centre for services and/or as a centre of growth;

(iii) *Economic conditions.* Each region must be of an economic size sufficient to sustain a non-subsidized development process over the long term; the economic structure must be sufficiently diversified to avert the cyclical fluctuations proper to dependence on a single product;

(iv) *Social conditions.* The social conditions for regionalization relate to the degree of social cohesion of the populations and to their regional loyalty;

(v) *Administrative conditions.* Lastly, the regionalization of the country must to some extent coincide with the geographical boundaries of one of the possible politico-administrative partitions of the country, at least in the first instance.

Another question of importance in relation to regionalization arises when a *time dimension* is introduced into the regionalization process. Notwithstanding the general consensus among specialists to the effect that regions are dynamic entities and therefore subject to change through time, this concept is seldom incorporated explicitly in development strategies and plans.[23]

The broader the time horizon, or, in other words, the more forward-looking is the planning process, the fewer will be the number of regions as a general rule. It is assumed that initially regional development planning operates over a geographical space in which the characteristics of human settlement and economic activity are those corresponding to a situation where integration (not only physical but also economic and socio-political) is lacking. In these circumstances, regionalization is one of the several mechanisms brought into use to surmount problems deriving from non-integration, and at this stage the number of regions tends to be relatively large so as to reflect accurately the geographical differences in levels and rates of development. As time goes by, and as the regional development process results in higher levels of integration, the geographical disparities tend to decrease, to disappear altogether or to find expression in more aggregated averages and, consequently, the number of planning regions must be reduced as well, so as to reflect the new state of affairs.

The end product of a forward-looking regional development process is —from one point of view— a perfectly integrated and organized space. In such a situation *geographical regions cease to be the expression of differences in economic and social processes,* and consequently as planning instruments they are no longer of much importance. In a sense, regional planning gives place completely to nationwide spatial planning. Consequently, it is important to

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[23]The fact that the size, number and delimitation of regions is a function of the time horizon has always been clear to French regional planners for example. In Latin America this subject is explicitly dealt with in UNO/OTC, *Estrategia de desarrollo regional a mediano y largo plazo de Panamá,* Panama City, 1975.

distinguish between prospective regions (which will usually be veritable macro-regions) and medium-term planning regions (smaller in size and greater in number), and the coexistence of different regionalization patterns (for planning purposes) can perfectly well be accepted if it is borne in mind that they represent images projected over different lengths of time.

The foregoing ideas are expressed graphically in map 1.
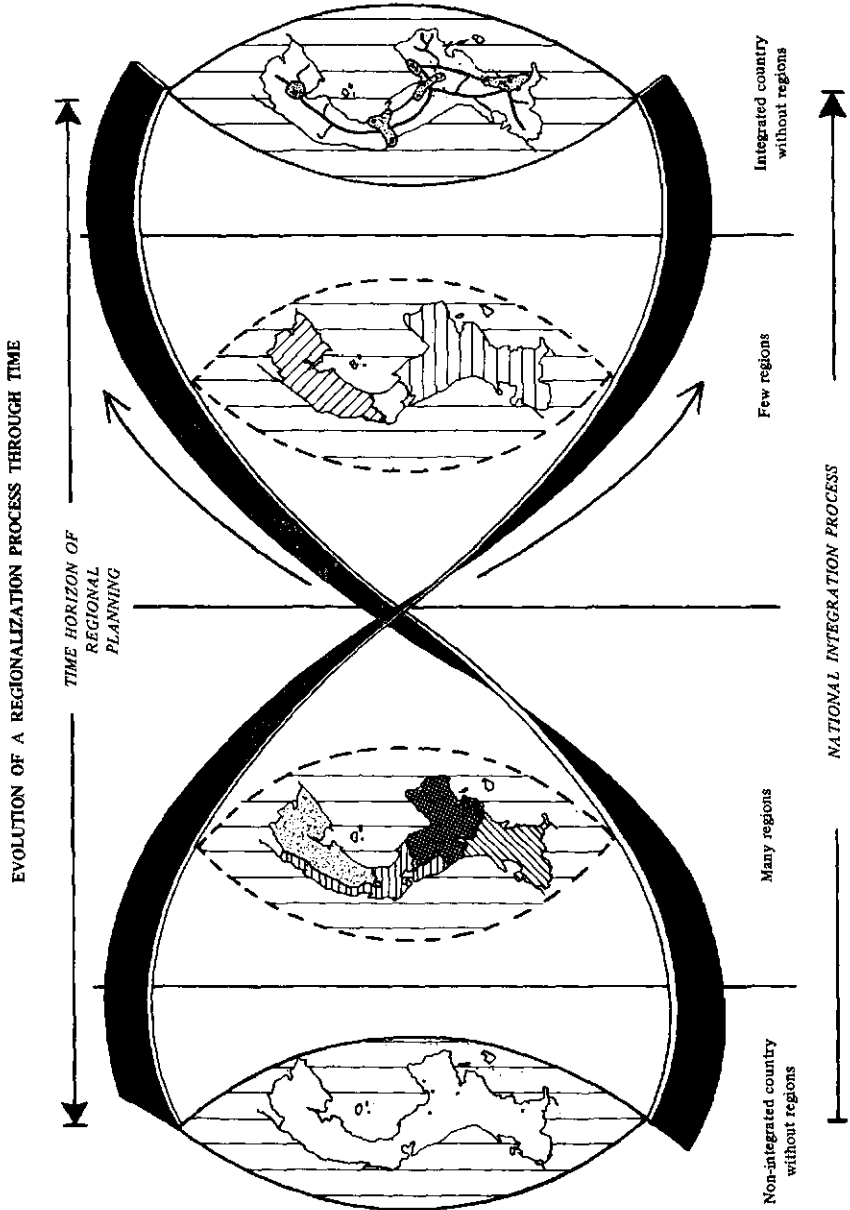
To revert now to the specific problems of diagnosis, two of them deserve to be accorded priority. The first relates to the information required for formulating the diagnosis and the second to the methods of analysis to be used. It may be noted in passing that the two problems are not mutually independent.

The collection of the minimum information required for preparing the regional diagnosis presupposes the existence of some formal regional information system which, to begin with, will seldom be adapted to the needs of the regional planner, as it will usually be based on geographical disaggregations which are of little use from the regional standpoint, reflecting as they do traditional —centralist and aggregative— criteria on the part of the national statistical machinery. Since discussion of the structure and functions of the system in question is outside the scope of the present notes, reference will be made only to the type of information which appears to be of basic importance for these purposes.

In a document concerned with regional information systems, Boisier (Boisier, 1969) suggests that the information for the diagnosis be grouped and classified as follows:

(a) *Physical description of each region*
1. Geographical position
2. Delimitation
    2.1 Boundaries
    2.2 Area
3. Physical characteristics
    3.1 Morphology
        3.1.1 Geological foundations
        3.1.2 Mountains, valleys and plains
        3.1.3 Coastlines
    3.2 Climate
        3.2.1 Climatic factors and elements
        3.2.2 Types of climate
    3.3 Hydrography
        3.3.1 Surface water
        3.3.2 Underground water table
    3.4 Vegetation
    3.5 Fauna
4. Natural resources
    4.1 Geological resources
    4.2 Soil resources (for agriculture and forestry)
    4.3 Water resources
    4.4 Energy resources
    4.5 Fisheries
5. Human resources
    5.1 Spatial distribution of population. Rural and urban areas
    5.2 Total population (sex and age)
6. Infrastructure
    6.1 Roads
    6.2 Railways
    6.3 Ports
    6.4 Airports

6.5 Communications networks

6.6 Power stations

(b) *Economic description of each region*

1. Economically active population
   1.1 Labour force (total and sectoral)
   1.2 Unemployment and underemployment
   1.3 Employment situation of the labour force
       1.3.1 Wage-earners
       1.3.2 Non-wage-earners
2. Sectoral structure of economic activities
   2.1 Regional geographical product, by sectors
   2.2 Sectoral productivity of capital and labour
   2.3 Installed and idle capacity, by sectors
   2.4 Regional exports and imports
   2.5 Existence of 'regional', 'national' and 'international' sectors in the region
3. Level and distribution of income
   3.1 Per capita income
   3.2 Functional distribution of income
   3.3 Income 'generated' and income 'received' by the region
   3.4 Saving
4. Sensitiveness of the region to national policies
   4.1 Tax policy
   4.2 Monetary policy
   4.3 Foreign exchange policy
5. Characteristics of operational units in the region's primary and secondary sectors
   5.1 Number and characteristics of agricultural properties
   5.2 Number and characteristics of mining developments
   5.3 Number and characteristics of industrial establishments
   5.4 Number and characteristics of commercial and services establishments

(c) *Socio-political description of each region*

1. Regional administrative structure
   1.1 Central government
   1.2 Regional government
   1.3 Local government
2. Level of regional participation
   2.1 Political participation
   2.2 Regional power centres
3. Socio-economic characteristics
   3.1 Education
       3.1.1 Illiteracy
       3.1.2 School enrolment
       3.1.3 Secondary, specialized and university education
   3.2 Health
       3.2.1 Fertility and mortality rates

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3.2.2 Infant mortality and morbidity
3.2.3 Health professionals (index per 10 000 inhabitants)
3.2.4 Specialized health services
3.3 Housing
3.3.1 Housing deficit
3.3.2 Potable water
3.3.3 Electricity
3.3.4 Sewage system
3.3.5 Stock of housing
3.3.6 Community equipment
3.4 Social indicators
3.4.1 Social cohesion
3.4.2 Social mobility
3.4.3 Regional consciousness
3.4.4 Social security
3.4.5 Indexes of anti-social behaviour

(d) *Description of interregional relationships*

1. Structure of interregional migratory movements
2. Structure of interregional trade
3. Structure of communications and transport
4. Interregional payment flows
5. National structure of population centres and market and services area

The foregoing list of data is not exhaustive, but even so it represents a larger quantity of information than it will usually be possible to obtain. Many of the data can perhaps be obtained from the census cards; in other cases specific collection mechanisms will have to be devised.

The statistical data collected in accordance with the system described in the preceding section are of little value *per se*, although if properly organized they offer an adequate static description of the situation in each region. What is important, however, is to organize them in such a way as to obtain descriptions of more complex situations and processes. The following are among the situations and processes which it is of interest to check up on in order to draw up the regional diagnosis:

(a) *Distribution of population and population movements*

The study of the population is of interest from several points of view: (i) as a way of examining the occupation of space; (ii) as an investigation of the degree of spatial mobility of persons; (iii) as a means of ascertaining the available supply of labour; (iv) as an exploration of future needs in terms of goods and services that must be produced in order to satisfy personal requirements.

(i) *Population and occupation of space.* One of the main objectives of regional development planning is to achieve the organization of space which will prove most functional in relation to national objectives. The organization of space at any given moment is conditioned by several factors, one of which is population itself. Thus, it is important to examine in this context: (1) the

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volume of population; (2) its relation to the geographical space; (3) its spatial distribution and (4) its regional distribution.

The indicators to be used will be the total population given by a census or by an inter-census estimate, the average density of the population and the variations around this average according to different geographical cross-sections, the urban-rural distribution of the population, its distribution by size classes of population centres, and its distribution by regions or any other geographical cross-sections that may be used.

It must be noted that the analysis described covers only partial aspects of the topic of population and development planning. The important thing is to underline whatever may prove most relevant from the standpoint of regional planning, without, of course, failing to acknowledge the validity of other aspects of the problem.

(ii) *Population and spatial mobility of persons.* Unquestionably there are few processes of greater importance for regional development and at the same time more difficult to study and control than population movements within the national territory. From a conceptual standpoint the view may be advanced that —generally speaking— the geographical mobility of resources, persons, goods and information is positively associated with the (Paretian) efficiency of operation of a spatial or regional system.

In the study of the geographical mobility of the population, interest attaches, from the standpoint of measurement, to the overall rate of mobility, defined as the proportion of the average population over an inter-census period which changes residence during that period, the scale of rural-urban migration, the direction of inter-urban migratory flows, the age composition of migrants, and the net balance of migration by different geographical areas.

The overall mobility rate can be calculated on the basis of the data for two censuses, by checking the place of residence at the beginning and end of the inter-census period for the population aged five years and over (depending on the length of the census period).

Table 4 shows how the data were arranged in the case of Panama. The total number of migrants for a period can be derived from the above-mentioned table by subtracting from 1 197 152 the sum of the diagonal (1 090 611). A figure of 106 541 is thus obtained, which, compared with the average population for the period (aged five years and over) gives the overall mobility rate, in this case about 10%. To form an idea of the significance of such a figure a standard of comparison is required. This standard may be international or may be provided by past periods in the same country.

The scale of rural-urban migration cannot be deduced from the foregoing figures, but it can be from more detailed census records, or, again, it may be estimated by sampling methods. A quick alternative way of assessing rural-urban migration consists in estimating, with reference to the urban system, the population in one census year on the basis of the population in the preceding census year and of the vital statistics (birth/deaths) for the intervening period. The difference between this estimate and the census figure affords an idea of the volume of migration.

The direction of inter-urban flows is information of great value for detecting the attraction points in the urban system and estimating its trends

Table 4

PANAMA: MIGRANT POPULATION (FIVE YEARS AND OVER) BETWEEN 1965 AND 1970

| Province of residence 1970 | Total | Province of residence, 1965 | | | | | | | | | Residu-um |
		BOC	COC	COL	CHI	DAR	HER	LST	PAN	VER	
Total	1 197 152	32 751	101 935	111 602	204 634	20 672	65 000	68 861	436 212	135 534	19 951
Bocas del Toro	35 996	29 981	73	642	3 699	31	98	45	723	188	516
Cocle	96 359	36	91 207	435	297	25	561	227	2 529	811	231
Colón	112 732	531	604	103 806	612	165	309	415	3 409	849	2 023
Chiriquí	194 682	801	287	271	189 017	119	123	111	2 466	558	929
Darien	18 376	4	19	40	281	16 231	45	59	581	180	936
Herrera	61 395	15	294	68	173	7	58 091	899	1 117	563	168
Los Santos	62 451	9	173	95	71	27	540	59 648	1 507	287	94
Panamá	483 840	1 249	8 814	5 972	9 769	4 006	4 533	7 048	421 314	10 771	10 364
Veraguas	126 010	95	447	171	668	44	687	399	1 983	121 316	200
Residuum	5 230	30	17	102	47	17	13	10	583	11	

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towards change. But this kind of information is unlikely to be available, and once again recourse to sampling methods will be necessary.

Information on the etarian composition of the migran population, i.e., its structure by age (and sex) can also be extracted from census data. It is useful for analysing the impact of migration on the labour force both in the regions of origin and in the regions of destination, as well as for the purposes of estimating additional social services requirements at the points of destination.

The net balance of migration in each region or province will be yet another element of use in determining each region's condition of dynamism, backwardness or stagnation (it will serve both for description and for classification purposes), and it is simple to calculate by applying the so-called 'compensation equation', expressed as follows:

$$P_t = P_o + B + I - D - E$$

in which P_t represents the population in the census year 't', P_o the population in the census year 'o', B births, I immigration, D deaths and E emigration. $I - E$ corresponds to the balance of migration. The data are obtained from the census (P_t and P_o) and from vital statistics (N and D).

(iii) *Population and the labour force.* The labour force or economically active population constitutes the basic resource in any development plan. The size of the economically active population depends upon a demographic factor (structure of the population by age and sex) and on economic and social factors (level of development, type of educational system, role of women, etc.).

The economically active population comprises two groups of individuals:

(1) Job-holders (on the day of the census)
(2) The unemployed and jobless, comprising the unemployed proper and persons seeking work for the first time

The non-economically active population comprises:

(1) Unpaid household workers
(2) Students
(3) Rentiers
(4) Pensioners
(5) Handicapped persons
(6) Children and old people

When the economically active population or labour force is analysed, the cross-section must be age-specific: 12 years and over, 15 years and over, etc.

From the regional standpoint, the first item of importance is the age-specific rate of activity both at the national level and in its regional deviations. To calculate this rate the number of active persons in a given age group is simply divided by the total number of persons in the same group.

The second point of interest is the regional classification of the labour force by branch of economic activity, for which purpose the United Nations Standard International Classification of Economic Activities will be used. The disaggregation of the classification (two, three, four digits) will depend upon the requirements of the analysis.

Lastly, the classification of the labour force by occupation or professional structures and by occupational status (employee, own-account worker, etc.) must be estimated.

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(iv) *Population and estimates of future requirements.* In conclusion, basic demographic and population distribution studies are indispensable for the purposes of estimating the future requirements of the population itself, especially in relation to the provision of collective social services (education and health facilities) and to housing needs. The volume of housing, education and health requirements will be the result of three factors:

— the demographic factor, i.e., the volume of the population, its geographical distribution and its distribution by sex and age;

— the backlog of requirements brought forward from the preceding period and the wear and tear on housing and services during the time elapsed;

— the standards adopted to determine the degree of coverage of requirements.

(b) *Use of land*

Another of the situations that it is important to examine in order to procure inputs for the preparation of a regional diagnosis is the actual and potential use of the land. Knowledge of the quality, aptitude and distribution of soils constitutes a fundamental requisite on which to base the agricultural programming component of the regional development plan and, essentially, to estimate the carrying capacity of the land in terms of population, and the organization of rural space. If a simple classification of land use in three categories is adopted (cultivable land, pastureland and forests, barren land, built-up areas, etc.), it is possible with the aid of the following triangular figure to portray the situation with respect to the actual or current use of the land. (See diagram 1.) For example, it can be seen from the figure that Denmark allocates 64% of its total area to agricultural uses, 7% to grasslands and livestock productions, and 28% to forestry and other uses.[24]

Comparison between actual and potential land use enables us to assess the manpower carrying capacity of the land (or optimum employment in agriculture) on various assumptions respecting productivity and use of capital.

In the case of Panama, for example, a country with a small geographical area, a comparison between the maps of the actual and potential use of the land reveals that approximately 15% of it is underutilized, a high figure in relation to the size of the country.

(c) *Distribution of secondary and tertiary activities*

In the study of several situations and processes which are of interest from the standpoint of regional description, measurement and classification, a place of outstanding importance is occupied by the geographical distribution of secondary activities (production of non-agricultural goods) and tertiary activities (services).

In this connexion it is important to obtain, by means of a set of indicators, a grasp of the economic structure of the geographical space. A major element in this structure is the spatial distribution of production and services activities.

[24] Taken from: E. Strauss, *Metodología de evaluación de los recursos naturales,* ILPES, Cuaderno N° 4, 1969.

The first question arising here relates to the type of economic activity on which work is to be based. Purely practical considerations suggest that attention should be focussed on manufacturing industry in the first place, since this is the sector with the best possibilities for alternative locations. Secondly, the position in respect of gross capital formation should be examined, because of its direct bearing on the expansion of future production capacity. Where services are concerned, it will be necessary to concentrate at first on the geographical distribution of the so-called basic services, i.e., health and education, and in a second stage to devote attention to the geographical distribution of wholesale and retail trade, financial activities and government and administrative activities.

Industrial censuses and annual surveys of the industrial sector provide sufficient information for describing spatial distribution on the basis of two variables: (i) employment; and (ii) the generation of value added. The two variables should preferably be used in conjuntion, since the information afforded

by each of them separately is incomplete. For example, data on employment only take no account of productivity problems.

From the sectoral angle, the United Nations Standard International Classification should be used, to a level of three digits, at least while from the geographical standpoint it is desirable to reach the urban centre level (given a prior statistical definition of such centres). Thus two double-entry matrices or tables will be available, one relating to industrial employment and the other to value added. From a comparison of the two provisional conclusions can be drawn regarding differences in industrial productivity.

The geographical data —presented as figures relative to the total— provide an initial idea of the degree of geographical concentration of employment or of value added in industry.

Gross capital formation (gross geographical investment) is one of the items in national social accounting (a component of the gross domestic product account by sectors of destination), which includes two major heads: (i) fixed capital; (ii) inventory increases.

Of basic importance is the geographical distribution of the fixed capital item, which in turn is broken down under the following heads:

(a) Housing
(b) Non-residential buildings
(c) Other types of construction and engineering works (road-building, infrastructure)
(d) Transport equipment
(e) Machinery and other equipment

Whenever possible, these components should be expressed in physical and monetary terms. Normally these data will not be available at lower geographical levels than that of the country itself.

With respect to basic social services —education and health— it is necessary to collect information which will show the geographical distribution of elementary variables suitable for measuring the degree in which the service is provided and its centrality. This is a matter of answering two basic questions: (i) given a minimum level of provision of such services (for example, primary education, professional care in childbirth), where settlements that do not obtain this minimum attention —if there are any— are located; (ii) whether in the case of higher-ranking services (for example, university education, specialized medical attention) there is or is not a hierarchized structure which makes such services accessible to the entire population. For instance, each primary school should serve a population resident within a radius of 6 kilometres around the school; for every 20 primary schools there should be a secondary establishment not more than an hour's bus-ride from each school; and for every 200 secondary establishments there should be a vocational or university college not more than six hours' journey away. This example is arbitrary.

The analysis of the spatial distribution of wholesale and retail trade is important from the standpoint of description of the structure and organization of space. The situation will have to be studied in relation to the size classes of the population centres, with particular reference to two facts: (i) whether population centres of equal or similar size possess the same type and number of commercial establishments; and (ii) whether population centres of larger size

possess a greater variety of establishments, also of larger size. For example, all towns of 1 000-2 500 inhabitants must have a retail shop, a pharmacy and a gas-station; while all population centres with 5 000-10 000 inhabitants must have in addition a wholesale store, a cinema, a workshop for mechanical repairs, etc.

Similar analyses can be carried out with respect to financial activities.

(d)   *Distribution of the result of economic activity*

Study of the result of economic activity by different geographical categories furnishes information as to geographical disparities in welfare. In the first place, per capita income (or the gross domestic product per capita as a proxy variable when the former indicator is not available) can be used for the purpose of investigating the prevailing situation. To supplement this, use should be made, whenever possible, of income distribution by categories of income recipients, and of unemployment rates. Normally it will be necessary to carry out *ad hoc* studies to procure this information.

(e)   *Size and structure of system of urban centres*

Another decisive element in the organization of space is the structure of the system of urban centres. Here two points are of interest: (i) the size of the urban system, that is, the degree of urbanization together with the total number of urban centres; and (ii) the distribution of urban centres by size ranks, which is equivalent to the structure of the system.

Both measurements, the degree of urbanization and the distribution of urban centres by size ranks will have to be calculated both at the national level and at the level of major regions.

(f)   *Volume and direction of interchange flows*

Virtually all the processes described above are of a static nature and their object is to give a basic description of the spatial structure. The interchange flows occurring on the transport and communications network reveal part of the operation of the spatial system.

From this angle, the information that should be recorded relates to the following items:
(i)   Transport of persons, by different transport media;
(ii)   Transport of end products, also by transport media;
(iii) Transport of raw materials, categorized in the same way;
(iv) Messages telephoned, mailed and telegraphed.

The relevant information can be gathered directly from transport and communications enterprises. A matrix of origin and destination is previously drawn up on the basis of urban centres.

The methods of analysis that can be used to handle this mass of data are to be found among the classic instruments of regional analysis and will therefore not be discussed in detail here. All that need be indicated are the considerable advantages of the method known as shit-share analysis for processing inter-regional information. It is well known that this method enables each region's situation to be analysed within a strict framework of national-regional inter-dependence.

The method is based on the calculation of relative variations, i.e., the gains or losses that a region experiences in respect of some economic variable (gross domestic product, population, industrial employment, etc.) in relation to the behaviour of the same variable at the national level. These relative variations are computed in each region as the difference between the real value of an economic variable at a given moment and the hypothetical value which would have resulted if this variable had followed exactly the same behaviour pattern as at the national level.

A positive difference indicates an increase in the regional variable in relation to the national variable; a negative difference represents a relative loss or deterioration in the region in relation to the figure for the country as a whole. This relative variation is usually termed the total effect and the method proposed breaks down this total effect into two components: a shift (or regional) effect stemming from each region's relative advantages for the expansion of economic activity, and a share effect, consequent upon the relative importance of the sectors of economic activity within each region. The scale and sign of the total effect depend upon the interaction of the shift and share effects.

The shift effect reflects the dynamics of each sector of activity in the region, i.e., which of them grow faster (or more slowly) than the average for the sector at the national level. It originates in the fact that some regions expand more rapidly than others in respect of certain sectors of activity. The regions showing positive shift effects are those for which access to basic inputs or markets has relatively improved in comparison with the situation of other regions carrying on the same activity. In other words, they have gained by their greater locational advantages in the operation of specific activities.

The share (structural) variations or effects are of a different kind. They arise from the fact that —in national terms— some sectors expand faster than others. Consequently, those regions which tend to specialize in slow-growing sectors show negative share effects, whereas in those that specialize mainly in fast-growing sectors the share variations will be positive.

At bottom, the shift-share method does no more than provide a suitable framework for the introduction of some broader questions which are those that in the last analysis would account for regional behaviour. Thus the method suggests the most appropriate lines of research.

For example, analysis of the share effect brings up the following question: why do some sectors of the national economy expand more rapidly than others? To answer such a question implies studying the national behaviour of supply and demand by sectors, and this must be analysed in terms of changes in basic economic determinants: population, technology, resources, income distribution, institutional factors, etc.

On the other hand, analysis of the shift effect raises a different question: why does the same sector expand more rapidly in some regions than in others? Replying to this question entails some knowledge of the reasons why a region may, in the case of a specific activity, have better access to inputs and markets than other regions.

The variations in the growth of a region in relation to average national growth are the product of the interaction of the two effects mentioned. Depending upon this interplay of effects, several typical situations will arise:

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Shift effect

$+$ $\qquad$ $-$

	+	−
+	Type I Type I	Type II-a Type II-b
−	Type III-a Type III-b	Type IV

Share effect

Positive total effect:

1.	SHI.E (+) SHA.E (+)	Type I
2.	SHI.E (+) + SHA.E (−)	Type III-a (SHI > SHA)
3.	SHI.E (−) + SHA.E (+)	Type II-a (SHI < SHA)

Negative total effect:

1.	SHI.E (−) + SHA.E (−)	Type IV
2.	SHI.E (−) + SHA.E (+)	Type II-b (SHI > SHA)
3.	SHI.E (+) + SHA.E (−)	Type III-b (SHI < SHA)

The arithmetical calculation of the effects is very simple, and a description of its mechanics can be found in several textbooks of regional analysis, such as that prepared by Bendavid, for example (Bendavid, 1973).

Once the data have been collected and processed it may be desirable to establish some kind of regional typology which will facilitate the subsequent determination of policies for each region.

A method which has been successfully tried out consists in constructing a regional matrix of situation and potential.[25] The method consists in preparing a series of multiple cross-classifications for each region, always comparing its present situation with its future potential.

On the one hand, the regions can be classiffied in accordance with their structure of production, the result being four categories (at least): (i) diversified structure of production; (ii) structure of production in which the agricultural sector predominates; (iii) structure of production in which the mining sector predominates; (iv) structure of production in which the industrial sector predominates. The inclusion of each region in one of the foregoing categories can be

[25]See for example, CEPAL, *Algunos problemas regionales del desarrollo en América Latina vinculados con la metropolización*. In this study the situation-and-potential matrix for the regions of Chile is reproduced.

determined in the light of the sectoral composition of the regional product and the relative sectoral participation of the labour force.

In turn, each of these primary categories can be divided into three sub-categories defined in accordance with each region's development potential. These three sub-categories are as follows: (i) high growth potential; (ii) medium growth potential; (iii) low growth potential. Thus, in one and the same column of each matrix, a region can be classified as having a diversified structure of production and at the same time showing a high growth potential. Any combination is possible.

Unquestionably, the most difficult part of this exercise consists in correctly evaluating the regional growth potential, which is something that cannot always be quantified and objectivized. In any case, the directives of the overall development strategy will help to resolve the problem, and so will the study of external markets for primary commodities and the consideration of far-reaching projects defined in sectoral terms.

In the horizontal rows of the situation-and-potential matrix, a two-way classification can likewise be adopted.

Thus, in the first place, the regions can be grouped in three major categories according to their average level of per capita product (or income): (i) regions with a high per capita product; (ii) regions with a medium per capita product; (iii) regions with a low per capita product. These categories are, of course, arbitrary and will have to be carefully established by the planner.

Each of these major categories can be subdivided in its turn into three new sub-categories determined by the growth rate of the per capita product (or income), as follows: (i) rapid growth rate; (ii) medium growth rate; (iii) slow growth rate.

Once again, this classification is arbitrary. Thus, in relation to the rows of the matrix, a region may be classified as having a high per capita product of which the growth rate is rapid.

By means of this type of matrix certain regularities in the system can be quickly detected, and the basic components of each regional policy can be rapidly identified in the same way.

Thus, for example, metropolitan regions will tend to be grouped on the upper left-hand side of the matrix (diversified structure, high potential, high product and rapid growth rate). Conversely, depressed rural regions will be located at the diagonally opposite point. It can also be averred that, generally speaking, regions appearing at the bottom of the first column are among those that require structural changes to resolve their problems. These examples must not be cited without a reminder that the layout of the matrix is not rigid.

A point to note in passing is that if subregional units are being used (provinces or communes, for example) the construction of this matrix makes it possible to discover which regions are homogeneous, not only in respect of their structure (as is usual in the definition of homogeneous regions), but with regard to the two-way structural-functional classification.

At this stage of the work of diagnosis (which by this time will have included a prognosis of the situation, that is, an extrapolation to determine the course and final value of variables and parameters on the assumption of continuity of historical causal factors), the planner should be in a position to enounce provisional opinions on the causes that account for a state of affairs such as that

described in the diagnosis. In other words, explanatory hypotheses must be formulated —although still tentatively— as to the spatial structure and operation of the economy.

The value of the hypothesis or hypotheses should not be underrated, since the efficacy of the plan will depend partly upon the accurate identification of causes rather than of effects, in view of the fact that practical policies will have to aim at controlling the causes of the situation. Correct identification of these will of course make it possible to devise an appropriate strategy instead of attempting mechanical application of stereotyped solutions to each individual case.

It is here that economic, social, political, urban theories play their most important role, and it is here too that they are tested by the touchstone of their practical applicability (as someone once pointed out, "there is nothing more practical than a good theory").

At the risk of introducing a simplistic classification, but recalling that a complex situation can seldom be explained from a single point of view, the priori explanatory hypotheses can be marshalled according to whether the elements predominant in them are purely technical, economic or political.

For example, an essentially technical hypothesis as to the structure of the economic space would place the emphasis on the functional concentration empirically observable in any economic growth process and on the imperfect territorial mobility of productive resources and of final goods and services. These two conditions would account for geographical concentration and thence for differences in the economic growth rates of the different regions, and, sequentially, for migration, urbanization, marginalization and other problems. This type of hypothesis is among the bases of the regional growth theory formalized by Siebert (Siebert, 1969), and, moreover, has manifest points of contact with polarized development theories.

Before an explanatory hypothesis of this kind is put forward, a prerequisite is to clarify the assumptions on which the theoretical analysis of the spatial mobility of resources is based. Without this frame of reference it would be impossible to propound empirical research designed to substantiate or refute the hypothesis. Hence some observations are needed on the mobility of labour, capital and technology.

Interregional population shifts are not purely economic phenomena.[26] Rather do they represent sociological problems, and consequently the explanatory hypotheses that will be postulated below are basically of that character.

Every individual —who is a supplier of labour— is integrated in a system of groups, and as a rule these groups are geographically concentrated. Individual behaviour, which is partly determined by the norms of the groups in question, is characterized by a pattern of perseverance linking the individual to the groups and thereby to the region. Hence it can be inferred that the natural propensity of the individual is closer to stability than to mobility.

Interregional mobility of labour can exist only if certain processes are started which loosen the ties of the individual with the group or groups and therefore with the region.

[26] The following analysis is essentially based on Siebert, *op. cit.*

Generally speaking, every individual wants to reach a certain aspiration level. This aspiration level is neither fixed nor endogenous. It depends, on the one hand, upon the past experience of the individual and on the other upon the targets attained by other individuals with whom he compares himself. The group which serves as a frame of reference is called the behavioural reference group.

When the individual compares his aspiration level with his immediate achievements, three situations may arise:

(i) The individual may have achieved little in the past, but although his behavioural reference group may have attained higher targets, he does not feel dissatisfied with his achievements and reduces his aspiration level, to which end the social system may offer countless possibilities;

(ii) The individual may be dissatisfied with his achievements when they are compared with those of his reference group (which is geographically localized). This situation may produce consequences of two types: (1) the individual acquires a different predisposition to information from other regions; (2) if his dissatisfaction is strong enough, he starts searching systematically for better opportunities. Information on new opportunities may lead him to change his behavioural reference group in favour of another group in a different region. This is the first step towards becoming a marginal individual, in a broader sense of the term than usual;

(iii) Even if the individual is not dissatisfied with his achievements when he compares them with those of the behavioural reference group, additional and more systematic information on better economic opportunities in other regions induces him to choose a new reference group, with the resultant determination of a new aspiration level.

The last two situations described may give rise to interregional migration, always provided that other conditions are also present.

Outstanding among these conditions is information, in the sense of the knowledge required for the individual to discern interregional differences in the behaviour of the relevant variables (aspirations, achievements, reference groups, etc.). In other words, the existence of a real information system is a prerequisite for movement from one region to another.

An information system basically consists in two processes, namely, the sending and the receiving of a message, and a transmission mechanism, i.e., the communication channels. In this sense, the transmission of information depends upon (a) the predisposition of the receiver; (b) the nature of the communication channels; and (c) the intensity of the information impulse from the sender.

As the analysis has shown, the predisposition of the sender depends in its turn upon his degree of satisfaction or dissatisfaction with his current situation; that is, it depends upon the balance between aspirations and achievements.

The nature of the communication channels depends upon the structure of the information system. In any communication model formal and informal information flows can be distinguished, which in turn reflect the existence of formal (the mass media, for example) and informal (person-to-person) channels of communication.

Informal communication depends in turn upon the frequency of personal contacts, which are a function of the social structure. This implies that much of the informal information on migration possibilities depends precisely upon past

migratory flows, since for a time at least the potential emigrant and the actual immigrant continue to be members of the same social group.

Not only do informal communication flows occur within one group, but information will also flow between different groups through individuals with multiple group membership. Consequently, in the last analysis informal information depends upon (i) the social structure; (ii) the type of new knowledge and its value for the group; and (iii) the intensity of the degree of affiliation to a group.

Formal information flows make use of organized channels of communication (newspapers, radio, etc.) but these channels do not ensure perfect mobility of knowledge of new opportunities in other regions. The distribution of formal information depends upon the communication space designed by the sender, and this communication field is a function of the type of work. For example, the (geographical) field of communication for recruiting an engineer is completely different from that used in recruiting an unskilled worker.

The empirical evidence suggests that formal information is less important than informal information as regards individual migration decisions. Moreover, person-to-person information is used to evaluate and check formal information.

Lastly, the intensity of the information impulse depends upon distance, on the number and spatial distribution of the senders, and on the difference in the level of the relevant variables. The greater the wage difference, for example, the stronger will be the information impulse at its source.

Another factor that affects the determination to migrate and therefore the mobility of manpower is the cost of migration.

Several types of monetary costs are involved in a migratory movement. Generically speaking, and in sequence, they are the following:

(i) Removal costs, relating to all the expenditure incurred by an individual under the head of change of residence;

(ii) Opportunity cost at origin, linked to a possible loss of income in the place of origin owing to a gap between different contracts;

(iii) Cost of transport for the individual, his family and his goods and chattels;

(iv) Installation costs, represented by additional expenditure on settlement in the place of destination;

(v) Opportunity cost at destination, related to a possible loss of income in the place of destination owing to unemployment or to a gap getween contracts.

Not all these costs, of course, affect different individuals alike, and not necessarily all of them are payable by the migrant. In current analysis, however, emphasis is placed only on transport costs, and due recognition is not accorded to other expenditure that may play a decisive role.

It may be concluded, therefore, that the degree of interregional mobility of labour depends upon the degree of satisfaction of the individual, the efficiency of the information system and the magnitude of migration costs. These three factors are in their turn strongly influenced by distance, or, if preferred, by spatial friction.

With respect to the mobility of capital, it must be stated in advance that capital will be treated here as a physical input of the production function. In the case of capital goods a distinction must be drawn, for analytical purposes, between the existing stock of capital and additions to the stock. Of this

additional capital, a good deal is interregionally mobile, in particular those capital goods that can be exported; while other components, such as, for example, infrastructure works, are attached to the land and are therefore not mobile at all.

It is assumed that the new components of capital have a higher degree of mobility than the existing stock, but once these units are integrated into a production process, they virtually become immovable capital because of the cost of transfer. Nevertheless, the stock of capital can be moved from one region to another by means of conversion into monetary terms, which may take two forms: (i) depreciation of the existing capital can be used as a means of acquiring new capital in another region; (ii) the stock of capital of one region can be sold in the same region and the monetary value invested in another region.

The new capital can be transferred from one region to another in return for imports of goods in the opposite direction. If the exchange consists in capital goods, the stock of capital in each region remains unaltered even if its composition changes. If it consists in exports of capital goods, on the one hand, and imports of consumer goods as a counterpart, the levels of the stock of capital are altered in both regions.

Generally speaking, the spatial mobility of physical capital is relatively low, for the following reasons:

(i) The existing stock of capital is essentially immobile over the short term. Its degree of mobility can be increased by speeding up depreciation, but this is a medium-term mechanism;

(ii) Part of the additional stock is also immobile, since it is attached to the land (infrastructure works) or incorporated into a production process;

(iii) A considerable proportion of investment financing comes from sources internal to enterprises (undistributed profits, depreciation, etc.), and enterprises, at least in certain stages of their development (Lasuén's single product/single plant/single city model), have a marked tendency to reinvest *in situ;*

(iv) Weaknesses in the information system may prevent investors from availing themselves of new investment opportunities in peripheral regions.

Lastly, in relation to the spatial mobility of technical innovations, the following observations may be made. Perroux's famous remark to the effect that economic growth does not take place at all points in space at once is perfectly applicable to technical progress. Some regions have better chances of generating innovations. According to Friedmann, they are identified by the possession of some (or all) of the following characteristics:

(i) The more regional problems there are that cannot be resolved by traditional methods, the greater will be the dissatisfaction with these methods and the more intensive the search for innovative solutions. The problem of public transport in the great metropolitan cities and the adoption of mass underground transport is a clear case in point;

(ii) Since the existing quantity of know-how is an input for the creation of new know-how, those regions which possess a larger stock of know-how have a better chance of generating innovations;

(iii) Since innovations to some extent depend upon interaction between sets of information, those regions in which such an interchange of information is most likely are in a better position to generate them;

(iv) Innovations are the product of a collective and systematic effort. The bigger the amount of resources allocated to research, the greater is the likelihood of generating innovations. The inference is that regions in which there are large firms (that allocate more resources to research), or important public institutions, have a strong propensity to generate innovations;

(v) The efficiency of research partly depends upon the existence and interaction of the research function in three types of organization: enterprises, institutes of higher education, and government agencies. Regions in which this structure exists are in a better position to produce innovations;

(vi) Regions in which there is a modern social structure, a positive attitude towards change and a system of rewards for innovative capacity have better chances of attracting talent and consequently, greater possibilities of generating innovations.

The foregoing considerations help to account for the fact that the rate of innovation is markedly differentiated in spatial terms and that in metropolitan regions the likelihood of generating innovations is high. Nothing has yet been said, however, of the mechanisms for territorial diffusion of innovations.

Some empirical studies suggest that two of the most important factors in explaining the territorial diffusion of innovations are the size of urban centres and the distance from the original point of adoption of the innovation (Pedersen, 1971).

Important as they may be, these factors account only in part for the diffusion process. To provide a fuller explanation, sociological or institutional elements would necessarily have to be introduced.

From the institutional angle, the existence of an efficient information system, the nature and structure of enterprises and the legal provisions respecting invention patents are three factors which manifestly affect the manner and speed of the diffusion process. The relation between the quality of the information system (both formal and informal) and the pace at which innovations are disseminated is obvious. It may perhaps be worth while to point out here that the systems transmitting information on 'production' innovations are not necessarily the same that are used for transmitting information on 'consumer' innovations, and that the latter generally precede the former in developing countries, so that consumption patterns are modernized more quickly than patterns of production.

The degree of complexity in the structure of the system of producer enterprises is one determinant of the pattern of spatial diffusion. The more frequent the multi-plant multi-city model, the greater will be the speed of diffusion and the wider the geographical coverage of the innovation. The legal rules and provisions regulating the degree of monopoly and the duration of invention patents tend to restrict the rapidity of diffusion of technical innovations.

Lastly, from a more sociological standpoint, the presence of individuals or groups capable of perceiving innovations and assuming the risk of incorporating them into production processes in peripheral regions largely determines the way in which technical know-how is transferred from one part of the territory to another. True, it must be recognized that a considerable proportion of technological innovations in the contemporary world is so tied to industrial equipment

that their territorial mobility is directly linked to the spatial mobility of physical capital.

From an empirical angle, the low degree of spatial mobility of the factors of production can be epitomized in a review of the differences observable in the technical production processes of similar goods in different regions (or cities). This type of analysis appears in the United Nations studies on Bolivia.[27] It must be borne in mind, however, that varying combinations of factors of production in different regions can reflect the lack of spatial mobility of resources (and the initial regional dissimilarities in resource endowment) only in the absence of taxes and subsidies on the use of specific factors. Thus, for example, the fact that the manufacturing sector in the North-East of Brazil shows a capital/labour ratio different from (higher than) the average for other regions is due more to the system of fiscal subsidies than to questions of resource endowment and relative mobility of resources.

A predominantly economic hypothesis would perhaps place emphasis on the reproduction —at the internal level— of centre-periphery relations, brought into vogue chiefly by Prebisch and CEPAL. Although it is extremely dangerous to transfer concepts proper to international trade to the interregional level (because of the obvious differences in degrees of openness, mobility of factors and monetary and tariff situations), there can be no doubt that at least in broad terms the centre-periphery 'model' is capable of providing a coherent explanation of the spatial structure and functioning of a good many developing economies. This holds good in so far as two complementary exaction mechanisms can be detected at the internal level: (i) deterioration of the terms of trade in favour of the centre in centre-periphery transactions; (ii) appropriation by the centre of the periphery's surplus earnings from its exports to the world market, through, for example, protectionist policies combined with policies of enforced industrialization of the periphery. As noted in the preceding chapter, this seems to have been the case in the North-East region of Brazil. Apart from the differences indicated between the international level and the interregional level, which make it difficult to transfer the centre-periphery concepts from one level to the other, account must be taken of the ambiguity which the two concepts acquire in default of a single dominant pole (A. Pinto and J. Kñakal, 1974).

Among the most outstanding empirical studies showing in part how the centre-periphery mechanism operates in subnational terms is one carried out by Baer on Brazil (Baer, 1965). Baer's hypothesis is that the overall economic policies of the Brazilian Government have led at worst to aggravation of the existing disparities between the North-East and the Centre-South or at best to counteraction of the beneficial redistribution effects achieved through fiscal mechanisms. This would seem to have come about through a transfer of income from the North-East to the Centre-South owing to the deterioration of the terms of trade and to losses incurred by the North-East through the exchange system. In order to follow Baer's argument it is necessary to reproduce some statistical data relating to the foreign trade situation of the North-East region.

Table 5 shows the value of the North-East's international exports and imports over the period 1948-1960.

[27]United Nations, *Planificación Regional, op. cit.*

Table 5

FOREIGN TRADE OF THE NORTH-EAST REGION OF BRAZIL

(Millions of dollars)

Year	Exports	Imports	Balance
1948	197.6	93.2	104.4
1949	133.0	100.3	32.7
1950	174.1	86.9	87.2
1951	197.6	166.4	31.2
1952	114.5	173.3	-58.8
1953	169.6	95.3	74.3
1954	235.4	86.9	148.5
1955	238.5	86.2	152.3
1956	163.9	97.7	66.2
1957	212.1	131.9	80.2
1958	246.1	94.4	151.7
1959	216.1	79.3	136.8
1960	247.7	85.3	162.4

Source: W. Baer, *Industrialization and Economic Development in Brazil,* New Haven, Yale University Press, 1965, p. 175.

According to Baer, the increasing surplus on the international trade balance of the North-East was principally due to the national industrialization policies pursued by the Federal Government. Since the North-East was not being industrialized as fast as the Centre-South, the structure of its international imports was slanted towards consumer goods, duties on which were decidedly heavy by virtue of the policies in question. As the North-East could not use its international trade earnings to import the consumer goods it required from abroad, it accordingly had to supply its needs from the new industries located in the Centre-South, which were producing at costs above international levels. This implied in practice a decline in the North-East's terms of trade with the Centre-South, with the consequent transfer of income.

In table 6 the index of Brazilian export prices is presented, together with the wholesale price index for Brazilian products (excluding coffee). The quotient of the first index and the second represents the terms of trade for the region (*de facto,* for any region), on the assumption that only domestic products are bought out of export earnings. The exchange rate index is used to correct the export price index.

On the basis of the foregoing data Baer estimates the real transfer of income from the North-East to the Centre-South, as shown in table 7. The first column in this table presents the North-East's net foreign trade earnings. These earnings are multiplied by the index of foreign exchange purchasing power in the Centre-South (just calculated in the preceding table). Thus an estimate is obtained of the real purchasing power of the North-East's foreign trade earnings. The difference between this value and the initial figure (in the first column) then reveals the amount of the interregional transfer.

As can be seen, during the period analysed the income transfer from the North-East to the Centre-South totalled 413 million dollars.

Table 6

ESTIMATE OF INDEX OF PURCHASING POWER OF EXPORT EARNINGS
(IN THE CENTRE–SOUTH)

Year	Index of Brazilian export prices	Wholesale price index	Exchange rate index	Index of purchasing power
1948	100	100	100	100
1949	86	105	100	82
1950	78	108	100	72
1951	96	130	100	74
1952	106	147	100	72
1953	98	169	112	65
1954	84	213	169	66
1955	85	252	225	77
1956	88	307	255	74
1957	89	352	255	64
1958	83	403	255	51
1959	79	575	406	57
1960	73	756	481	48

Source: W. Baer, *Industrialization and Economic Development in Brazil,* New Haven, Yale University Press, 1965, p. 178.

Table 7

ESTIMATED TRANSFER OF INCOME FROM NORTH-EAST
TO CENTRE-SOUTH THROUGH TRADE

Year	Net North-East foreign trade income (A)	Index of purchasing power in Centre-South (B)	$\frac{A \cdot B}{100}$ (C)	Transfer of income $A - C$ (D)
1948	104.4	100	104.4	–
1949	32.7	82	26.8	5.9
1950	87.2	72	62.8	24.4
1951	31.2	74	23.1	8.1
1952	–	–	–	–
1953	74.3	65	48.3	26.0
1954	148.4	66	97.9	50.5
1955	152.3	77	117.3	35.0
1956	66.3	74	49.1	17.2
1957	80.2	64	51.3	28.9
1958	151.7	51	77.4	74.3
1959	136.8	57	78.0	58.8
1960	162.4	48	78.0	84.4

Source: W. Baer, *Industrialization and Economic Development in Brazil,* New Haven, Yale University Press, 1965, p. 178.

In addition, Baer estimates the losses inflicted on the North-East by the exchange rate system in force at that time in Brazil. He points out that importers in the North-East paid for their imports (mainly of consumer goods) at rates substantially higher than those applied in the case of payments for imports of capital goods. The product of this difference was used to give impetus to the coffee economy —located in the Centre-South— and to increase the lending capacity of the Banco do Brasil, addressed principally, once again, to the Centre-South. Table 8 makes it possible to estimate these losses for the North-the second indicates their dollar value. If the first column is divided by the second the real exchange rate paid by importers is obtained. The fourth column in the table gives the exchange rate in force for earnings on the type of goods exported by the North-East. Multiplication of the dollar value of imports by this rate of exchange shows what their cruzeiro value would have been if they had been paid for at the same exchange rate as exports. The difference between this value and the initial figure represents the loss incurred by the North-East through the exchange mechanism.

Baer's study is cited here as an example of the type of research and analysis that must be carried out in order to objectify a hypothesis, based on the 'centre-periphery' concepts, as to the spatial functioning of an economy.

The explanatory capacity of the 'centre-periphery' model at the subnational level may vary greatly from one country to another, and in some instances may quite possibly be null.

In this connexion, the thesis has been put forward, taking the economy of Panama as an example, that the 'centre' (or metropolitan region) has not in the course of its development caused the underdevelopment of the periphery (as is maintained in the centre-periphery theory), but would seem to generate peripheral development (even though in inadequate and inefficient fashion). The

Table 8

LOSSES INCURRED BY THE NORTH-EAST THROUGH
THE EXCHANGE RATE SYSTEM

(Millions of cruzeiros)

Year	Value of imports (millions of cruzeiros)	Value of imports (thousands of dollars)	A/B	Exchange rate for exports	B x D	Losses incurred by the North-East A − E
	(A)	(B)	(C)	(D)	(E)	(F)
1955	3 830	87 292	43.87	37.06	3 325	595
1956	4 933	98 933	49.86	43.06	4 260	673
1957	6 782	131 928	51.41	43.06	5 681	1 101
1958	6 340	94 357	67.19	43.06	4 063	2 277
1959	8 537	79 292	107.66	76.00	6 026	2 511
1960	10 147	85 308	118.94	90.00	7 678	2 469

Source: W. Baer, *Industrialization and Economic Development in Brazil,* New Haven, Yale University Press, 1965, p. 180.

explanation of this situation apparently lies in the exceptional degree of opennes of the Panamanian economy, the absence of exportable peripheral resources of any great significance and the favourable rural-urban terms of trade. In these conditions the 'centre' would appear to have been unable to tap surpluses from the periphery either through the deterioration of the terms of trade or through the appropriation of the periphery's foreign trade earnings.

It is of interest to note the strategical implications deriving from a test for or against the 'centre-periphery' hypothesis in subnational terms. The explanatory capacity of the hypothesis can be linked directly to a polarized development strategy.

As will be discussed later, a development strategy for the 'periphery' based on the creation of one or several growth centres presupposes brisk competition between the traditional 'centre' and the new centre or centres of growth. This in turn means assuming that the new centres in question will be capable of diverting the flow of surpluses from the 'periphery' to the traditional 'centre', or, in other words, the 'internationalization' capacity of the growth centres is implicitly taken for granted. But if, as sometimes happens in cases like that of Panama referred to above, the 'periphery' does not produce surpluses, it would be meaningless to aim at making it compete with the 'centre'. In such a case regional development strategy would seek to strengthen complementarity between the 'centre' and the 'periphery' rather than to encourage competition. Where this is so, the strategic concepts associated with polarized development theory cease to be directly applicable.

Lastly, a hypothesis with a political content would probably seek the explanation of the spatial structure in factors connected with the place of the economy in question in the world capitalist system, in the location patterns of transnational corporations and in the way in which the internal dominant groups control the State machinery. That is, in this sense a conception based on the theory of international dependence would prevail.

Dependence theory has come strongly to the fore in recent years, partly as a reaction to the supposed theoretical and operational incapacity of the current theories on economic development and social change. Despite the remarkable ambiguity and generality of the terms, it has unquestionably exerted a profound intellectual influence in Latin America. What is of interest on the present occasion is to check how far these international analytic categories are also useful as categories in intra-national or interregional analysis. Once certain definitions of the concepts of dependence and domination have been accepted, it is important to find out whether such phenomena are also proper to regional systems, and, if so, to investigate the type of relationship that links the various geographical levels at which they make their appearance.

In other words, is there such a thing as dependence and domination between regions in one and the same country? If so, is it an independent phenomenon or is it interlinked with the corresponding phenomenon at the international level? Lastly, does the break-up of international relations of dependence and domination guarantee the elimination of relations of this same type at the interregional level?

If we interpret dependence as does Sunkel, for example, i.e., placing the emphasis on the endogenous or exogenous character of growth, there can be no doubt whatever that in a regional system autonomous and dependent regions do

coexist. According to Sunkel, development and underdevelopment can then be understood as partial but interdependent structures forming a single system. One leading characteristic by which the two structures are differentiated is that the developed structure, largely by virtue of its endogenous growth capacity, is the dominant one, and the underdeveloped structure, partly because its growth capacity is induced, is dependent; and this holds equally good between countries and between regions within a country. (Sunkel, 1970.)

This approach calls for a few comments.

In the first place, the essentially exogenous nature of the dynamics of regional growth is a characteristic proper to open economies (such as regions are) to which attention has long been drawn by regional specialists (the classic controversy between North and Tiebout is a case in point), and which constitutes the cornerstone of the theory of the economic base.

Secondly, the fact that regional economies are seen as essentially exogenous and therefore dependent is not a useful category for economic analysis, either because the degree of endogeneity (and consequently of autonomy and dependence) depends upon the definition of a region (on its size), or because it is merely the result of interregional specialization.

Obviously, except for the so-called 'metropolitan' regions (and always depending upon their size), all the regions forming a regional system (in a given country) are dependent. Accordingly, from this point of view, the introduction of the concept of dependence into regional analysis enriches nothing but its terminology.

If the concept of dependence upheld by Quijano, for example, is adopted as an alternative or as a complement, the result is not substantially different. The following paragraphs summarize Quijano's thinking:

". . . In other words, any confrontation between the dominant interests in societies whose power is unequal will be conflictive and may possibly lead to dependence; but in itself it does not constitute a situation of dependence.

"Consequently, relations of dependence appear only when the societies involved form part of a single structural unit of interdependence, within which one sector is dominant over the others: a situation that constitutes one of the determinant features of the production and market system of present-day capitalism. That is, dependence does not imply confrontation between the set of basic social interests of the dominated society and those of the dominant society. On the contrary, it presupposes a basic correspondence of interests between the dominant groups at both levels of the relationship, although this does not rule out the possibility of friction over the rate of participation in the benefits of the system. In other words, the dominant interests in dependent societies correspond to the interests of the total system of dependence relations and of the production and market system, as a whole." (Quijano, 1970.)*

Obviously, regions, as spatial subsystems in a larger system, are societies which form part of a single structural unit of interdependence. Within this unit (the country) one sector is dominant, whether the term 'sector' is interpreted as a social class or as a segment of the production apparatus. Moreover, if no political conflicts of a regionalist type exist, there will always be a basic correspondence of interests between the local and national dominant groups.

* Unofficial translation.

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Conflicts of the national-regional type, which will be discussed later, precisely correspond to the "friction over the rate of participation in benefits" of which Quijano speaks.

Consequently, from the standpoint of the concepts utilized by Quijano, a multiregional system is by definition a system of dependent relationships. It is not clear, however, that this characterization, which in the light of its terms of reference is accurate, makes any positive contribution to the analysis of regional problems.

Castells, for his part (Castells, 1973), says that a society is dependent when the articulation of its social structure, at the economic, political and ideological levels, reflects asymmetrical relations with another society which *vis-à-vis* the former holds a position of power. What is meant by a position of power is that the organization of class relations in the dependent society finds its logic outside itself and is an expression of the form of hegemony of the social class that wields power in the dominant society.

On the basis of this fairly broad conceptualization, Castells seeks to explain the whole of the historical formation of urban and spatial structures in Latin America, in face of which Singer wonders whether it is in fact possible to deduce from the different situations of dependence —and basically from them alone— phenomena as complex as the organization of space in the various countries. (Singer, 1973.)

As de Imaz points out (de Imaz, 1974), it is a striking fact that dependence theory has shown little or no interest in recalling that the world is interdependent, and that the relations with which we are concerned cannot be simply envisaged within an autarky-interdependence continuum, because today self-sufficiency is non-viable.

The same author offers a somewhat more realistic definition of dependence, saying that relations of dependence will be those representing subordination, or the expression of asymmetrical powers, which, as a result of the inevitable interdependence, not only among independent States, but also between these and public and private bodies, or, in regional units, between national and local agencies, are coincidentally or dissimilarly manifested within the political, economic, scientific, military and cultural systems.

De Imaz adds that this operational definition is intended to be highly comprehensive; it covers the two known economic systems —for it is applicable both to capitalism and to socialism— and intra-national relationships.

In the light of all these definitions the basic question may once again be posed: does a situation of dependence exist in a nationwide regional system?

If dependence is an attribute of interdependence (and none of the authors quoted seems to doubt this) it is absolutely obvious that within a regional system forms of dependence are to be found, but this is completely tautological and consequently useless as an analytical category.

However, *mutatis mutandis*, it could therefore be said that since the whole world is interdependent (and more so every day) dependence theory is also beyond salvation in its international dimension. This is going too far, for between the international level and the interregional level there is a sharp distinction: in the first case the relations concerned are between States that are politically independent (at least formally), whereas in the second they are

relations between parts (always somewhat arbitrarily defined) of one and the same sovereign nation-State.

The second question bearing on this subject is: how far does dependence theory —in its international dimension— account for the conformation and evolution of the spatial (and particularly the urban) structure of the Latin American countries?

Singer, discussing metropolitan problems, the lack of articulation of the urban network and interregional inequalities in Latin America in the light of the propositions put forward by Castells and Quijano, concludes that it is hard to imagine how far the understanding of this process is assisted by fitting it into systems of dependence (Singer, *op. cit.*).

Later on, Singer adds that in the last analysis the dependence of the countryside upon the town is a result of the 'urbanization of the economy', an essential feature of development, capitalist or not, whereas the dependence of Latin America in relation to imperialism derives simply and solely from the capitalist character of its development. He does not deny that the two related types can be encompassed in the same concept of dependence, but at a level of abstraction which fails to reveal, if it does not actually obscure, the essential characteristics of both. (Singer, *op. cit.*).

If dependence theory were capable of explaining changes in the organization of space in the Latin American countries, and if it had the totalizing character which its exponents seem to attribute to it, ought therefore to be able to pass the test of empirical evidence.

Should it be true, as Castells maintains (see Castells, *op. cit.*) that the development of Latin America has been characterized throughout the course of history by different types of dependence (colonial, capitalist-commercial, imperialist) and if at the same time there has been a succession of different dominant centres (Spain-Portugal, United Kingdom, United States), ought we not perhaps to expect a change in for example, the urban structure both at the continental level and within the individual countries, to corroborate the thesis that international dependence conditions the internal structuration of space? The absence of any such change would invalidate the thesis, or, worse still, would involve maintaining that urban structures have been equally functional with respect to any of these stages of dependence, a contention somewhat difficult to accept as a historical and scientific premise.

At least as far as South America is concerned, it is fairly obvious that the basic features of the sub-continental urban structure have remained unchanged not just for several centuries. Except for the emergence of São Paulo, Cordoba and secondarily Brasilia, the urban structure exhibits no significant changes (setting aside a mere increase in scale), in terms of, for example, ranking by size. In fact, as Hardoy shows, the structure in question was virtually shaped by the mid-16th century, since when it has displayed considerable stability.

According to Hardoy, between 1540 and 1600, approximately, the basic urbanization pattern of the Spanish-speaking territories in Latin America, as well as of Brazil, was almost definitively established. This pattern survived in specific regions, with no other variants than changes in the reciprocal order of importance of the centres, until well on into the nineteenth century, and constituted the basis of the present pattern of continental urbanization. (Hardoy, 1969.)

To turn attention now to the level of individual countries, in a good many cases a noteworthy stability in urban structures is once again observable, and in others it would be difficult to accept a causal relationship between the country's global dependence and the mode of consolidation of its existing urban structures.

As a case in point, Panama shows an urban system with absolute structural stability throughout the period 1940-1970, apart from the logical increase in size and primacy. And this happens in a country which can be regarded as the archetype in respect of dependence. Furthermore, it would be hard for anyone who is acquainted with the history of Chile to accept the idea of a strict relationship between the country's global dependence —which is not open to discussion— and the evolution of its urban system. Apart from the fact that Chile's international frontiers were defined only just at the end of the nineteenth century by the incorporation of territories with consolidated urban structures and that internal expansion (settlement of Aysen) ended as lately as the 1930s, it is obvious (see Hurtado, 1966) that primacy in the system is due more to administrative and internal security reasons than to economic causes. A notable change in the structure of the Chilean urban system has been what may be termed the 'urban regression in the North', brought about by the obsolescence of natural potassium nitrate (saltpetre) resulting from the appearance of synthetic nitrate between the first and second decades of the present century. Once again, it would be difficult to discover a relationship between this major change and the country's situation of dependence.

In short, although the validity of dependence theory as an instrument for analysis of overall development and of international relations is not called in question in the present discussion, it would seem to offer only marginal contributions to an attempt to explain and interpret the spatial and urban configuration of the Latin American countries. Since regional problems are not independent of overall development situations, if in these dependence has played a role of greater or lesser importance, it will clearly always be possible to note some relation between spatial configuration and situations of dependence; but this relation could hardly be regarded as of a totalizing character. Furthermore, this total explanatory capacity attributed to dependence theory is denied by Cardoso himself both in his first book and in subsequent articles.

Perhaps domination as a concept complementary to dependence constitutes a more rewarding category of analysis at the regional level.

Domination should be understood to mean a situation in which one region imposes upon another a pattern and rate of development such as will be functional to its own objectives. Consequently, the dominated region is incapable of mobilizing its own energies and of generating its own motivations for speeding up its development. Domination leads, in the long run, to regional parasitism. In certain cases, domination within the regional system generates situations of veritable internal colonialism, as González Casanova puts it (González Casanova, 1970).

The principal difference between dependence on the one hand and domination and internal colonialism on the other lies in the fact that in the two latter cases all social classes in the dominant region exploit all the counterpart social classes in the dominated region. This signifies the disappearance of the basic association between ruling classes in the dominant and dominated regions which, according to the writers concerned with it, characterizes dependence.

Dependence is consubstantial with the existence of national multiregional systems; domination is an abnormality in the system, which must be corrected if the system is to operate more efficiently.

It is important in this context to distinguish between a situation of domination (according to the definition given above), which is a political and social phenomenon, and mere regional specialization under a rational programme of national and regional development. Since regions are differently endowed with natural resources, and their potentialities, their relative positions *vis-à-vis* international markets, etc., are likewise different, there will consequently be differences in their rates of growth and in the composition of their products.

For example, if the overall development and in particular the industrial development of Brazil in the postwar period is considered, a situation of regional domination is quite clearly apparent: domination of the North-East by the Centre-South (basically Sao Paulo). Several studies demonstrate that the Centre-South has imposed on the North-East a type of development and particularly a type of industrialization which is more functional for the Centre-South than for the North-East itself. Specifically, it has been shown that the industrialization of the North-East has meant substantial subsidizing of the Centre-South by the North-East. The subsidy has operated via the appropriation of part of the North-East's export earnings (from the sale of sugar and other products) through the twofold action of a policy of industrialization (in the North-East) and of protectionism in relation to imports of capital goods. In other words, a manifest example both of domination and of the operation of the centre-periphery thesis at the internal level.

Again, let us look at the following paragraph taken from an article by Nove. "The economy of Azerbaidjan is tied to control from Moscow. It is the Russians that adopt decisions. Petroleum flows mainly into Russia and other points in the Soviet Union. The surplus (tax on operations plus profits) is appropriated by Moscow. The bulk of the industrialized goods consumed in Azerbaidjan comes from Russia and the Ukraine. Obviously, we, the people of Azerbaidjan, are exploited for the benefit of the Russians. Except for the district of Baku our Republic is an underdeveloped rural area. The underdevelopment of Azerbaidjan is due to Soviet communism; to the fact that it is chained to the Soviet market; this has prevented Azerbaidjan from developing its own industries. Hence we can neither raise a protectionist barrier by means of customs tariffs nor have our own cotton textiles. It is demonstrable that cotton can be and in fact has been grown, but we have been told not to do so because it is cheaper to get it from Uzbekistan: another example of the generation and perpetuation of underdevelopment, etc., by outsiders . . ." (Nove, 1972.)*

In Nove's hypothetical example what is depicted is obviously a situation of interregional specialization, although in principle it could be assimilated to a situation of domination. Whether there is or is not domination, would depend on the existence of social classes and the pattern of relations between the 'central' and 'regional' classes. Another and quite different phenomenon which could be illustrated by Nove's remarks is that of straightforward economic exploitation of a region, a situation which need not be set in the broader framework of social domination.

It is also possible that within the framework of a capitalist society internationally integrated with the system, domination may be exercised be-

*Unofficial translation.

tween regions in different countries. This might be the case with a region in a peripheral country where an activity was carried on that was affiliated to a parent activity located in a region in a central country. For obvious reasons, this type of structuration is more clearly apparent in extractive activities. By way of example, let us imagine a region in a peripheral country whose main activity is coal mining and where ownership is in the hands of transnational corporations running the same type of activity in a region in a central country. Obviously, in such a case domination would be plainly manifest, not only because the central region would impose the pattern of development in the peripheral region; in addition, horizontal-type class exploitation would be clearly observable.

In short, domination, as a category in regional analysis, seems considerably more rewarding than dependence.

As often happens, the truth may lie halfway between the two, and it will be incumbent upon the analytical capacity of the regional planner to determine which are the essential and which the subsidiary elements in a rational explanation of a given situation. In any case, no hypothesis can be accepted without empirical testing, a requisite which is seldom met in most of the known regional development plans.

B. Plan objectives and targets

What is an objective? What is an objective-image? What is a target? These three questions are of basic importance for the purpose of standardizing —by replying to them satisfactorily— the language used in this section.

One of the most distinguished of Latin American planners maintains that the concepts of objectives and instruments are not substantival but adjectival. Different actions or things have different degrees of instrumentality, that is, they serve in greater or lesser degree to ensure that certain things are brought about or certain activities are carried out. A thing or an action is an objective or an instrument only in a context of a clearly-defined field of activity and within a specific time limit. (Ahumada, 1969.)

The same writer adds that those objectives whose degree of instrumentability is zero could be termed pure or final. Generally speaking, they are related to ethical or aesthetic value judgements and therefore depend more upon the observer than upon their own nature. (Ahumada, 1969.)

He goes on to say that a distinction must be drawn between the enunciation and the definition of objectives. The proposition "We will combat malaria" represents an enunciation. The proposition "We will reduce malaria by 10% in the course of two years in the State of Apure" constitutes a definition of objectives. (Ahumada, 1969.)

According to Ahumada, an objective is defined, therefore, once the object of the action has been determined (the State of Apure), the objective has been quantified (reduction by 10%) and a time limit has been fixed for its attainment (two years). An objective thus defined is called a target. (Ahumada, 1969.)

The foregoing paragraphs perfectly clearly define the concept of target, as an objective whose temporal and quantitative dimensions are established. But the concept of 'objective' itself is not equally clear.

Other authors draw a subtle distinction between 'aims' and 'objectives', stressing the quasi-philosophical nature of the former (equity, for example) and

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pointing out that 'objectives' would be aims that are susceptible of establishment in economic terms and that, in principle, can be measured in cardinal or ordinal numbers. (E.S. Kirschen, L. Morrissens, 1965.)

In the broader field of decision theory, Isard and Smith make the following observations.

"In many situations, knowledge of actions, outcome and preferences will yield determinant choice behaviour for the individual. In the one-person world of complete certainty, the outcome function estimated by the individual will associate a unique outcome with each of his possible actions; and, if he can simply identify the most preferred of these outcomes, then a choice of actions is automatically implied. Beyond this class of simple situations, however, objectives and guiding principles play a basic role.

"In traditional decision theory, the first extensions of these situations have involved a relaxation of the complete certainty assumption on the environment. In a one-person world with many realizations of the environment possible, the individual's behaviour can still be projected in certain situations on the basis of only actions, outcomes and preferences. However, the class of situations in which projection is still possible on this basis alone is too special to be of much interest. Thus, in order to extend this analysis to a wider class of situations, new behavioural assumptions have to be introduced. Individuals *do* make decisions when confronted with uncertainties as to the future, depending on their *motivations* and *attitudes* towards such uncertainties. These motivations and attitudes have thus been introduced into the analysis of decision-making in the form of what we shall call objectives. Formally, the 'role' of these objectives has been to 'reduce' outcome possibility sets containing many elements down to single elements over which a simple statement of preferences can determine the individual's behaviour."[28] (W. Isard and T. Smith, 1967.) Later on the same writers define the term "objective function" as meaning a function which the individual uses to transform outcome possibility sets into representative preference numbers.

To sum up, it may be said that for these writers 'objectives' are outcomes of actions, to which numbers (ordinal or cardinal) can be assigned and which are consequently finite and susceptible of arrangement in order. This definition is a good deal more formal and exact than Ahumada's and coincides up to a point with the concepts of Kirschen and Morrissens. According to the propositions noted, objectives are not actions.

Perhaps a clearer definition of the concept could be reached indirectly via prior definition of the idea of objective-image.

The objective-image is a voluntaristic model (and, as such, a selective simplification) of the reality with which planning is concerned (the economy as a whole, the society, the multiregional system, etc.) set in a specific future time. It may or may not coincide with the image of the object of planning that emerges from the prognosis exercise. The essential characteristic of the objective-image is its internal rationality; that is, it is not merely a set or sum total of objectives but a construct in which the problems of cohesion between different objectives have been resolved. It therefore presupposes a harmonization and ordering of these objectives.

[28]The italics are in the original text.

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This will imply that an objective is the state in which a variable appears in the model or objective-image. The value of this state is a target in so far as the said value is associated with a definite spell of time.

Let us assume, for example, a completely simplified objective-image representing an economy where the following conditions are set: (i) an overall annual growth rate of 7%; (ii) full employment; (iii) balance-of-payments equilibrium. What are the objectives and the targets here? The objectives would be: a high growth rate, full employment and absence of international trade pressures; the targets would be to attain a growth rate of 7% per annum in five years, to secure employment of 97% of the labour force in five years, and to expand exports by such and such a quantity in five years.

Other specialists are in favour of a much more generic and qualitative approximation in this respect. For example, Matus remarks that another problem consists in the degree of accuracy with which the elements of the objective-image should be defined. Its precise quantification is not indispensable, since the function it must fulfil is one of guidance, not the proposition of specific targets with fixed deadlines, and the substantive character of its elements thus appears to be more pertinent for the purposes it has to serve. (Matus, 1972.)

In the context of the foregoing definitions, such a proposition as "to redistribute income" or "income redistribution", which is of frequent occurrence in official development plans, is not an objective, because it indicates actions or intentions and not final states; on the other hand, "income distribution in accordance with this or that pattern" does constitute an objective, from which a corresponding target can be derived.

Before embarking upon discussion of regional objectives proper, it is worth while to reflect upon the relation between objectives and planning.

It is true that in Latin America criticism has been levelled at the results of more than two decades of planning activities, and a good many of the critics have laid stress on the apparent lack of connexion between political will (or the power structure) and the formal content of the plans. In point of fact, in many cases this lack of connexion (which is sometimes nothing but a lack of realism on the part of the planners) can reasonably account for the meagreness of the visible results of planning efforts; above all when the plan contains proposals for structural changes which are formally accepted by the power groups, but which in practice are repudiated by means of overt or covert mechanisms.

In other cases, however, which the foregoing observation does not explain, it can be seen that the plan lays emphasis on objectives which are, *de facto*, completely coincident with the objectives of the dominant groups (the most noteworthy case in point might be that of a plan almost entirely geared to the objective of 'growth' in a purely capitalist political context), and yet, as the years go by, the plan cannot be said to have been successful.

In this and in other instances the problem seems to lie not in the lack of political will to implement the plan but rather in the necessity of institutional adaptation to the attainment of a small number of objectives.

In the first place, it is unquestionably easier to attain plan objectives if they are few in number. A multiplicity of objectives —which reflects in part the real needs of any developing country, but is also a response to the need of the planning apparatus to satisfy the largest possible number of potential clients, and

thus legitimize its continuity and stability through time— creates increasing difficulties for the country's institutional machinery.

Nor does it only breed institutional pressures that are difficult to ease. Worse still, the greater the number of objectives, the greater is the probability that propositions will be put forward which at bottom are completely inconsistent, at least over the medium term, with the result that in practice some State efforts are aimed one way and others in exactly the opposite direction. Thus, there is nothing surprising in the fact that after a reasonable lapse of time the country finds itself just where it started. It is not hard to agree with the economist who, in describing the long-term evolution of Chile, quoted Lewis Carroll: "Here, you see, it takes all the running you can do to keep in the same place".

Obviously, if the plan contains a few firmly-established objectives (in the last extreme a sequence of objectives, one for each different time-span) it will be easier to mobilize the country's whole effort in pursuit of the objectives in question. The words "mobilize the whole effort" are not intended to allude only to the mobilization of material and human resources. They also —and primarily— refer to the institutional and even psychological resources that can be recruited: in other words, to the adaptation of all the country's institutions and of its mentality to the aims synthesized in the objectives. It is here that planning acquires a cultural dimension, in the broadest sense of the word. Merely as an example, it may be useful to note what was happening in Chile in 1974. Clearly, the government's principal long-term objective was that of growth. It is equally clear to anyone who knows the country that almost all its institutions and, of course, the idiosyncratic leanings of most of the population are slanted much more towards a distribution objective. Obviously, then, unless a change were brought about in both institutions and mentality, the government's objective would not be attained to any significant extent. In the same context, the situation of Brazil exemplifies the opposite case. The basic objective is the same, but in Brazil institutions and mentality are being geared to its attainment. From the creation of specific institutions (there is a long list of these) to the use of subliminal messages by the government, everything is coherently directed towards fulfilment of the government's fundamental objective.

The foregoing considerations are perfectly applicable to regional planning. Few but consistent objectives, adaptation of the supporting institutional apparatus, cultural changes and continuity over the long term seem to be indispensable conditions for success.

Undoubtedly, there are few tasks in the process of drafting a regional plan that are more difficult than the identification, selection and harmonization of development objectives in a multiregional system.

In this connexion, a Polish specialist says it is noteworthy that the problem of defining the aims of regional development is incomparably more complicated than that of establishing development objectives for the whole of the national economy. (B. Winiarski, 1970.) Winiarski's assertion is highly relevant, inasmuch as in the regional plan objectives will have to be established for the whole of the spatial system as well as different and differentiated objectives for each region, and all these objectives will have to be mutually

compatible as well as compatible with the global (and sectoral) objectives of the country.

The relation between the country's overall objectives and the objectives of one region may be associative, neutral or conflictive in character. The relation is associative if the attainment of one objective includes or contributes to the attainment of the other; it is neutral if the resources used in pursuit of each objective are not competitive; and it is conflictive if the achievement of one objective implies some sacrifice of the other. Generally speaking, this type of problem has been well analysed in the literature on the subject and, moreover, belongs to the sphere of intra-regional planning; hence there is justification for its being merely mentioned here. In the present context it is more important to discuss the type of relation that may be found between the objectives of the various regions composing the regional system as well as between the country's overall objectives and the objectives of the spatial system as a whole.[29]

In so far as the set of regional units is considered and handled as a system, it is necessary to accept a basic theorem of general system theory which establishes that optimization of the system may imply situations of underoptimization in one or several sub-systems. If the exercise of decision-making power (i.e., the capacity to establish objectives and allocate resources) is centralized within the system, the need to adopt interdependent decisions may be a source of interregional conflicts, i.e., inconsistent objectives may be set up; but, on the other hand, if decision-making power is decentralized in the system, the differences between individual valuations (in terms of objectives) may also give rise to inconsistencies between objectives of different regions.

The last case is easy to illustrate. For example, if each region is autonomous in so far as the establishment of objectives is concerned, a situation is conceivable in which each individual region's valuation of the 'growth' objective is such that national resources prove insufficient to meet regional requirements. Another way of visualizing the same phenomenon would be to translate objectives into terms of targets and then to find that the sum total of the targets will exceed an independently-established global target, a situation which is manifestly inconsistent. The first case, which is somewhat more complex, might be illustrated by means of a hypothetical situation in which the central decision-maker establishes an industrialization objective for region A and for the neighbouring region B an objective linked to the development of tourism, overlooking the fact that the industrialization of A will produce pollution in the waters flowing towards B, etc. In other words, in default of satisfactory methods of analysis, the interdependence of decisions may mean that the phenomenon of interregional externalities is disregarded.[30]

[29]Cf. Siebert's analysis in *Regional Economic Growth. Theory and Policy*, chapter VIII, Scranton, Pennsylvania, International Textbook Company, 1969.

[30]It is quite common in practice to find examples of interregional externalities. For instance, in Panama, the development of the Eastern Region (and of the country as a whole) has led to the construction of a big dam on the river Bayano, to feed a new hydroelectric power station. One of the foreseeable effects is that the dam will act as a filter for the organic matter contained in the waters of the river, with the result that the shoals of shrimps along the coast will be deprived of their main source of food, and this in turn will affect the level of operations of the fishing companies located in the neighbouring metropolitan region.

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The objectives of the spatial system as a whole, i.e., those proper to the spatial system, must be defined in such a way as to distinguish them from the typical objectives set up in the context of overall economic and social development. In other words, they are objectives which cannot be defined without reference to the spatial factor. Thus, the achievement of a high rate of economic growth cannot constitute an objective of the spatial system, since it can be established (and attained) without express reference to the geographical space.

According to Friedmann, this type of objective must satisfy two side restraints: (i) it must be functional in relation to the stage of development reached by the country (the discussion with which this book begins should be recalled); and (ii) it must be consistent with the dominant national aspirations (Friedmann, 1960).

In view of these restrictions, perhaps the most general way of presenting the objectives proper to the system is to reduce them to only two: the organization of space and, national integration.

According to Friedmann, the main objective of regional policy is to attain that spatial structure of the economy which, at any point of time, is deemed satisfactory for the promotion and maintenance of an efficient economic growth process. To establish the basic objective of regional policy (and of the regional plan) in these terms, Friedmann starts with the assumption that in transitional societies (those in which a nationwide regional development policy really is fully justified) economic growth is the predominant national objective. It should be noted in passing that this is not really in line with the existing facts. Nevertheless, even if the dominant national aim is different —for example, the socialization of the economy— in any event it can be postulated that the basic objective of the regional plan would be to achieve the spatial organization best fitted for the attainment of that end.

Hermansen defines spatial organization as (i) the set of agglomerations of human activity characterized by their relative location, size and functional composition; (ii) the network of services for the movement of products, persons and information which connects up these agglomerations; (iii) the distribution and pattern of density of the activities making use of the space (Hermansen, 1969).

Localized economic activities, towns and transport and communications networks form the spatial organization whose structure and operation (i.e., the changes therein) constitute a basic objective of the regional plan.

In view of the predominant national objectives, the best organization of space is achieved by means of a structure of centres, activities and networks which will minimize total transport, since, according to the classics of locational analysis, the resources allocated to transport could be more efficiently used for an alternative purpose, that is, they could generate a larger quantity of goods and services for the community.

In the light of this line of argument, the spatial structure of Argentina (at least up to the 1930s) could not be considered inefficient. In this instance, the radial pattern of the transport network (with its vertex in Buenos Aires) was functional and consistent with the country's role as an agricultural exporter. Similarly, in a national strategy strongly slanted towards exports of manufactures, as in the case of Brazil today, the concentration of activities in a few

urban centres along the littoral is perfectly consistent, spatially speaking, with the major national objectives.

Are there any spatial organization theories and/or models which, by virtue of their normative content (what ought to be) and their control content (how to intervene in order to attain an ideal state) are useful for the transition from the vague field of objectives to the more specific field of targets?

Hermansen, replying to this question in a widely-known study, notes that the stock of spatial organization models is very poor, partly perhaps because it is only recently that interest in controlling and directing spatial organization has grown up, and the formulation of such models has thereby been motivated. Probably, he goes on to say, what is of most importance is the fact that spatial organizations change only gradually, and, as Kuklinski has suggested, they do not always have an appreciable effect on economic development. Spatial planning, therefore, has been of a distinctly fragmentary and stopgap character, and there has not been a definite need for global models in this field. If, however, the assumption is adopted, as in the study from which these remarks are taken, that the evolution of spatial organization and economic development influence each other and that these reciprocal influences ought to be controlled and directed within the framework of overall development planning, spatial organization models are called for to link up the spatial and economic elements. For the purposes of planning and control it is impossible to rely on descriptive geographical models of the type involved in rank-size relations. Fortunately, there are some models which, despite their extreme simplicity and their some-what unrealistic conclusions, do provide systematic starting-points and frames of reference, if not for comparative research, at least for the time analysis of planning in specific areas. (Hermansen, 1975.) The models to which Hermansen refers include, in the first place, the well-known spatial organization models of Lösch and Chrystaller. Tinbergen too has formulated a spatial organization model in which the distribution of urban centres by size and their industrial composition is first determined, and then their location is established. A regional programming model will later be described which has its origin in this conception of Tinbergen's. Well-known too, nowadays, is the spatial organization model propounded by Friedmann in terms of the various types of spatial organization which characterize the sequential stages in the economic growth process.

Lastly, the theory of development poles itself, while it does not constitute a spatial organization model proper, nevertheless contains many elements of 'control' which make it a valuable input in relation to the objectives and targets of the organization of space.

In any event, in stressing the 'organization of space' as a central objective of regional planning it must be made perfectly clear that what is meant, in the last analysis, is the orientation and control of a simultaneous process of indus-trialization and urbanization, interpreted broadly enough for the concept of industrialization and urbanization to embrace the field of rural settlements and agricultural activity as well. Hence by derivation the structuring of transport and communication systems is a natural part of the 'organization of space'.

Given such an interpretation of this objective of regional planning, in Latin America, as far as is known, there are no regional development plans (or more general strategies) which specifically include the handling of such matters.

Apparently the farthest that anyone has gone is to formulate the changes desirable in the pattern of spatial distribution of the population, with reference to Peru (H. Méot and S. Domicelj, 1974).

The second major objective of regional development has to do with national integration, i.e., with the attainment of a high degree of internal mobility, but also with more complex questions relating to the participation of individuals in the conduct and outcome of economic activity, to the identification of individuals with certain national values and images and to the Nation-State concept itself.

To put it another way, a basic objective of planned regional development is to contribute to the nation-building process. It is assumed that this nation-building process culminates in the creation of a "Nation-State", conceived in turn as a nation that is satisfactorily integrated from the physical, economic and socio-political standpoints.

If preferred, the "Nation-State" concept can be better grasped by means of an analogy with mathematical sets theory. It might be asserted that a country has really created a true "Nation-State" when any partition of the national territory results in a series of sub-sets in which the characteristics of the whole set, i.e., the country, are reproduced without major variations. For example, in any of the sub-national spaces thus defined economic, social and political structures and relations should appear which are perceptibly similar to those of the country as a whole.

The concept of national integration which constitutes one of the objectives of regional development planning can be conveniently interpreted in three interdependent contexts. Thus, the overall concept can be broken down into three components, namely, physical integration, economic integration and socio-political integration.

The concept of physical integration should be taken to mean the degree of accessibility existing between all points in the territory. At any given moment, a country's level of physical integration depends upon two major factors: (i) the geographical configuration of the space (or, if preferred, of the morphological base); and (ii) the use made of the space.

In practice, it is possible to devise several indicators which show a country's level of physical integration. In a document prepared by Chile's National Planning Office an index of habitability is used to examine the morphology of the space, and the population density, density of the road system and accessibility of urban centres are adopted as indexes for the study of the intensity with which the space is used. These indexes are mentioned here for illustrative purposes, as they are not the only ones that could be adopted (see ODEPLAN, 1968).

By economic integration is meant the similarity existing —in spatial terms— in relation to the marginal return on productive resources or the capacity of the economic system to guarantee the factors of production (labour, reproducible capital and technological know-how) a similar marginal return, irrespective of their geographical location.

In other words, in an (economically) well-integrated economy, *ceteris paribus* neither the rate of interest (or the internal discount rate) nor wage rates should show appreciable geographical differences. Of course, wages for one and the same type of activity may differ from one locality to another, but this would

have to be because of adventitious elements extrinsic to the work itself (for example, compensations for distance or climate). Obviously, such a degree of economic integration cannot be attained if resources in their turn have not a high degree of geographical mobility, which in turn depends upon the degree of physical integration, as well as upon other conditions.

Many indicators can be used to evaluate the degree of economic integration at a given point of time. Perhaps the best way of examining the problem consists in analysing the relative importance of space as a differentiating factor in respect of wages or returns on capital. Economic information theory, as developed by Theil, for example, can provide the tools required for the conduct of the analysis. As a general rule, however, it will not be necessary to resort to very sophisticated methods in order to evaluate the scale of the problem. Economic (territorial) concentration itself bears witness to the geographical inequality of the remuneration of factors.

By socio-political integration should be understood the existence throughout the country of a single institutional framework and likewise a similar degree of active and passive participation of individuals in the generation and appropriation of the fruits of economic activity. It should be noted that active participation relates to the participation of persons in the political process of decision-making, whereas passive participation refers to the share in the social product that each individual appropriates. The level of active participation can be indirectly measured by means of indexes of polling, formation of trade unions, existence of intermediary social grouping agencies (neighbourhood councils, women's institutes, etc.). The level of passive participation can be quantified by means of indexes of income levels and distribution, school attendance, health, etc. Socio-political integration of course also implies that a certain code of values is shared by the whole community independently of geographical location. This is turn presupposes the existence of an efficient information system capable of disseminating these values.

It is important to indicate the relation between these two major regional development objectives and the more general objectives established at the national level.

In this context, the first objective mentioned above, organization of space, will never come into conflict with national objectives, since adjustment of the spatial structure to national objectives is precisely the aim pursued through this regional objective.

In contrast, the second objective discussed, national integration, may clash with national objectives, especially in so far as these latter relate primarily to questions of overall economic growth.

To conclude this brief presentation of the objectives proper to the spatial system, and before discussing both the regionalization of global objectives and the objectives of each component region of the system, it is worth while to stress the close relationship between regional development and the modern military concept of national security.

Considerations relating to national security arise in the context of regional development on account of three processes.

Firstly, as Perroux originally noted, in certain conditions conflict between economic spaces and political spaces may occur which is capable of affecting the

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countries' sovereignty. This clearly happens in the event of contact between two frontier zones (in different countries) with very unequal levels of economic development. In these circumstances, 'the economic space' of the activities located in the more developed region will extend beyond the 'political space', even though the traditional international barriers exist.

Over the long term, a situation such as this tends to generate localized conflicts which may rapidly spread to the national level. In Europe especially, history shows eloquent cases in point. If a major international conflict is to be avoided, the only solution consists in promoting the rapid development of the backward region. In this case development is entirely guided by considerations relating to national security. Furthermore, as in the case of Latin America, the existence of vast empty spaces, especially in the interior of the continent, also raises serious problems of national sovereignty which are directly linked to the question of national security. Thus, penetration and colonization strategies are often propounded which are dictated solely by geo-political motives. An example may be seen in Brazil's ambitious road-building and settlement programme in the Amazon region.

In addition, the location of industries must be approached with an eye to strategic questions. Obviously, the more territorially concentrated is the industrial park, the weaker is the country's position in face of possible external aggression. These strategic considerations in relation to the location of industries are of great importance, for example, in the industrial location policy pursued in the socialist countries.

In this connexion it is of interest to introduce one of the basic reasons for Chile's present regionalization, put into effect in 1974. A government document states that it is also necessary for clearly-defined equilibrium to exist in frontier zones and for the country to be internally well-integrated, so that its inhabitants may be able to live and prosper in peace and harmony. This means that to ensure close linkage between the aforesaid integration and national security objectives is a task that cannot be shirked. Circumstances may be adverse to all this if there are many empty spaces in the national territory, or if underdeveloped areas exist, or if resources are under-utilized in specific regions.[31]

A second category of objectives that must be established in the regional plan corresponds to the result of regionalization of global objectives.

Since regional planning, as treated here, is regarded as part of the entire planning system, the planning regions become elements (and must, moreover, be efficient elements) in the process of regional disaggregation of global objectives and policies. It is a matter of determining how far a specific global objective may acquire regionally differentiated characteristics, with the ultimate aim of more accurately establishing whether the problem to which the objective relates admits of different explanations in different regions; if this is so, the policies designed to attain that objective will also have to differ in form from one region to another. This whole process implies a direct contribution to the achievement not only of greater efficiency in the entire planning system but also of a fairer distribution of the costs of development. It should be noted in passing that from

[31] Document issued by the Government of Chile, 11 July 1974.

this point of view (regionalization of global objectives) a small number of large regions is always more efficient [32] than any other alternative.

The foregoing ideas can be crystallized with the help of an example already cited in the introductory chapter. A habitual objective in most development plans is "the improvement of income distribution". [33] In the great majority of cases it would be possible to note significant differences in the pattern of income distribution prevailing in rural areas and in metropolitan regions, for example, and, of course, it will also be possible to detect different causes in each case. A regressive distribution in rural areas may be associated with land tenure patterns, whereas in a metropolitan region differences in the skills of the active population perhaps account for it better. Here it is clear that the global objectives (and later the policies) have a different content in each region.

Given a still more general approach, if the global objectives are the traditional ones, *viz*, growth, employment, price stability, expansion of exports, each region will generally be in a position to make some contribution to their attainment. The price instability which it is sought to correct might have its origin in a low supply-elasticity of agricultural commodities, for example; in that case, regions whose structure of production is essentially agricultural clearly have a well-defined role to play in contributing to the achievement of global objectives. It must not be forgotten, however, that the determination of regional objectives of this type does not depend upon the will of the region itself. In point of fact, objectives of this kind are allocated centrally to each region; hence they may be classified as exogenous objectives.

But regions do not only form part of a country. It has already been pointed out that in terms of regional development they form part of a spatial system which, as discussed above, has its own objectives. Hence each region must also help to attain the two basic objectives of this system: spatial organization and national integration. Once again, the contribution of each region to the task of fulfilling these objectives of the system is exogenously determined, that is, it is determined by the central regional planning nucleus.

In connexion with this discussion Stöhr notes that the definition of objectives is the basis of any consistent public policy. This would suggest that generally speaking the countries that have not established regional development objectives have not yet introduced regional development policy as an integral part of the national development effort.

Nevertheless, the same writer goes on to say, some of the possible regional development objectives can be formulated by translating the global objectives into regional terms and examining how far nationwide regional policies can contribute to their achievement. He appends the following list:

[32] It implies greater interregional heterogeneity.

[33] This would be an incorrect way of stating the objective, according to the discussion in earlier pages on the nature of objectives.

Global objectives:

Translation into regional terms:

To increase the gross national product

(a)   To channel investment into areas (locations) where the highest capital-output rates can be obtained, taking into account economies of scale and the accumulated stock of capital in the shape of social infrastructure (infrastructure, urbanization).
Comment: the territories of developing countries are especially heterogeneous in these respects. Accordingly, the efficiency of investment largely depends upon the location of the investment funds available.

(b)   To incorporate additional regional resources (human, natural, financial) into the development process.

To improve income distribution

To increase per capita income in the less developed areas by means of contributions of capital and know-how from outside the area, transfer of population to other areas, and remodelling of the existent socio-economic structures, including among the means employed such instruments as land and tax reforms.
Comment: the traditional income redistribution targets are expressed in terms of social strata, although the definition of regional income targets is of great importance owing to the wide interregional income disparities and their high degree of persistence.

To reduce inflationary pressures

To increase the directly productive component of total investment, by channelling investments into areas (locations) where the existing infrastructure may allow additional expansion of the directly productive sectors.
Comment: the heavy requirements in respect of investment in infrastructure are major sources of inflationary pressure in developing countries.

To increase national economic autonomy

To lay emphasis, at the regional level, on export industries, by means of more efficient utilization of regional resources.
The resulting multiplier effects should help to reduce regional imports within the framework of national comparative advantages.

To raise the rate of employment

To increase the geographical mobility of capital and labour, in accordance with the distribution of potential resources.
Comment: in Latin American countries greater mobility of labour is of special importance owing to the severe shortage of capital and the traditional propensity to migrate on the part of inhabitants of recently colonized countries.

In economic terms: to promote inter- and intra-regional relations, by improving means of access between all areas of production and consumption, through an intercommunicated system of urban centres, as potential markets.

In social terms: to improve all populated areas' access to social infrastructure capital (educational and health equipment, urban services) and to central places.

In political terms: decentralization of the political and administrative structure, so as to incorporate a steadily-growing proportion of the population in the decision-making process.

In national terms: to incorporate peripheral frontier zones into the national system, both economic and political.

Before beginning to discuss how these objectives can be translated into terms of targets, it is useful to introduce two examples relating to the determination of regional plan objectives. One of these examples relates to Bolivia and the other to Panama; in both instances the reference documents are the product of United Nations technical assistance missions.

In the case of Bolivia it is noted that a final list of five national objectives is arrived at:

"Objective 1: Maximization of the national growth rate over the medium term.

"Objective 2: Minimization of the external debt, given a national growth rate.

"Objective 3: Development of frontier zones for reasons of security or geopolitics.

"Objective 4: Distributive justice: the reduction of interregional differences in the levels of living and payment of the factors without shifting them geographically.

"Objective 5: National integration.

"Henceforward any reference to objectives will relate to this list.

The national objectives closely linked to territorial problems have been pinpointed, together with their interrelationships. It is now necessary to specify the requisites or conditions that territorial policy and strategy must fulfil for the attainment of these objectives. They are the following:

"*Condition 1.* Medium-term investment must be of relatively high productivity, say at least equal to the average for Latin America. This "at least equal to the average for Latin America" is simply an example. What it is essential to do is to determine the social opportunity cost of capital in Bolivia and insist that the social return on investment be at least equal to that cost. The aim underlying this condition is the achievement of an increase in the efficiency of the system, and it therefore corresponds to objectives 1 and 2.

"*Condition 2.* Competitive investment in the various regions must be avoided, particularly in the industrial sector, since this leads to underutilization of capital. This happens when the market is small and due to the wish of individual regions two or more plants are installed in the country, with the result that they will only be able to utilize part of their installed capacity.

Like the foregoing, this condition corresponds to objectives 1 and 2.

"Condition 3. Some frontier zones will be developed simply and solely because of their contribution to national defence and sovereignty, but if investment in them is to be justified the following requisites must be met:

— the investment must make for a real enhancement of national sovereignty in the area;

— the area must be subject to external influence that is negative from the standpoint of national security;

— if 'sacrifices' are involved in terms of economic growth and of external indebtedness (sacrifices which are other forms of loss of sovereignty) the policy-makers must consider them justifiable as a function of the attainment of the national defence objectives through the development of frontier zones (among several alternatives serving the same defence objective the choice will always light on the one which best fulfils conditions 1 and 2).

"Condition 4. Some areas will be developed and certain investment will be placed in them on account of their contribution to national integration, but the investment will have to secure real articulation of the areas chosen with the rest of the national system. Among several alternatives attaining the same integration objective, preference will be given to the one that best fulfils conditions 1 and 2. The requisites then to be met are the following:

— through the investment a real increase in national integration must be achieved;

— if a 'sacrifice' is involved in terms of economic growth (objective 1) or of external indebtedness (cf. objective 2), the policy-makers must consider this sacrifice justifiable (in the light of their value judgements) as a function of the attainment of the national integration objective. Consequently, among several alternatives whereby the same level of integration will be reached, preference will be given to the one which best fulfils conditions 1 and 2.

"Condition 5. If investment is placed in an area in order to raise the income of its population, the following requirements must be met:

— a real increase in the income of the inhabitants must be achieved over the medium term;

— if a 'sacrifice' is involved in terms of economic growth (cf. objective 1) or of external indebtedness (cf. objective 2), the policy-makers must consider this sacrifice justifiable (in the light of their value judgements) as a function of the attainment of the distributive justice objective.

"Consequently, among several alternatives which will secure the same degree of 'distributive justice' preference will be given to the one that best fulfils conditions 1 and 2." (C. Legna, 1974.)*

In the case of Panama the type of analysis is slightly different from that carried out in Bolivia. In Bolivia an attempt was made to examine the logical coherence of the various national objectives; in Panama, as will be seen shortly, all that was attempted was to ascertain how far the broader global objectives (which in this case are highly valuative) can tolerate regional differentiation.

According to a United Nations report, the most general and longest-term objectives proposed for Panama are described in a document setting forth the

*Unofficial translation.

national development strategy (*Estrategia para el desarrollo nacional 1970-1980*) and comprise the following:

1. Increase in national wealth and diversification of exports.
2. Nationwide regional economic integration.
3. Social integration of the country.
4. Development and strengthening of institutions.
5. Strengthening of national motivation and personality.

The report goes on to state that the objectives relating to regional and social integration had already been interpreted in the context of the broader concept of national integration, which is identified as one of the two objectives of the spatial system. The objective relating to an 'increase in national wealth and diversification of exports' is very general in character, and the diversification of exports refers more to the number of exportable products (currently four commodities —bananas, petroleum products, shrimps and sugar— represent almost the whole of Panama's exports of goods) than to their geographical origin. Generally speaking, the present pattern of exports may be said to be fairly diversified by geographical areas of origin.

With respect to the development and strengthening of institutions, the report continues, this objective does admit of certain variants. For example, as regards the metropolitan region (defined as the districts of Portobelo, Colon, Chagres, Panama, Arraiján, Chorrera and San Miguelito) the objective in question should be understood to imply the necessity of creating a metropolitan government, capable of handling in its entirety the complex urban-regional system which is characteristic of this region and of overcoming the typical problems of lack of co-ordination between the various municipalities. Obviously an *ad hoc* study will have to be prepared to define more precisely the functions, attributes, constitution and authority of a supra-local government. On the other hand, the same objective acquires a different dimension in relation to the Eastern region (Province of Darien, Comarca of San Blas, districts of Chimán, Chepo and Santa Isabel) in which the development and strengthening of institution should probably signify the installation of a Development Corporation with ample power and resources and geared principally to the integrated planning and execution of public works in the region. Lastly, in the Western region (the remaining provinces plus the districts of Donoso, Chame and Capilla) the global objective should be reflected in the strengthening of authentic Provincial Planning Offices with considerably broader functions than those hitherto performed by provincial planners.

The global objective of a social type described as the strengthening of national motivation and personality is also appropriate, according to the report, for translation into regional dimensions. This objective implies in the first place the preservation and encouragement of the cultural patterns and modes of expression proper to each region or locality, a process which has clearly-defined characteristics in respect of appreciation of the architectural heritage in Portobelo and Panama City and in relation to artisanal and cultural self-expression in the interior of the country. This objective also signifies mobilizing, co-ordinating and making positive use of regional or local social forces through the exaltation of each region's role in the process of change implicit in the Panamanian Revolution. At the same time, it entails, from the territorial stand-

point, guaranteeing the dissemination throughout the national territory of the intrinsic values of Panamanian culture and nationality.[34]

The third category of objectives figuring in a regional plan is that comprising the objectives proper to each region, typically endogenous and established in accordance both with the diagnosis prepared in each region and with the role assigned to each region by national development strategy. From another angle, these objectives represent the aspirations of the regional community, and in the process of determining them a wide field of possible interregional conflicts (or inconsistent solutions) is opened up. This is the result (as has already been discussed) of the different values set by each region on each type of objectives (an consequently on the resources involved).

It must likewise be borne in mind that as the number of objectives that each region desires to attain grows larger, the possibility of generating situations of internal inconsistency in each region is proportionally increased. For example, the objective relating to regional industrialization (the degree thereof) may be in conflict with that relating to regional growth (the level thereof), if certain side conditions exist. Or again, the full regional employment objectives may be inconsistent with the industrial growth objectives, likewise given the existence of certain side conditions.

All this only highlights the need for careful ranking of regional objectives, a task in which the joint participation of politicians and planners will be of vital importance. Moreover, it is precisely in this task that the organized community must actively participate.

It must also be stressed that this process of selection of endogenous regional objectives must be carried out in a framework of close collaboration between the central and strictly regional levels of planning. In short, each region's objectives belong to three complementary fields of action, and their nature has to do with the physical, economic and social aspects of each region.

Once the objectives have been specified and assigned their ranking, they have to be translated into terms of targets, by which is meant a quantified expression of objectives into which a time dimension has been introduced.

The objectives proper to the spatial system, i.e., the organization of space and national integration, are, in general, difficult to translate into terms of quantitative targets, and in practice it may prove more appropriate simply to leave them established in the terms already indicated. Nevertheless, consideration may be given to spatial organization targets specified in terms of size, distribution and functions of urban centres, and in terms of penetration, connexion and capacity of transport and communications networks, as well as in terms of the number and territorial distribution of economic activities. Much the same can be done with respect to the several concepts and objectives of integration.

The regionalization of global objectives and the objectives of each individual region can more easily be translated into specific targets. The principal problem arising here is to ensure the consistency of the national and regional targets. It should be noted that when large regional systems are in question,

[34] UNO/OTC, *Estrategia de desarrollo regional a mediano y largo plazo de Panamá*, Panama City, 1975.

i.e., systems constituted by a considerable number of regions, the consistency of the targets becomes a problem in itself: that is, in such cases, consistency has a value *per se*.

Here a procedure will be discussed for determining on consistent lines two types of regional targets: regional-global targets (growth rate of regional product or income) and regional-sectoral targets (growth rate of a region's industrial sector, for example). It should be noted in passing that these are two different problems, inasmuch as the resolution of the first does not guarantee the resolution of the second.

A prior requisite is to point out that the only possible theoretical solution of the problem propounded is by way of a system of simultaneous equations such as was commented on in earlier pages in the context of the relation of regional planning to other forms of planning. As this is not feasible, in practice an iterative method is used in which national targets are treated as pivots of the method and never as an unalterable statistical datum.

The whole nature of the problem of determining regional targets (both global and sectoral) can be relatively simply established, as may be seen in the figure appended below.

On the one hand, we have (as input information) a global programme and on the other hand a multiregional system. The question is to bring about an optimum assignment from the national programme to the regional system so as to obtain (as output information) an interregional programme, i.e., a set of targets for all regions, such as will be consistent with the national global targets.

Once the idea of optimum is introduced into the analysis it becomes necessary to specify the criterion of optimality that will be applied. Generally speaking, these optimality criteria may be of the Paretian type (usual in neoclassical economic analysis) or may relate to minimization in the use of resources (usual in their turn in linear programming models). Here an optimality criterion of the latter type will be used.

Furthermore, the process of optimum assignment which is to be carried out is to some extent conditioned by a particular decisional mechanism in the regional system itself, which in the appended figure is termed the 'institutional framework'. The nature of this decisional system may correspond to a centralized system, to a semi-centralized system or to a decentralized system. Any one of these specific forms depends upon a variety of factors, including the size of the regional system itself in terms of the number of its component parts (regions). The smaller the number of regions (and the larger their size), the greater will be the relative importance of intra-regional aspects in comparison with interregional questions, and the greater too will be the propensity (or the pressure) in favour of a decentralized decision-making mechanism within the regional planning system. Here a centralized mechanism is assumed in the model which will be presented later. The three alternative degrees of centralization just noted will be considered in detail later on.

Of course, the specific objectives of each region in the system constitute another piece of input information in the optimum assignment process under review.

The regional disaggregation of the national programme is definitively affected through the use of some mathematical or econometric model. In

relation to the use of this model it will be essential to know, as indicated in the figure, its assumptions, its structure, its information requirements, its limitations and the nature of its results. There is also a feedback effect in the process. (See diagram 2.)

This general analytical framework once accepted, the next step is to refer in detail to the methods used for determining the regional-global targets and the regional-sectoral targets.

The problem of establishing growth targets for each of the regions in a multiregional system is exactly equivalent to the problem of finding a set of regional growth rates consistent with a given rate of overall growth. It could not be otherwise, since it would be of no practical use whatever to determine a certain amount of economic growth for several regions if the requisite of coherence is not met.

REGIONAL DISAGGREGATION OF NATIONAL PROGRAMMES
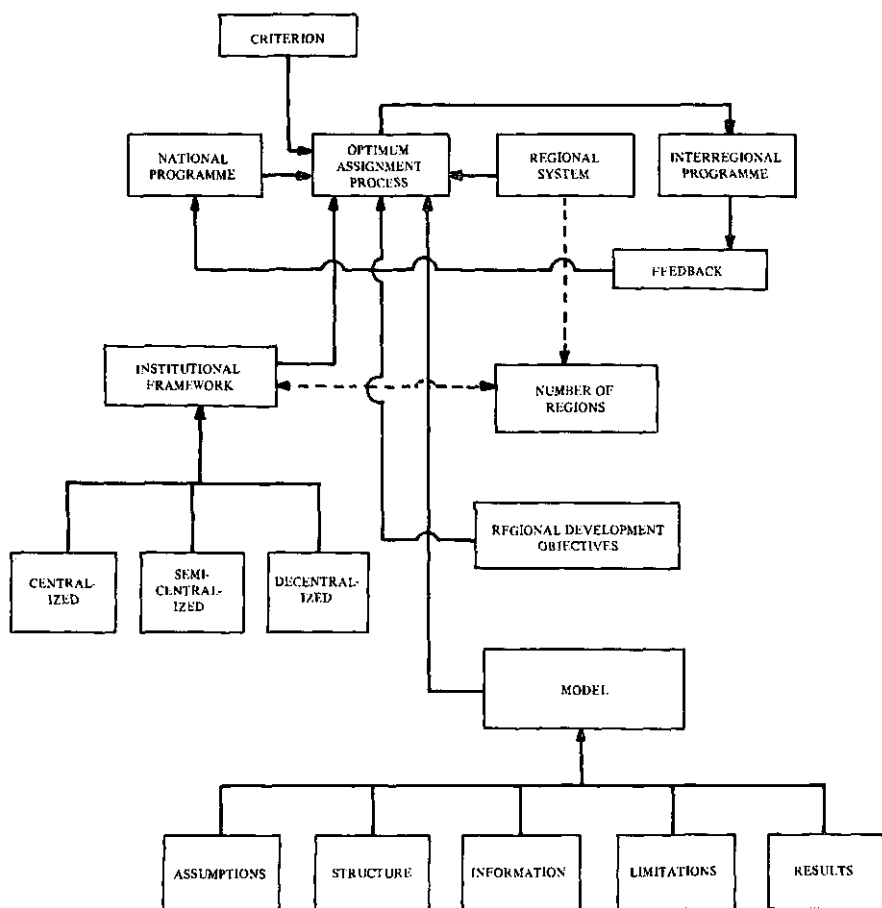
The general problem of fixing regional targets will be divided into two parts. First, given an overall growth rate for the whole economy, how the 'n' regional overall growth rates can be so determined that each of them is consistent with the national overall rate. Secondly, given the national sectoral growth rates and the regional overall rates, how the growth rates of each sector of activity in each region can be so established that they are all consistent.

With respect to the first part of the problem posed, a method will be used which presupposes the following hypotheses:

(a) In the first place, it is assumed that the various regions really do constitute a system in the sense that definite (although not necessarily known) functional relations exist between all the components of the system. For simplicity's sake, it is further assumed that all these functional relations between each region and the regional system can be synthetically represented by means of an index which relates each region's geographical product (or income) with the corresponding national concept. This index will be called the coefficient of regional participation;

(b) Secondly, it is assumed that the entire planning system formed by the global, sectoral and regional levels generates a coherent structure of action in the regional system. This is tantamount to assuming that the objectives have already been made compatible within the system;

(c) Thirdly, it is assumed that the population of each region is determined exogenously and that its territorial distribution does not alter as the result of the programme itself; that is, the population reacts to the plan incentives with a time-lag;

(d) Fourthly, it is assumed that the regional plan is designed in such a way that no-one is worse off as a result of its application. This is tantamount to imposing a restriction to the effect that in all regions the variation in the per capita product (or income) must always be positive, although it may be nil.

In accordance with the general scheme described above, the method of determining regional global growth rates can be discussed with reference to its component elements, as follows:

1. *Data*
   (a) Length of programming period
   (b) Number of regions
   (c) Present coefficients of regional participation
2. *Exogenous variables*
   (a) Global growth rate of the economy
   (b) (Estimated) growth of the population in each region
3. *Endogenous variables*
   (a) (Global) regional economic growth rates
4. *Control variables*
   (a) Future coefficients of regional participation.

Since it is recognized that a system exists and, furthermore, that the links between the component elements of the system can be represented by means of the "coefficients of participation", the implication is that the growth rate of any region can be related with the country's global growth rate, determined exogenously. In other words, given the national global rate and given the present and future coefficients of participation of a region, it is an elementary matter to

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calculate the corresponding regional global rates and *vice versa*. In other words, given any regional rate and provided the participation coefficients are known, it is possible to estimate (working upwards) a national global rate which is consistent with the given regional rate.

This relation can be established for each of the regions, and, therefore, it is possible to estimate as many national global rates (hypothetical, since the real rate is fixed) as there are regions in the system.

Let us then assume that the percentage increase in the population in each region of the system is known. While this is not a simple problem, there are methods of demographic analysis which, taking into account interregional migratory flows, may produce adequate estimates of such variations in the population over the programming period. The present coefficients of participation are obtained simply by dividing the gross geographical product (or, best of all, income) of each region by the corresponding national figure. To ensure that the results are not too much affected by particular conjunctures, it is preferable to take the average coefficients for a certain number of years.

The most difficult problem, however, consists in estimating the values of the future coefficients of regional participation. Generally speaking, the empirical evidence suggests that these coefficients are considerably stable through time, particularly in large multiregional systems. There are at least two major methodological alternatives for calculating their value. In the first place, the future situation of each individual region can be estimated by means of some simple econometric method. These estimates must ultimately be adjusted so as to fulfil the requisite that the sum of the participation coefficients must be equal to unity. An alternative method, more complex but at the same time more rewarding, consists in simultaneously estimating all the coefficients of participation for the regional system. Thus approached, the problem seems to lend itself particularly well to treatment by the use of Markovian processes.[35]

[35] Let us assume that for a given period it is possible to construct a square matrix whose dimension is given by the number of regions, and in which each element 'a_{ij}' indicates the amount of gross geographical product that in the initial state was generated in region "i" and in the final state was generated in region "j": that is, in which every element shows, so to speak, the interregional mobility of the gross geographical product. On the basis of this matrix P, a transitional matrix P* being defined as the quotient of the corresponding element in matrix P and the sum of the corresponding row in the same matrix. Consequently, each element 'a_{ij}*' in P* is interpreted as the probability that a unit of gross geographical product which was generated in region "i" in the initial state will be generated in region "j" in the final state. Accordingly, matrix P* can be considered an ergodic and stochastic matrix. In this case, the power of P* converges on a matrix T, in which each row is defined by a single probability vector 'v', all the elements in 'v' being positive and less than unity. Furthermore, this single probability vector satisfies the equation v. (P* − I) = 0, in which I is the unitary matrix and 0 is a zero vector.

According to a well-known Markovian chains theorem, the final state of the system (vector 'v' in this case) is independent of the situation of the system in the initial state and depends only upon its situation in the state 'n − 1'; this is an additional advantage of the method proposed. Vector 'v' can be calculated by means of a linear programming model.

For the short (or medium) term, the state of the system can be described in terms of the product of the initial distribution vector (the present structure of the 'p_i') and the

Let us for the moment assume that the vector of future participation coefficients is known.

Mathematically, the method can be formalized by means of the following model, which, it must be clearly understood, is not a growth model.

Let:

d_i = percentage of growth of the population of region 'i' in the period in question;

r_i = percentage of growth of the gross domestic product (GDP) of region 'i' over the same period;

p_i = participation coefficiente of region 'i' ($p_i = PGB_i/PGB$). The superscript '0' denotes the base period or year and the superscript 't' the final year;

e_i = percentaje of per capita increase in the gross domestic product of region 'i'.

In accordance with the assumptions on which the method is based, the following condition must be fulfilled:

$$r_i = d_i + e_i \tag{1}$$

in which 'e_i' may take any null or positive value.

Again, we have:

$$r_i = \frac{PGB_i^t - PGB_i^0}{PGB_i^0} \tag{2}$$

and by definition:

$$PGB_i^t = p_i^t \, PGB^t \tag{3}$$

therefore expression (2) may be written:

$$r_i = \frac{p_i^t \, PGB^t - PGB_i^0}{PGB_i^0} \tag{4}$$

$$r_i = p_i^t \frac{PGB^t}{PGB_i^0} - 1 \tag{5}$$

If (5) is introduced into (1) the result is that:

$$p_i^t \frac{PGB^t}{PGB_i^0} - 1 = d_i + e_i \tag{6}$$

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appropriate power of P*. In any case, the elements of 'v' are the 'p_i's defined above, i.e., the probable participation (over the short or long term) of region 'i' in the country's geographical product, or, from a different angle, the probability that one unit of geographical product will be generated in region 'i'.

or, after some adjustments:

$$PGB^t = \left(\frac{d_i + e_i + 1}{p_i^t} \right) \ PGB_i^0 \tag{7}$$

an expression which can be converted into:

$$\frac{PGB^t}{PGB^0} = \left(\frac{d_i + e_i + 1}{p_i^t} \right) \frac{PGB_i^0}{PGB^0} \tag{8}$$

If the quotient PBG^t/PGB^0 is termed 'y_i', and bearing in mind the definition of 'p_i^0', the following equation is arrived at:

$$y_i = \left(\frac{d_i + e_i + 1}{p_i^t} \right) \ p_i^0 \tag{9}$$

Application of the above equation to each of the regions makes it possible to calculate a whole set of values for 'y_i'. Each value of 'y_i' represents the percentage of growth (and therefore the existence of an implicit growth rate) of the total gross domestic product which is consistent with: (i) a specific increase in the population; (ii) a specific change in the nation/region relation and (iii) a given target for the increase in the regional per capita product. Consequently as many values for 'y_i' will exist as there are regions in the system.

Let us now assume that the calculation expressed in equation (9) is made for $e_i = 0$ $(i = 1, 2, \ldots, n)$. Once again a set of values will be obtained for 'y_i $(e_i = o)$'. One of these values will normally be the highest in the series for the region whose combination of variables 'd_j', 'p_j^0' and 'p_j^t' generates the highest (hypothetical) national growth percentage. This region 'j' may be called the 'critical region' of the system. A first consistency test may then be carried out by comparing the real global growth percentage (i.e., the percentage established in the global plan) with the percentage obtained on the basis of the so-called critical region. If 'y' is the growth percentage fixed for the gross domestic product by the global planning subsystem, the following condition must then be fulfilled:

$$y \geqslant y_j \ (e_j = 0) \tag{10}$$

If the foregoing condition is not met it is not possible to fulfil the initial conditions of the model and the general problem of programming proves inconsistent, so that some side adjustments must be made. If condition (10) is fulfilled, the implication is that even in the 'critical region' an improvement can be obtained in the per capita product (i.e., a positive e_j).

Reverting now to equation (9) and expressing the quotient p_i^0/p_i^t as 'a_i', we may make the following generalization. In a system comprising two regions, the consistency of the global target (percentage or rate) with the regional targets will require that:

$$\left(\frac{d_i + e_i + 1}{p_i^f}\right) \quad p_i^o = \left(\frac{d_j + e_j + 1}{p_j^f}\right) \quad p_j^o \tag{11}$$

or, in a more simplified form:

$$a_i \cdot e_i - a_j \cdot e_j = y_j^* - y_i^* \tag{12}$$

In equation (12) y_j^* is the same as y_j $(e_j = 0)$, i.e., y_j^* is the global growth percentage which is obtained on the basis of the data for region 'j' when $e_j = 0$; y_i^* can be interpreted in the same way.

Equation (12) must hold good for any pair of regions, so that if region 'j' is the 'critical region', in accordance with the definition given, we can write:

$$e_i = \frac{a_j}{a_i} \, e_j + \frac{y_j^* - y_i^*}{a_i} \tag{13}$$

an equation in which both the slope and the free term are always positive. Equation (13) can be regarded as a general consistency equation. It shows that given a rate (or percentage) of overall growth (through the global plan) which is implicit in the value of e_j, it is possible to calculate for each region the per capita increase in the regional geographical product (e_i) consistently in relation to the entire system.

The most important conclusion to be drawn from the foregoing analysis is that if the global national rate is a datum (and therefore immutable) for regional planning, in relation to a given (planned) set of participation coefficients, there is no degree of freedom for determining the set of regional rates in an internally consistent manner. If the global rate is not a datum, for each set of participation coefficients there is one single degree of freedom for establishing the set of regional global rates. These conclusions can be visualized by reference to diagram 3.

Quadrant IV in the preceding figure is the simplest to interpret. What it shows is merely an elementary version of Domar's model. The negative horizontal axis shows investment as a proportion of the country's gross domestic product, while the positive vertical axis shows the global rates of growth (rg). Given a technology (capital/product coefficient), the curve of the quadrant is simply an aggregate production function.

Quadrant I shows, on the vertical axis, the different values of the national overall growth rate (as proposed by the global planning subsystem); on the horizontal axis are shown the values for the national hypothetical-global rate, which are determined on the basis of each region. This corresponds to what in the model is called 'y_i'. If the system generates an internally consistent solution, the two rates must ultimately coincide and their value must be found on the bisector of the quadrant.

In quadrant II is shown one of the several curves that can be constructed on the basis of equation (13). Naturally there will be as many similar curves as there are regions in the system.

Let us now look at the figure clockwise.

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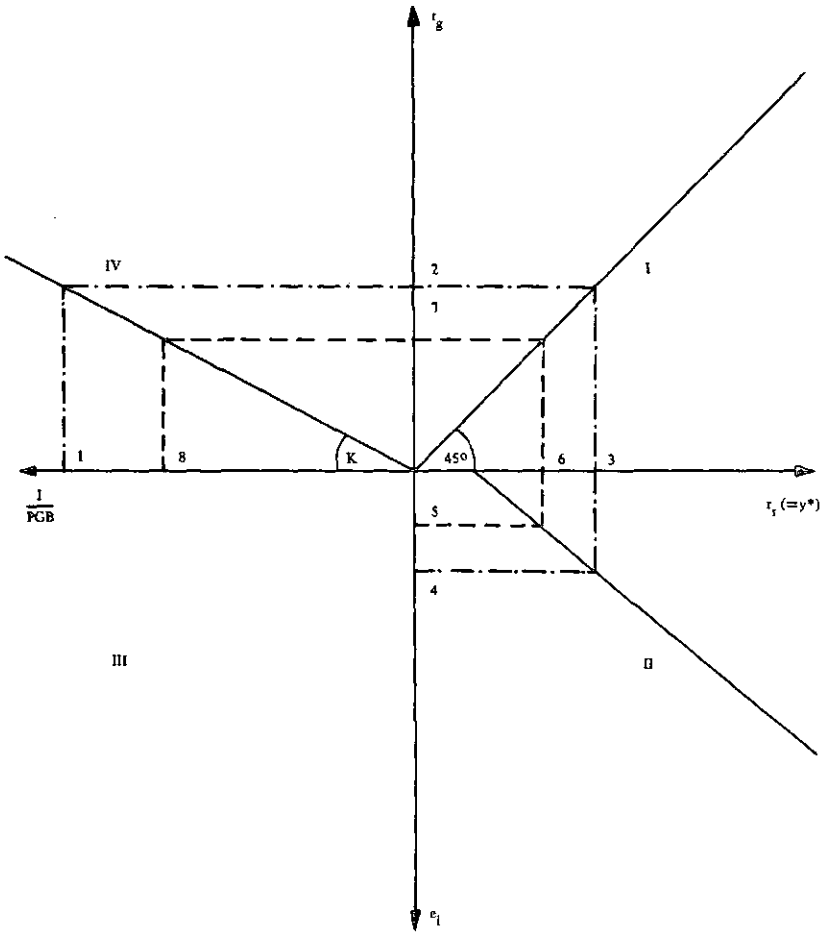
The global planning subsystem, in tackling the task of determining the maximum overall growth rate, establishes a certain investment-product coefficient (underlying this coefficient are the internal and external saving restrictions). Once relative investment has been determined, and given the technology implicit in its turn in capital coefficient 'k', the ensuring step is the establishment of the maximum overall rate (point 2 on axis 'r_g'). By virtue of the consistency that should exist in the system, this rate can be symmetrically reproduced at point 3 on axis 'r_r'. In turn, the rate 'y_i' corresponding to point 3 determines point 4 on axis 'e_i', i.e., it automatically establishes the level of the

increase in the per capita product in region 'i' and in all the other regions for which the curves are not shown in the figure.

This exercise demonstrates how, in a consistent planning system, purely global considerations (investment rate) determine the entire set of regional growth rates.

If the same type of exercise is carried out counter-clockwise, one can see how purely regional considerations involve judgements on national variables, control of which is not of course the province of regional planners. Let us suppose that regional planners establish the increase in the per capita product of region 'i' at a level given by point 5 on axis 'e_i'. This point (through equation (13)) determines an overall rate given by point 6 and by point 7: a rate which in its turn implies investment requirements such as those indicated by point 8.

From the foregoing analysis several conclusions can be drawn.

The first of these relates to the imperative need for the global and regional subsystems to work in conjunction. Otherwise, it is clearly almost impossible to obtain a consistent solution for the general planning problem.

The second conclusion draws attention to the fact that if the overall rate is fixed and if the regional results deriving from it do not satisfy the aspirations or needs of regional planners, the situation can be improved only by a shift of the curve in quadrant IV which is a production function. A shift of this curve towards the vertical axis makes it possible for a higher overall rate to be attained with the same volume of investment. But such a movement implies a change in technology which as a general rule will not be achievable in the short run.

The last conclusion to be drawn from the analysis is that it may perhaps be more reasonable to establish regional global targets as bounded targets rather than exact figures. In this case, the possibilities of inconsistency are considerably reduced.

Let us now examine the following numerical example to clarify the *modus operandi* of the proposed method. Table 9 presents the basic data for a country divided into five regions.

Table 9

Regions 'i'	Coefficient of regional participation		Percentage increase in population d_i
	Present p_i^o	Future p_i^t	
1	0.017	0.023	41.0
2	0.147	0.148	24.7
3	0.655	0.627	37.7
4	0.163	0.178	51.6
5	0.018	0.024	73.1

If equation (9) is now applied, the following series of values is obtained for $e_i = 0$:

$$y_1^* = 4.2\%; y_2^* = 23.6\%; y_3^* = 43.8\%; y_4^* = 38.7\%; y_5^* = 29.8\%$$

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In this case the 'critical region' is region 3, since in view of its conditions in respect both of participation and of population growth, a national growth rate of 43.8% would be required to make the solution consistent. In this example, the real percentage increase programmed for the global gross domestic product is 93.14%. If in equation (9) $y = 1.9314$ and the rest of the data for region 3 are known, it is possible to calculate the value of 'e_j' which in this case works out as equal to 0.471, i.e., a per capita increase of 47.1% in the regional gross domestic product. This is sufficient for calculating the per capita increases in each region's gross domestic product by the use of equation (13). For example, for region 1 the following results would be obtained:

$$e_1 = \frac{a_3}{a_1} \cdot e_3 + \frac{y_3^* - y_1^*}{a_1}$$

$$e_1 = \frac{1.044}{0.739} \cdot 0.471 + \frac{0.438 - 0.042}{0.739}$$

$$e_1 = 1.202 \ (120.2\%)$$

Similarly, the values for the rest are: $e_2 = 0.698$; $e_4 = 0.593$; and $e_5 = 0.843$.

The gross percentages of regional economic growth then work out, according to equation (1), as follows:

$$r_1 = 41.0 + 120.2 = 161.2\%$$
$$r_2 = 24.7 + 69.8 = 94.5\%$$
$$r_3 = 37.7 + 47.1 = 84.8\%$$
$$r_4 = 51.6 + 59.3 = 110.9\%$$
$$r_5 = 73.1 + 84.3 = 157.4\%$$

The consistency of these regional percentages of overall growth with the national overall growth percentage can easily be checked. It is commonly accepted that the rate (or in this case the percentage) of national growth can be expressed as a convex linear combination of the regional rates. That is, in this case, the sum of the regional percentages weighted by the initial values of the participation coefficients is exactly the same as the national growth percentage.

It is not enough, however, to determine the regional global targets. The planning process must reach more specific levels which really guide the action of both private and public decision-makers.

Consequently, it is also necessary to determine each of the regional sectoral targets, which, obviously, must be consistent with the national targets for each sector.

To resolve the problem recourse may be had to various techniques. Here discussion will be focussed on the so-called 'Rotterdam model' worked out by Tinbergen and his colleagues at the Rotterdam Institute of Economics. (L. Mennes, J. Tinbergen, G. Waardenburg, 1969.)

In keeping with the general scheme of analysis presented in earlier pages, the Rotterdam model can be discussed on the following lines.

1. *Structure.* As far as the nature of the model is concerned, this is a linear programming model using the semi-input-output method. It is also static and short-term.

2. *Assumptions.* The main hypotheses on which the construction of the model is based are structural (tied to the nature of the model itself) and contingent (imposed by the empirical conditions in which the model is applied). Briefly, these hypotheses are as follows:

(a) Homogenous linear production functions for each sector of production included in the model;

(b) Implicit consideration of the costs of transport of goods and services through a non-functional classification of activities. Thus three types of economic sectors are distinguished: regional sectors (those whose products are mobile only within each region), national sectors (mobility throughout the country), and international sectors (the remainder);

(c) The regional population is given exogenously and its spatial distribution is not affected by the programme itself;

(d) Full utilization of installed capacity;

(e) Constant prices;

(f) Immediately maturing investment;

(g) Existence of a single scarce factor (capital in the example under discussion) and use of the marginal capital-output coefficient (constant) to measure the cost of the resource in short supply;

(h) Equality of production functions for each regional sector in each of the regions;

(i) Interregional equality of the final demand coefficients corresponding to the regional sectors.

3. *Input information.* The information requirements posed by a model of this kind are considerable and, moreover, constitute the chief stumblingblock to its application.

(a) In the first place, this regional disaggregation model uses as input the information produced by the global and sectoral programming models, which are assumed to be previously resolved. In particular, this information relates to:

(i) growth of the country's total gross product during the period in question;

(ii) growth of the product of each of the national and international sectors;

(iii) (exogenous) growth of each international sector's exports;

(iv) volume of production and volume of investment in certain investment projects whose location is predetermined (expansion of copper mining, for example).

(b) Secondly, the model entails the use of certain parameters and coefficients which represent the information demand that is hardest to meet. These parameters are technological in some cases and in others behavioural. The following are the most important:

(i) technical input-output coefficients interlinking all sectors in each region;

(ii) coefficients of final demand for each regional sector;

(iii)   net product coefficients for all sectors in each region;

(iv)   marginal capital/output coefficients per sector and region.

(c) Thirdly, the model necessitates (at least in one of its possible versions) the information previously generated with respect to the value of each region's global targets.

4.   *Limitations of the model.* The principal limitations of this model emanate both from its own linear structure and from information difficulties. Thus, for example, the linear nature of the model tends to produce solutions with a high degree of geographical concentration owing to disregard of scale phenomena (diminishing returns). This problem can be controlled to some extent, however, by the introduction of some additional restrictions. Moreover, owing to the fact that all restrictions on the objective function are presented in the model as equalities, from the computational standpoint this implies a high degree of rigidity in the determination of the optimal solution.

From another point of view, the chief problem in the use of this version of the model lies in the difficulty of obtaining sound estimates of the regional/ sectoral capital-output coefficients.

5.   *Results of the model.* The final product or output information of the model can be envisaged as a matrix in which the rows represent regions and the columns sectors (or *vice versa),* and in which each box shows the increase in the sector's gross production in each region. Parallelly, the boxes can show the investment required to sustain this increase in production in each sector located in each region. Furthermore, other results can be obtained indirectly in terms of employment, transport flows, etc.

In addition, through comparison of different solutions (reached by intro- ducing different sets of restrictions), the model can be used to compare and evaluate different strategical alternatives in respect of territorial concentration.

An example will give a fuller idea of the structure and operation of the model described. Let us assume a multiregional system composed of three regions and a multisectoral system composed of five sectors. Among these sectors, let it be assumed that sectors 1 and 2 are regional sectors, sectors 3 and 4 national and sector 5 international.

Here, as in any linear programming model, there is an objective function, the nature of which must be defined and which constitutes the criterion for determining when an optimum solution has been reached. The objective func- tion in this case will be postulated as minimization of use of capital (or it might be, alternatively, maximization of employment, or some combination of the two objectives). We then have:

$$\text{F.O. Min } Z = {}^{1}k^{1}\ {}^{1}x^{1} + {}^{1}k^{2}\ {}^{1}x^{2} + {}^{1}k^{3}\ {}^{1}x^{3} + \dots\ {}^{3}k^{5}\ {}^{3}x^{5}$$

in which:

${}^{r}k^{s}$ is the marginal capital-output coefficient of sector 's' in region 'r'

${}^{r}x^{s}$ is the increase in gross production in sector 's' in region 'r'.

The objective function is subject to a series of side constraints which fall into the following categories:

Constraints for regional sectors. Constraints for regional sectors are expressed as equalities, one for each sector in each region. Each of them indicates that the gross production increment in each sector (in each region) must be exactly equal to the increment in (regional) intermediate demand plus the increment in (regional) final demand. This is so because of the very definition of the sectors, inasmuch as, in this case, products cannot be exported or imported from one region to another. Since, moreover, the model is static, accumulation of stocks cannot exist either. Hence these sectors exactly balance supply and demand within the regional limits. Thus, in the example propounded we have:

Region 1

$$a_{11}\ {}^1x^1 + a_{12}\ {}^1x^2 + a_{13}\ {}^1x^3 + a_{14}\ {}^1x^4 + a_{15}\ {}^1x^5 + c_1\ y_1 = {}^1x^1$$

$$a_{21}\ {}^1x^1 + a_{22}\ {}^1x^2 + \ldots \qquad\qquad\qquad + c_2\ y_1 = {}^1x^2$$

Region 2

$$a_{11}\ {}^2x^1 + a_{12}\ {}^2x^2 + a_{13}\ {}^2x^3 + a_{14}\ {}^2x^4 + a_{15}\ {}^2x^5 + c_1\ y_2 = {}^2x^1$$

$$a_{21}\ {}^2x^1 + \ldots \qquad\qquad\qquad\qquad\qquad + c_2\ y_2 = {}^2x^2$$

Region 3

$$a_{11}\ {}^3x^1 + a_{12}\ {}^3x^2 + a_{13}\ {}^3x^3 + a_{14}\ {}^3x^4 + a_{15}\ {}^3x^5 + c_1\ y_3 = {}^3x^1$$

$$a_{21}\ {}^3x^1 + \ldots \qquad\qquad\qquad\qquad\qquad + c_2\ y_3 = {}^3x^2$$

The following is the meaning of the symbols in the foregoing equations:

a_{ij} is the technical coefficient of input-output between sector 'i' and 'j'. These coefficients are assumed to be the same in all regions;

c_s is the coefficient of final demand for the products of sector 's'. It is deduced from the national input-output matrix and is assumed to be the same for all regions;

${}^rx^s$ is the increase in gross production of sector 's' in region 'r'.

Constraints for national sectors. Given that the targets for national sectors are data determined exogenously in relation to the regional model, constraints for these sectors are established as equalities. Each of these equalities (one for each national sector) expresses the necessity for the increase in the sector's gross production to be exactly equal to the sum of the increases in the sector's gross production in each of the regions. That is, given the sectoral target, all that the regional planner can do through the model is to express an opinion as to the location of the sector. Consequently we have in the example under consideration:

$$^1x^3 + {}^2x^3 + {}^3x^3 = x^3$$

$$^1x^4 + {}^2x^4 + {}^3x^4 = x^4$$

Constraints for international sectors. The constraints for international sectors are established on the basis of considerations similar to those put forward in relation to the national sectors.

The targets for the international sectors are also exogenously determined. In this case, however, international trade must be taken into account, in terms of both exports and imports. The increase in exports is projected exogenously as a function of world market trends. The constraints are represented by the equality between the increase in the sector's gross production and the sum of the sectoral increases in each region, minus the variation in imports and plus the increase in exports. In the example proposed we have:

$$^1x^5 + {}^2x^5 + {}^3x^5 + e^5 - m^5 = x^5$$

in which:

e^5 represents the increase in exports in sector 5
m^5 represents the increase in imports in sector 5

Regional constraints. The object of the regional constraints is to guarantee that the sum of the increases in the net product of all sectors located in each region is exactly equal to the income increment propounded as a regional overall target. There will, of course, be a constraint of this type for every region. This means that in the example on which we are working we shall have:

$$a_{01} \, {}^1x^1 + a_{02} \, {}^1x^2 + a_{03} \, {}^1x^3 + a_{04} \, {}^1x^4 + a_{05} \, {}^1x^5 = y_1$$

$$a_{01} \, {}^2x^1 + a_{02} \, {}^2x^2 + a_{03} \, {}^2x^3 + a_{04} \, {}^2x^4 + a_{05} \, {}^2x^5 = y_2$$

$$a_{01} \, {}^3x^1 + a_{02} \, {}^3x^2 + a_{03} \, {}^3x^3 + a_{04} \, {}^3x^4 + a_{05} \, {}^3x^5 = y_3$$

in which:

a_{01} is the coefficient of the net product of sector 'i' as deduced from the input-output matrix.

Additional constraints. Additional constraints may be used in order to take into account certain specific projects whose location is predetermined or to prevent a solution that implies overconcentration in certain regions (for example, a restriction can be introduced specifying that no $^rx^s$ can exceed 100% of the original value of regional-sectoral production). Of course, all the endogenous variables in the model will have to be subject to the plus-sign restriction typical of linear programming, i.e., they can only assume positive values.

Consequently, the outcome of the model will be a set of values of which each indicates the increase in gross production in each sector of activity in each region in the system. More detailed analyses of the Rotterdam model can be

found, from the theoretical standpoint, in the work of Mennes, Tinbergen and Waardenburg, and from the point of view of its application to countries, in the studies by Carrillo-Arronte (1968) on Mexico and Boisier (1968) on Chile.[36]

Obviously, the results of an exercise like the foregoing must not be taken as articles of faith. The planner must never lose sight of the fact that economic models are mainly useful for teaching one to think in coherent terms (in relation to the variables involved) and to detect the chief flaws in the information system. From this point of view, the usefulness of a model like that presented is obvious. It permits identification of the principal inconsistencies in strategic and political propositions, and provides an appropriate framework for the organization of statistical information.

While the preceding analysis has presupposed the use of concepts such as the regional product or regional income on the basis of which to specify regional growth targets, this must be understood only as one possible option in a wider range of alternatives. Thus, for example, employment might constitute a more appropriate concept for the definition of regional targets, not only by virtue of the social content of employment but also because employment figures are sometimes easier to obtain and statistically more reliable.

From this standpoint, the same model presented above may be revised so as to establish maximization of employment as a criterion function.

Lastly, it must also be pointed out that the Rotterdam model is not of course the only one that could be used in this context. The specialized literature records a fairly numerous group of models for regional growth and regional allocation of investment, some of which have passed the test of empirical trial, although most are still on the level of theoretical propositions.

Once the regional sectoral targets have been quantified, the use of appropriate parameters (capital coefficients) will make it possible to obtain an estimate of the gross investment that will be needed in each region. This investment can be broken down by institutional origin (public and private sectors). The share of public investment will constitute an extremely valuable datum for regionalizing the public sector's programme budget and modifying the structure of the financial apparatus so as to adapt it to regional requirements. The estimated share of private investment will also be a useful indicator for the various actors in the fields of production and finance in the private sector. It must not be forgotten that one of the chief functions of planning is to generate information which will help to rationalize the adoption of decisions by the different economic and social agents.

It is both possible and needful to carry the planning process still farther. The amounts of investment allocated to each region must find their concrete expression in programmes in a portfolio of regional projects. The identification of projects at the regional level is a stage in the formulation of the regional plan, in which, perhaps more than in any other, it will be possible to take full advantage of the participation of organized local groups and mobilize the region's positive energies in pursuit of locally beneficial projects.

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[36] See A. Kuklinski (ed.), *Regional Disaggregation of National Policies and Planning*, The Hague, Mouton, 1974.

The identification (not necessarily the evaluation) of regional projects gives rise to one of the basic tasks of intra-regional planning, and becomes one of the most important contributions that each region can make to the work of nation-building.

No one knows the region as well as its inhabitants, among whom are the local planners, and no one has so clear a perception of its problems and above all its potential as the people who live in it. Consequently, the structuration of the portfolio of projects is essentially the responsibility of the regions themselves, and in this task no idea should be despised, however small and insignificant it may appear.

Similarly, as will be discussed later, if the regions themselves identify their investment projects, it will be much easier subsequently to link the regional savings potential to the execution of these projects. It will even be possible to consider non-traditional forms of ownership and administration in some cases.

An elementary example of practical experimentation with the Rotterdam model

As was stated in earlier pages, there are few examples of practical application of the Rotterdam model; among them perhaps the one to which most interest atttaches as a test of the model is the work done by Carrillo-Arronte in Mexico to which reference has already been made. Unfortunately the experiment carried out in Chile with several versions of the model has not been continuous throughout time, despite the considerable efforts made at the close of the 1960s.

In order to give a more concrete picture both of the potentialities and of the difficulties implicit in attempting practical work based on the model, some of the results obtained in Chile with the first and most elementary application of this instrument are summarized below. Needless to say, the purpose of this experiment was not to translate the results into immediate measures of regional economic policy, but rather to become gradually familiar with what is certainly a complex tool and to identify the chief problems of methodology and information. With this reservation, then, there should be nothing surprising in the distinctly elementary level at which the exercise is carried out. On the basis of this original handling of the model continued attempts to perfect its application were made, until finally a model with 16 sectors and 11 regions was used, albeit the results are not shown here.

The period to which the following example relates covers the years 1967-1971.

The first problem to be resolved in the implementation of the model is the definition of sectors. The basic information for that purpose is provided by the national input-output table, with a matrix comprising 54 x 54 sectors. Ideally, this should be the number of sectors included in the model. A considerable degree of aggregation was necessary, however, since the number of sectors incorporated depends directly upon the quantity of capital coefficients available. At the time when the work was begun, reliable information was available on only nine sectoral capital coefficients, so that the sectors were limited to that number (Agriculture and Fisheries; Mining; Industry; Construction; Ownership of Dwellings; Electricity, Gas and Water; Trade and Finance; Transport; and, lastly, Services, Public Administration and Defence); these closely correspond to the classification by sectors used in the system of National Accounts.

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In view of the relative shortage of information, it did not seem advisable in the initial stage to group these nine sectors under the three heads mentioned before (regional, national and international); the classification used simply distinguished between 'regional' and 'national' sectors, as can be seen in Table 10.

As regards Construction and Ownership of Dwellings, there can be no doubt that they are, by their very nature, 'regional' sectors. The reader may justifiably wonder whether the same can be said of transport and services. Clearly, the classification of these as regional sectors is an undesirable by-product of the aggregation of the input-output table. The regional-national-international classification is obviously all the better, the more disaggregated is the information. Nevertheless, if the internal composition of the product of the two sectors is carefully analysed, the classification adopted does not seem over-bold, particularly with regard to transport. In any event, it must be borne in mind that this is a defect of the model, in its present stage of implementation.

Table 10

CLASSIFICATION OF SECTORS

Sector	Category	Number in the Model
Agriculture	National	1
Mining	National	2
Industry	National	3
Construction	Regional	4
Electricity, gas, water	National	5
Trade and finance	National	6
Ownership of dwellings	Regional	7
Transport	Regional	8
Services, etc.	Regional	9

As has been pointed out, closely linked to the problem of the definition of sectors is the question of the availability of capital coefficients per sector-region. In principle, national coefficients were available for each of the nine sectors. To be precise, what was available was the probable range of variations of these coefficients, estimated for the period 1962-1966 by the application of different hypotheses relating to the lead time of investment. In the first version of the model (the results of which are discussed here) the lowest variations of the coefficients were used, except in some sectors with specific locations. Consequently, the total investment given by the model is probably —in this version— underestimated.

As already pointed out, the coefficients of the variables of the objective function are not national sectoral coefficients of capital, but capital coefficients per sector-region. To estimate these values two methods were proposed, which were ultimately recast in the form of a single procedure, as follows.

It was assumed to begin with that the sectoral capital coefficients were the same from one region to another, except for mining and for agriculture in some cases. Given the locational specificity of mining, it was assumed that in those regions where no mineral resources exist it is impossible to expand mining

activity and that the sector could be allocated an extremely high coefficient (10 000 as against an average national value of 1.5), in order to be sure that the solution should not include these activities.

For the remaining coefficients a sensitivity analysis was designed, through a sub-routine of the Mathematical Programming System (MPS). In relation to those coefficients that showed a small range of variation (so that they could easily modify the optimal solution) a detailed study was subsequently carried out with a view to estimating regional deviations from the regional sectoral value. Once these estimates were to hand the entire model was reprocessed.

The following were the values for the sectoral product-capital coefficient, which served as a starting-point for the analysis: Agriculture (4.0); Mining (1.5); Industry (1.5); Construction (1.0); Electricity, Gas and Water (9.0); Trade and Finance (0.2); Ownership of Dwellings (15.0); Transport (6.0); and Services, (2.0).

The foregoing analysis is undoubtedly the most difficult part of the implementation of the model and is to some extent of a subjective character.

The sectoral targets constitute, as stated above, exogenous variables whose values were fixed in the sectoral plan.

Targets for 1971 were expressed in terms of each sector's gross domestic product; since in the model these targets have to be specified in terms of the gross value of production, it was necessary to assume that the percentage of growth (1967-1971) of the sectoral gross domestic product is equal to the percentage of growth of the gross value of production (applied to 1966 data). This is tantamount to assuming that no technological changes of any importance will come about in the period; since the period is relatively short, this is not a risky hypothesis.

Increases in the gross value of production and percentages of growth are shown in table 11 for the national sectors and for the period 1967-1971.

Table 11

Sector	Δ GVP (1967-1971) (Millions of escudos at 1965 prices)	Percentage of growth 1967-1971
Agriculture (1)	427.0	17.0
Mining (2)	1 204.0	45.2
Industry (3)	3 063.0	26.2
Electricity, gas and water (5)	165.0	31.1
Trade and finance (6)	827.0	15.8

It was stated earlier that an aggregation of the input-output matrix had to be carried out, reducing the number of sectors to nine. From this reduced matrix the technical coefficients for the regional sectors were calculated. Table 12 shows the value of these coefficients, which are assumed to be the same for all regions.

From the reduced matrix information was also deduced respecting the coefficients of final demand for the regional sectors; these coefficients too are assumed to be the same for all regions.

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Table 12

TECHNICAL INPUT-OUTPUT COEFFICIENTS

Coefficient	Value	Coefficient	Value	Coefficient	Value
a_{41}	–	a_{74}	–	a_{87}	–
a_{42}	–	a_{75}	–	a_{88}	0.12629
a_{43}	–	a_{76}	–	a_{89}	0.01231
a_{44}	–	a_{77}	–	a_{91}	–
a_{45}	0.00668	a_{78}	–	a_{92}	0.01106
a_{46}	0.00376	a_{79}	–	a_{93}	0.00224
a_{47}	0.22774	a_{81}	0.05539	a_{94}	0.01763
a_{48}	0.00405	a_{82}	0.05876	a_{95}	0.02355
a_{49}	0.01411	a_{83}	0.02561	a_{96}	0.01688
a_{71}	–	a_{84}	0.01979	a_{97}	–
a_{72}	–	a_{85}	0.01869	a_{98}	0.02650
a_{73}	–	a_{86}	0.02492	a_{99}	0.01451

In order to calculate them the total figure for sales to final demand in each regional sector was divided by the country's national income (figures for 1962 in both cases). Total sales to final demand in each regional sector were as shown in table 13.

The second area of definitions and information for the model is given by regional considerations. The first problem to be resolved is the definition of regions. In this case, obviously, use was made of the regionalization established by the National Planning Office (Oficina de Planificación Nacional — ODEPLAN), which divides the territory into the following eleven regions:

Regions	Provinces included	Number in the model
I	Tarapacá	1
II	Antofagasta	2
III	Atacama-Coquimbo	3
IV	Valparaíso-Aconcagua	4
Metropolitan Area	Santiago	5
V	O'Higgins-Colchagua	6
VI	Curicó-Talca-Maule-Linares	7
VII	Ñuble-Concepción-Bío-Bío-Arauco-Malleco	8
VIII	Cautín-Valdivia-Osorno	9
IX	Llanquihue-Chiloé-Aysén	10
X	Magallanes	11

Table 13

Sector	Sales to final demand (millions of escudos at 1962 prices)	National income (millions of escudos at 1962 prices)	Coefficients c_i	Value
Construction	455 243	4 503 000	c_4	0.10109
Ownership of dwellings	406 799	4 503 000	c_7	0.09034
Transport	209 642	4 503 000	c_8	0.04656
Services	852 574	4 503 000	c_9	0.18933

For efficient quantitative programming, eleven regions is probably a number rather higher than the optimum figure. It seemed preferable, however, to keep to the existing partition for the moment, without ruling out the possibility of aggregation in the future.

The main problem in this context has to do with the establishment of regional targets. In general, the procedure employed can only be described as a rough approximation to the ideal solution.

In the first place, the available information is not as satisfactory as sectoral information. This is due to methodological and organizational problems which affect the time-lag with which the information comes to hand. For the year 1965 an estimate of the regional gross domestic product is available which makes it possible to obtain a pretty accurate picture of the relative interregional distribution of the gross domestic product. In accordance with the methodology used in the calculation of these figures, it was assumed that the country's gross domestic product in 1966 showed the same interregional distribution as in the preceding year. Obviously this hypothesis is to some extent unrealistic: to overestimate a priori the changes in structure that may occur in so short a period of time.

While estimating the regional gross domestic product for the year 1966 is a delicate process, it is at bottom a relatively simple question compared with the establishment of growth rates by regions. For this purpose the following data were available: (i) the overall growth rate programmed for the country; (ii) the objectives of regional development policy; and (iii) the specific development projects which were already underway and of which the location was determined.

For the five-year period 1967-1971 an average annual growth rate of 5% was postulated for the country's gross domestic product. The regional rates had to be adjusted to the said overall rate, at least in this version of the model.

Bearing in mind the major industrial expansion projects which had a predetermined location and the overall objectives of a medium-term regional development policy (mainly to slow down the growth of the Metropolitan Area and at the same time create poles of growth to deconcentrate economic activity and give dynamic impetus to the regions), it was possible to estimate certain growth rates for all regions. These rates are shown in table 14.

As can be seen, the effort proposed implies a drastic change in the historical trend.

Table 14

Region	Annual growth rate 1967-1971	Cumulative annual rate 1961-1965	Region	Annual growth rate 1967-1971	Cumulative annual rate 1961-1965
1	5.5	18.4	6	8.0	1.6
2	7.0	3.7	7	4.5	1.8
3	7.5	9.3	8	7.0	2.5
4	4.5	4.1	9	3.5	3.5
			10	4.0	3.3
5	3.4	7.4	11	6.0	5.7

With these programmed rates, the increases in the regional gross domestic product during the period 1967-1971 are shown in table 15.

The foregoing growth rates are compatible with the overall rates, and this compatibility can be checked by means of the following expression:

$$r = \overline{e} \cdot \overline{s}$$

in which $\overline{e}$ is the vector of (1 x 11) elements, each element being the elasticity of the country's gross domestic product in relation to the regional gross domestic product, and $\overline{s}$ is a vector of (11 x 1) elements, each element being the programmed regional rate, while r is the overall growth rate. Of course the above expression also implies that in absolute values, the sum of the sectoral targets is equal to the sum of the regional targets.

Table 15

Region	Δ regional gross domestic product 1967-1971	Region	Δ regional gross domestic product 1967-1971
1	123.67	6	502.92
2	490.96	7	198.07
3	564.61	8	895.52
4	449.53	9	223.71
		10	107.93
5	1 135.37	11	106.21

Note: Figures in millions of escudos at 1965 prices.

It was also possible to obtain a highly provisional estimate of the additional income (to maintain the National Accounts nomenclature) of each of the regions, for the year 1966. It must be pointed out that this estimate should be regarded as methodologically weak, but there is no prospect of improving it over the short term. The assumption was that the income in question would increase at the same pace as the regional gross domestic product, a hypothesis which implies, inter alia, keeping interregional payments flows stable. The income increment in each region having been ascertained, then, the increase in final

demand was calculated for each regional sector. The pertinent figures are shown below.

Let $^r d^h$ be the increase in final demand corresponding to sector $\underline{h}$ in region r. We then have (figures in millions of escudos at 1965 prices):

1_d4	$=$	10.31	2_d4	$=$	39.31	3_d4	$=$	49.31
1_d7	$=$	9.22	2_d7	$=$	35.13	3_d7	$=$	44.07
1_d8	$=$	4.75	2_d8	$=$	18.10	3_d8	$=$	22.71
1_d9	$=$	19.32	2_d9	$=$	73.62	3_d9	$=$	92.36
4_d4	$=$	32.45	5_d4	$=$	89.32	6_d4	$=$	41.94
4_d7	$=$	29.00	5_d7	$=$	79.83	6_d7	$=$	37.48
4_d8	$=$	14.94	5_d8	$=$	41.14	6_d8	$=$	19.32
4_d9	$=$	60.77	5_d9	$=$	167.29	6_d9	$=$	78.55
7_d4	$=$	16.22	8_d4	$=$	77.13	9_d4	$=$	19.11
7_d7	$=$	14.49	8_d7	$=$	68.93	9_d7	$=$	17.18
7_d8	$=$	7.47	8_d8	$=$	35.52	9_d8	$=$	8.80
7_d9	$=$	30.37	8_d9	$=$	144.46	9_d9	$=$	35.79
10_d4	$=$	9.44	11_d4	$=$	9.00			
10_d7	$=$	8.43	11_d7	$=$	8.04			
10_d8	$=$	4.35	11_d8	$=$	4.14			
10_d9	$=$	17.68	11_d9	$=$	16.85			

Lastly, the net output coefficients were calculated for each sector, also on the basis of the aggregated input-output matrix. The values are as follows:

a_{01}	$=$	0.58235	a_{04}	$=$	0.53853	a_{07}	$=$	0.74481
a_{02}	$=$	0.79602	a_{05}	$=$	0.63278	a_{08}	$=$	0.66106
a_{03}	$=$	0.44800	a_{06}	$=$	0.68521	a_{09}	$=$	0.70645

The foregoing data complete the information required for the presentation of the model. As already pointed out, in this version no separate consideration was given to the international sectors, which are classified as national sectors, along with the national sectors proper.

A special feature of the application of the model in this case lies in the fact that the sectoral targets were determined beforehand. In a general version of the model, the only data are the regional targets and the coefficients. In this case, however, the sectoral targets are also data (a fact that was implicitly incorporated in all the preceding presentations), which introduces an important modification in the formalization of the model. It is in fact unnecessary in this case for the national-sector equations to include either technical coefficients or final demand. The reason is that with the targets for each national sector fixed, all that the model can do is to give a spatial distribution of these activities, in accordance with the other side conditions and the minimization objectives.

Thus, the structure of the model is as follows:

$$\text{Min. } Z = \sum_{r=1}^{11} \sum_{h=1}^{9} {}^r_k h \; {}^r_x h$$

Subject to:

$$\sum_{h=1}^{9} a_{4h} \cdot {}^1_x h + c_4 \; {}^1_y = {}^1_x 1$$

$$\sum_{h=1}^{9} a_{4h} \cdot {}^1_x h + c_9 \; {}^1_y = {}^1_x 9$$

$$\sum_{h=1}^{9} a_{9h} \cdot {}^{11}_x h + c_9 \; {}^{11}_y = {}^{11}_x 9$$

$$\sum_{r=1}^{11} {}^r_x 1 = x^1$$

$$\sum_{r=1}^{11} {}^r_x 2 = x^2$$

$$\sum_{r=1}^{11} {}^r_x 3 = x^3$$

$$\sum_{r=1}^{11} {}^r_x 5 = x^5$$

$$\sum_{r=1}^{11} {}^r_x 6 = x^6$$

$$\sum_{h=1}^{9} a_{oh} \cdot {}^{1}x^{h} = {}^{1}y$$

$$\vdots \qquad\qquad \vdots$$

$$\sum_{h=1}^{9} a_{oh} \cdot {}^{11}x^{h} = {}^{11}y$$

Leaving aside the non-negativity restraints, the set of regional sector constraints includes 44 equations; the set of national sector constraints includes only 5 equations; and the set of regional constraints comprises 11 equations, giving a total of 60 constraints and 99 variables.

Results

With regard to the numerical results of the model, stress must be laid on two prior considerations. In the first place, given the assumptions of linearity adopted, it is highly likely that the model may lead to a situation of marked regional specialization in 'national activities'. This is perfectly compatible with the logic of economics, since with constant returns and no transport costs (for the national sectors) it is natural that production should tend to be located in the regions that offer the best conditions (reflected in the capital coefficients). Secondly, it should be borne in mind that the results of the model may differ considerably from what might be regarded as a 'realistic' locational picture. The reason is that the location of activities given by the model basically depends on the capital coefficients used, and these, in the first stages of processing, are not adequately differentiated for each region/sector. Consequently, the model must be used within the framework of a typically iterative process in which each solution serves as the basis for improving the parameters and obtaining a better solution in the following stage.

The results of the first computation are shown in the appended tables. (COMP. No. 1.)

As might be expected, the regional sectors figure as having a positive level of activity in all the regions, but the same is not true of the national sectors, which show a high degree of concentration.

The sum of the increases in the gross domestic product both by sectors and by regions is obviously the same (4 799 million escudos at 1965 prices), since this is a condition imposed upon the model beforehand. Two facts strike one forcibly on examining these results. The first is that the distribution of national activities does not strictly coincide with what experience suggests. It has already been remarked that this might be a defect in the present stage of the model, due both to the lack of significant differentiation between capital coefficients (which introduces a random factor into location) and to a somewhat subjective and possibly mistaken assessment of what ought to be the structure of production in each region. It should be recalled, moreover, that the model only offers a localization of increases in activity and not of the level of activity proper. The second important fact revealed by these figures is a curious inconsistency. Even though the capital coefficient of ${}^{8}x^{2}$ is extremely high and on the other hand

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the coefficient of this same variable is null in the equation for national sector 2, the computer in any event introduced the variable $^8x^2$ into the base, with a positive level of activity (216.41). If the levels of activity of all the $^rx^2$ variables are added together a figure of 1 420.38 is reached, which is higher than the pre-established target by 216.28, that is, precisely the level of activity of $^8x^2$. The fact that an optimum solution to the problem was found, and that nevertheless this solution was, from another point of view, inconsistent, must be attributed to one of the following circumstances: either (i) the target for Region 8 is excessively high and is not compatible with the other regional and sectoral targets; or (ii) to assign a zero value to the coefficient of $^8x^2$ in the national sector equation was a mistake, which allowed the computer to disregard the level of activity of $^8x^2$ in drawing up the sectoral balance, but to introduce this variable, on the other hand, for the attainment of the regional target.

Given this situation, the model was computed over again, and a coefficient equal to unity was re-established for the variables $^1x^1$, $^2x^2$, $^7x^2$, $^8x^2$, $^9x^2$, $^{10}x^2$ and $^{11}x^2$ in the equations corresponding to national sectors 1 and 2. Furthermore, in this second computation the capital coefficient of these same variables was raised to the highest perforable value.

The second computation gave a non-feasible solution with curious characteristics. An inconsistency was produced with respect to targets established for Region 5 (Metropolitan Area), creating a slack in the corresponding constraint equivalent to those same 216.41 million that had been additionally introduced in the preceding computation. Another point that could be noted was that the regional sectors showed the same total level of activity in both solutions. Comparison of the two solutions led to the conclusion that in view of the technological structure and the composition of final demand in the regional sectors, there was an inconsistency in the regional and sectoral targets, over and above the mere arithmetical differences between the two totals. There were two possible ways of corroborating this conclusion: (i) to reduce the target for Region 5 by the amount of the slack variable which appeared in the second computation; (ii) arbitrarily to increase the amount of final demand in the regional sectors of Region 5. To justify this latter possibility the following hypothesis can be adduced: the coefficients of final demand for this region should be higher than the national averages used in the model, by virtue of certain sociological considerations linked to the degree of urbanization of this region.

In the third computation the target for Region 5 was lowered and at the same time the corresponding equation was replaced by two inequalities, establishing an upper limit of 953.0 million. In these conditions a feasible optimum solution was determined, which is shown in the appended tables (COMP. No. 3).

Once again the specialization occurring in respect of the national sectors is observable. In this solution the total increase achieved in the country's gross domestic product amounts to only 4 616 million escudos, both from the sectoral and from the regional standpoint. This figure would seem to indicate an annual growth rate very close to 5%, which was the target previously established.

The value of the objective function was set at 19 589 million escudos for the period 1967-1971, a figure which is almost identical with that established in the global programming model, i.e., 19 586 million escudos.

In the fourth computation the aim was to find an alternative way of obtaining a solution which would include a target for Region 5 as close as possible to the target postulated in the original calculations. To this end, final demand in each region was increased, and a new solution was thus obtained whose results are also shown in the appended tables (COMP. No. 4). In this solution the total increase in the gross domestic product (both sectoral and regional) reaches 4 783.20 million escudos, a figure practically equal to the original 4 799 million. The total cost in this case amounts to 20 780 million escudos at 1965 prices, a figure slightly exceeding that established as the sectoral starting-point.

This was the solution adopted as the point of departure for the iterative process of improvement. The sensitivity analysis of the cost coefficients became the most useful tool for improving the realism of the solution.

The following were the first two changes introduced. Taking into account an important expansion project (already underway) which would affect copper mining in Region 6, it was possible to estimate with a considerable degree of accuracy the increase in the gross production of this region-sector in the period 1967-1971. In this way the level of activity of $^6x^2$ was fixed at 169 million escudos by means of the introduction of an additional constraint.

Secondly, in the foregoing solution the variable $^3x^2$ does not appear in the base, Region 3 being a predominantly mining area. The sensitivity analysis shows that this variable would appear in the base, if the variable $^3x^3$ (whose level of activity is from every point of view exaggerated for this region) were outside it; the same analysis shows that $^3x^3$ would be outside the base if its capital coefficient were higher than 1.5. Consequently, it was assigned a coefficient of 1.6.

The result of these changes can be seen in the appended tables (COMP. No. 4.1).

The new solution, which shows the same total cost as the one before, is better inasmuch as it gives a considerably more realistic distribution of activities.

Subsequent changes in the capital coefficients, through the pertinent sensitivity analysis, gave rise to a solution likewise shown in the appended tables (COMP. No. 4.2).

This last result may be regarded as inferior to the one before, from the locational standpoint. Apparently, this is because on that occasion the computer was given several instructions at once instead of a stepwise procedure's being followed. Consequently, it is preferable to adopt solution No. 4.1 for the purposes of the following discussion. It did not seem necessary to make any further computations, since from those carried out the necessary conclusions could be drawn for the future presentation of the model.

It must once again be stressed that the computer does not know the real situation or the personal preferences of the planners; to some, therefore, the solution may be surprising. Nevertheless, it is an optimum solution according to the logic involved in the presentation of the model. The procedure adopted allows of improving the solution step by step, but in any event the possibilities in this direction are very limited. It should also be recalled that the presence of so many blank boxes in the solution is strictly due to a mathematical characteristic of linear programming, and therefore, if, for example, an increase in agricultural activity in Region 5 is desired, this can only be effected at the

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expense of total agricultural expansion in Region 6 or in Region 7 or in any other. The only way of broadening the base is by introducing additional constraints, which was not done to any great extent on this occasion.

When the results of the model are examined, it will inevitably be asked why specific projects already underway and with a clearly-defined location are not included as additional constraints. This would seem particularly logical in relation to those boxes whose value is zero in the solution (for example, industry in Region 2). There was some discussion on this point, and the following two observations may be noted as a reply to the foregoing question. In the first place, the introduction of such projects is perfectly feasible (except for a few difficulties of measurement), although it greatly reduces the flexibility of the model. Secondly, and more important, it may be maintained that a model of this kind ought in addition to serve as a means of assessing the rationality of the action currently being taken. Clearly, the rationality in question is judged in this context in the light of a criterion of economic efficiency. If specific projects are introduced, while the solution may gain in realism, it loses by the disappearance of this important function.

Now that these general considerations have been put forward, the time has come to examine in detail what it was possible to learn, through the sensitivity analysis, with respect to the capital coefficients —the veritable Gordian knots of the problem.

It must be recalled that the sensitivity analysis shows the permissible range of variation of each capital coefficient with which the solution will still be optimal. The model was designed as a simple location model at a general level, and it is important to bear this fact in mind when considering the sensitivity analysis.

Analysis by sectors

(a) *Agriculture*

The sectoral coefficient used is 4.0. Diverse data warrant the tentative hypothesis that this coefficient should be lower in Regions 4, 5, 6, 7, 8 and 9, owing to soil quality, water supply and equipment; a parallel suggestion may be advanced that in regions 1, 2, 3, 10 and 11 this coefficient should be higher than 4.0. Of course, as pointed out in earlier pages, the coefficients for this sector in regions 1 and 2 were arbitrarily raised so as to eliminate the variables $^1x^1$ and $^2x^1$ from the solution.

The sensitivity analysis relating to the capital coefficients of the $^rx^1$ variables which were not incorporated in the base is shown in table 16.

According to this, $^3x^1$, $^{10}x^1$ and $^{11}x^1$ would on no account be incorporated in the base, granted that their respective capital coefficients were higher than 4.0. It is therefore unnecessary to attempt to estimate the value of these coefficients.

For the $^rx^1$ variables which do form part of the base, the analysis gives the following result:

Variable	Upper limit	Lower limit
$^6x^1$	3.80005	3.70772
$^7x^{1\cdot}$	4.00000	$-$ infinity

This indicates that $^7x^1$ (with a coefficient assumed to be less than 4.0) is included in the base whatever the value of the cost coefficient, provided it is less than the sectoral average. Consequently, if the postulated hypothesis of qualitative differences is accepted, the variables $^1x^1$, $^2x^1$, $^3x^1$, $^7x^1$, $^{10}x^1$ and $^{11}x^1$ can be dismissed. All this reduces the problem, in the case of the agricultural sector, to estimating the capital coefficients of five variables instead of the original eleven.

Table 16

Variable	Upper limit	Lower limit
^3_xl	Infinite	3.79995
^4_xl	,,	3.80084
^5_xl	,,	3.80074
^8_xl	,,	3.79984
^9_xl	,,	3.80000
$^{10}_xl$	,,	3.79995
$^{11}_xl$	,,	3.80000

(b) *Industry*

In the industrial sector a similar qualitative hypothesis will indicate that the value of the capital coefficient is likely to be less than the average for the sector (1.5) in regions showing a relatively high degree of industrialization, i.e., in Regions 4, 5 and 8. The sensitivity analysis shows the results in table 17.

The foregoing table shows that in accordance with the hypothesis postulated, no study need be devoted to the capital coefficients for the variables $^2x^3$, $^3x^3$, $^6x^3$, $^7x^3$, $^9x^3$ and $^{11}x^3$, since they would not form part of the base; moreover, the variable $^8x^3$ can also be left out of the study, since it forms part of the base whatever the value of its coefficient. The problem is therefore reduced to the study of four coefficients.

(c) *Mining*

The sectoral coefficient used is 1.5. The coefficient of the variables $^7x^2$, $^8x^2$, $^9x^2$, $^{10}x^2$ and $^{11}x^2$ was also arbitrarily raised so as to eliminate these variables from the solution. For the remainder, the analysis shows the results in table 18.

Since mining activity differs appreciably from one region to another in accordance with the natural resources of each, a qualitative hypothesis is

Table 17

Variable	Basic	Non-basic	Upper limit	Lower limit
$_1x^3$	X		1.50000	1.50000
$_2x^3$		X	infinity	1.49997
$_3x^3$		X	infinity	1.49959
$_4x^3$	X		1.50001	1.48489
$_5x^3$	X		1.50037	1.49999
$_6x^3$		X	infinity	1.49962
$_7x^3$		X	infinity	1.49959
$_8x^3$	X		1.49959	− infinity
$_9x^3$		X	infinity	1.42765
$_{10}x^3$	X		1.5000	− infinity
$_{11}x^3$		X	infinity	1.49962

Table 18

Variable	Basic	Non-basic	Upper limit	Lower limit
$_1x^2$	X		1.50044	− infinity
$_2x^2$	X		1.50000	− infinity
$_3x^2$	X		1.50067	1.49994
$_4x^2$		X	infinity	1.49998
$_5x^2$		X	infinity	1.49997
$_6x^2$	X		1.50006	− infinity

difficult to establish in this case. Nevertheless, it seems possible to put forward the idea that in Regions 4 and 5 the coefficient should be higher than 1.5, in which case the variables $_4x^2$ and $_5x^2$ would not be included in the base. Similarly, it may be considered that in Regions 2 and 6 the coefficients should be less than 1.5, which would guarantee that $_2x^2$ and $_6x^2$ would in any event form part of the base. Thus the problem would be reduced to detailed study of the coefficients of $_1x^2$ and $_3x^2$.

With respect to the other national sectors (electricity, gas and water, and trade and finance) it is impossible for the moment to establish hypotheses similar to those put forward for the sectors already discussed. In sector No. 6 with the exception of $_{11}x^6$, the other sectoral variables included in the base show practically no significant ranges of variation in their coefficients, which is an indication of their instability as components of the solution. Furthermore, the variable $_9x^5$ shows a lower limit of minus infinity.

With respect to the regional sectors the situation changes drastically. Given the form in which the model was presented, the variables representing levels of

activity in these sectors must necessarily form part of the solution, and the level at which they appear basically depends on the level of final demand and on what is assumed to be the prevalent technological structure (i.e., on the level of activity of the national and regional sectors). A further general assumption is that the production functions of these sectors are essentially similar from one region to another.

This suggests that it is not worth while to make an exact calculation of the value of the capital coefficients of these variables, if the outcome desired is an approximation to the level of activity rather than the amount of investment.

Taking these considerations into account, the amount of gross domestic investment per region (corresponding to the solution under discussion) is as shown in tables 19, 20 and 21, while the table also indicates where this amount is undervalued (S) or overvalued (SS).

Table 19

GROSS DOMESTIC INVESTMENT, 1967-1971

(Millions of escudos at 1965 prices)

Regions	Sectors								
	1	2	3	4	5	6	7	8	9
1		$114^{(S)}$	$88^{(S)}$	13			138	69	42
2		$659^{(SS)}$		49			527	283	164
3		$777^{(S)}$		51			557	318	174
4			$1\ 110^{(SS)}$	41			444	246	133
5			$2\ 116^{(SS)}$	187			2 030	698	595
6	$750^{(SS)}$	$255^{(SS)}$		52		33	562	258	173
7	$958^{(SS)}$			20			217	133	64
8			$1\ 026^{(SS)}$	97		95	1 034	424	320
9				25	1 485	15	256	94	85
10			$254^{(S)}$	12			126	56	38
11				12		22	121	45	39

In short, the model indicates levels of activity a good deal more exactly than amounts of investment. All this highlights the fact that the problem of estimating capital coefficients by sector-region is still the chief difficulty in the implementation of the model, although the volume of research required is notably reduced by the use of the sensitivity analysis. (See table 21.)

Table 20

GROSS DOMESTIC INVESTMENT, 1967-1971

(Millions of escudos at 1965 prices)

Total by regions

Region	Gross domestic investment
1	466
2	1 681
3	1 878
4	1 973
5	5 625
6	2 083
7	1 391
8	2 996
9	1 961
10	486
11	238
Total	*20 780*

Table 21

INCREASES IN GROSS PRODUCTION BY REGIONS AND SECTORS, 1967-1971

(Millions of escudos at 1965 prices)

Regions	Sectors								
	1	2	3	4	5	6	7	8	9
Computation No. 1									
1		109.16		12.76			9.22	11.99	21.38
2		293.69		49.29		171.59	35.13	42.75	82.97
3				63.17		578.00	44.07	40.73	105.84
4		414.96		40.18			29.00	42.06	68.17
5		69.04	1 723.00	110.41			79.83	96.24	179.00
6	172.58	317.12		51.88			37.48	50.93	85.56
7			318.05	20.04			14.49	16.85	32.35
8		216.41	1 021.93	95.34			68.93	80.31	155.20
9				25.05	165.00	77.39	17.08	15.23	42.44
10	127.50			11.66			8.43	12.19	18.47
11	126.90			11.12			8.04	11.91	17.61
Computation No. 3									
1		109.16		12.76			9.22	11.99	21.38
2		439.28		48.65			35.13	47.12	81.77
3	299.49	270.30		60.98			44.07	59.16	99.43
4				42.02		482.60	29.00	36.28	71.65

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Regions	Sectors								
	1	2	3	4	5	6	7	8	9
5		162.29	1 163.18	110.37			79.83	87.13	178.54
6		222.94		52.87		266.99	37.48	35.49	88.68
7			318.05	20.04			14.49	16.85	32.35
8			1 413.17	95.30			68.93	77.52	153.58
9				25.05	165.00	77.39	17.08	15.23	42.44
10	127.50			11.66			8.43	12.19	18.47
11			168.58	11.12			8.04	9.13	17.92
				Computation No. 4					
1				13.24		128.66	9.22	8.72	22.27
2		339.28		48.65			35.13	47.12	81.77
3			937.03	51.37			37.13	46.39	83.26
4		401.49		41.05			29.59	55.33	69.65
5	158.34	363.22	543.40	186.97			135.32	124.41	299.78
6				53.85		536.34	37.48	22.07	90.45
7	239.41			20.05			14.49	22.10	31.77
8			1 143.17	95.30			68.93	77.52	153.58
9				25.05	165.00	77.39	17.08	15.23	42.44
10			169.38	11.66			8.43	9.39	18.78
11	29.24			11.45		84.59	8.04	8.55	18.98
				Computation No. 4.1					
1		76.39	59.24	12.75			9.22	11.57	21.13
2		439.27		48.65			35.12	47.12	81.77
3		518.32		51.46			37.12	53.08	87.13
4				40.95			29.58	40.99	66.43
5			1 410.40	186.90			135.31	116.25	297.46
6	187.58	170.00		52.48		164.42	37.47	48.93	86.52
7	239.41			20.05			14.49	22.10	31.77
8			684.23	97.15		475.25	68.92	70.63	159.92
9				25.05	165.00	77.39	17.08	15.23	42.44
10			169.38	11.66			8.43	9.39	18.78
11				11.54		109.91	8.04	7.54	19.39
				Computation No. 4.2					
1		109.16		12.76			9.22	11.99	21.38
2			794.13	48.58			35.12	41.45	78.49
3		208.38		52.83		365.31	37.12	43.78	89.68
4			740.49	40.95			29.59	40.49	66.42
5		716.44	115.19	187.01			135.31	125.49	302.80
6	160.48	170.00		52.73	46.79	143.87	37.48	42.30	87.27
7				20.85		207.36	14.49	13.84	35.11

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Regions	Sectors								
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
8			1 413.17	95.30			68.92	77.52	153.58
9	266.51			23.62			17.07	25.15	37.41
10				12.09		110.43	8.43	7.79	20.25
11				11.93	118.20		8.04	7.02	20.32

Sectors	Regions
1. Agriculture	1. Tarapacá
2. Mining	2. Antofagasta
3. Industry	3. Atacama — Coquimbo
4. Construction	4. Valparaíso — Aconcagua
5. Electricity, gas and water	5. Santiago
6. Trade and finance	6. O'Higgins — Colchagua
7. Ownership of dwellings	7. Curicó — Talca — Maule — Linares
8. Transport	8. Ñuble — Concepción — Bío-Bío — Arauco — Malleco
9. Services, etc.	9. Cautín — Valdivia — Osorno
	10. Llanquihue — Chiloé — Aysén
	11. Magallanes

C. Regional development strategy

Few ideas have found their way into Latin American professional jargon more swiftly than that of 'strategy'. Perhaps this very speed has prevented any attempt at accurately clarifying the nature, scope and content of the concept.

What really is a regional development strategy? How far does a strategy differ from a plan? Are strategy and policy the same thing or are they not?

Despite its copious use of the term, Latin American literature is nothing if not reticent as regards definition of the concept, and outside the Latin American region —with few exceptions— the use of the concept is almost always implicit.

In these circumstances it is only natural to resort to the well-known book by Matus entitled *Estrategia y plan* in quest of elucidation. For Matus a 'strategy' is not so much 'something' as a 'way' of doing something, and his definition of the concept is expressed in the counterposing of normative and strategic procedures and of planning.

He says that a normative procedure defines a course of development which comprises the action necessary for the attainment of specific objectives established *a priori*, without, however, making the utmost possible use of knowledge of the factors which explain and determine behaviour; the action proposed does not stem from real behaviour functions, but a norm of behaviour consistent with the objectives is superimposed on these.

A *strategic procedure*, on the other hand, assumes a reaction on the part of the system to deliberate changes: a reaction which may be directed towards the fulfilment of consciously selected objectives.[37] (Matus, 1972.)

Later the same author adds that the concept of strategy is applied to the result of the process of defining overall policy, and includes prior exploration of

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[37]The italics are in the original text.

the 'major alternatives' or options for action; in other words, it is a procedure for the selection and definition of a policy.

Strategy, he goes on to say, constitutes a macroproposition of economic policy and involves a certain type of integrated analysis which makes it possible to define objectives and select a chain of appropriate measures and policies. (Matus, 1972.)

Unquestionably, Matus' ideas probe deeply and are attractive, but for a thorough understanding of the notion of strategy it is necessary to move on to less abstract planes. From this angle, nationwide regional development affords an exceptionally favourable field for expressing the matrix idea in concrete terms.

What happens if, simplifying the problem to the utmost, we visualize the question of nationwide regional development as a clash of interests between the 'centre' and the 'periphery'? What connotations does the concept of strategy then acquire?

It is immediately evident that a situation like that described closely resembles a game, particularly the zero-sum type of game; and we are at once reminded that the concept of strategy has been effectively formalized in the context of the theory of games, and that perhaps this formalization may be useful in the field of regional development.

A basic question in the theory of games is how to represent each competitor's decisions *vis-à-vis* the sequential decisions of the rest. The answer, according to one group of writers, is that here the notion of pure decision is replaced by that of strategy. A strategy is a succession of decisions, in which all past, present or future decisions of the competitor or competitors are taken into account. A strategy is, *de facto*, a well-ordered set of decisions of a combinatory character. There must be no confusion between a decision, a plan, a policy, a tactic, a strategy. (A. Kaufmann, R. Fauré, A. Le Garff, 1966.)

The same writers add that since it is impossible to define a strategy owing to the large (in fact countless) number of hypotheses that would have to be enunciated, the following meaning is usually accepted: a strategy is a limited set of certain important decisions, in face of certain important decisions on the part of the adversary or adversaries, which is small enough to be susceptible of simple verbal explanation that can be understood without recourse to any special symbolism. (A. Kaufmann, *et al., op. cit.*)

Later on specific use will be made of the foregoing ideas in defining a regional development strategy in a given context. For the moment it is desirable to explore the notion of strategy from other angles.

Economic planning is a technico-political activity the aim of which is to intervene deliberately in a society's process of change in order to speed it up, control it and channel it as a function of a future image of the society, of its structure and of its *modus operandi*. The future image or objective-image of the society is not defined only in terms of certain quantitative parameters such as the level of income, the degree of distributive inequality, the average expectation of life or the average level of schooling. Through the construction of this objective-image an attempt is made to define the type of society which it is desired to build, for example, a more just society, more solidary, more democratic, more aware of the process of technological change in the present-day world and of its implications, more concerned with the quality of life than with

the quantity of material goods. In short, an objective-image shows not only the scale of change but also its direction.

A strategy shows precisely how the society proposes to attain the state defined by the objective-image: not so much specifically what is to be done as how it will be done. It is a definition of the basic principles by which the process of change will be guided. For this reason a strategy is, from the formal standpoint, a qualitative rather than a quantitative pronouncement.

However, every social system (and the spatial system of a country is a social system) has a dynamic of its own. It has its own internal laws of change which determine the pace of change and its direction. For example, we know that in the urban system of Panama the pace of change is slow and its direction is towards macrocéphaly of the system.

Systems, whether biological, social or of any other kind, react to the introduction of exogenous elements which alter their laws of change either by rejection or by incorporating the destabilizing element into the system itself, and thus generating new internal rules of change. On the other hand, if influence is to be brought to bear on a system, certain basic restraints always come into play. In relation to social systems these restraints are of an essentially ideological nature and determine whether the system in question can be converted into another of a different kind or can only be modified in its operation, without its basic parameters being affected. These parameters may be related to the operativeness of the political, economic and religious institutions. Within these limitations, a development strategy (referring now to the economic system) may be defined as an evaluation of the maximum of exogenously induced change that a system can tolerate without its causing so strong a negative reaction on the part of the system itself as to nullify the external stimulus and even wipe out the agent bringing about the change. Disregard of these principles or inability to perceive the exact limit of tension to which a system can be subjected may precipitate the most violent reactions.

How can this possible maximum of change be evaluated? The task involves a complex technical and political process of which only a minimal proportion can be conducted on a quantitative basis. From a technical standpoint it is possible to evaluate and compare development options or styles. These options are generally presented as dichotomic (economic development or social development) to facilitate their analysis. In practice, however, strategy implies determining a satisfactory combination of the two. Such combinations of options or priorities as between them assume the form of guiding principles and shape the frame of reference in which policies are inserted.

Thus, the concept of strategy can also be interpreted as a set of decisions which maximize change in a given system while minimizing the reaction to change on the part of the system itself.

It is interesting to note that the few contributions to be found in the literature of the subject on the content of the concept of strategy do not come from academic circles but from the more pragmatic world of advisers on specific development projects. Thus, for example, a well-known consultant on regional development wonders:

"Is there a meaningful 'middle ground' for regional development planning between the unacceptable primitiveness of an isolated projects approach and the

widely demonstrated futility of the conventional planning approach? " (Bendavid, 1972.)

Bendavid answers his own question by developing what he calls a 'concept-strategy-projects approach' consisting in the formulation of an analytical sequence in three steps: (i) determination of the key strategic concepts; (ii) determination of the overall development strategy; and (iii) project recommendations.

To quote his own words:

"The key strategy concepts together constitute the overall structure within which growth must take place and toward which it should be oriented if it is to bring about meaningful long-term development. Moreover, the framework key strategy concepts is instrumental in establishing overall planning priorities and therefore in providing directions for allocating the usually severely limited research and planning resources available for more detailed work."

"The overall strategy for development is a program which spells out the approach to be taken with respect to each of the various aspects of the region's economic, social, and administrative activity."

"A 'project' which may be recommended is, for purposes of this planning approach, any action which will bring about a change in the nature or quantity of production in the region, in the supporting systems (including administration), in social welfare, or in the spatial framework." (See again Bendavid, 1972.)

Following this brief review of some of the interpretations placed upon the concept of strategy, a more comprehensive definition may be introduced in the context of the topic under discussion here.

Accordingly, it may be said that a regional development strategy is a limited set of important decisions which, on the basis of the possible reactions of the milieu, is principally aimed at maximizing change in a regional system while at the same time minimizing unfavourable reactions on the part of the system itself. This limited set of decisions finds expression in a sequence of combinations of alternative options, termed 'guiding principles'. The guiding principles define the frame of reference within which specific policies are inserted.

These 'guiding principles' really reflect the philosophy (and ideology) with which a process of change is approached and are therefore fairly heavily loaded with ideological, political and ethical elements. It is in the content of information incorporated in this set of basic lineaments and in the strategy itself that their importance lies. This information content is extremely high for the various individuals, social groups and all agents in general that in one way or another are active or passive subjects of the process of change. Consequently, it is a strategy, rather than a policy, that makes it possible to evaluate the degree of consensus or dissension generated by a programme, and this is exceptionally important in the context of planning.

Thus, for example, when it is stated that the objective pursued is polarized regional development (which constitutes a strategic declaration and not a policy), in reality a message is being generated with a much bigger quantity of information than if it is announced that industrial parks will be constructed in cities A and B and that such-and-such industries will be installed there. Strategy converts a situation of uncertainty into a situation of risk (or of certainty in some cases) more quickly and fully than a policy.

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In the light of the foregoing definition, a strategy is not a plan. A plan constitutes a finite and arbitrary collection of decisions adopted *a priori* without taking into account the present or future decisions of competitors (Kaufmann *et al, op. cit.*). From a more economic standpoint, a plan is an orderly and coherent set of programmes and investment projects, with its financial and institutional implications clearly identified with a perfectly definite time limit. Nor is a strategy a "pre-plan", that is, something which is prepared rapidly with the information immediately available and on the basis of certain pre-established hypotheses. Still less could a strategy be considered a substitute for a plan, although in practice, admittedly, this is precisely what often happens.

It is convenient but dangerous to regard a strategy as substitute for a plan: convenient, because a strategy makes it possible to bypass the usually complicated process of quantitative analysis involved in a plan and because it obviates the need to reach that level of detail at which the inconsistencies in programme declarations become evident. Nevertheless, this attitude entails —as has been demonstrated in practice— the risk that the task of constructing a real plan may be indefinitely postponed.

In the view of other specialists the relation between strategy and plan must be differently envisaged. For them a strategy is an analytical procedure which becomes one phase in the planning circuit, formally resembling other classic phases in the process of drawing up a plan, such as, for example, the phase of diagnosis or the phase of evaluation. The phase of strategy formulation represents in this case the introduction of an innovation in the traditional planning process, and it would therefore be pertinent to look into the reasons for an innovation of this kind.

This proves a relatively simple undertaking if it is recalled that socio-economic planning acknowledges its principal sources to lye in the experience (in relation to State control) of Western industrialized economies and of economies structured in accordance with the Marxian-socialist model.

In the case of the former, planning experience has never (or seldom) been associated with major structural changes, for the simple reason that such changes had already taken place when the planning exercise began to be introduced into such societies, *grosso modo*, after Keynes. Hence planning in industrial economies has been of an essentially adaptive kind. Thus, political reaction to the plan (or to certain general government measures) has never been a determining factor in the drafting of the plan.

In the case of the second type of economy, where planning practice has indeed been very directly associated with the achievement of substantial changes in society, the institutional organization resolutely bars dissension, and therefore political reaction to the plan is non-existent.

In both cases, therefore, although for different reasons, planning can be conceived as an almost linear process in which certain objectives can be more or less mechanically attained, and in which the problems arising in the course of its execution are always attributed to technical questions.

Very different is the case of developing economies in which there is a certain amount of political cut-and-thrust and in which the structure is of a mixed type, both the State and the private sector playing a significant part. In these cases, the presence of politically active power groups, whose aims may

differ considerably from government objectives, necessitates changing the method of planning to incorporate a sort of political give-and-take in the plan itself.

The above remark of course transcends any simplistic division in terms of forces that are 'progressive' or 'awkward' as regards the process of change. It merely constitutes and acknowledgment that planning is inserted in a political context in which different power groups confront one another, each one prompted by its own group or class interests. In this sense, it is utterly fruitless for the planner and the decision-maker to determine on a linear basis that objective A will be attained by the application of policy B, unless the political feasibility of such a measure has been previously ascertained.

Even if a strategy is to be regarded as a stage in plan formulation, this does not imply that the time dimension of the strategy is exactly the same as that of the plan.

The time-horizon of a strategy usually stretches a good deal farther than that of a plan. This has the advantage of converting strategy into a kind of time framework for a series of plans following one another in a time sequence. Thus a strategy provides a frame of reference within which existing plans are modified and new plans are generated, although some basic objectives and principles always hold good. In other words, a strategy makes or ought to make it possible to impart long-term continuity to government action which, in a more limited time dimension, finds expression in plans and programmes.

This implies, on the other hand, that the formulation of a strategy presupposes an arduous effort of imagination. Undoubtedly, during the last quarter-of-a-century, the biggest mistake a planner could make was to consider strategy as a mere linear extrapolation of the past. The rapid and ever-quickening pace of technological change will mean that in ten years' time concepts will be obsolete which today may be classified as dogmas. Today, the distance between Buenos Aires and Cordoba may be thought considerable. What will be the situation in 15 or 20 years more? What will be the impact on prevailing ideas with regard to decentralization and economic deconcentration? After all, spatial friction, the basis of the whole conceptualization of regional development, is absolutely dependent upon transport and communication media and costs.

Furthermore, a strategy includes a ranking of the very categories of analysis that are used in drawing it up. Just as at the global level a strategy may give priority to consumption over investment, or as at the sectoral level it may place greater emphasis on agricultural than on industrial development, in the same way at the spatial level it will hierarchize its own analytical categories, or, in other words, a system of regional priorities will be established. This procedure serves a twofold purpose: on the one hand, it establishes an orderly time schedule for the action to be taken, and on the other hand it assists in defining the global policies which will be instituted in each region.

Lastly, a strategy is not a policy.

A strategy constitutes a nexus between reconnaissance of the existing state of affairs (diagnosis) and overall development objectives, and likewise represents the framework for specific economic policies.

Any economic policy is usually defined as an instrument for converting an existing situation into a desired future situation. In other words, a 'policy' also

appears as inserted between a diagnosis and a set of objectives. Greater precision is needed, then, in distinguishing between strategy and policy.

If 'strategy' and 'policy' are not the same thing, wherein lies the difference between them?

The relation between 'strategy' and 'policy' is similar to that existing between economic selection and technical selection of alternatives. For example, the choice between using given resources to construct a steel mill or to construct an electric power station is a typically economic choice; but once it has been decided to use the funds for constructing an electric power plant, the choice between a hydroelectric and a thermoelectric plant is essentially a technical and not and economic decision. The difference between the two processes of selection lies in the fact that in one case ends have to be chosen and in the other means.

A policy is likewise a set of instruments (parameters) used to change the course of a series of variables or functions so that certain final states (objectives) of these same variables or functions may be attained in a given space of time. A policy is deterministic action; a strategy is a more stochastic procedure.

On the basis of the concepts set forth above, attention can now be turned to the options which shape a regional development strategy. For analytical purposes, it is useful to divide the possible options into two categories and examine first the most important general option for regional development and then review a set of more specific options.

If 'centre' and 'periphery' denote in simplified fashion the protagonists in the regional game and if, as pointed out in chapter I, the transfer of surpluses to the periphery is the usual way of financing its development, the first evaluation incorporated in the strategy is undoubtedly that of the margins of action within this transfer process. How far can the growth of the centre be reduced in order to benefit the periphery? Or to put it another way, what level should be reached by the development effort in the periphery? What is the exact point of equilibrium between a country's relative efforts in the periphery and in the centre?

The answer to these questions has a very strong political content,[38] and therefore the evaluation of alternative options will be difficult to quantify. In some simple cases, however (and in this instance simplicity is afforded by the number of regions), it will be possible to attempt a simulation exercise in respect of regional growth with the aim of obtaining objective background data. The following discussion is based on a simple example of a purely illustrative character deriving from the preparation of a regional development strategy for Panama,[39] in which case the problem was simplified by working with only three large regions and assuming in addition that one of them always grew at the same rate as the country as a whole. This expedient reduces the problem to terms of two regions; but even with these extreme simplifications the example is highly enlightening.

[38]The discussion in chapter I on the political feasibility of regional development should be recalled.

[39]See UNO/OTC, *Estrategia de desarrollo regional de mediano y largo plazo de Panamá*, Panama City, 1975.

In the above-mentioned document it is pointed out that even on the basis of estimated figures two significant facts spring to the eye: (i) overconcentration of growth in the Metropolitan Macro-Region (*viz.*, an annual growth rate of about 10% if the national growth rate were round about 7%) implies an absolute and relative deterioration of the per capita situation in the Centre-West Macro-Region; and (ii) a disproportionate growth rate in the Centre-West Macro-Region (once again in the neighbourhood of 10% per annum) would reduce the growth of the Metropolitan Macro-Region to levels that would jeopardize the aims of the global strategy itself and consequently would prevent the generation of surpluses to finance the development of the interior. In these circumstances, the viability of regional development in Panama presupposes an action strategy that consistently maintains the growth of the Metropolitan Macro-Region within limits which at their lowest will not imply a contradiction with the major national objectives and at their highest will not be reflected in a deterioration of the existing situation in the Centre-West Macro-Region, and that is likewise consistent in ensuring the transfer of surpluses from one region to the other. (UNO/OTC, *op. cit.*)

How was this conclusion reached? Partly through a simplified simulation exercise prepared on the basis of the compatibility model for global (national and regional) targets discussed in the preceding section of the present chapter. Starting with an initial datum (an annual overall growth rate of 7%) and assuming that the growth of the so-called Eastern Macro-Region would always keep parallel with that of the country as a whole, five alternative strategies were tried out, as shown in table 22.

The following is the meaning of the symbols in the table:

y_i = annual growth rate of gross domestic product of region 'i'

t_i^o = coefficient of participation of region 'i' in the country's gross domestic product in year 'o'

p_i^t = the same meaning for year 't'.

On the basis of the figures resulting from the exercise the following comment is made in the document referred to: if in the foregoing analysis the growth rate of the regional population is introduced it is easy to see that of the strategic alternatives examined, the only realistic ones, given the official declarations on global strategy, are strategy B (medium concentration in the Metropolitan Macro-Region) and strategy D (medium deconcentration in the Centre-West Macro-Region). Strategy A is of theoretical interest rather than anything else; in practice it would be virtually impossible to maintain so delicate an equilibrium. Strategy C (high concentration in the Metropolitan Macro-Region) implies an absolute deterioration of the per capita product in the Centre-West Macro-Region and therefore is socially unacceptable. Strategy E (high deconcentration in the Centre-West Macro-Region) runs counter to the guiding principles of the global strategy, and in this case the arithmetical calculation overlooks the fact that the objectives and targets of a metropolitan region of great relative size cannot significantly differ from the national targets (in this alternative the regional target is 20.6% lower than the global target) for the simple reason that macro-economically a metropolitan region is almost indistinguishable from the country as a whole (UNO/OTC, *op. cit.*).

Table 22

SIMULATION OF REGIONAL GROWTH ALTERNATIVES

Strategy	$y_i{}^a$	(y_i+1)	p_i^o	p_i^t	p_i^o/p_i^t	$p_i^o/p_i^t\,(y_i+1)$
Overall growth rate: 7%	y_1 0.07	1.07	0.02	0.020	1.000	1.07
A No change in spatial structure	y_2 0.07	1.07	0.65	0.650	1.000	1.07
	y_3 0.07	1.07	0.33	0.330	1.000	1.07
Overall growth rate: 7%	y_1 0.07	1.07	0.02	0.020	1.000	1.07
B Medium concentration in the Metropolitan Macro-Region	y_2 0.09	1.09	0.65	0.662	0.982	1.07
	y_3 0.03	1.03	0.33	0.318	1.038	1.07
Overall growth rate: 7%	y_1 0.07	1.07	0.02	0.020	1.000	1.07
C High concentration in the Metropolitan Macro-Region	y_2 0.10	1.10	0.65	0.669	0.972	1.07
	y_3 0.02	1.02	0.33	0.311	1.044	1.07
Overall growth rate: 7%	y_1 0.07	1.07	0.02	0.020	1.000	1.07
D Medium deconcentration in the Centre-West Macro-Region	y_2 0.06	1.06	0.65	0.644	1.009	1.07
	y_3 0.09	1.09	0.33	0.336	0.982	1.07
Overall growth rate: 7%	y_1 0.07	1.07	0.02	0.020	1.000	1.07
E High deconcentration in the Centre-West Macro-Region	y_2 0.05	1.05	0.65	0.640	1.016	1.07
	y_3 0.10	1.10	0.33	0.340	0.972	1.07

[a] y_1 = A Eastern Macro-Region; y_2 = Metropolitan Macro-Region; y_3 = Centre-West Macro-Region.

The selection of one of the two strategies that appear viable will generally involve a procedure at the political level. The magnitude of a country's relative effort both in the 'centre' and at the 'periphery' is thus decided; in other words, the general option for the regional development strategy is determined.

It might justifiably be argued that the model used in the foregoing exercise is too simplistic (for example, anyone can guess the equality of the capital coefficients that appear implicit) to endorse so important an option. This of course is true, but the model was used mainly as an illustration of what an analysis of alternatives should be and is manifestly useful from that point of view. Although the question will not be discussed on this occasion, it is possible

to consider the feasibility of using in this context the classic decision criteria, either for pure or for mixed strategies (Baumol, 1965).

The basic option for the strategy once selected, a series of options or combinations of options must be chosen which will give rise to the 'guiding principles' of the strategy. Clearly, only the most important and general of these options will be reviewed.

Not all the options evaluated through the strategy process are, properly speaking, regional options as such. For example, the relative emphasis to be placed on economic development and social development (and therefore the selection of a given option) is in fact a choice that is better made in the context of the drawing-up of a country's global strategy. Nevertheless, by virtue of the heterogeneity which is assumed to characterize the regional system, an option already selected at the global level can be interregionally differentiated. Other alternatives are, however, proper to the field of action of the regional planner, as is the case with the classic option between balanced development and unbalanced development, when these terms are stated in a spatial context.

The choice that can first be made in respect of regional development strategy (although this does not imply a fixed priority) relates to the assignment of functions in institutional terms, i.e., to specifying what will be the responsibility both of the public sector and of the private sector in the promotion of regional development. In everyday political language this is equivalent to "fixing the rules of the game", a process in which experience suggests that the fixing of these rules is more important than their actual content.

Some writers have introduced a distinction between two types of regional planning: adjustment or passive (or adaptive) planning, and development or active planning. It is useful to conduct the analysis in terms of this differentiation from the standpoint of identifying the role incumbent both upon the public and on the private sector.

According to Hermansen, spatial 'adjustment' planning is based mainly on recognition of the influence of overall development trends on the spatial system. The evolution of the latter is envisaged as a response to the pressure and the requirements of national economic development. The task of regional planning is therefore to facilitate the process of spatial evolution with a view to the future attainment of an optimal spatial structure (Hermansen, 1969).

On the other hand, 'development' planning, recognizing the interaction between economic development and spatial evolution, attempts to identify and attain, in a dynamic and historical framework, a pattern of evolution of the spatial structure which at any point in time will be the most efficient for promoting sustained and rapid economic development.

The prevalence of one or other type of approach —which is not without a certain ideological significance— largely determines the relative participation of the public and private sectors in the tasks of (regional) development.

If planning is understood as a process of 'adjustment', the role of the public sector immediately dwindles to that of a provider of external economies which in turn are favourable to the activities of the private sector, the true prime mover of development according to this position.

On the contrary, in so far as spatial planning is interpreted as a 'development' planning process, the relative role of the public sector gains preponder-

ance. In this case it is precisely the government (with its agencies) that becomes the leading protagonist of change. But this does not signify depreciating the role of the private sector in the implicit process of structural change. Precisely in order to turn the capacity of this sector to good account, when the 'development' approach prevails, it is absolutely essential that the State should establish the norms which will guide the process of change, that is, the rules of the game.

There is no need for the above option and the subsequent institutional definition of tasks to be exactly the same for the whole of the regional system. Apparently, in highly capitalized regions (like those of the metropolitan type) spatial planning could assume a more passive character, indirectly contributing to a greater transfer of government resources to the less capitalized regions where the approach should be more active.

In any case, the institutional distribution of tasks between the public and the private sectors of the economy seems to constitute an important element in the generation of the minimum degree of social consensus which makes a development effort possible.

Setting aside this institutional type of option, the definition of regional planning strategy implies selecting lines of action from among a series of dichotomic alternatives which are classic in the literature of the subject.

For example, strategy will have to choose between a pattern of balanced development or a pattern of unbalanced development.

It must be noted that the terms 'balanced' development and 'unbalanced' development belong entirely to the conceptual arsenal of an economic growth theory largely formulated with no spatial connotation. Nevertheless, these same terms are generally used in the context of regional development, without definition of their precise content, so that a number of confusions arise.

The theory of balanced economic growth, developed mainly by Cassel, Nurske, Lewis and Rosenstein-Rodan, aims essentially at surmounting the problem of the narrowness of the market in developing economies, as the principal obstacle to the introduction of new industrial investment. Hence the need for simultaneous planning of a large group of interdependent (industrial) activities, so that the direct and indirect income increment generated may ensure a market broad enough for the investment packet. Such a situation will not be achieved, in the opinion of the writers, by means of individual projects, each of which would probably be overside in relation to the dimensions of the existing market.

Here the concept of balanced development appears linked to purely functional questions and to the supposedly necessary simultaneity (or supply-and-demand equilibrium) of several sectoral projects. No reference is made —either explicitly or implicitly— to problems of spatial development of the economy.

On the other hand, the theory of unbalanced economic growth, which largely figures as an intellectual reaction to the foregoing theory, is mainly associated with such names as Perroux, Hirchman and Myrdal.

At least as originally formulated, the theory of unbalanced growth is also a completely aspatial theory in which emphasis is placed on discontinuous innovations (following Schumpeter's thinking) that are generated at certain points (firms or industries) in the structure of production: points which, through backward and forward effects, communicate growth impulses to other activities. It should be stressed that the geographical reference of this theory is purely

incidental (and in any case of later date). A point to note in this connexion is that the concept of growth pole directly associated with the theory in question initially had purely functional connotations.

These points having been cleared up, the next question is what spatial significance attaches to the concepts of equilibrium and disequilibrium.

There should be no confusion on this point. At a given moment in time a specific interregional system exists with a given structure. This structure is defined by the nature of the component subsystems and by the type of relations which interlink these subsystems.

Balanced growth of the interregional system can only signify a growth process which maintains the structure of the system unchanged, altering only the scale of the system itself. This can only be achieved if all regions expand at an identical rate, which obviously corresponds to the national growth rate.

While the concept of balanced growth of the regional system can be unambiguously defined, it must be recognized that —in the terms propounded— this concept has no great strategic value, since 'equilibrium' will be all the more difficult to maintain, the greater the size of the interregional system, that is, the larger the number of regions.

On the other hand, the unbalanced development option is not so easy to define. By contrast, it should be understood that any regional growth process in which the different regions expand at rates that are likewise different will imply some sort of spatial disequilibrium. Consequently, many alternatives are engendered here, still within the unbalanced development option.

If the present structure and the operation of the regional system are deemed inefficient (in relation to the more general global objectives, for example), from this point of view the strategy will clearly have to adopt an unbalanced growth pattern. As it is precisely when the evaluation of the system is negative, and only then, that the regional planning process will take effective shape, the corollary is that disequilibrium must be the norm for regional development strategy.

The above way of differentiating and defining the concepts of balanced and unbalanced development may seem oversimplistic at first sight. It is, however, the only means of transferring on to the spatial plane concepts which, as has been pointed out, have their origin and their widest application in the purely functional context of economic growth theories.

Two facts should be noted in passing. The first has to do with the relativity of the very concept of equilibrium, which cannot be defined unless in relation to a given point or moment; this suggests that the foregoing interpretation is not the only one possible. The second relates to the absence of strict correspondence between the functional and spatial interpretation of the concepts of equilibrium and disequilibrium. It is therefore possible to conceive of a balanced growth *à la* Rosenstein-Rodan, in terms of activities, which might simultaneously generate completely unbalanced spatial growth, and *vice versa*.

Another option between formally exclusive alternatives which will have to be considered in the drawing-up of the strategy relates to the concepts of vertical development versus horizontal development.

This option, as advanced by Matus (Matus, 1969), has its roots in an alternative long ago propounded by regional specialists, which can be summa-

rized in one question: must the population move towards employment opportunities, or should it be the other way round?

Matus understands by vertical development a development style which consits in basing growth on places where infrastructure already exists, i.e., places where the generation of external economies is guaranteed and new investment thus becomes an attractive proposition. For easily explicable historical reasons, in Latin America a characteristic feature of this development pattern has generally been location on the littoral. The concept of vertical development, moreover, is linked with a pattern of development by diversification as against an expansion pattern, and it is asserted that diversification would seem to be the typical form of expansion of dependent capitalist economies (for example, greater diversity of cars, always produced for one segment of the population).

The essential feature of 'vertical' development is that the country's resources shift towards the pre-existent location of the population. The logic of this type of development is based on the premise that the existing urban centres are operating with diminishing costs in relation to the additional population and economic activity. According to those who decry the 'vertical' option, this hypothesis would appear to be false, at least in a good many cases, and, furthermore, it poses a series of side problems connected with unemployment, income distribution and marginality.

On the other hand, the concept of horizontal development is based on planning a succession of poles or centres of development with a view to the conquest of new spaces, as a result of which the population shifts towards where the resources are, that is, the process is exactly the reverse of vertical development.

Unquestionably, in a continent like Latin America, the interior of which is virtually empty, the horizontal development option is very attractive. Not only would space be occupied, an objective desirable in itself; what is more important is that this process of occupation of space could be based on the use of labour-intensive technologies, at least in certain sectors. Thus, the occupation of space, the building of new cities, the exploitation of new resources and other similar activities might generate a considerable volume of employment. There can be no doubt of the impact that could be made on income distribution and on the marginality brought about by capital-intensive industrialization. Horizontal development strategy is of course accompanied by radical changes in the mode of industrial production, i.e., it is associated with a pattern of expansion of mass consumption.

Underlying the option of vertical development versus horizontal development, there is clearly a problem of costs, and in general, of capital resources. It can be formally demonstrated that on certain assumptions and in a static framework, horizontal development implies greater use of resources than vertical development. But a correct evaluation of the two alternatives would necessarily have to be carried out in a dynamic and long-term framework. Furthermore, the costs of social capital formation in horizontal development can be considerably reduced if a capital formation mechanism is adopted such as is suggested by Nurske, i.e., use of the surplus rural population.

Another of the development options entering into the drawing-up of a strategy offers a choice between a pattern of polarized development and a pattern of non-polarized development.

Beyond all doubt this has been the most important element in the academic discussion and the practice of regional planning in Latin America in recent years. On the other hand, if any concept or any theory (although this title is somewhat ambitious) has been ill-interpreted and ill-applied in Latin America, it is precisely the concept of polarized development. Paradoxically, the very controversy aroused by the use of polarized development theory has generated promising lines of critical thought in Latin America.

Accordingly, the foregoing considerations warrant relatively lengthy treatment of the problem in these pages, with the aim of placing so important an option in a sufficiently general and appropriate framework.

Polarized development theory, which has its origin mainly in the work of Perroux, is essentially a theory of unbalanced growth in which such concepts as innovation, domination, and transmission play a basic role. Moreover, the structure of this theory is essentially inductive, stemming from empirical observation to the effect that growth is not simultaneous everywhere but tends to take place at certain points (poles) of the economic system, whence it spreads to other points with varying intensity and effects.

From a 'pure' growth theory, the theory of polarized development was rapidly converted into a theory of 'spatial' growth in so far as the concept of 'pole' was mistakenly assimilated to the notion of 'urban centre'.

From the operational standpoint, polarized development theory may give rise to at least two specific strategies or concrete ways of interpreting and applying the original concepts: 'single-point' polarization and 'areal polarization'. Each specific form is particularly associated with the nature of the structure of the urban systems that would sustain the economic measures to be devised. As this is an aspect not covered by the literature of the subject, it must be examined in some detail with a view to subsequent discussion of the practical content of a polarized development option.

The geographical size of countries, the type of distribution of cities they present and the nature of the polarization strategies functional to each individual case, should be considered as interrelated matters. Perhaps the apparent failure of polarized development strategies in Latin America is to some extent linked with disregard of these interrelationships. A failure in any case more apparent than real, for, as someone pointed out, the same might be said of polarized development (in Latin America) as of Christianity: a thing cannot have failed that has hardly ever been applied.

To begin the analysis of the interrelationship of geographical size with distribution of cities and with polarized development strategies, it is useful to take as a starting-point the group of basic technological hypotheses pertaining to polarized development theory.

Reduced to its simplest expression, polarized development theory is based on a set of hypotheses whose validity in a given situation constitutes a *sine qua non* for structuring a polarized development strategy with some possibility of success. These hypotheses may be formulated as follows:

(a) A process of functional polarization exists (i.e., economic growth can be viewed as a series of imbalances caused by the appearance and decline of a number of innovative, dominant and propulsive activities);

(b) A process of geographical polarization exists (i.e., the spatial structure is modified as a result of the appearance and decline of urban centres which

generate forces of attraction and of dissemination in relation to economic activities in the geographical environment);

(c) This is a self-contained process (i.e., there is a reciprocal feedback effect which means that either of the two processes induces the emergence of the other);

(d) These destabilizing elements (poles) can be exogenously introduced into the functional structure of activities and by this means it is possible to bring about geographical polarization.

The validity of the above hypotheses is not generally questioned in the case of developed economies where the two basic side conditions exist that make it possible to postulate these hypotheses and therefore to propose a polarized development strategy. These conditions are the existence of interindustrial relationships which determine a relatively comprehensive transactional matrix and the existence of interspatial (or interurban) relations which also determine a more or less complete set of transactions. In these conditions, and given the validity of the feedback hypothesis, it is legitimate to suppose that the introduction of a new 'polar' activity will generate a number of effects that will be simultaneously diffused through the matrix of industrial relations and through the matrix of spatial relations.

The basic problem lies in the fact that these conditions are not generally found in developing economies. Interindustrial relations are scanty and feeble; interspatial relations are still more so. It is precisely low-integrated economies that are concerned.

For this reason, in a developing economy a polarized development strategy has a completely different and much more complex content. It is not merely a question of introducing destabilizing elements (poles) into the system; at the same time the system of economic and above all spatial relations must be created.

Recognition of the above fact immediately implies admitting that a polarized development strategy involves a much larger quantity of financial, technological and administrative resources than is usually assumed. In other words, a correctly-conceived polarized development strategy is a large-scale business rather than a series of separate small-scale measures.

The second element that must be introduced in order to shape a more integrated approach to the polarization phenomenon is the absolute geographical size of countries. It may of course be expected, *a priori,* that there will be some differences in the way of introducing a polarized development strategy in 'small' countries and in 'large' countries. Little has been said on this point in regional literature proper. Among others, Geisse and Coraggio (Geisse and Coraggio, 1970) from one point of view and Gutiérrez, Ortíz and Villamil (Gutiérrez, Ortíz and Villamil, 1971) from another, offer important contributions to the treatment of the subject.

Although addressed to metropolitan planning problems, the well-known article by Geisse and Coraggio affords and excellent example of how different spatial scales call for different instruments of control and orientation, based on non-traditional concepts. The two writers' argument, relating to metropolitan regions, would be perfectly applicable in the case of very small countries which, in certain conditions, operate like 'big cities'.

Needless to say, Geisse and Coraggio do not advocate a change of methodological approach only because of a question of scale of regional size; clearly, their argument is rightly based on the different functional structure of a metropolitan area. Nevertheless, from the standpoint of the subject under discussion, the fact remains that a 'small' country could also be conceptualized as a 'big city', depending of course upon the degree of internal interdependence and mobility. This means that in the case of 'small' countries a change would also be required in the approach to regional planning, and this would likewise have to include a change in the way of conceptualizing the introduction of a polarization strategy, if this were definitively the instrument of change appropriate in the circumstances.

From another and no less interesting point of view, Gutiérrez, Ortíz and Villamil postulate the need for readapting planning blueprints —too Keynesian and therefore based on hypotheses of very limited openness of the economic system— for the purposes of operation in small countries, normally characterized by a considerable degree of openness.

While the above-mentioned authors focus their study almost exclusively on the global aspect of economic planning, it is no less true that if (nationwide) regional planning is taken to be a component of national planning, the praxis of the former should be modified to the same extent that the content of the latter is altered. In turn, if a polarization strategy is incorporated in a regional planning system, it too will need, in conditions of great openness, to be reformulated in respect of its content and scope.

Taking as their point of departure the set of characteristics which typify small countries, the authors cited suggest a planning model slanted towards control of intersystem flows, reduction of uncertainty, generation of information and formulation of a strategy of minimization of losses which will ensure the stability of the system.

Thus it can be seen that the scale of the area under control (whether it is a region or a country) has a decisive influence both on the methodology and on the operational instruments of planning, whether the scale is measured in purely geographical terms or in relative functional terms.

A preliminary working hypothesis can therefore be deduced: a polarized development strategy will have to differ in its conception and specific content according to whether it is to be applied in 'large' or 'small' spaces, and in the latter case there is the additional possibility that the formulation of a polarized development strategy may be meaningless.

The third element that needs to be introduced into the analysis is the pattern of the urban system.

In an important study by Vapñarsky (Vapñarsky, 1969), it is noted that the urban hierarchy models known as 'primacy models' and 'rank-size models' are not mutually exclusive in one and the same country; rather, the author maintains, "a perfect fit to the rank-size rule of all cities in an area except the largest is compatible with a high level of primacy".

Considering regions (or countries) as ecological systems, Vapñarsky concentrates his attention on the attributes of closure and internal interdependence of these systems. The closure of a system is defined by the author as the proportion of all existing interactions beginning or terminating within a particular system which are also completed within the same system. Internal interde-

pendence is defined as the total amount of interaction that takes place between all possible pairs of units in the system (for example, cities), divided by the total population living in these units.

From the foregoing definitions Vapñarsky deduces two important hypotheses. The first of these lays it down that "for regions which are suffciently well defined, that is, having relatively high closure, the lower the degree of closure, the higher is expected to be the degree of primacy of the city which establishes the main links between the given area and the external world". The second hypothesis "is that the higher the interdependence, the higher the fulfilment of the rank-size rule for the whole distribution of cities is expected to be".

Since closure and internal interdependence are independent attributes of a system, the author distinguishes between four possible situations:

(a) *High closure and low interdependence.* This combination would characterize a very underdeveloped area practically isolated from the rest of the world. No city of appreciable size is likely to occur, nor can a rank-size pattern be expected;

(b) *Low closure and low interdependence.* In this case the primacy of the city maintaining links with the external world may be expected; at the same time no well-defined distribution pattern would be likely for the rest of the cities;

(c) *Low closure and high interdependence.* While the largest city will tend to show high primacy, the rest of the cities will probably conform to the rank-size rule;

(d) *High closure and high interdependence.* In these conditions the rank-size rule would be fulfilled for the whole distribution of cities.

To this typology may be further added the size-of-country factor, when this element is regarded as relatively independent of the degree of closure and the level of internal interdependence. This would give us eight typical situations.

On this framework of basic conditions must be superimposed the set of alternative strategies for the development of the geo-economic space in order to establish some possible pattern of association.

In a recent document, Boyce and Boisier (Boyce, Boisier, 1974) discuss some of the propositions most commonly drawn up with a view to influencing the urban-regional structure, and compare these alternatives with the existing situation in Venezuela. Of the options examined, three are of interest in the context of the present study: geographical equity, urban primacy, and systems of medium-sized cities.

The option of 'geographical equity' consits in disseminating resources (for example, investment in industrial parks) throughout the whole urban spectrum so as to benefit the largest possible proportion of the population, i.e., so as to make employment opportunities as equitable as possible, by mobilizing resources instead of mobilizing the population.

Although such an option can easily be criticized from the standpoint of efficiency in the use of resources in short supply, it has served as a conceptual basis for experiments as important (but also as little successful) as the so-called 'Operation Boot-Strap' carried out in Puerto Rico during the 1950s and the experiment in dissemination of industrial parks in India during the earliest five-year plans.

Of course, when capital is in short supply, an option of geographical equity is irremediably doomed to failure if at the same time the implicit scheme of industrial development is adapted to the requirements of modern technology; in that case it is impossible as a general rule to surmount the problems of scale and indivisibility. Similarly, if the degree of internal interdependence (at the level of urban centres) is low, it is impossible to use the mechanisms of geographic separation of processes and complementarity of functions between urban centres. So that from this angle a 'geographical equity' option could not be fitted into the context of an economy where interdependence was slight. Of course it could be used to generate greater interdependence, but perhaps at too high a cost in terms of under-utilization (this seems to have been one of the results reached in Puerto Rico).

The urban primacy option —diametrically opposed to the foregoing alternative —presupposes a high degree of correlation between urban size and economic efficiency (efficiency in a different sense from the Paretian optimum): i.e., that large cities are more efficacious generators of economic progress than smaller cities, a rule which holds good for any segment of the urban system. It follows as a corollary that the most effective urban growth policy will be the one that stimulates the accelerated growth of the primate city in such a way as to take advantage of the urban hierarchy for spreading the gains of the primate city throughout the length and breadth of the whole geographic space.

The option of strengthening the growth of the primate city on the basis of its supposed greater efficiency has been supported by such leading exponents of regional-urban development theory as Alonso (Alonso, 1968-1971) and Mera (Mera, 1970), among others. Mera's basic argument is that in developing areas the economic efficiency of a country (measured in terms of per capita income) is enhanced as the population of the central city increases in relation to the country's total population (the index of primacy rises). Mera gathered data for a period of seven years in a large number of countries, and, through several statistical analyses, reached the conclusion that in developing countries the largest cities are the most productive. In contrast with this conclusion, it is found in a study mentioned above that in Brazil the largest cities would seem to be less productive[40] than those of medium size; in these latter industrial productivity per worker increases at a rising rate, while in the former it increases at a declining rate, according to a cross-section analysis of more than 200 Brazilian urban centres.

In any event, empirical evidence for or against the urban primacy option is scanty, and such as does exist is one-sided in the sense that either costs or some form of benefit are measured without the two concepts' being considered simultaneously.

The option focussed on 'systems of medium-sized cities' in some sense represents a half-way house between the extremes just discussed, and in essence is a suggestion for: (i) determining the existence of well-integrated urban systems formed around a central city of relatively medium size (at all events exceeding a

[40] Although average productivity is higher in the larger cities, as regards variations in productivity within one and the same urban-size category the advantage lies with the medium-sized cities.

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given minimum); (ii) applying in such systems a complex development strategy along the lines implied in the concept of INDUPOL (Boisier, 1974).

The conceptual basis of an option oriented towards 'systems of medium-sized cities' is the hypothesis that in such a case it would be possible (although not as a universal rule) to override the classic 'efficiency-equity' antinomy, always provided that in such systems, and particularly in their nodal cities, activities could be developed with a (localized) productivity higher than could be obtained either in large-sized cities or in unduly small centres. (See diagram 4.)

A close association (although not completely exclusive as regards its categories) can be observed between the three urban (or spatial) options reviewed and three alternative ways of introducing into them the functional or purely economic aspects (a strictly functional and single-point polarization approach, an approach of the 'big city' style and an approach corresponding to a more complex polarization effort such as INDUPOL).

MODES OF INFLUENCING REGIONAL-URBAN SYSTEMS
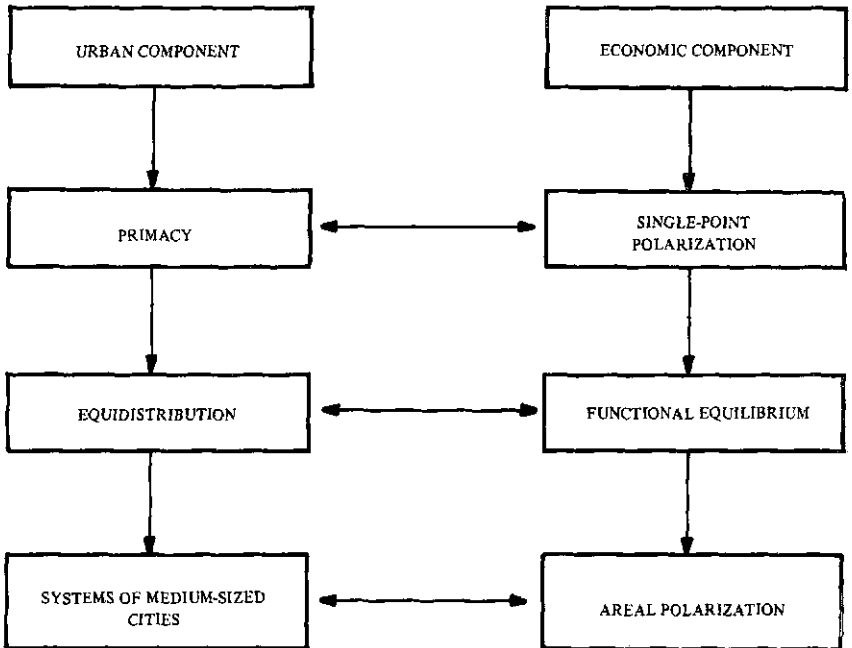
Thus, an urban primacy option finds its functional complement in a single-point polarization effort (corresponding to the classical or Perrouxian interpretation of the phenomenon); an urban equidistribution option is reflected in a functional and operational modality of the big-city (or functional-equilibrium) type; an urban option of systems of medium-sized cities finds its operationality in an areal polarization pattern. This form of association makes it possible to reply simultaneously to the questions where action is to be taken and how it is to be taken in order to change given regional-urban structures, as shown in the appended figure.

In the present discussion the polarized development option will be understood in a special sense, as a form of induced development, in which the industrialization, urbanization and polarization processes are consistently and simultaneously handled in such a way as to guarantee the growth and modernization of an area (not a point) structured by the existence of a system of urban centres. This conception of polarized development derives directly from what Boisier calls 'INDUPOL strategy'.

Industrialization, urbanization and polarization should be regarded as three facets of one and the same planned, comprehensive and large-scale process of regional development. It should be noted that this proposition cannot be accused of undue originality. The interrelations between industrialization and urbanization phenomena have been long and consistently studied; interrelations between industrialization and polarization too have been widely analysed and are to be found at the very base of Perroux's original propositions. The only new point made is the need to study in greater depth the interrelations between the urbanization and polarization processes and the necessity of considering these three phenomena as three interdependent and inseparable processes in a correct interpretation of a polarized growth strategy in developing countries.

During the past fifteen years the theory of polarized development has been the target of all sorts of positive and negative criticism. Some of these criticisms have been levelled at the conceptual framework of the theory, and generally speaking have been right in pointing out several weaknesses in it, particularly in relation to its normative aspects. Others have been directed at the policy questions emanating from the theory. These criticisms are largely based on empirical observation of the negative side-effects present in some polarization experiments.

The conception of INDUPOL strategy stems from two immediate considerations. In the first place, from empirical evidence to the effect that the failure of some experiments in polarization (in developing countries) is mainly linked to the existence of partial interpretations and measures. Secondly, from intellectual speculation to the effect that it may perhaps be feasible to reproduce —on a suitable scale— a pattern of industrial production observed in certain countries which up to a point revives the oldest industrial and guild traditions of the Middle Ages. All that is needed for illustrative purposes is to cite the example of the manufacture of watches, in which each separate part is made by craftsmen working at home, and the whole is subsequently assembled at some central place. Consequently, a series of industrial processes are carried out at different points in the geographical space, with a high level of reciprocal interaction, and subordinately to a final process at a central point.

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Will it not be possible to consider a similar form of industrial production on a regional scale?

One answer will naturally be that 'modern' industrial products need special technologies and indivisible scales, and that, in any event, it is not the same thing to manufacture cars as to make watches. It is true that not all industrial processes can efficiently split up into individual sub-processes, but a detailed examination of the problem will reveal three facts. First, industrialization in developing countries covers a wide variety of industrial activities, ranging from the technologically advanced to the more elementary. Secondly, even in more modern branches of industry, such as the manufacture of vehicles, electronic apparatus, chemicals, metallurgy and others, the reasons for vertical integration and geographical concentration are of an economic rather than a technical nature. Thirdly, there is always the possibility and in this case the advisability of envisaging industrial complexes rather than isolated projects.

The INDUPOL strategy is conceived as a series of interlinked and sequential measures intended to launch —in a given geographical area— a simultaneous process of industrialization and urbanization in such a way that the positive effects of the process are retained in the area in question. The changes brought about in the area are of a physical, economic and social nature and do not merely represent an expansion of the existing structures; rather do they signify changes in the nature and relations of economic and social structures on lines that will transform the area's society into a more modern society with a higher level of living.

The proposed strategy includes nine stages or nine types of complementary measures, listed below:
1. Identification of industrial activities
2. Identification of the urban system
3. Identification of processes susceptible of delocalization
4. Analysis and evaluation of the comparative advantages of the urban components
5. Assignment of industrial processes to the urban components
6. Selection of systematizing measures
7. Selection of internalizing measures
8. Physical and financial programming
9. Control and evaluation of the strategy

A brief description of the nature and content of each of the stages listed will make it easier to understand the scope of the INDUPOL strategy.

1. *Identification of industrial activities*

This phase, whose content is obvious, differs only in a few respects from the basic task included in the drafting of a purely sectoral industrial development programme.

In conformity with the general objectives of a development plan and with the more particular objectives of a given industrial strategy, the question is to select a set of industrial activities which will serve as a basis and a starting-point for the implementation of the INDUPOL strategy.

It is useful to point out that this phase involves a broader and more complex task than the mere locational specification of industrial projects already

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established in sectoral plans. While this may constitute a valuable first step, what is really needed is to generate new ideas for industrial activities, consistent, of course, with sectoral priorities, but at the same time representing a genuine contribution to the identification of projects by regional interests. In this connexion, both the local regional planners and also the local groupings by class (producers, trade unions, dealers) should be called upon to contribute in general to this generation of new ideas. It is common knowledge that a bottleneck in the development effort is sometimes created not by shortage of resources but by shortage of viable projects.

Is there any *a priori* criterion that can be of help in the selection of these activities? It is difficult to give a categorical reply at this general level of discussion, although some provisional guidelines can be laid down.

For example, the activities selected should clearly represent what in the relevant literature are termed *activités motrices*, or dominant and propulsive activities. All the many characteristics which are attributed to the *activités motrices* can be summed up in a single one: they are activities with a marked capacity to generate external economies.

If the necessary statistical data are available, relatively complex techniques can be used for the purposes of this identification, such as the techniques of triangularization of the input-output matrix and Rasmussen's calculation of dispersion indexes. If the information required is not to hand, it will be necessary to resort to more elementary procedures based on direct surveys of industries.

Another possible orientation relates to the degree of foot-looseness of industrial activities. The higher the degree of foot-looseness, the wider will be the possibilities of drawing up alternative (in a purely geographical sense) polarization strategies. The standard location analysis can be used in this stage for the calculation of various location indexes and quotients.

A third guideline which may help to establish the selection criterion is employment, if the unemployment situation is considered to be critical, either at the national level or at the level of localized pockets of unemployment. Bearing in mind the fact that this slant towards employment may be conflictive with the first orientation (generation of external economies), activities could in any event be selected whose direct and indirect coefficient of employment (in relation to fixed capital or to level of output) is higher than the average for the sector.

Other side conditions might be added, such as, for example, conditions relating to the use or generation of foreign exchange. In this connexion —*ceteris paribus*— priority might be accorded to activities geared to the country's foreign trade.

At this point emphasis should be laid on the preferability of selecting industrial complexes rather than a set of individual projects.

Industrial complexes —not in fact very common in the context of polarization in the Western countries— have at least two advantages (over individual projects) when used as part of a strategy like INDUPOL.

First, they possess by definition a high degree of technical and locational interdependence and it does not seem evident that this locational interdependence must relate only to one point in the geographical space.

Secondly, by their means certain activities which in isolation would not achieve adequate rates of return can be made financially viable.

It is true that generally speaking it will be more difficult to identify a set of complexes than a set of projects, but the effort should be made in any case in view of the advantages, which will be discussed again later. Furthermore, if the industrial base of the INDUPOL strategy is an industrial complex (it does not necessarily have to be so), this will undoubtedly help to cut down the number of INDUPOL strategies that could be simultaneously and hierarchically implemented in one single country. The available financial resources and the technological situation itself will tend to impose a ceiling on the number of basic complexes.

This is also the place to point out that there has been a tendency —which may well have been excessive and even mistaken— to link polarization to certain specific attributes of economic activity, i.e., the industrial attribute and the size attribute. It does not escape the notice of several writers that the spatial-sectoral modernization sought through a polarization strategy could also be generated by way of the establishment of purely tertiary or quarternary activities, such as higher education, research, tourism, management and administration services, etc.

2. *Identification of the urban system*

The feature that fundamentally differentiates the INDUPOL strategy from a sectoral industrial development strategy is precisely the simultaneous spatial-sectoral treatment at the level of urban centres. Again, what distinguishes a strategy like INDUPOL from other current polarization strategies is the emphasis on urban (or spatial) interdependence as against functional interdependence via input-output. Perhaps it should be made clear that in polarization strategies it is usual to identify one or several cities which will fulfil the function of 'poles'; the important thing is that these cities are implicitly considered as points rather than as components of an urban system.

Consequently, the second stage of the strategy consists in identifying the urban system or systems (in the second case it is more correct to speak of sub-systems) capable of receiving and assimilating the impact of industrialization.

In some cases it is impossible to distinguish several urban sub-systems within a single country (Uruguay, for example) an only the national system of urban centres exists. In this event, in accordance with the nature of the strategy under discussion, polarization can only be proposed in national terms, or in terms of a supra-national territorial category.

In most cases, however, urban sub-systems can be identified within a country. The basic identification criterion is one of nodalization of cities (in terms of goods, services and social interaction) around a nodal point.

Attention should be drawn to the possibility that the urban sub-systems identified may in some cases be potential rather than real.

This implies, as will be seen, that part of the strategy will have to be directed towards converting a potential sub-system into a real one.

At this point some reference must necessarily be made to a question which is complicated *per se*. What size is tolerable for each of these urban sub-systems? Or more specifically, what is the maximum distance tolerable between the

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components of the sub-system if a high degree of internal interaction is to be preserved? Of course no single theoretical answer can be given, since in each case the reply must emerge from consideration of the prevailing transport and communications situation. A hundred kilometres may be a perfectly tolerable distance for commuting in a well integrated regional-urban system, but it may constitute an insurmountable barrier in different conditions. The inference is that more caution should be exercised in the identification of the urban sub-system, at least from this point of view, although it should not be forgotten that part of the strategy will be directed towards reducing the level of spatial friction and will therefore tend to increase the 'size' of the sub-system.

Lastly, the specific analytical techniques that will have to be used during this stage are to be found among the familiar instruments of regional analysis. Flow statistics (goods, persons, services) by origin and destination and gravitational models usually permit fairly rigorous quantification of the intensity of interaction between cities. Moreover, this is just the place to introduce the concepts deriving from the theory of central places (Lösch-Christaller), since one of the functions of the nodal point of each urban sub-system will be precisely a function of centrality (even though the centrality attribute should, strictly speaking, be distinguished from the attribute of polarity).

3. Identification of processes susceptible of delocalization

One of the principal theoretical and practical problems that arises in the drafting of a polarization strategy consists in the correct mapping-out of functional activities over the geographical space. When these strategies are conceived in the usual way, that is, along mono- or multi-punctual lines (a group of cities or 'poles' in hierarchical order) the assignment of activities to these points is relatively direct and simple and is generally based on a combination of economic location criteria and political criteria respecting territorial distribution. In such cases, as a rule, there is an explicit or implicit tendency to place emphasis on the use of polarization as an instrument of growth (to the detriment of the difussion function) and to strengthen, principally, intersectoral relations (manifested in the abstract functional space) in preference to spatial or regional-urban relations.

If, however, the perspective in which a polarization strategy is applied assumes different connotations, or, in other words, if the strategy is used more as an instrument for spatial-sectoral modernization than as a mere instrument of sectoral growth, and if in consequence it is areal rather than punctual in character, the geographical assignment of economic activities becomes somewhat more complicated. In this case the main interest does not lie only in achieving growth at a certain point, but in achieving that growth while at the same time maximizing the level of internal interaction in the area, which is represented in this instance by an urban sub-system.

The foregoing considerations imply a need to postulate a highly disaggregated pattern of industrial production, in terms both of technological processes and of geographical points. In other words, this means that for each industrial activity previously selected during the first stage it will be necessary to study how far it is feasible to divide up this activity or process into sub-activities or sub-processes susceptible of delocalization in relation to a matrix or central process.

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Undoubtedly this possibility of identifying delocalizable sub-processes is a direct function of the degree of technical and economic complexity of the total activity. The manufacture of pins certainly does not allow such disaggregation as is proposed; the manufacture of cars certainly does.

At the risk of making a regrettable incursion into the field of mechanical engineering, let us take the example of the manufacture of cars. We will assume that the basic process among all those whose joint outcome is a car is that of assembly. Other identifiable subprocesses might be: manufacture of wheels and brakes, manufacture of tyres, manufacture of batteries and electric parts, manufacture of engines, manufacture of glass parts, painting, upholstery, etc.

What it is of interest to investigate (in this technically imperfect example) is the following question: granted that assembly is the central process upon which all the other sub-processes converge, can some of the sub-processes be carried out efficiently and without technical impairment in localities other than that where the central process is undertaken?

In other words, can the assembly process be carried out in city A, the process of manufacture of wheels and brakes in city B, the manufacture of engines in city C, without this militating against the general technical efficiency of the activity in question?

The answer naturally has to be provided by the engineers in the first place and secondly by the economists. The engineers will undertake to demonstrate the technical feasibility of geographically splitting up the whole process. The economists must assume responsibility for socially evaluating this technical feasibility. Clearly, in terms of private profitability, a production system of this kind might turn out to be completely anti-economic, mainly because of transport costs. But if costs are regarded as a price of regional development rather than as a negative item in the private accounting of firms, the result of the evaluation may be entirely different.

Obviously, in the case of industrial complexes it will be much easier to divide them up territorially, without going to such an extreme that the agglomerative element in the complex disappears altogether.

4. *Analysis and evaluation of the comparative advantages of urban components*

This phase of the INDUPOL strategy consists in a veritable study of supply and demand of an economic and urban character. The result of the analysis should make it possible to optimize the association between sub-processes and centres.

On the demand side the first requisite is to examine the structure of the production function of the activities selected during stage one. As a first approximation, the corresponding column in the input-output matrix can be used in this case.

The information provided in this column, however, is generally at too high a level of aggregation and strictly technological in character. In addition, still from the standpoint of demand, it is of interest to ascertain —given the unitary scale of production— what are the urban requirements entailed by the process.

Inter alia, at this stage space requirements must be quantified, together with location in relation to taking advantage of water, power and sanitary

networks, the housing demand (at its various levels) which the project will generate, needs in respect of industrial services provided by third parties and requirements as regards recreational services. The additional requirements in terms of educational and hospital services which will be generated on account of the increase in employment and income must also be calculated.

On the supply side, it is necessary to examine actual and potential conditions in each of the urban centres composing the sub-system under study. Consequently, it is a typical urban study of the traditional kind that is required.

The principal aspects that must be analysed and quantified are the labour supply and its classification, the availability, quality and location of land for industrial use, the supply (and short-term expansion capacity) of housing, education, health and financial and recreational services. Special attention must be devoted in this stage to questions of urban and interurban transport and communications so as to ascertain the present state and degree of saturation of the corresponding networks. The same may be said of the urban water, power and sewage networks. Lastly, it is important to study institutional aspects peculiar to each urban centre, such as, for example, special legislation on land use, promotion of industrial activities, environmental control and pollution, etc.

5. *Assignment of industrial processes to urban components*

Once the supply and demand study has been completed the most complex stage of the INDUPOL strategy follows. In this case the task is to design a mechanism for optimal assignment of sub-processes to the sub-system of urban centres.

Once the idea of 'optimum' has been introduced into the analysis, a prior definition must be given of the criterion of optimality that is to be used. A criterion of minimization of transport and equipment costs can be applied. In these conditions, the problem can apparently be resolved by means of a linear programming model, which is briefly described below.

Let us assume, for simplicity's sake, that two sub-processes or two independent processes A and B have been selected and that the urban system in its turn is composed of two centres I and II.

The preceding analysis of demand has made it possible to quantify the technical inputs (raw materials, labour, etc.) and urban inputs (sites, housing, etc.) for both processes. The analysis of supply on the other hand has made it possible to examine the provision of both types of inputs existing in each centre and the inputs that have to come from the rest of the world.

Let us assume that the technical imports are transportable from one centre to another and likewise from the rest of the world. A similar assumption is valid for end products. In contrast, urban inputs are localized and the supply of them can only be increased by additions *in situ*.

Thus the problem involves four types of transport costs: for inputs between centres, for inputs from outside the country and for products both between centres and abroad. In addition there are two types of equipment (divided in turn into several categories): equipment in I and equipment in II. Thus, the criterion function of the model can be easily established.

The restraints of the problem have the usual structure of restrictions on use of resources in linear programming, with the additional characteristic that

the supply of urban inputs represents not only the existing stock but also the increase in the stock within a definite period (for example, the period of execution of the projects). The variables of the model must assume only entire values of the 0-1 class, showing that each process is indivisible in relation to the urban centres. That is, a solution of type A (I) = 0; B (I) = 1 would indicate the assignment of process A to centre II and of process B to centre I.

If information or technical training difficulties make it impossible to construct a rigorous assignment model, the problem can still be resolved by means of a qualitative evaluation based on the supply and demand analysis. However, the information requirements posed by a model of this kind are not excessive, provided an input-output matrix is available.

At bottom, the analysis of supply and demand and the assignment process represent a very primitive and more general version of an industrial accessibility model. What is more, if it is accepted that the problem can be simplified by the exogenous adoption of given scales of production, its resolution then involves nothing but a traditional analysis of comparative costs in alternative locations.

6. Selection of systematizing measures

The name 'systematizing measures' is given to a set of measures whose object is to strengthen or create the conditions required for the group (or groups) or urban centres already identified to function as a real system, by system being understood a set of objects and the relations between the objects and between their attributes.

This systematic approach to the urban component in the INDUPOL strategy is of basic importance for its effectiveness. If the set of urban centres does not operate as a highly integrated (but open) system it will not be possible, as a norm, to bring about the geographical disaggregation of industrial processes; and without that dissaggregation it will be a case of reverting to the traditional experiments in functional polarization and single-point geographical concentration.

Consequently, a series of measures need to be implemented which will strengthen the interdependence of urban centres in economic terms and which at the same time will reduce the level of 'spatial friction' between these centres. To that end, it is of interest to consider the urban sub-system in terms of what Geisse and Coraggio have called the 'big city'. From this angle, the cities forming the sub-system are visualized as specialized 'neighbourhoods' rather than competitive centres, and consequently —paradoxical as it may seem— in the INDUPOL strategy the competitive connotation of the pole concept must be abandoned, in spatial terms.

The 'systematizing' measures can be conveniently grouped in two major categories: (i) those affecting each individual centre; and (ii) those affecting the system. In other words, they are intra- and interurban.

Among the systematizing measures of an intra-urban nature mention may be made of all those whose object is to raise the level of efficiency at which each centre operates: for example, construction of dwellings, urban transport, zoning, improvement of urban networks, construction of industrial districts and of supply centres, etc. In the last analysis, these measures form the classic arsenal with which urban planners have operated in isolation. The hierarchical assign-

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ment of services to the various cities in the system will contribute to the efficient operation of the system as a whole, and it is here that the concepts deriving from the theory of central places should be introduced. It only remains to point out that the final selection of the measures in question will depend upon the result of the supply analysis described above.

The basic objective of the systematizing measures of an interurban nature is to increase the degree of spatial mobility (within the sub-system) of factors, products and technological external economies. In the main, these measures are comprised in three groups: (i) measures affecting the interurban transport system; (ii) measures affecting the interurban communications system; and (iii) measures relating to the administration of the urban sub-system.

Measures intended to influence the transport system and the communications system within the urban sub-system tend to create veritable axes or corridors of development, interlinking the urban components in such a way as to bring about maximum fluidity in the internal movements of goods, services and persons.

Two additional observations may be made here. In the first place, something that must be borne in mind is the increasing importance of the 'communications' factor as against the 'transport' factor in modern industry. The functional and geographical disaggregation of industrial processes will be appreciably affected by the level and efficiency of intra-system communications. It will therefore be necessary to devote careful attention to the improvement of formal and informal channels of communication within the urban system. Secondly, it is worth while to note that perhaps the principal objective of the measures relating to improvement of the transport network is the diffusion —within the system— of the technological external economies which may be generated at any given point in the regional-urban network. In this context, some sort of a balance will have to be struck between typically intra-urban investment whose effect is to localize external economies and interurban investment which tends to produce the opposite effect.

As regards the administration of the urban sub-system, the traditional patterns of municipal and urban administration are clearly not the most appropriate if what is desired is the efficient operation of the system as a whole. Here it will therefore be necessary to study the desirability and political viability of an administrative structure capable of effectively co-ordinating the workings of the system. Some supra-local agency will be needed whose authority emanates from transfers of power both from the central level and from local levels. The specific nature of such an agency —autonomous development corporation, regional planning offices, etc.— will naturally depend upon the national power structure and upon administrative considerations beyond the scope of the present book.

7. *Selection of internalizing measures*

The fact that a group of urban centres really does function as a system is not enough to ensure effective implementation of the INDUPOL strategy. Even in that case, the positive effects of polarized industrialization (increasing income, capital accumulation, etc.) might revert through technical, financial or other interrelationships to spaces other than the geographical space where the strategy is being applied.

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Consequently, a series of measures must be adopted which have been termed, for lack of a better name, 'internalizing' and whose objective is precisely to guarantee the internalization of the whole development process. In other words, it is necessary, up to a point, to 'close' the system.

The effects of 'escape' outside the system make themselves felt in various ways. The classic manner is a high level of marginal propensity to consumption of imported goods. In this way the Keynesian multiplier effect of the polarization process may be completely cancelled out.

At the national level it is relatively easy to apply quantitative and qualitative measures whereby this marginal propensity to consumption of imported goods can be reduced. At the subnational level, the problem acquires much more complex connotations, since the imports concerned are generally goods produced within the country but outside the area under analysis. The truth is that the only positive and realistic action that can be proposed in this connexion is careful management of a transport tariff policy and a policy of regional import and tertiary services substitution. On this point, however, it must be recognized that additional studies, both theoretical and empirical, are required.

Another way in which the 'escape' effect is manifested is through financial operations.

A recent case in point is afforded by Brazil. A considerable boom on the stock exchange in 1970 and 1971 seems to have led to financial investment of the industrial surplus produced in the North-East. The vast majority of the securities negotiated on the stock exchanges of Río de Janeiro and Sao Paulo correspond to enterprises located in the already super-developed Sao Paulo-Río-Belo Horizonte triangle. The result is low reinvestment in the North-East and transfer of capital to the South. Granting that the foregoing example represents only a hypothesis still to be substantiated, it serves to illustrate an operational mechanism of the 'escape' effect which can be corrected without recourse to any very complex solutions. For a start, some compulsory form of regional reinvestment can be imposed, as was done in Chile in the case of the Magallanes Region or as is laid down in the Industrial Act of Peru, for example.

But it is not only through the financial market that profits can be transferred. As happens with international corporations, 'regional' enterprises and their 'national' parent firms may put into practice various mechanisms which enable the parent firm to appropriate the surpluses generated by its subsidiary. These mechanisms include payment of royalties, undue participation of the subsidiaries in certain costs originating in a parent firm, and other similar procedures.

Briefly, appropriate tax legislation and strict legal control over financial procedures may, within reason, guarantee the local retention of gains. If the foregoing measures are complemented with proper management of public and private credit policy, there is a very fair margin of certainty that —in this respect— the regional development process will tend to be self-supporting.

Another line of action has to do with industrial complementarity within the urban sub-system. In this connexion, the definition of the projects or complexes included in INDUPOL strategy should be broad enough at least to envisage the setting-up of a number of enterprises responsible for final transformation of products. If the complex in question is structured around a steel mill,

for example, the ideal thing would be for the regional urban system to export only final products so as to maximize the local value added.

There are also 'internalizing' measures of another type which are perhaps more important. The regional development achieved by means of the INDUPOL strategy is not development for the greater glory of the planner. It is development brought about by and for the regional community and through it above for the national community.

In other words, the polarized industrialization process cannot be exclusive and marginalizing as is the case with most of the present-day industrialization processes in Latin America. On the contrary, it must signify the mass incorporation of the population into the benefits of progress. Consequently, a number of social aspects must be explicated and taken into account.

As discussion of them is outside the scope of this section, mention will merely be made of some general questions. It must be pointed out, however, that the INDUPOL strategy is not basically a social development strategy, although it may represent an important contribution to regional social development.

The objectives of social policy at the regional level have been categorized as follows: (a) motivation and modernization of the community; (b) mass incorporation of the population into the production process; (c) improvement of socio-political institutions; (d) systematic acceleration of social mobility; (e) national integration; (f) introduction of popular participation; (g) progressive improvement of levels of living; (h) realization of the potentialities and safeguards of human dignity; (i) definition of a national image.

Clearly, the INDUPOL strategy is not conceived with a view to making a decisive contribution in respect of all these objectives of social development. Even so, it may do much to assist in the attainment of such objectives as the following: (i) mass incorporation of the population into the production process, through an appropriate selection of complexes and of complementary activities in which labour-intensive technologies can be used; (ii) systematic acceleration of social mobility, through the process of modernization which industrialization introduces and through the Keynesian multiplier effect of polarization; (iii) national integration, particularly in its economic and physical senses, through industrialization and systematizing measures; (iv) progressive improvement of levels of living, through the multiplier effect mentioned above; and, lastly, (v) definition of a national image, by infusing into the regional community a positive awareness of the region's potential and future role in the national context.

8. *Physical and financial programming*

Once the foregoing stages in the INDUPOL strategy have been completed, the specific measures emanating from these stages must be presented in orderly fashion by means of a physical and financial programming blueprint. This blueprint must make it possible: (a) to evaluate the cost of the strategy or strategies; (b) to draw up a time schedule for the allocation of resources and specify their source; and (c) to provide a short-term control and implementation instrument.

Here, therefore, programme-budgeting technique may be directly applied, so as to guarantee that the various specific measures will follow a pre-established sequence and that the various types of physical and financial inputs will be available both at the necessary date and in the appropriate place.

In order to organize the programme-budget of the INDUPOL strategy it would be useful to distinguish certain basic programmes, each of which would include an unspecified number of projects. For example, these programmes may be the following:

Programme	1.0	Industrialization
Project	1.0.1	Construction of a motor-vehicle plant in city A
Project	1.0.2	Construction of a synthetic rubber factory in city B
Project	1.0.3	Construction of a special steel plant in city C
Project	1.0.4	Construction of an electric power station in city B
Project	1.05	x x
Programme	2.0	Urbanization
Project	2.0.1	Improvement of the transport system in A
Project	2.0.2	Construction of housing in B
Project	2.0.3	Construction of an industrial park in C
Project	2.0.4	Educational and hospital equipment in A and B
Project	2.0.5	x x
Programme	3.0	Interurban works
Project	3.0.1	Construction of a highway between B and C
Project	3.0.2	Installation of automatic-dialling telephone system between A, B and C
Project	3.0.3	Rail interconnexion between A and C
Project	3.0.4	x x
Programme	4.0	Complementary works
Project	4.0.1	Installation of a labour training centre in C
Project	4.0.2	Establishment of a technological research centre in C
Project	4.0.3	Installation of community centres in A, B and C
Project	4.0.4	Regional administration
Project	4.0.5	x x

The above list is of course only a very incomplete example for purely illustrative purposes. In a more real situation the financial and physical resources for each project and the time schedule for their allocation will naturally have to be included, and likewise the programme-budget will have to specify the institution responsible for each project. Perhaps what it is most important for the phase of physical and financial programming to guarantee is perfect equilibrium in the entry into operation of industrial activities in the system and an adequate supply of primarily urban inputs.

9. Control and evaluation of the strategy

The INDUPOL strategy is conceived as a circular chain of processes, and periodic control and evaluation must be the feedback elements whereby the entire process can be perennially redefined.

Two observations may be made with respect to this stage.

In the first place, plan control, as some writers point out, must be effected with the active participation of the individuals directly affected by the plan itself: in this case, the regional community. Representation of the community, without its coming to mean that the people sit in political judgement upon those responsible for the strategy, is necessary at this stage in a strategy too, and may furthermore imply a contribution to the first of the social development objectives indicated above.

Secondly, from a more technical standpoint, the stage of control and evaluation calls for the establishment of an up-to-date information system.

In reality, this is the last in a series of sequential stages. It would be useful, however, to bear in mind that the information system necessary for the control of the strategy should be planned sufficiently far in advance, if possible as from the very moment at which the political decision to draw up the strategy is adopted. Experience tends to show that the delicate task of creating a regional information system (especially in developing countries) is quite difficult and needs careful planning. Moreover, it is always desirable to possess an *ex ante* socio-economic diagnosis of the area, so that the impact of the strategy may be more clearly perceived.

The basic objective of the information system and of the control phase in general is perennial evaluation of the balance between the centripetal and centrifugal effects of polarization, with a view to guaranteeing that the latter prevail.

In this connexion it will be indispensable to devise a regional information system whereby two types of structural change can be detected: (i) variations in the position of the region in the country's interregional system, which will occur only over the medium and long term; and (ii) variations in both the level and the distribution of intra-regional income, which should occur, in a positive direction even over the relatively short term. Here it must be stressed that a mere increase in average regional per capita income by no means implies that the strategy is achieving the desired result; what is of primordial importance is that this increase should be reflected in a more equitable distribution of income, to which end certain structures of ownership in the region will have to be changed.

Lastly, the information system should not be geared solely to the task of generating statistical information. Concurrently, it should generate and disseminate more general qualitative information that will affect the locational, investment and migration decisions which are adopted by private agents and which, for lack of adequate diffusion of knowledge of the regional situation, end by benefiting other regions of the country.

The opposite option, i.e., that of non-polarized development, is not easy to identify clearly (and there is always the possibility that it might be an artificial option or simply that no option exists at all), partly because those who have criticized the theory and strategies of polarized development have not yet succeeded in formulating a complete body of doctrine.

In any event, it should be assumed that a non-polarized development pattern implies territorial dissemination of investment and, presumably, marked emphasis on urban-rural integration through the modernization of agriculture. If this is indeed its content, such a strategy would have to be based on small-scale activities, not only because of the global restriction of resources, but also

because small industries are more suitable than bigger ones for insertion in small urban centres and in rural areas, and, furthermore, absorb a larger quantity of manpower per unit of capital.

A strategy of territorial dissemination finds expression in practice, in most cases, in a strategy of integrated rural development, which is particularly attractive in countries where the problem of population dispersion is very acute (for example, in Panama, one-third of the total population is spread over 9 000 population centres with an average size of about 60 inhabitants).

The basic elements of an integrated rural development strategy are associated with the concentration of the population in small and medium-sized population centres into which is introduced a complete and interdependent packet of social and commercial services, dimensioned to serve the centre and its natural hinterland. The underlying logic obviously relates to the exploitation of economies of scale and to reduction of costs in the provision of services of a social type (education and health, for example) and of a commercial type (for example, public markets and agricultural technical assistance services).

From the conceptual standpoint, the idea of polarized development and the idea of integrated rural development are completely different.

On the one hand, polarized development is structured on the basis of urban systems. On the other, the aim of a polarized development strategy is to promote the spill-over of certain effects from the centre to the periphery.

In contrast, integrated rural development strategy is directed towards the rural space and its design is to create small centres on the basis of peripheral concentration. In other words, in the one case the object is to generate centrifugal effects and in the other centripetal effects are sought.

Nevertheless, if the right conditions are present, both strategies, although conceptually different, can and should be operationally applied on complementary lines, especially when an integrated rural development strategy is recognized as an application of the principles of the theory of central places.

At all events the fact holds good that a polarized development option is an essentially 'urban' and 'industrial' option and that nothing is known of any outstanding attempts at effectively linking up polarization questions and questions of an agricultural or rural type. Carlos de Mattos points out that in polarized regional development strategies the most neglected aspect has been that relating to the rural area and to the measures which must be defined and applied for the development of the primary-sector activities that would there be predominant (de Mattos, 1975).

Another alternative open to the designer of regional development strategy consists in opting between State aid to places and State aid to persons.

Cumberland mentions that this has been a major issue in academic and political discussion on regional development in the United States (Cumberland, 1972). Alongside this it may be noted that despite the importance of the option in question, little attention has been paid to it in Latin America.

Apparently it has been assumed that a regional development plan is drafted precisely in order to rationalize aid to places: after all it is space that is the central element in regional planning. The implicit rationality of this option —as Cumberland indicates— is that it seems in some way more efficient to assist persons through the indirect mechanism of raising the level of activity in the

region than by direct aid to individuals and social groups. The trouble is that this greater efficiency is taken for granted without having even been proved.

There are at least two points to which attention should be drawn in relation to this option.

Firstly, aid to places, as an indirect mechanism for helping individuals, may, in certain cases, be completely useless. In choosing this option it is assumed that a region's economic problems (or at any rate some of them) are resolved by the simple but sometimes costly expedient of creating new employment opportunities in the region. But if the region's unemployed are jobless because they are unable to join the labour force on account of their low level of training, poor health or deplorable housing conditions, any regional plan will fail in its attempt to settle the question of unemployment.

In this case, more often than is usually thought, it is more efficient to use the available resources for direct aid to persons, so as to overcome their basic difficulties. Instances have been observed of regional industrialization programmes which, owing to the situation described, end by using manpower from outside the region.

Secondly, assistance to places (which always represents indirect aid to persons) requires that the impersonal market and price mechanism operate with a measure of efficiency. Seldom will this be the case in underdeveloped regions, so that the efficacy of aid to places by this means is open to question.

Moreover, it must not be supposed that in choosing an option like aid to persons, the action taken is shifting to a completely aspatial plane. After all, persons are definitively localized in the geographical space.

Yet another alternative that presents itself in relation to the drawing-up of strategy is the option between development of basic social capital and development of the directly productive sectors. Of course, this is not a question of a dichotomous option once again, but rather of placing emphasis on one or the other possibility.

Up to a point, the selection of one of these alternatives (or a combination of the two) is directly linked to the national development strategy pursued and to the conception of the role of the State which it embodies.

Indeed, the more 'Keynesian' is the national strategy, that is, the more emphasis is placed on the expansion of global demand, the more slanted it will be —and this holds good for regional strategy too— towards investment in basic social capital.

Parallelly, if in the national strategy the State is conceived as an entity whose most important economic role is that of generating the most appropriate conditions for other sectors of the economy to function as the principal agents of change, this implies in practice transforming the State into a 'generator of external economies'. External economies (mainly technological) are partly associated with the construction of infrastructure, that is, basic social capital. It may be noted in passing that this type of strategy to some extent shapes a mode of production which has been described as neo-capitalism.

A fact which is generally overlooked when this alternative (development of basic social capital) is chosen to determine regional strategy is the following. As is common knowledge, investment procedure has two effects: an increase in income via the multiplier effect and an expansion of installed capacity (whether directly

productive capacity or not). When an option like this is applied in backward regions and under certain conditions, the likelihood is that both effects will make themselves felt in the region itself, which definitely does not happen when the second alternative is chosen. Let us compare, for example, the alternatives of constructing a factory or building a road in certain regions. In all probability the capital equipment required for the factory will have to be imported from another region (at best). Thus the multiplier effect of investment largely benefits regions which are already capitalized (a case in point is the industrialization of the North-East of Brazil). In contrast, the building of the road can largely be carried out by means of inputs from the region itself, so that the multiplier effect is produced within the region. This is of course a short-term analysis, and also disregards the fact that the occupational effect of the construction of social capital largely disappears when the period of construction is over. At all events, these are considerations that must be taken into account in drawing up the strategy.

The choice made between the options of development of social capital and development of the sectors of production (or rather the emphasis placed on each) would not necessarily have to be the same for all regions. Depending upon the result of the diagnosis made and the objectives pursued in each region, several nuances could be distinguished in the application of one and the same national-regional strategic option. For example, in metropolitan regions (which will generally have to deal with a situation of control rather than of promotion) the strategy will probably place the accent on measures relating to basic social capital. In regions of another type, on the contrary, a strategy based on the development of the directly productive sectors might be applied.

In short, such factors as the relative role of the State, the situation existing in each region, the managerial capacity available (both in the public and in the private sector), will tend to shape a specific relation between the efforts that the country makes in each region in terms of infrastructural investment and of direct productive investment.

One last aspect that must be taken into account in drafting the regional development strategy relates to the option that might be termed economic development versus social development.

In this connexion, two implications of the proposed option must be clarified.

In the first place, the concept of social development should not be taken to mean State provision of certain social services, such as health, education and housing. These sectors have been traditionally described as social sectors, but it is clear that social development relates to more complex phenomena which have to do with the structure, organization and functioning of the society concerned. For example, elimination of the traditional housing deficits indicates a higher level of economic development, but it has no direct relation to the social development of the community.

Secondly, if the process of social change is rightly understood, there can be no antagonism between economic development and social development. Both are part of one and the same process and if what the society seeks is non-conflictive change, the two types of development must be understood as complementary and interacting.

It is common knowledge, however, that in practice they are presented as an option *de facto,* and one or the other alternative is chosen or, at least, emphasized.

Utria has schematized the objectives of a regional social development policy, suggesting that they could be grouped as follows: (i) motivation and mobilization of the community; (ii) mass incorporation of the population into the production process; (iii) systematic acceleration of social mobility; (iv) national integration; (v) introduction of popular participation; (vi) progressive improvement of levels of living; (vii) definition of a national and regional image (Utria, 1970).

Since some of the objectives listed above are attained as a by-product of economic growth pure and simple, it would perhaps be better to say that a strategic option in favour of social development relates to a radical change in the existing power structure which will imply both a substantial rise in the level of participation (both active and passive) of the community, and a rapid transformation of social values, symbols and relations.

If the process of social development is interpreted in this way, its apparent opposition to the economic development process is clarified as far as a short-term analysis goes. Obviously, this change in the social structure generates alterations in social, juridical and production relations, which prevent the normal development of the savings-investment process. Only when the new social order, whatever it may be, is consolidated will it be possible to look after the purely economic aspects of the process of change.

It is of interest to note that the 'region', as a territorial unit midway between the 'locality' and the 'country', probably has a good many advantages as a geographical frame of reference for the social development process. For example, social mobilization in relation to specific objectives is easier to achieve at the regional than at the national level. Similarly, social cohesion can also be more easily structured at the regional level and the same might be said of popular participation.[41]

All these various options or combinations of options which gradually give rise to a regional development strategy must form a whole coherent and consistent body of measures, both at the internal level of the strategy itself and at the external level of global strategy.

D. Regional development policies

Once regional development strategy has been defined in the framework of the guiding principles, regional development policies must be specified.

An explicit or implicit planning model is governed by the same principles of solution as mathematical equations, that is, a *sine qua non* for the existence of a solution to the model is that as many policies be specified as there are groups of objectives (in reality it is necessary that at least one policy instrument be applied for the attainment of each objective).

[41] See Torcuato Di Tella, "El concepto de desarrollo polarizado de planeación regional. Un enfoque sociológico", *Revista SIAP,* Vol. III, No. 12, 1969.

This suggests that what is usually described as 'regional development policy' is really a complex set of global policies for each region on the one hand and interregional[42] and spatial[43] policies on the other. In practice it will be difficult to avoid some measure of overlapping between them.

The background data collected by means of the type of exercise described in the preceding sections of this book provide the material for a first approximation to regional policies. The diagnosis, the objectives and targets and the strategy, together with a preliminary idea as to the instruments that can be used, form a sufficiently detailed picture for policies to be defined.

There is one matter of theoretical importance which must be discussed in relation to the determination of regional development policies.

Commonly observable in regional planning experiments (a case in point is the policy formulated in Chile during the years 1964-1970) is an almost obsessive tendency to define a specific global policy for each of the regions in the system, assuming, at least implicitly, that the more differentiated these policies are, the more evidence there is of the progress made by regional planning. In a good many cases this reveals an unnecessarily unflexible and restricted approach to the problem, regarding which two facts must be borne in mind.

On the one hand, it is a mistake to suppose that the economic and social structure of a region constitutes a homogeneous whole. Quite the contrary: what usually happens is that this structure is made up of a complex network of activities in which both modern sectors and backward sectors find a place. Thus, in a single region highly technicalized industrial sectors may exist alongside exceptionally backward and primitive agricultural sectors.[44] In this case, the problem cannot be posed as if it were a matter of raising the whole regional structure to a different level.

On the other hand, it must also be taken into account that, partly owing to the above phenomenon itself, space does not act as a differentiating element to the same extent for all activities. This fact of course exerts a marked influence on the correct definition of regional policies.

For example, one of the findings of recent research on territorial differences in productivity and industrial wages in Brazil is that geographical location (space) is a factor appreciably less important than technology and plant size in the explanation of differences in industrial productivity. In the same study the conclusion is reached that in this case (and with reference to this circumscribed problem) it is more efficient to regionalize a national (sectoral) policy than to draw up specific regional policies.

This suggests that regional policies should be conceived as a flexible set of global policies for certain regions and regionalization of national policies in other cases, plus the purely aspatial management of certain economic variables. The

[42]That is, policies whose scope is nationwide but which leave room for degrees of differentiation between regions.

[43]Namely, policies addressed to the multi-point spatial system in respect of which significant regional differentiations cannot be introduced and which also differ from global economic policies of the traditional type.

[44]Descriptively speaking, they are veritable dual regions.

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precise combination of these elements of course depends upon each specific case. The important thing is to avoid any rigid and totalizing conception formulated on weak empirical bases.

Another factor that calls for comment in relation to the formulation of regional policies tends to highlight the close interrelationship between economic aspects and physical aspects at the level of each region. Probably, the lower down one looks in the geographical scale, the greater is the relative weight of the physical aspects of planning, as against the purely economic aspects. There is an exception to this rule, however, in the special case of metropolitan regions where optimizing the use of space seems to be a key element in its control.

Similarly, social questions constitute another of the basic elements or ingredients in regional policy, since in a relatively limited geographical frame-work —such as a region— it will be simpler to attain a number of objectives relating to the modernization of society which were reviewed in the context of strategic options for regional development. Thus, the content of the policy to be defined for each region represents a combination of economic, physical and social questions.

Since certain regional development objectives have been described (see the corresponding section of the present book) as objectives for the entire spatial system or as objectives proper to the spatial system (they are, as will be recalled, objectives really relating to a multipunctual spatial system), specific policies will be directed primarily to their attainment, although these same policies may also help to serve other purposes.

The most striking examples of regional policies designed primordially in relation to objectives of this kind are constituted by a transport and communications policy (which is usually regarded as an eminently sectoral policy) and by an urban development policy. A national urban development policy focusses its attention on the orientation and control of the national system of urban centres, and its principal proposals relate precisely to questions of size, number, spatial distribution and functions of an organic body of urban centres, over and above any regional partition of the country. In other words, urban development policy is directly linked to the organization of space. A transport and communications policy, for its part, centres its interest on consideration of the transport and communications network, which is just what interconnects all points in the urban system. Given that the ultimate aim of a policy of this kind is to increase the mobility of resources and goods (as well as of information), while at the same time penetrating throughout the whole of the geographical space, it is natural to associate transport and communications policy with the objective of national integration, although once again it may also be placed at the service of other specific objectives.

The close relationship between objectives proper to the spatial system and urban development and transport and communications policies should not give rise to the mistaken conclusion that these two policies would not allow, in a given case, for some degree of regional differentiation. Obviously, transport policy, for example, might place strong emphasis on the treatment of a specific region, since it is equally obvious that the transport infrastructure is disparate in several regions. Nevertheless, the emphasis and the conception of both policies

are directed more towards the consolidation of national systems and networks than towards matters more peculiar to one or several regions.

The management and control —in general, the administration— of a country's urban system is, unquestionably, one of the chief instruments of overall regional development policy; it is a policy in its own right.

The system of urban centres becomes a medium of overall regional development policy in so far as: (i) a deliberate effort is made to create the conditions for converting certain urban centres into centres of growth as this concept is applied in polarization theory; and (ii) the urban system is so structured, likewise deliberately, that it is organized as a hierarchical system of central places —according to the terminology used by Lösch-Christaller— which optimally covers the whole of the national territory.

A point to note is that in the foregoing assertion it is implicitly recognized that all urban centres have an attribute (real or potential) of centrality, but only some of them have the attribute of polarity.

Administration of the urban system as a function of regional development interests leads to optimal definition of the number, size, distribution and functions of urban centres and of their interrelationships.

Specification of the number of urban centres involves a decision as to the creation of new urban centres (possibly a satellite-towns programme) or the maintenance of the existing situation. To define the grounds on which such a decision is based of course exceeds the scope of the present discussion.

Determination of the size of urban centres implies appraisal of the efficiency of the existing sizes and above all entails the formulation of a genuine migration policy of both a rural-urban and an interurban character.

The problem of the distribution of urban centres over the national space is conditioned by the two preceding questions. What is of importance in this connexion is not only the geographical location of the centres, but also their distribution by size, that is, the type of structure aimed at (primate or Paretian).

The functions of urban centres will have to be determined in relation to the size of the centres themselves and to the size of the area they serve. Generally speaking, the question here will be to adjust the structure of urban centres to the central places model, attempting to minimize total expenditure on transport. Once the functions have been defined, it will be necessary to provide the urban equipment required for their support. At this point the whole thing becomes a typical problem of physical planning, or, more exactly, of urban planning.

Defining the interrelationships between urban centres implies not only specifying their ranking but also, on a more concrete level, determining the scale and type of interurban works (communication and transport media interlinking the centres) which will have to be carried out in order to ensure inter-centre mobility.

Whether such an urban policy, as reviewed here, is or is not the direct responsibility of a regional planning office is a question of subsidiary importance. Given the magnitude of the tasks proposed and the multiplicity of agencies that will be involved in them, it seems reasonable to imagine some form of administration specifically designed for the purpose. In such a body, which need not necessarily correspond to the classic image of a Ministry of Housing, the regional planning system must play a leading part.

Lastly, it is worth while to repeat that urban policy must be conceived and administered together with industrial policy, as can be inferred from the discussion on strategies. This need for simultaneous treatment partly derives from the fact that urban policy will establish a certain order of priorities in the development of large, medium-sized or small centres, and urban size is not independent of the industrial base.

The literature of the subject records a number of economic (and administrative) measures which —with regional development plans— have gone to make up regional policies. For example, the management, control and orientation of industrial location holds an outstanding place in all or almost all the known regional development plans.

When a given nationwide regional development policy is established, the regional priorities for its application will have to be established as well. This is seldom explicitly done in plans. The reasons for the need to fix priorities in the application of policies are perfectly clear. On the one hand, regional development strategy will have established an order of priority between regions; on the other, the structural heterogeneity of regions (interregional heterogeneity) makes it indispensable to differentiate the application of policies through the use of priorities. For example, an industrial location policy may be accorded high priority in a region where it is desired to promote industrialization, medium priority in a region of a different type and perhaps very low priority in an essentially agricultural or mining region.

The establishment of regional priorities for each policy will be greatly facilitated if—once again—the number of planning regions is small. It is relatively simple for the planner to differentiate between priorities if the categories are few, for example, high priority, medium priority and low priority. Beyond the limits of these three categories, qualitative determination of priorities is extremely difficult and if the number of regions is large it will be necessary to resort to complicated quantitative methods.

Global policies for each region will therefore be derived in part from study of the priorities accorded in each region to the set of interregional policies. The other elements contributing to the definition of a region's global policy emanate both from the diagnosis of the region and from such regional objectives as may not be covered by the application of a given interregional policy in the region concerned. This might be the case, for example, with a region in which a large indigenous group is localized, with the resultant problems of economic, social and cultural integration.

Table 23 affords an idea of how the intermixing of interregional policies gives rise to global policies in each region.

In the above table, the vertical sum of the priorities of interregional policies ('sum' is used here in a purely figurative sense) gives as its result a specific global policy in each region, to which must still be added the elements proper to the region itself.[45]

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[45] For a more fully elaborated example of priorities for objectives and policies see R. L Lukiwja, "La planificación regional y las prioridades presupuestarias en Uganda", in A. Mabogunje (comp.), *Planificación Regional y Desarrollo Nacional en Africa*, Buenos Aires, Ediciones SIAP, 1973.

Table 23

TABLE OF REGIONAL POLICIES

Policies and interregional components	Priorities by regions		
	Region A	Region B	Region C
Industrial location			
(a) Construction of industrial parks	High	Low	Low
(b) Subsidies to use of capital	Low	High	Low
(c) Subsidies to use of labour	Low	High	Low
(d) Energy supply	High	Medium	Low
Regional financing			
(a) Official regionalization budget	High	High	High
(b) Long-term credits	Medium	Low	Medium
(c) Regional development banks	High	Low	Low
Integrated rural development			
(a) Construction of towns	Low	Low	High
(b) Social services equipment	Low	Low	High
(c) Marketing equipment	Medium	Low	High
(d) Technical assistance equipment	Medium	Low	Medium
Global regional policies	*Policy X*	*Policy Y*	*Policy Z*

It is difficult to attempt any typification of these regional policies unless in the light of a specific analysis in respect of a given regional system. Accordingly, for purely illustrative purposes, a brief review follows of the nature of the regional policies drawn up in Chile in a document prepared some years ago by the Chilean Planning Office (ODEPLAN, 1970). The example is cited here for purely didactic purposes irrespective of whatever validity the pronouncements concerned may have at the present time.

On the basis of a careful diagnosis, the 12 planning regions defined in Chile were grouped in four categories, for each of which an overall policy was established. These policies can be outlined as follows:

(a) *Policy of spatial control and rationalization,* applied to regions having a highly diversified structure of production and showing at the same time a high level of per capita income and a high rate of per capita income growth. In Chile's case, only the so-called Metropolitan Area fits this description.

As stated in the document referred to, such a policy seeks to ensure satisfactory management of the growth of this region (reduction of its overall growth rate), with special emphasis on the quest for new physical structuration alternatives that will make it possible to resolve the urban problems of the region, which is defined precisely as a metropolitan region, i.e., one formed by a metropolis, an inter-metropolitan periphery and a cluster of metropolitan centres.

It can thus be seen that the emphasis of the policy in this case is placed on questions of spatial or physical rearrangement.

(b) *Reconversion and polarization policy,* applied to a group of regions characterized by possessing a diversified structure of production with an average level of per capita income (or low in some cases) and showing some degree of stagnation or at any rate a sluggish growth. As a general rule they are regions whose economic base is linked to out-of-date economic sectors or economic sectors for which the income-elasticity of demand is decidedly low. From another point of view, these regions present a loose spatial structure marked by strong links with the national growth centre.

The aim of reconversion and polarization policity is in this case to associate the regional economy with sectors that are more dynamic terms of growth, thus bringing about a real structural reconversion. Similarly, the policy seeks to structure a space polarized around the main regional centre, through the strengthening of the corresponding urban sub-systems and of the transport and communications network concerned.

(c) *A policy of diversification and integration,* drawn up for certain regions which show a high level of per capita income, high potential, rapid growth and a production structure in which one sector of production is strikingly predominant. As a general rule, these are regions of punctual settlement (with mining or energy-producing enclaves), lacking consolidated urban systems and having very slight linkage with the rest of the country. Patagonia in Argentina, Guayana in Venezuela and the copper-producing regions of the north of Chile are good examples of regions of this type.

Accordingly, for such regions the policy proposed is one of diversification of their structure of production, with the aim of securing a more stable economy, less dependent upon a single product, and of integration, both in intra-regional terms and in respect of closer physical integration with the rest of the country.

The diversification of the structure of production should of course be approached in a framework of interregional specialization and of complementarity with the predominant regional sector.

(d) *A policy of support and complementarity,* laid down for a group of regions characterized by a low level of per capita income, by slow growth of this indicator, by non-diversified structures of production (with an agricultural base) and by relative potential for future development.

For regions of this type, the aim of the policy is to confer a higher degree of economic support so as to keep the population within the region. This greater economic support is to be achieved through exploitation of natural resources, complemented by some primary level of industrial processing of the resources in question.

If the policies defined above are combined with an ecological classification of the regions, a matrix like that shown below is obtained, which summarizes, for the planner, a good deal of information:

Policies

Areas	*Control*	*Reconversion*	*Diversification*	*Support*
Consolidated areas				
Areas in process of settlement				

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Of course, the policies thus defined are not necessarily exclusive and to some extent overlap one another. Moreover, they will also have to be ranked in some way, since they are not strictly complementary. Nor are they the only policies that could be drawn up. Although they are largely general, the specific situation of each regional system will generate the specificity of regional policies too.

Generally speaking, every economic policy finds expression in a set of components and a set of instruments. In conformity with the splitting-up of the regional planning process into various stages adopted in this book, the regional policy instruments will be discussed in the chapter corresponding to plan implementation. In the present section a set of regional (interregional) policies (with their respective components) which are commonly applied in this context will be discussed below. Once again, these are examples whose practical applicability will depend upon each individual situation. For obvious reasons, it is useful to begin with industrial location policy.

The industrial sector represents a special case in the formulation of a regional policy which goes beyond a mere regionalization of national industrial policy. This special character of the industrial sector derives partly from its greater degree of geographical mobility, as well as from its considerable multiplier effects and its impact on the urbanization process.

Through an industrial location policy (which includes both the location and the relocation of industries) several objectives are pursued at one and the same time. On the one hand it is sought to control or lessen the industrial (and urban) growth of certain large urban centres whose size is deemed excessive in relation to the country (in this sense every industrial location policy contains a strong element of control). On the other hand, the same industrial location policy aims at promoting the installation of industries in urban centres situated in regions whose development and modernization it is desired to encourage.

In relation to an industrial location policy, there are two basic questions that must be answered. What industries are to be located in each region? How is the most appropriate assignment of locations to be achieved?

Replying to the first question implies carrying out a careful analysis in spatial terms and by branches of industry so as to achieve the best pattern of association between regions and industries. It must at all events be borne in mind, however, that a decision respecting industrial location will never (at least from the standpoint of the public sector) be an entirely technical decision. In a good many cases, purely political or security factors will have to be taken into account. A case in point is the vigorous industrialization drive in the 1960s in Arica, a town in the far north of Chile which, except for its strategic location, possesses no basic element favourable to industrial development.

Clearly, however, the formulation of industrial location policy will have to be based as far as possible on a technical analysis which will minimize its (social) cost.

Furthermore, industrial location policy will have to be placed at the service of an intra-regional policy that will take into consideration the urban effects of industrialization and at the same time will prevent the formation of

veritable regional industrial enclaves which in the end prove more advantageous to the centres already capitalized than to the regions which it is desired to develop. Thus, industrial location policy and urban policy (understood as the control of urban systems) form an indissoluble whole.

Various techniques can be used in considering the best association between branches of industry and geographical regions. Any one of them ultimately implies making a study of supply and demand both for the industrial sectors and for the regions.

From the standpoint of branches of industry, attention must be devoted not only to the production functions but also to the urban requirements of the activity, both as regards space and in respect of communications, housing, services, etc. An idea will thus be formed of the directly productive inputs —as well as of those indirectly productive— which the region should supply for each branch of industry. Still from the sectors-of-industry angle, it is also necessary to identify the type of market that each industry needs in order to sell its products. The market analysis seeks to establish the relative importance of intermediate and of final demand in relation to each industry's output, and also the regional, national or international character of the two kinds of demand in question.

From the regional standpoint, the analysis of supply and demand aims at quantifying the regional supply of directly and indirectly productive inputs for each industrial activity and the type of demand existing for each product.

One way of formalizing an analysis of this type, in which optimal association between branches of industry and regions is pursued, may consist in the use of some such model as the 'accessibility model' worked out by Klaasen, Levem and others.

Finally, industrial location policy will be expressed in the form of a table of priorities for each industrial group in all regions. These priorities will serve to establish on a differentiated basis the various locational incentives that are to be granted. (See table 24.)[46]

The problem of which are the industrial groups best adapted to the conditions of each region having been cleared up, the next step is to work out how this assignment of locations will be put into effect.

The answer to such a question of course largely depends upon the prevailing political system and the nature of planning itself. Under a system of State ownership of the means of production, it will suffice for the planning agency to issue the pertinent orders. Under a system of mixed ownership, such as exists in most of the Latin American countries, an indicative economic system of rewards and penalties will be necessary to induce economic agents to adopt the right locational decisions.

At first sight, at least three types of complementary mechanisms for attaining the objects of industrial location policy can be distinguished.

Certain control mechanisms can be established to prevent, wholly or in part, the installation of specific industries in certain areas. For example, the State can use its power to prevent altogether any additional installations of large establishments in the big metropolitan urban centres, and can also stop the

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[46] This figure is reproduced from a document prepared by the National Planning Office of Chile (ODEPLAN), in 1969.

TABLE OF PRIORITIES FOR INDUSTRIAL LOCALIZATION

IX	X	IX	VIII	VII	VI	V	Z.M.	IV	III	II	I	Regions / Industries	UN classification Industries
●	●	●	●	●	●	●	⊕	⊕	⊕	○	│	Slaughtering and derivatives	201
⊕	●	●	●	●	●	⊖	○	○	⊕	│	│	Dairy products and derivatives	202
│	●	●	●	●	●	●	●	●	●	│	│	Canning and preserving of fruits and vegetables	203
●	●	●	○	●	○	│	●	●	●	⊕	●	Canning and preserving of fish and other sea foods	204 / 205
│	⊕	●	●	●	●	⊖	⊕	○	⊕	│	│	Grain mill products	205
●	●	●	●	●	●	●	●	●	⊕	●	⊕	Miscellaneous food products	206 y 209
○	⊕	●	⊕	●	●	●	○	⊕	⊕	●	○	Beverages	21
│	│	│	│	○	●	●	⊕	●	●	│	│	Tobacco	22
●	●	●	⊕	●	⊕	⊖	○	●	⊕	│	⊕	Textiles, natural fibres	23
│	│	│	│	●	│	│	│	●	│	│	●	Textiles, artificial fibres	23
●	⊕	⊖	⊕	●	⊕	⊕	│	●	⊕	○	●	Textiles, woven goods	23
●	⊕	●	●	●	●	●	○	●	○	●	○	Footwear	241
●	●	●	●	●	⊖	⊖	○	●	⊕	●	⊕	Wearing apparel	243 y 244
●	●	●	●	●	●	⊖	○	○	│	.	│	Wood and cork products, basic and intermediate	25
●	●	●	●	●	●	●	⊕	●	│	⊕	│	Wood and cork products, final	25
⊕	⊕	●	●	●	⊕	●	⊕	●	○	●	○	Furniture	26
│	│	⊖	⊕	●	●	⊕	│	│	│	│	│	Paper and paper products	27
●	○	●	○	●	○	⊕	●	●	○	●	●	Printing	28
●	●	●	●	●	●	●	○	○	○	●	○	Leather and leather products, basic and intermediate	29
●	●	●	●	●	●	●	●	⊕	⊕	○		Leather products, final	29
○	○	○	○	●	○	●	○	●	●	●	○	Rubber	30
●	⊕	⊕	○	●	○	●	○	◐	●	●	⊕	Basic chemicals	311
○	●	●	●	⊕	◐	●	○	⊕	⊕	○	⊕	Oils and fats	312 y 319
●	○	⊕	○	●	○	●	●	◐	○	●	●	Miscellaneous chemicals	313 y 319
●	●	⊕	│	●	│	│	│	◐	│	●	●	Petroleum products and coal	32
●	⊕	○	○	●	○	●	⊕	◐	⊕	●	●	Non-metallic mineral products	33
○	⊕	⊕	⊕	●	○	●	○	○	●	●	⊕	Basic ferrous metal industries	341 / 342
⊕	⊖	○	○	○	○	◐	○	●	●	●	⊕	Basic non-ferrous metal industries	341 / 342
⊕	⊕	●	⊕	●	⊕	◐	⊕	●	●	●	⊕	Metal products	35
⊕	●	●	●	●	●	◐	│	⊕	│	│	│	Agricultural machinery and equipment	36
│	│	│	│	●	│	◐	⊕	●	●	●	●	Mining machinery and equipment	36
⊕	⊕	●	⊕	●	○	◐	⊕	●	⊕	●	●	Other machinery and equipment	36
●	○	○	│	●	│	◐	⊕	●	○	●	●	Electrical appliances	37
│	│	○	│	●	│	⊖	◐	●	●	○	│	Heavy electrical machinery	37
●	│	│	│	│	│	│	⊕	●	│	│	●	Electronic equipment	37
│	●	●	│	●	○	│	│	●	●	●	⊖	Maritime transport equipment	381 / 382
│	│	⊕	○	●	│	●	│	●	●	│	◐	Overland transport equipment	388 / 389

SIMBOLS

●	First priority	○ Fourth priority
●	Second priority	┤ No priority
⊕	Third priority	
┼	No priority	

Source: Regional Planning Department

expansion and diversification *in situ* of those already existing (this being a typical mode of industrial growth in certain cases). This type of direct control has been used successfully in France, where in Paris no new installations covering an area of more than 500 m² are authorized. Needless to say, a measure like this implies the existence of a government which is sufficiently strong and independent of industrial interests. The control mechanisms can also be of a more indirect character, such as special permits, rising taxes or some other similar device.

Alongside the control mechanisms, in a location policy several incentive mechanisms are established which at bottom represent transfer and subsidies granted by the State.

These incentive mechanisms usually tend to affect either the fixed costs of firms or their variable costs, or some combination of both.

The incentives directed towards fixed costs, such as, for example, the reduction (differentiated by sectors and regions) of tariffs and other duties and charges on imports of capital goods are usually less efficacious in practice than might be supposed in principle, and in any case do not affect all industries in the same way. It may be noted, for example, that for many industries it will be preferable, especially over the long term, to pay the normal duties and thus secure the possibility of installation in a large urban centre —by which means they can immediately make sure of a sizeable proportion of the domestic market— rather than to choose a different alternative.

The incentives designed to affect variable costs almost always take the form of tax exemptions and in practice have apparently a stronger impact than those just described. Naturally, these tax exemptions can only be granted by the central government in the framework of the general content of tax policy.

A third mechanism, commonly used in the formulation of an industrial location policy, is State financing and construction of the physical infrastructure. This type of incentive takes the form of construction by the public sector of industrial precincts and parks, which are placed at the disposal of industrialists free of charge or for a nominal cost. In some cases, this type of instrument is highly successful as a means of attracting industry, an outstanding example in Latin America is the Aratú Industrial Centre in Salvador, Bahia, Brazil. The type of equipment ranges, of course, from the mere parcelling-out of lots to the provision of communal services.

Following this generic presentation of the basic outlines of an industrial location policy, it is important to systematize more completely the principal components of the policy, which may be outlined as follows:

(a) *Construction of industrial parks and precincts.* In accordance with regional development objectives and as a function of the technical studies mentioned above, the regional plan will have to propose the number, location, size and equipment of the industrial parks or precincts to be constructed by the State itself (this will depend upon strategic definitions already analysed) or by more local authorities, such as the municipalities. The equipment of each park will depend upon the type, size and number of industries to be located there and may comprise only division into lots and urbanization (streets, electricity, water supply and gas, telephone and drainage networks) or may include services (banks, repair workshops, premises for common use) and even management of the park.

It is important to bear in mind that the construction of industrial parks must be considered a distinctly selective component of industrial location policy and consequently (as is borne out, moreover, by the experience of several countries) their indiscriminate proliferation, as well as excessive competition between localities, should be avoided. This suggests that final decisions in this field are necessarily centralized decisions.

(b) *Employment incentives.* In any industrial location policy in the framework of a regional development plan there is a risk that industrialization programmes may not signify a substantive contribution to the solution of regional unemployment and underemployment problems. As a general rule, given current technological trends, this will be difficult to achieve unless the use of labour-intensive techniques is explicitly and heavily subsidized.[47] Furthermore, the subsidy serves the purpose of making location in the 'periphery' more attractive to the private investor. Since the wages paid by new industries in the interior will have to be markedly higher than those paid in the 'centre' (to help to divert the migratory flow), an employment incentive will have to include both the wage differential and a 'reward' for additonal employment of labour. Payment of a direct subsidy to the enterprise should be preferred to any indirect mechanism and the State can enter into specific agreements of limited duration with each new enterprise to be located in the priority areas or regions. This mechanism is, as could easily be numerically demonstrated, effective but unquestionably costly.

(c) *Incentives to capital formation.* Incentives to employment may possibly have to be combined in industrial location policy with incentives to capital formation (i.e., to the selection of capital-intensive techniques) in the case of specific industries and regions. This is particularly true when it is desired to improve the international competitive capacity of certain industrial activities, generally located in regions that are already developed. In a good many cases, overall industrialization and import substitution policy has ended by so greatly changing the relative prices of capital and labour that the result has been a disproportionate incentive to the use of capital-intensive techniques. In industrial location policy at least an attempt should be made to rectify this state of affairs. The specific mechanisms for providing incentives to capital formation are well-known, and include liberalization of imports of capital equipment, reduction of taxes on profits, accelerated depreciation, etc.

(d) *Provision of energy.* Although this is a problem usually dealt with in sectoral plans, the provision of a supply of electric power (or energy from other sources) which is adequate in quantity, reliability and prices for industrial use must be carefully contemplated in industrial location policy.

(e) *Training of labour and entrepreneurial training.* A lack or simply a shortage of labour trained in industrial-type skills may be a crucial impediment to the success of an industrial location policy. On the basis of the prior studies which will define the type of industry to be located in each region it will be indispensable to draw up a 'crash' programme for intensive training of skilled manpower in *ad hoc* regional centres. It may be equally important to establish

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[47]The very limited employment-effect of industrialization in the North-East of Brazil has been the easy and favourite prey of almost all analysts of Brazilian experience.

advisory assistance and training programmes for entrepreneurs designed to introduce modern managerial methods into the administration of regional enterprises.

(f) *State enterprises.* Another possible component of industrial location policy is the State's own entrepreneurial activity. In some circumstances, the success of an industrialization policy will depend upon the capacity of the State itself to install, in the selected places, veritable industrial poles, that is, fairly large-scale industrial activities, capable of externalizing their operational economies to smaller private enterprises which under other conditions could not absorb the external diseconomies inherent in the initial stages of a regional industrialization process.

Regional administration

If regional planning is introduced as an innovative function into State action, the internal (sub-national) administration system in force is unlikely to be the most appropriate for a regional category of action. Alike at the level of communes, provinces or states, the administration will have to be overhouled so as to leave room for a regional administration system.

It is here perhaps that the greatest political problems of regional planning will be generated. In whatever form the new system of regional administration is conceived, this new government body will clearly obtain power on the basis of delegation of power by the central government and transfer of power from the local governments (municipal or provincial). It is equally clear that the delegation of power will be easier for the central government than for the local governments, for the simple reason that in the latter case whatever amount of power is given up (to the regional government) represents a relatively significant proportion of the total power wielded by each local government.

All the central government's influence and all its capacity for arbitration will therefore be needed to put into operation a regional administration system. The components on the basis of which this reform of the State's internal administration régime can be established must embrace at least the following points:

(a) Regionalization of the country. The first question to be tackled is the regionalization of the country, since this clearly implies a revision of the politico-administrative partition in force. As that is a task which –in this sequence of the planning process– has already been performed in the stage of diagnosis, all that remains to be pointed out is that regionalization will have to be based not only on economic criteria but on consideration of the requirements that will be posed by a regional administration system. Thus, the region will not only be the expression of a certain homogeneous space or of certain functional and geographical relations, but it will also be characterized as the territorial unit of expression of the government and the internal administration of the State.

(b) Establishment of a regional politico-administrative authority. Particularly in those cases in which regions comprise several units of the politico-administrative partition, it will be necessary to set up a regional authority. This requirement derives partly from the need to exercise throughout the territory political power for the preservation of internal public order and external security, and partly from the necessity of ensuring attainment of the economic and social objectives pursued by the State, for which purpose institutional co-

ordination within the region is an indispensable requisite. It hardly need be added that in order to discharge this role the regional authority must be endowed with effective faculties and powers to co-ordinate and supervise public services.

(c) Regional administration organs. Two types of administrative agencies can be established, differing both in their nature and in their functions. On the one hand, organs of administrative co-ordination may be set up, for the purpose of ensuring the coherence and proper timing of the measures put into effect by the various services of the central administration in the regional district. In this case it is a question of exchange of information and co-ordination among the various regional representatives of the central administration, for example, co-ordination between the regional delegations of the national Ministries of Transport or Housing, or between the several local agencies that have to do with the agricultural sector. On the other hand, administrative organs proper may be established, territorially decentralized and with functions that may be advisory, deliberative or executive. An example of such an agency may be afforded by a Council for Regional Administration or by a Regional Economic and Social Council.

One of the most interesting examples of administrative institutions associated with a national view of regional development to be found in Latin America is the Federal Investment Council (Consejo Federal de Inversiones – CFI) of the Republic of Argentina. This Council was created by a resolution of the Ministries of Finance of the provinces of Argentina in 1959 and represents a political agreement between the federal states (provinces) which the Nation can ratify (the Nation does not form part *ipso facto* of the Federal Investment Council) by joining the Council. At present the membership of CFI comprises all the Argentinian provinces, plus the Territory (Government) of Tierra del Fuego, Antartica and the South Atlantic Islands and the Municipality of the City of Buenos Aires.

Looking at the matter from another angle, it might be said that the basic object of the Federal Investment Council is to represent, before the Nation, the interests of a regional system, which do not necessarily coincide with the interests of the Nation. This implies lifting the technical problem of the difference between global-planning objectives on to a definitely political plane.

It is of interest to reproduce part of the content of the Organic Charter of the CFI.

For example, the object and functions of the Council are defined as follows:

Article 1. The Federal Investment Council shall be established as a permanent agency for research, co-ordination and advisory assistance, responsible for recommending the measures required for an appropriate investment policy and for more efficient utilization of the various economic measures conducive to the achievement of development based on decentralization.

In the Regulations of the Organic Charter the following functions of the CFI are established:

Article 1. To discharge the mission indicated in article 1 of the constitutive Charter and to attain the objectives set up by the Assembly, the Federal Investment Council, in the exercise of its faculties, shall undertake:

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(I) To advise its members, at their request, on all questions relating to the formulation and implementation of decisions aiming at attainment of the development best fitted to meet the needs of the People and to bring into being an economically free, socially just and politically sovereign nation. This advisory assistance shall be provided mainly in the following fields:

(a) Use of resources with a view to their optimum exploitation;

(b) Promotion of sources of production and rationalization of systems of distribution of wealth;

(c) Orientation of fiscal policy;

(d) Formulation of regional plans and programmes, whose main objective shall be to remedy inequalities and prevent the establishment of relationships of dominion between more and less developed regions, within the same national scenario;

(e) Establishment of priorities for public and private investment and formulation of investment projects;

(f) Orientation of financial and credit policy;

(g) Constitution of regional bodies to promote development;

(h) Formulation of the legal and institutional norms whereby the necessary structural changes can be promoted;

(i) Organization of the State.

(II) To co-ordinate the activities of its members, at their request, mainly in respects necessary for the achievement of regional integration and the integration of the regional economies in the national economic unit.

(III) To assist members so requiring in the preparation of proposals to the National Government and in whatever activities may prove necessary to secure the possible participation of the member governments in the formulation of national economic policy and national plans.

(IV) To sponsor the formation of federal or regional funds or bodies for the promotion of development, mainly intended to finance study projects, investment and administration of regional programmes; and to co-ordinate, manage or participate in such funds or bodies.

(V) To carry out such studies and research as may prove desirable for the exercise of the preceding functions.

(VI) To promote scientific and technological research, and the training of experts, in fields related to its mission.

(VII) To establish liaison with national and international agencies having similar or allied objectives.

(VIII) To contribute to the enlightenment of public opinion and to the diffusion of science and technique, in fields related to its mission.

(IX) To finance priority projects with the resources at its disposal.

As far as its internal organization is concerned, the Federal Investment Council is composed of an Assembly, as the highest organ of the Council with decisional faculties, a Permanent Board, as the excecutive organ of the Council, and a General Secretariat responsible for the technical and administrative aspects of the management of the agency.

Undoubtedly, the creation of a regional administration system will only be viable in the framework of effective territorial decentralization of the State machinery, and this system will be able to operate efficiently only if it can rely

upon adequate technical backing, which will have to be provided by the regional planning system itself.[48]

Financing of regional development

Another regional policy usually propounded in regional development plans consists in the establishment of a series of regional financial mechanisms (components of the policy) whose aim is to tap and channel regional saving (whether within a region or between regions) and convert it into investment.

It has been suggested that the public-sector budget (national treasury plus public institutions) constitutes one of the principal regional financing mechanisms in so far as the procedures, methods and techniques used in the preparation of the budget permit genuine regionalization of this instrument of economic policy. In theory, the task of preparing a regionalized public budget does not seem to present any insurmountable difficulty. After all, every project, every programme and every item of expenditure included in the programme and performance budget of the public sector can be assigned geographical terms of reference. In practice, however, regionalization of the budget encounters stumbling-blocks, on the one hand in the regional public administration's lack of preparation for this task and on the other in the very nature of the organic budget laws which in practice assign global budget responsibilities to the various services. Thus, transfers between programmes and between projects (and all the more between regions) end by nullifying the original intention. Nevertheless, the effort must be made, even if it is conceived as a long-term work of education.

Strictly speaking, however, the regional budget must not be understood simply as a geographically disaggregated *ex post facto* presentation of sectoral public investment, as is to be inferred from the preceding paragraph. That is only a first step. In reality the budget must be based year by year on the implementation of the regional development plan and policies; in this connexion the budget becomes the chief operational instrument (for implementation and control) of the government's regional strategy and policy.

Thus interpreted, the public sector's regional capital budget must reflect in financial terms all the components and measures comprised in the various regional policies. It is, so to speak, the financial and operational side of the overall policy picture exemplified in this same section. Thus it is also clear that there is no reason why the regional budget should coincide with the public sector's total budget, since regional action is only a part of the total action of the public sector.

A regional financial system can be structured around various types of agencies.

To begin with, the bank system must be reformulated, at least in its operational aspects. It is a well-known fact that the bank system generally acts as the chief vehicle of monetary transfers from the periphery to the centre. Steps must be taken to safeguard the way in which regional banking institutions retain

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[48] Despite the undeniable importance of the topic, there are few studies and few books on institutional aspects of regional development. For a comparative international study, see W. Schaeffer, *Administration for Regional Development,* United Nations, Public Administration Division, New York, 1973 (mimeographed text).

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the resources they tap within the region. To this end there will necessarily have to be plenty of opportunity for local investment no less profitable than the alternative extra-regional opportunities.

Alongside the bank system proper, a system of 'regional development funds' can be set up, comprising both a national fund and a body of regional funds. These 'funds' are really veritable regional investment companies whose basic object is to manage the resources placed at their disposal by the public sector and by each region's private savers themselves. The creation of such funds offers a wide field for channelling regional popular participation in specific development projects. Through this type of mechanism it is even possible to try out non-traditional forms of ownership and management.

An example of one type of regional development fund can be found in the 'Fundo de Participaçao de Estados e Municipios', as it is called, which operates in Brazil. In the case of this fund, federal transfers to State and municipal authorities are fixed at a certain global percentage as a function of the size, population and income level of each subnational unit.

Another contry in which a National Fund for Regional Development has recently begun to operate is Chile. Since 1975 the annual budget of the public sector has included an allocation to the above-mentioned Fund, which in turn comprises a Regional Fund for each of the planning regions. Although the sum concerned is at present quite small, the conviction apparently exists in official circles that it should be increased commensurately with the perfecting of the regional administration system.

In the public-sector budget for the year 1976 the sum of 71 million dollars is earmarked to finance the National Fund for Regional Development.[49] On an average, the Fund's resources finance 21% of regionalized investment. The deviations around this average are very marked: in the Metropolitan Region the Fund finances only 3% of investment, whereas in Region XII (Magallanes) financing through the Fund covers 85% of the total.

In addition to these regional funds, or instead of them, a possibility worth considering is that of a finance structure corresponding to a Regional Development Corporation. Owing to the success achieved by some regional development corporations in certain parts of Latin America, such agencies are higly attractive to the regional communities themselves.

Consideration may also be given to several alternative forms of financing regional development through mechanisms linking the income of some financial institution to the exploitation of the region's natural resources: that is, a sort of regional royalty. Sources of financing of this type have been tried out with some success in Chile (in the copper-producing regions), in Bolivia (in the Department of Santa Cruz in connexion with the exploitation of petroleum) and in several other parts of Latin America. Similarly, in some cases the income of certain regional corporations depends upon the region's overall level of economic activity as is the case with the Board for the Advancement of Arica (Junta de Adelanto de Arica) (Chile), whose income basically derives from the product of the transfer tax.

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[49] See *El Mercurio*, 26 February 1976.

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In connexion with the financial aspects of nationwide regional development, Schaeffer makes the following remarks in a report prepared for the United Nations:

"Nationwide regional development poses a very different financing problem. First of all, planning and co-ordination of regional development activities are considered a normal government function in all cases under consideration. It is a fundamental aspect of national administration and, in some cases, of intergovernmental relations. Nevertheless, as the Chilean example clearly indicates, the creation of planning and co-ordinating units at the regional level does not by any means take care of all the regional financial needs for development purposes. Some kinds of investment and lending organizations are still important adjuncts of regional planning and co-ordination. Banking institutions can perform some of these functions, but the usual commercial banks in developing countries seldom if ever provide a suitable solution to the problem, dedicated as most of them are to short-term, highly secured loans with rapid turnover. The result of this defficiency in development finance has been the creation of a plethora of special-purpose banking institutions, often at the national level, for making housing loans, agricultural improvement loans, small business loans, crop loans, inventory loans, and so on. Initial and supplementary capital is normally provided by the government and the banks function as decentralized public corporations.

"Another response to the need for special financial resources for development has been the chartering of development corporations related to and as part of the structure of national regionalization. The Venezuela nationwide regionalization programme provides an excellent example of this, for a separate development corporation is called for each region. The functions of such corporations go beyond those of banking institutions in that some of them have engaged in economic research, financed feasibility studies, and engaged quite positively in determining the focus and priorities of development programming. In some instances they invest in private enterprises, help organize them, and train the management, thus assuming a most positive role in the development process.

"A varied pattern of private and mixed development corporations in particular regions also characterizes the French nationwide regionalization picture. Indeed, an extremely complex network of such institutions has emerged involving varying degrees of public and private control. As with special-purpose banks, regional development corporations normally receive their initial capital from the national government, supplemented in various cases by contributions of State and local authorities and even private enterprise. Additional funding may be provided by loans or stock purchases. The hope is that in most cases such organizations will eventually become self-supporting and even provide suitable return on the investments made in them." (Schaeffer, 1973.)

In any case, and whatever the pattern followed, the regional financial system should fulfil the following functions: (i) administer fiscal and public transfers to the region; (ii) tap regional private saving; (iii) transfer extra-regional private saving in accordance with national development policy; (iv) collaborate in the identification of investment projects; (v) convert savings into real investment; (vi) permit regional participation in new patterns of ownership and administration.

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Integrated rural development

In a good many cases regional problems have their roots in questions linked to the structure and functioning of the rural world. The traditional approach or the traditional response to rural problems (which are broader than the mere problems of agricultural production) has been eminently sectoral in character. This approach is partial and as a response is ineffectual in so far as underlying the rural problems there are typically spatial questions.

Moreover, to whichever strategic option priority has been accorded upon consideration of the polarized-development/non-polarized-development dichotomy, the problem of how to integrate the urban and industrial world with the rural and agricultural world remains to be solved. Often it even happens that the possibility of strengthening the development of one or several urban centres in the interior is inescapably dependent upon the modernization of their rural hinterland so as to build up markets of minimum size for the support of an economic base.

A possible response to a problem of this type may be found in the application of an integrated rural development policy.

An integrated rural development policy implies concentrating the scattered rural population by means of the structuration of a hierarchized and interconnected system of rural centres with the following objects in view: (i) to facilitate the provision of basic social services in such fields as health, education, housing, etc., and reduce their costs; (ii) to provide agricultural technical assistance and reduce its costs; (iii) to reorganize space on more functional lines; (iv) to facilitate the incorporation of the rural population into the monetary trading economy by means of the appropriate location of marketing infrastructure; (v) to modernize the attitudes, values and behaviour patterns of the rural population through concentration that will facilitate the exchange of ideas and social comity; (vi) to facilitate the process of popular participation at the level of basic localities; and (vii) to reduce the cost of the physical integration of the territory.

The following are the principal components of integrated rural development policy:

(a) *Selection of areas.* Since the integrated rural development policy and specific programme will not be homogeneously applied throughout the whole country, the need arises to define and select the areas of application. This is a distinctly delicate question, since the success of a policy of this kind will largely depend upon the type of area initially selected. At least three criteria could be suggested for the identification of potential areas for integrated rural development.

In the first place, from the standpoint of regional planning interests, the dispersion of the population may be regarded as a relevant criterion, since one of the objectives to be attained is the restructuration of space. The volume of population per district, its distribution in terms of size, classes of population centres and its spatial location are the basic data required for applying this criterion.

Secondly, the level of poverty of the population likely to benefit may be taken into account. In considering poverty as a selection criterion, however, what was said in this connexion *à propos* of strategic options for regional

development must be borne in mind, so that a consistent line of action may be laid down.

Thirdly, consideration must be given to the real possibility of executing profitable agricultural or agro-industrial projects in the area in question on the basis of the existing natural resources. The success of a policy of this kind must not be jeopardized by pushing things beyond a reasonable limit. Integrated rural development policy is not a social policy; if the aim is to assist the inhabitants of an area in which the first two conditions are present but not the third, it is preferable to use alternative mechanisms.

(b) *Construction of towns.* Once the areas have been selected for the application of an integrated rural development policy, it will be necessary to strengthen the infrastructure of this or that population centre or, in some cases, really to build towns *ad hoc.* Prerequisites for this will be to choose the specific site (it will have to be really a central place in the area), to define the size desired, sketch out a regulatory plan and determine the necessary types of construction (residential, and for services and community purposes). During this stage too the problems of electricity and water supply involved in the designing of any population centre must be resolved.

(c) *Educational equipment.* On the basis of the population of the area the educational facilities to be installed in the central place will have to be defined. What is referred to here is not only the scale of the educational equipment but also the type of educational facility (primary cycle, practical agricultural school, etc.). Consideration must also be given to the physical requirements that may be implied by an adult literacy programme.

(d) *Health equipment.* Almost the same considerations as in the preceding sub-paragraph hold good for health equipment. The physical requirements to be met and the type of medical and paramedical services to be provided at each central place in the integrated rural development areas will have to be defined.

(e) *Technical assistance equipment.* One of the basic aims of integrated rural development policy is precisely to facilitate the extension and provision of technical assistance to farmers, particularly to those who have least access to the sources of agricultural technology. For this reason, the necessary technical assistance equipment to be provided in each area must be carefully defined. The general slant of technical assistance will depend both on the natural resources of each area and on current land use and the specific nature of agricultural projects. Technical assistance must include experimentation, extension services, demonstration, follow-up and control in the use of management techniques, and financial assistance (as a parallel supporting function).

(f) *Marketing equipment.* Since one of the typical problems found in the rural environment in several countries is the difficulty experienced by small farmers in obtaining access to markets where they can offer their products on competitive terms, in introducing an integrated rural development policy consideration will have to be given to the installation of the physical warehousing facilities presupposed by the existence in the area of a State purchasing power (to which private enterprises and businesses would obviously have access). The object is to guarantee producers in the area that their products will be purchased on terms at least equal to those prevailing in established markets, while at the

same time forestalling any possibility of monopolistic exploitation of the products in question.

(g) *Land reform.* It is difficult to conceive of any integrated rural development policy (at least with the scope defined here) which could be implemented without in some way affecting the land tenure régime. To start with, the poverty of the inhabitants of a potentially benefited area may be closely linked to the distribution of agricultural property, so that for that reason alone some sort of reform is justified. There are, of course, many complex questions involved in a land reform process which this is not the place to discuss; nevertheless, from the standpoint of the aims of an integrated rural development policy it is pertinent to recall that a change in the land ownership régime should not only be directed towards a fairer distribution of land tenure but must also guarantee that each new unit of property contains at least a minimum proportion of good-quality agricultural land.

Regionalization of sectoral policies

A regional development policy of a different kind is constituted by the actual regionalization of certain sectoral policies. This process is of course a logical step if sectoral targets have previously been regionalized, and although in this case it is not a question of establishing a new policy as such, it has been usual in Latin America's experience to consider this explicitly regional interpretation of sectoral policies as a regional development policy in its own right.

Sectoral policies are generally expressed in totalizing terms for the sector concerned. For example, a fisheries development policy may establish, as a means of attaining its objective, a substantial increase in loans, credits and technical assistance to the sector. Normally the definition of sectoral policy goes no farther. In the case of the agricultural sector, for example, the objective of increasing the domestic food supply may entail, as a means to this end, the introduction of a land reform whose intrinsic characteristics (what forms of tenure will be established, what indemnification will be paid, etc.) are clearly defined, albeit usually the geographical connotation of this policy is not specified.

Something of the same sort happens with the establishment of the global policies embodied in the overall development plan. A policy to expand exports or a policy to raise the level of employment, for example, seldom incorporates any sort of regional specification.

Herein lies, therefore, a wide field for the generation of regional information (at bottom a policy is nothing else) through analysis of the territorial impact of global and sectoral policies.

This process of regionalization of policies will be conducted by comparing the regional diagnosis with regional objectives and targets on the one hand, and sectoral policies on the other. The result will find expression in the specification of areas of priority for each sectoral policy. These priority areas indicate where the geographical emphasis will be placed in sectoral policies and constitute a piece of information of exceptional value for local planning offices.

For example, agricultural development policy, one of whose components in turn may be a land reform policy, will be qualified in geographical terms (according to the conditions in each region), giving rise to a territorial order

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whereby it will be possible to establish the intensity of the land reform process in each region. Or again, if the mere management of prices (paid to the producer) is indicated in the sectoral policy for agriculture as the chief instrument, regional planning will have to be in a position to assess the regional efficiency of the instrument in question. It might happen that in a particular region the structure of land tenure made a price incentive ineffectual as a means of increasing production, owing, for example, to the existence of latifundia.

Ultimately, then, a regional ranking will be established for every economic sector for which an economic policy has been specified. By considering the priority of a given region in relation to all the sectors of production, it will be possible to determine the administrative changes required in that region on the part of the State machinery. Reverting to the case of agriculture, if the region in question proves to be a top-priority area in terms of land reform, this will certainly make it essential to adapt the institutional structure of the public sector in that region so that it can respond efficiently to the sector's needs.

These remarks on regionalization of sectoral policies and programmes may pertinently be closed with one additional observation.

The lesson of experience is that in most cases the territorial impact of sectoral programmes and projects (the extent to which they modify the structure of the spatial system) is a good deal more marked than that of regional policies themselves. Thence, precisely, the necessity of giving a regional content —in accordance with the regional priorities emanating from the stategy— to sectoral policies and thence too the need to establish sound institutional mechanisms for regional-sectoral co-ordination.

There are two or three reasons for this greater territorial impact of sectoral programmes.

In the first place, sectoral policies are often more closely associated with implementation than regional policies. In other words, in the case of sectors it is generally a single institution that decides upon policy and also executes projects. For example, a Ministry of Housing establishes housing policy and also has direct executive agencies which build housing units in conformity with the content of the policy.

Seldom does this happen at the regional level. Partly because of the very complexity of regional problems, a Regional Planning Office formulates a policy (including spatial and sectoral aspects) which is, in the last analysis, offered as a 'piece of information' to sectoral executive agencies and to some agencies of a territorial type (corporations). But the power or the capacity really to implement this regional policy is commonly lacking.

Secondly, sectoral policies are a good deal more simple in their conception than regional policy, and this is an important factor that facilitates the translation of policy norms into projects susceptible of execution.

Thirdly, sectoral policies usually enjoy a considerable degree of continuity through time, even though in some cases this derives purely and simply from the senescence and the red tape of sectoral executing agencies. In any event, there is always something going on at the sectoral level —houses and roads are always being built in any region— and therefore a spatial effect is always produced by sectoral programmes.

The long-term continuity of regional policies is essential for the attainment of objectives relating to the transformation of the spatial structure. This continuity has not, of course, been of a historical character for the simple reason that national efforts at regional development are of quite recent date. Here the question is to guarantee the future continuity of regional policy. Such a guarantee can be provided only through regional development strategy, whose principal role is precisely this, and through the establishment of an institutional co-ordination mechanism incorporated in the highest level of the State machinery. One possibility of this kind might be a sort of Ministerial Council for Territorial Organization as a supra-political agency (in the sense of being superior to short-term political contingencies), whose essential function would be not only to ensure regional-sectoral co-ordination but also to guarantee the long-term continuity of regional policies.

Generation of information as a special regional development policy

The entire planning process can be visualized as one of input and output of information. From this standpoint, neither the preparation of a plan nor its implementation is conceivable without the parallel existence of a system of information capable of supplying the input information and of transmitting the output information.

The discussion in earlier pages of the mechanics of formulation of a regional diagnosis afforded an opportunity to appraise the magnitude of the basic information required, and the difficulty of its being efficiently collected without the existence of an *ad hoc* information system. Now, the complete regional planning process poses still more stringent requirements, as regards not only the quantity but also the quality and degree of processing of the data.

De facto, all countries have some properly institutionalized information system. Seldom, however, does the operation of these systems meet the needs of regional planning. It is common knowledge that censuses and other methods of collecting data give rise to a process of aggregation (with respect to the basic information which has *ipso facto* an explicit geographical reference) which in the end supplies global figures and statistics that are of little use to the regional planner. Experience suggests that national statistical agencies are generally among the oldest and most inefficient segments of the State machinery, always short of resources and qualified personnel and consequently following very hidebound patterns. Indeed, little can be expected if the regional planner decides to try making use of these agencies. It is better worth his while to tackle directly the question of creating a regional system of his own.

It is not part of the purpose of these notes to deal exhaustively with the topic of information for regional planning (in any case this has been done by the author on another occasion) and consequently only a few general aspects of the question will be mentioned here.

What is meant by a regional information system is a structure designed and operated with the aim of generating, processing, filing and transmitting information with a given geographical base of reference that is smaller than the country. As in any information system, the structural components are the generating centres, the communication channels and the receiving centres.

It is important to bear in mind that the regional information system proposed draws a distinction between two kinds of information, both equally necessary for the regional planning process and for the development of the regions itself.

Thus, on the one hand, when the word information is used in this context it should be taken to mean general knowledge about an object, a subject or a process. This is the type of information which is handled when a region makes an effort to publicize its growth potential, for example (to attract possible investors), or its potential for tourism. As a rule this information is not quantifiable and is expressed in terms of appraisals rather than figures.

On the other hand, and in the more common acceptance of the term, what is understood by information is a statistical datum referring to something measurable and quantifiable, such as, for example, the historical growth rate of regional income. The system of information for regional planning will have to generate both types of information.

A problem which has to be resolved from the moment the information system is put into operation is that of selecting the geographical base to which the information will refer (at least the statistical data). In this connexion three alternatives may be compared.

In the first place, the region itself can be used as the geographical base. This has the advantage of consolidating the idea and image of the region, particularly in the public administration. It has some disadvantages in that the partition into regions is not necessarily stable through time and, moreover, in some cases may still represent too high a level of aggregation.

Secondly, use can be made of the political-administrative partition in force as the geographical base for information. In this case the advantage lies in the ease with which aggregation can be effected (at the regional level). Furthermore, there is always the possibility of utilizing to some extent the existing statistical system. As a general rule, this will be the most acceptable solution in practice, although the smallest possible spatial unit should always be sought as the base (the commune, department, etc.).

Thirdly, as is fairly often done in urban studies (and also in some countries, such as Sweden for example), a system of geographical co-ordinates can be designed to localize information. In this case, a mesh must be constructed whose dimension is partly determined by cost considerations. The greatest advantage of this method lies in the extent to which it facilitates electronic data-processing.

Another problem relating to the regional information system on which emphasis should be laid is the importance acquired in it by (interregional) flow statistics. In this case, of course, the distinction between stocks and flows is not marked by a question of time but by a spatial question. It will not be possible to obtain a picture of the regional system without statistics of this type. Similarly, the periodicity and degree of processing of data will also have to be decided beforehand.

Of course, the basic question —that is, what information is to be gathered— depends upon the scope of the regional planning process itself and the methods used in it.

Generally speaking, in relation to the putting into operation of an information system for regional planning, a point that should be borne in mind is the

difficulty of setting up a highly sophisticated system from the very outset. In this connexion it is useful to consider as a start more simple and modest, but for that very reason more feasible, targets.

An elementary information system, designed to attain its maximum operationality in a period of two to three years, could be based on the following elements:

1. Generation of data
2. Processing
3. Registration (recording)
4. Communication
5. Storage
6. Control of system
7. Monitoring

In view of the conditions typically prevailing in any Latin American country, putting the system into operation involves two stages, the first of them to be carried out during the first year of the experiment and the second over two or three subsequent years. Each element in the system, therefore, can be analysed in relation to these two phases, as follows:

1. *Generation of data.* In the first stage of setting up the system the generation of data consists only in systematic compilation of existing information together with codification of producers of statistics. The list of information presented in relation to the regional diagnosis serves as a guide for this initial compilation. During this stage the official agency responsible for statistics and censuses is the principal source of information. In the second stage, the system will in addition generate its own information mainly on the basis of quantitative regional studies and the quantitative aspects of the regional development plan itself.

2. *Processing.* In the first stage primary data are processed only up to the point of generating second-order data, that is, data resulting from the comparison of two or more kinds of primary information (for example, coefficients, indexes, etc.). In the second stage, the system must generate, by means of processing, third-order data, that is, statistical information prepared on the basis of technological hypotheses or hypotheses of behaviour (for example, technical input-output coefficients or marginal propensities to saving, etc.).

3. *Registration.* Initially the information may be recorded in the form of specially designed tables showing both absolute and relative values. The table presented below may serve as a point of departure for the system. Subsequently the aim should be electronic registration in which the information is recorded on computer cards or tapes.

4. *Communication.* During the first stage of putting the system into operation the most recommendable method of communication may consist in a sort of Bulletin of regional statistics, issued annually. Later on the Bulletin may be supplemented by some electronic communication system automatically connecting the Central Planning Office with the Regional Planning Offices.

5. *Storage.* Storage of the information must be functional in relation to the method of registration. For this reason, in the first stage a simple system of metal cabinets with hanging files may be recommended. Each file will contain

Diagram 5

REGISTRATION CARD

Table No. ⸺⸺⸺

Year ⸺⸺⸺

Variable   Unit⸺⸺⸺

RECORD OF VARIABLE

Geographical base	Absolute value	Relative value		
		District/ Country	District/ Province	Province/ Country
district 011				
district 012				
. 013				
Province 01			100.00	
district 021				
district 022				
Province 02			100.00	
district 031				
Province 03			100.00	
Country		100.00		100.00

Code Institution	Periodicity		Source
	Serial	*Occasional*	

an adequate number of copies of each registration table. At more advanced stages the computer cards or tapes themselves provide the storage mechanism.

6. *Control of the system.* In the first stage some elementary norms must be established for the administration of the information system. These norms must make it clear who is responsible for the system, by whom and in what way access to the files can be obtained and how a request for information to be submitted outside the system (for example, to other government agencies) is centralized so as to avoid duplication. In the second phase control must also include checking the quality of the information.

7. *Monitoring.* The 'monitoring' element in the information system relates to the measurement and control of the level of (conjunctural) activity of each of the spatial subsystems, whether these be regions, provinces or planning districts. This activity includes the designing of a system of conjunctural or short-term indicators for each region and the establishment of a Regional Statistical Office.

The conjunctural indicators may be based on such elements as sale and purchase taxes, consumption of electric energy, unemployment subsidies, security of private credit or any others that may be deemed appropriate. Periodic study of these indicators permits rapid correction of the maladjustments noticed in each region.

Lastly, it must not be forgotten that the regional information system should not function parallelly to the planning system itself, but must be an integral part of it, and will therefore embrace central agencies and also local agencies attached to each local planning office. Similarly, it seems needless to stress that the establishment of a system of regional social accounting is an integral part of the task of setting up the information system. After all, a paramount function of that system is to permit evaluation and control of the plan.

Channelling of migration

To close this tentative and by no means exhaustive list of some of the typical policies used in regional planning, a few words must be said on the question of migration.

It is completely utopian, of course, to consider formulating a rigid migration policy, since such a thing would come into direct conflict with an inalienable right of the human being, namely, the right to free choice (at least within the country) of his place of residence and of work. Accordingly, any migration policy will have to be essentially indicative. It will indeed be an information policy, rather than a migration policy.

An indirect migration policy would have to be based on three key elements. In the first place, of course, on the generation of employment opportunities in places where the population is located (the strategic option between vertical and horizontal development should be recalled). Secondly, on the generation —mainly through the educational system— of a sentiment of regional loyalty (by analogy, a regional patriotism), which will keep the population in its region, if and when the first condition is fulfilled. Thirdly, on the generation of appropriate information, both on regional potentialities and, above all on the real living conditions in the great metropolitan centres, which are usually the ultimate destination (even if reached stepwise) of the migratory flow.

It is of interest to note in this connexion that in Sao Paulo (a city which receives more than 300 000 immigrants yearly) there is a government-sponsored information centre for immigrants. This is a good more, but the observer wonders whether it would be not more efficient for similar centres (probably oriented in the opposite direction) to operate in the places that generate the largest negative balances of migration.

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Chapter III

PLAN IMPLEMENTATION

As was pointed out in the appropriate context, in the regional planning process a distinction can be drawn, for analytical purposes, between a stage of formulation and a stage of implementation, which is in turn made up of several substages. As regards the implementation of the plan, three phases will be identified here: institutional organization of the regional planning system, selection of policy instruments and control and evaluation of the planning process.

A. Institutional organization of the regional planning subsystem

The success of regional development planning largely depends upon the satisfactory organization of the regional planning (administration) system.

From the institutional angle, the regional planning subsystem (part of the complete planning system) allows for the existence of at least two major classes of agency: the central regional planning office and the local regional planning offices. In certain cases some type of research agency is found alongside these. To determine the respective roles of these two kinds of agency, and above all their interrelationships, is a complex task (which will really be carried out prior to the sequence described here), partly depending upon the degree of centralization which it is desired to impart to the regional planning subsystem.

Three alternatives can be examined which reflect different degrees of centralization of the regional system. Each of these alternatives is based on a method which can sometimes take the form of a particular quantitative model, one of which (the Rotterdam model), as will be seen, was expounded in earlier pages, although from a different point of view.

In the first place the decentralized (or iterative) method will be examined; secondly, the so-called semi-centralized (or decomposition) method will be presented; and lastly, the centralized (or fixed-targets) method will be discussed.

(a) *The decentralized or iterative method*

Both from a conceptual and from an institutional standpoint, the iterative or decentralized method is particularly attractive to regional planners. Conceptually, because it is simple and apparently easy to handle, and institutionally, because it allows each region maximum freedom to formulate its own development programmes. Generally speaking, in the early stages of putting a nationwide regional planning system into operation, the idea of decentralization, often *per se*, is overloaded with value (and emotional) judgements, and the iterative method is a logical choice from this point of view.

The method essentially consists in minimizing the work of programming the central agency and maximizing it in the local agencies. This means that each local agency (and consequently, each regional community) decides upon its own development programme independently and in accordance with some specific programming 'model'.

The work of the central agency is confined to co-ordination and to checking that the sum of the targets and resources established in each regional

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plan is consistent with national values. For example, the central agency must take care to see that the sum of regional labour requirements does not exceed the national manpower supply.

It is worth while to note that the use of this method gives regions a measure of control over the country's mobile resources, and this may lead to the generation of regional external diseconomies as well as to the outbreak of interregional conflicts over the control of the resources in question.

It is easy to perceive an immediate problem which may arise when this method is used. If the number of regions forming the system is too large, it may prove completely impossible to ensure the consistency of so great a number of regional programmes. In practice, moreover, it is hardly likely that enough qualified technical teams will be available for each regional office to be adequately staffed, so that more or less similar and simultaneous formulation can be secured in all regions.

The most interesting problems are, however, the two previously mentioned: the consistency of the various systems and the possible political conflicts over the use of national resources.

It must be noted that ensuring the consistency of each regional programme with the national programme and of all the regional programmes with one another is a question which goes beyond the working-out of mathematical balance equations. For example, the regions may set forth in their programmes labour requirements of which the sum exactly coincides with the national supply of manpower; nevertheless, any one region may be putting forward demands which imply a completely abnormal interregional movement of labour.

Furthermore, the mere arithmetical balance-sheet drawn up by the Central Office cannot pinpoint inconsistencies of a certain type which may arise when a regional programme is compared with the national programme. For example, an essentially agricultural region might present an ambitious growth programme without changes in its structure and without the existence of any effort in this sector at the national level.

Since under this method regions are free to state their requirements in respect of national resources in accordance with what they deem desirable, competition —sometimes unbridled— for the use of these resources will in all likelihood be unleashed. Resolving this problem without bringing the weight of authority to bear calls for a great capacity for negotiation on the part of the central authorities and no less a dosage of independence to prevent the criterion of the regions with greater political or economic power from carrying the day.

These problems of 'competition' between the regions of a country are naturally prone to be aggravated where there is strong regionalist sentiment in the purely political sense of the term. Experience seems to suggest that if such problems are not properly controlled they may destroy from within the best-conceived regional planning system:

The following remarks by Lefeber are relevant to this point:

"The function of regional planning is to provide a design or blueprint for the regional allocation of resources. However, if central planning is practised, the harmonization of regional plans and the co-ordination of regional resources allocation decisions with the central plan present a complex problem which cannot be resolved without reference to the meaning or concept of nationhood.

Each discipline in the social sciences may have a different interpretation of this concept, but for purposes of economic analysis the natural definition seems to be in terms of the welfare function (or functions) to be maximized through planned economic development policies. National unity is represented by a unique and well-defined welfare function or set of weighted objectives which is accepted as guide for resource allocation in all component regions. In contrast, a loose federation of autonomous states implies that each state has individual and distinct welfare objectives which are independently pursued subject only to certain well-defined constraints.

"If there is no unified concept of welfare, implying that the nation is composed of a federation of autonomous states, the role of central planning is restricted to those areas where the common interest of the component regions are predominant, such as national defence or inter-state commerce. As a consequence the problem of regional decentralization in plan preparation and implementation is minimal; planning is undertaken individually by each state. On the other hand, if there is a strong concept of nationhood represented by a dominant, nationally agreed-upon set of welfare objectives, and even if there is a detailed national plan, there is the problem of how to induce regional decision-makers to act in harmony with national welfare priorities. In particular, if the component regions themselves are political units with elected governments, so that plan implementation cannot be through central control or fiat, it may not be possible to find regionally decentralized means for the pursuit of national welfare interests.

"Decentralization can work only if all individual private or institutional decision-makers can be induced to behave voluntarily in a way that is consistent with social welfare criteria. In other words, conditions must be created to make it desirable for participants to act in the social interest. In the fictional purely competitive market organization this is attained by making use of profit and loss incentives based on the price mechanism, and by suitably selected means for income redistribution. Unfortunately, such an approach cannot be directly adopted for the purpose of regional decentralization. This is because regional governments are not profit maximizers in the economic sense of the term. Furthermore, the decisions of regional governments with respect to resource use may directly and significantly affect large segments of the total economy, so that the economic behaviour of one regional government can and often will affect the welfare of other regions. Hence, conflicting interests and various externalities may also arise." (Lefeber, 1975.)

(b) *The semi-centralized or decomposition method*

An extremely interesting possibility for organizing relations between the central and local planning levels is offered by the use of the so-called 'decomposition principle' applied in linear programming problems of a certain type. In this case the interest lies in the fact that through this method it is possible to transfer to local planning agencies (and by that means to the regional community itself) a considerable decision-making capacity, while at the same time the advantages of central co-ordination are not lost.

Since no literature exists on the subject (at least as regards the possible application of the method in this context), it is inevitable to make a relatively

detailed theoretical presentation of the method here, even though a certain amount of mathematical knowledge is entailed.

The local planning offices are assumed to be technical agencies which possess precise knowledge of the situation of each region in terms of resources, technology and development potential. Nevertheless, they lack a global view of the whole country and its international situation, and in addition are unaware (or heedless) of the effects that their actions may produce in other regions.

In contrast, for the Central (or National) Planning Office the position is reversed. It possesses detailed knowledge of the national resources, technology and financial situation and of the international connexions of the economy. On the other hand an agency of this kind must necessarily have only a relatively superficial knowledge of the situation in each region.

From a different standpoint, if the whole programming process is centrally managed, efficient handling of so large a volume of information may prove impossible, and aggregation may eliminate results which could be significant from the regional angle. Contrariwise, if the whole mechanism is handed over to the regional offices, the gain in respect of case of operation may be more than offset by the fact that the results of this type of programming may not be optimal from the national point of view; after all, a national programme is something more than the sum of different regional programmes.

The principle of decomposition used in linear programming seems to suggest the possibility of devising an intermediate mechanism which would co-ordinate and take into consideration both types of interest; national and regional. The principle of decomposition is based particularly on the use of the shadow prices given by the dual model, and consequently it is important to make a few observations on these prices.

Baumol discusses a problem relating to an enterprise owning several plants, in which the central management calculates the shadow prices per unit of resource in short supply. Each of the plant managers must maximize the profits accruing from his plant, subject to a charge (the shadow price) for each unit of resource in short supply required for his optimum solution. On resolving the linear problem of his own plant, the manager has at his disposal an optimal solution involving only those items which do not cause book losses, that is, those on which the profit is sufficient to cover the charge for the inputs utilized. Non-optimum items from the standpoint of the firm as a whole are those which do cause the plant book losses. Consequently, the solution for the plant's partial programme is one of zero gains (while at the same time the losses are zero). (Baumol, 1966.)

This zero gains result does not lead to determination of the quantity of output (of each item) in the optimum solution for the partial programme of each plant. The decision to expand output of those items which bring in a profit up to the limit of capacity (on the assumption of constant yields) —a decision generally made in ordinary linear programmes— does not take into account the diseconomies external to the plant to which this action may give rise in the rest of the enterprise. It is at this point that the decision passes into the hands of the central management.

A similar approach, likewise reflecting the failure of shadow prices to provide a mechanism for decentralized decisions, is to be found in a study by Dorfman, Samuelson and Solow. The example discussed here is that of the

National Planning Office, whose overall objective is maximization of the national product by means of the selection of a group of products. In this instance the National Planning Office calculates the shadow price of an input which is considered a national resource. The individual enterprise must reduce their profits (calculated at market prices) by an amount equal to the shadow price (per unit) multiplied by the quantity of the national resource consumed. If the minimum shadow price is so fixed as to reduce to zero the profits of the most efficient enterprise, all the less efficient enterprises will record losses and must be compelled by the Planning Office to stop production. With zero gains there are no incentives for an enterprise to expand its output. Once again the decision regarding the desired volume of output of the various goods and full utilization of national resources passes into the hands of the National Planning Office.

The use of the principle of decomposition is reflected in a procedure of decentralized decisions in a multiregional economy through the use of internal prices (for each region k) in face of economies or diseconomies external to region k caused by other regions in the system. A general interpretation of shadow prices converts them into the instrument of the co-ordination mechanism, which prevents regional (decentralized) decisions from conflicting with one another.

The staff of the central agency does not need to have full knowledge of the technological structure of each region; the central decisions are based on summary statements of the products of each region, of the available supply of national resources and of the requirements of such resources implicit in each regional proposition. However, there still remains a problem of implementation after the optimum solutions have been reached.

For the sake of simplicity, let us assume a system with two regions, each of which has a given technological structure and a limited supply of resources. It is assumed that both the technological matrices and the resource restrictions are constant through time (at least throughout the period covered by the programme) and that there is no capital accumulation. Intermediate and also final demand are assumed to be satisfied by regional production; but each region has to import some inputs from outside and in turn each one exports the difference between regional output and regional demand. The programming problem for each region is quite simple: maximization of the value of output subject to resource constraints and certain minimum levels. The national programme consists in maximizing the value of national output with respect to national resource restrictions. For the moment let it be assumed that the only national resource is the available supply of foreign exchange (presumably given exogenously) in terms of the country's capacity to import.

In accordance with these assumptions and conditions, the programme for region 1 (drawn up by the corresponding Regional Office) is as follows:

$$\text{Max } P = P_1 x_1 + P_2 x_2$$

Subject to:

$$a_{11} X_1 + a_{12} X_2 \leqslant C_1$$

$$a_{21} X_1 + a_{22} X_2 \leqslant C_2$$

$$a_{31} X_1 + a_{32} X_2 \leqslant C_3$$

$$X_1 \geqslant D_1$$

$$X_2 \geqslant D_2$$

and D_1, $D_2 \geqslant 0$

where:

P	=	Gross regional output
P_j	=	Unit price of product j
a_{ij}	=	Regional technical coefficient
C_1	=	Total available supply of national input (foreign exchange)
C_2 and C_3	=	Available supply of regional resources
D_1 and D_2	=	Demands to be met with regional output

Assuming that region 2 also processes two products Y_1 and Y_2, the regional programme for this region is formally identical with the preceding programme and need not be reproduced. The national programme has the following structure:

$$\text{Max } P_N = P_1 X_1 + P_2 X_2 + P_3 Y_1 + P_4 Y_2$$

subject to:

$$a_{11} X_1 + a_{12} X_2 + a_{13} Y_1 + a_{14} Y_2 \leqslant C_1$$

$$a_{21} X_1 + a_{22} X_2 \leqslant C_2$$

$$a_{31} X_1 + a_{32} X_2 \leqslant C_3$$

$$a_{43} Y_1 + a_{44} Y_2 \leqslant C_4$$

$$a_{53} Y_1 + a_{54} Y_2 \leqslant C_5$$

$$X_1 \geqslant D_1$$

$$X_2 \geqslant D_2$$

$$Y_1 \geqslant D_3$$

$$Y_2 \geqslant D_4$$

$$D_1, D_2, D_3, D_4 \geqslant 0$$

The interpretation of each symbol is similar to that given for regional programme 1.

If the foregoing model is presented in empirical terms it may probably become something completely unmanageable. It is precisely in this type of programme that the principle of decomposition may be useful. The national programme can be restated as follows:

$$\text{Max } P_N = P_1 \, x_{1q}^a + P_2 \, x_{2q}^a + P_3 \, y_{1r}^a + P_4 \, y_{2r}^a$$

subject to:

$$a_{11} \, X_1 + a_{12} \, X_2 + a_{13} \, Y_1 + a_{14} \, Y_2 \leqslant C_1$$

$$u_0 + u_1 \ldots + u_q = 1$$

$$v_0 + v_1 \ldots + v_q = 1$$

$$u_s \geqslant 0$$

$$v_t \geqslant 0$$

where:

x_{iq}^a and y_{jr}^a represent the weighted averages of products X_i and Y_j deriving from the solutions proposed by the regions in stages 'q', 'q−1', 'r' and 'r−1';

$u_0, \ldots, u_q$ are the weightings assigned to each solution;

$y_0, \ldots, y_q$ propounded by the regions.

The mechanics of the procedure just described is as follows:

The National Planning Office requests each Regional Office to settle its own regional programme and transmit to the central agency an optimum production plan. The programme for region 1 does not take into account the effects that its use of the national resource may produce in region 2; similarly, region 2 does not take into account the requirements (in respect of the national resource) implicit in region 1's programme. The combination of the initial propositions may not be optimum (perhaps not even feasible) from the national standpoint. The problem of the National Planning Office consists in inducing the regions to increase production in those sectors which give rise to external economies (for any region) and to reduce inputs of resources which cause external diseconomies. The regional proposals (optimum solutions) are presented to the National Planning Office as X_q^* and Y_r^*, X_q^* being a vector which contains the magnitudes X_1 and X_2 for the q−th solution. In the case of the first proposition we should have:

Region 1 $\qquad X_1^* \quad = \quad (X_1, X_2)$

Region 2 $\qquad Y_1^* \quad = \quad (Y_1^* \cdot Y_2)$

On the assumption that this is a first attempt on the part of the National Planning Office to use a decentralization mechanism, X_1^* and Y_1^* are the only propositions available. To begin with a significant estimate of the weightings, it is assumed that the Central Office knows the time series for products in the form of X_0^* and Y_0^*. Consequently, the available information can be presented as follows:

Region 1				Region 2		
	X_0^*	X_1^*			Y_0^*	Y_1^*
X_{1q}	X_{10}	X_{11}		Y_{1r}	Y_{10}	Y_{11}
X_{2q}	X_{20}	X_{21}		Y_{2r}	Y_{20}	Y_{21}

These values, together with the technical coefficients $a_{11} \ldots a_{14}$ are the only data necessary to enable the Central Office to draw up a programme using weighted average values for each product (or sector) X_i and Y_j with weightings (unkown as yet) such as: $u_0, \ldots u_q, v_0 \ldots, v_r$. The programme is as follows:

$$\text{Max } P_N = P_1 x_1^a + P_2 x_2^a + P_3 y_1^a + P_4 y_2^a$$

subject to:

$$a_{11} x_1^a + a_{12} x_2^a + a_{13} y_1^a + a_{14} y_2^a \leqslant C_1$$

$$u_0 + u_1 \qquad = 1$$

$$v_0 + v_1 \qquad = 1$$

$$u_0, u_1 \geqslant 0, v_0 \; v_1 \geqslant 0$$

where:

$$x_1^a = x_{10} \cdot u_0 + x_{11} \cdot u_1$$

$$x_2^a = x_{20} \cdot u_0 + x_{21} \cdot u_1$$

$$y_1^a = y_{10} \cdot v_0 + y_{11} \cdot v_1$$

$$y_2^a = y_{20} \cdot v_0 + y_{21} \cdot v_1$$

Since the prices are parameters (market prices) the quantities of products are given by the regional propositions, the a_{ij} and C_1 are data and $\Sigma u_i = 1$,

$\Sigma \, v_j = 1$, the only unknown variables are the weightings u_s and v_t. The national programme can therefore by rewritten as follows:

$$\text{Max } P_N = (P_1 \, x_{10} + P_2 \, x_{20}) \cdot u_0 + (P_1 \, x_{11} + P_2 \, x_{21}) \cdot u_1 +$$

$$+ (P_3 \, y_{10} + P_4 \, y_{20}) \cdot v_0 + (P_3 \, y_{11} + P_4 \, y_{21}) \cdot v_1$$

subject to:

$$(a_{11} \, x_{10} + a_{12} \, x_{20}) \cdot u_0 + (a_{11} \, x_{11} + a_{12} \, x_{12}) \cdot u_1 +$$

$$+ (a_{13} \, y_{10} + a_{14} \, y_{20}) \cdot v_0 + (a_{13} \, y_{11} + a_{14} \, y_{21}) \cdot v_1 \leqslant C_1$$

$$u_0 + u_1 \qquad = 1$$

$$v_0 + v_1 \qquad = 1$$

$$u_0, \, u_1 \geqslant 0; \, v_0, \, v_1 \geqslant 0$$

By means of this programme the National Planning Office determines a feasible solution which is improved (in relation to one that will use only the solutions of the previous year X_0^* and Y_0^*) through the use of the simplex method.

This is not necessarily an optimum solution, and the values of the variables are not taken into account. The object of the calculation is to determine the values of the shadow prices in the dual problem: σ_1 corresponding to the national resource and $\bar{\sigma}_1$ and $\bar{\sigma}_2$ corresponding to the weighting constraints. These latter are known in the literature of the subject as provisional dual prices and constitute the most important elements in the principle of decomposition. Their use and their relation to the usual concept of shadow prices is indicated below.

If the optimum values of the structural variables of a dual problem are designated $V_1, V_2 \ldots V_m$ and the optimum values of the slack variables as $L_1, L_2 \ldots L_p$ (for an optimum solution of the direct problem), these values may be interpreted as follows:

V_i is the shadow price or marginal profit which would result from the use of one additional unit of resource i

L_j is the opportunity cost for relative loss caused by additional production of one unit of j (when j is not included in the optimum solution of the direct problem).

The provisional dual prices ($\sigma_1 \ldots, \sigma_m, \Delta_1 \ldots \Delta_n$) can be determined in such a way as to correspond to any feasible basic solution of the direct problem, whether optimal or not. In the optimum solution of the 'national' problem, the provisional dual prices will become dual (shadow) prices and opportunity costs (dual slacks).

In the meanwhile, they can be interpreted as follows:

σ_i is the marginal return on one unit of resource 'i', or the increase in national output obtained from one additional unit of resource 'i' when 'i' is used in the form prescribed by the current (or present) feasible basic solution;

$-\sigma_i$ represents resources which will be used in the production of non-profit-making items if the current (present) basic solution is adopted;

Δ_j is the opportunity cost incurred by the introduction of a good (or sector in an aggregated context) on which the return is less than on those incorporated in the current (or present) basic solution;

$-\Delta_j$ represents the net gains (loss of negative opportunity) obtained by introducing a good (or sector) on which the return is higher than on those at present contained in the solution.

The regional constraints have specified that all goods must be produced; consequently, since for every item 'r' currently included in the basic solution $\Delta_r = 0$, all the Δ_j are null in this case.

The possibility of obtaining negative σ_i and Δ_j constitutes the only difference from the usual dual prices; furthermore, in the optimum solution all the Δ_j must be non-negative.

Reverting to the problem stated, the Central Office obtains the value of σ_1 and, immediately, the 'revised' regional products:

Region 1: $\quad R_{11} = P_1 - (\sigma_1 \cdot a_{11})$

$\qquad\qquad R_{21} = P_2 - (\sigma_1 \cdot a_{21})$

Region 2: $\quad S_{11} = P_3 - (\sigma_1 \cdot a_{31})$

$\qquad\qquad S_{21} = P_4 - (\sigma_1 \cdot a_{41})$

Consequently, the Regional Offices have to once again find solutions for their respective regional programmes, using the revised values in their objective functions. For region 1, for example, this is equivalent to working out a programme identical with the preceding one, but with a new objective function such as:

$$\text{Max } R_1 = R_{11} X_1 + R_{12} X_2$$

and for region 2:

$$\text{Max } S_1 = S_{11} Y_1 + S_{12} Y_2$$

All this is equivalent to the adjustment of each price P_j by the shadow price of the national resource (σ_1) multiplied by the quantity of the resource used in each line of production (a_{1j}). This adjustment obliges each Regional Office to consider the value of the national resource 'j' in relation to its use in other regions, which is tantamount to explicit consideration of the external diseconomies generated.

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The new proposals (solutions) X_2^* and Y_2^*, calculated on the basis of the revised prices, are returned to the National Office and converted into part of the next iteration of the national programme, in which:

$$x_1^a = x_{10} \cdot u_0 + x_{11} \cdot u_1 + x_{12} \cdot u_2$$

$$x_2^0 = Y_{20} \, y_0 + y_{21} \cdot v_1 + y_{22} \cdot v_2$$

are the coefficients of the 'national' objective function which may be written as follows:

$$\text{Max } P_N^2 = P_1 \, x_1^a + P_2 \, x_2^a + P_3 \, y_1^a + P_4 \, y_2^a$$

Although the number of solutions that can be proposed is finite, after each proposal has been received by the National Office it is tested to try out its optimality in relation to the use of the national resource. This test of optimality involves comparison of the revised output of each region with the simplex multipliers, σ_1 and σ_2 associated with the national programme constraints, $\Sigma_{ui} = 1$ and $\Sigma_{vj} = 1$.

For the first regional proposals, the comparisons are:

Region 1: $R_1 \gtreqless \sigma_1$

Region 2: $S_1 \gtreqless \sigma_2$

If $R_1 > \bar{\sigma}_1$, this implies that the net contribution of proposal X_1^* is greater than the contribution made by the previous solution which contained X_0^*; an increase in national output can be obtained by the additional use of national resource 'i' in region 1, in accordance with the structure of production reflected in X_1^*. Consequently, the proposal X_1^* must be included in the next iteration of the national programme. If $R_1 < \bar{\sigma}_1$, proposal X_1^* must be withdrawn, since its marginal contribution is less than the marginal contribution $(\bar{\sigma}_1)$ of solution X_0^* pertaining to the previous period. Thus, only if a new proposal offers a higher revised value than that determined in the previous solutions $[R_q (X_q) \geqslant \bar{\sigma}_1]$ should this proposal be introduced into the (averaged) national solution x_q^a. A similar line of reasoning can be followed in relation to $S_1 \gtreqless \bar{\sigma}_2$.

An optimum solution for the national programme is established when $R_q = \bar{\sigma}_1$ and $S_r = \bar{\sigma}_2$; the values of u_i and v_j are the optimum weightings which will determine the values of the regional proposals in the national programme. The following is the interpretation of the optimal conditions: $\bar{\sigma}_1$ represents the marginal contribution of the allocation of national resource 'i' to region 1 and the use of this resource in accordance with the previous averaged solutions (x_p^a); again, R_q represents the marginal contribution of the proposal x_q^*, so that if $R_q = \bar{\sigma}_1$ no net gain results from the introduction of R_q into the national programme. If the same condition holds good for S_r, the net marginal value of the contribution of any of the proposed regional programmes is zero, and

consequently additional iterations of the national programme will not improve the solutions.

In the example under discussion, if $R_1 = \bar{\sigma}_1$ (for proposal x_1^*) and $S_1 = \bar{\sigma}_2$ (for proposal y_1^*), no gain would be obtainable by means of proposals x_2^* and y_2^*. The (optimum) gross regional products would be given by:

$$P^0 = P_1 (x_{10} \cdot u_0^0 + x_{11} \cdot u_1^0) + P_2 (x_{20} \cdot u_0^0 + x_{21} \cdot u_1^0)$$

and $\quad P^0 = P_3 (y_{10} \cdot v_0^0 + y_{11} \cdot v_1^0) + P_4 (y_{20} \cdot v_0^0 + y_{21} \cdot v_1^0)$

where:

P^0 = (Optimum) gross regional output

P_j = (Market) price of j

x_{iq} = Production of good x_i in proposal q

u_q^0 = Weighting of proposal x_q in the optimum national-programme solution

y_{jr} = Production of y_j in proposal r

v_r = Weighting of proposal y_r in the optimum national-programme solution

It is assumed here that the optimum gross national product is simply the sum of the regional values.

Although the use of the principle of decomposition has afforded a set of internal prices for each region (those represented by r_{iq} and s_{rj}) whereby a solution can be obtained which is otpimal as far as the use of the national resource is concerned, the final decision must be taken and implemented by the National Planning Office. In other words, the National Office must inform each Regional Office of the production values (X_1, X_2, Y_1, Y_2) deriving from the optimum solution of the national programme, and in some way must oblige the Regional Offices to attain these targets.

The principal difference between this sort of final order and that obtained by the ordinary use of shadow prices lies in the fact that the present order incorporates the optimal production values for each region, based on maximum use of national resources.

The application of the principle of decomposition has won a measure of acceptance in the literature of the subject as a decisional tool in enterprises with a number of plants. In addition it has been utilized in sectoral planning, especially in countries with centrally-planned economies. Generally speaking, the models in which the principle of decomposition is used are especially applicable in economies where prices are instruments of planning rather than the result of the interplay of market forces; this is the case with the socialist countries and also to a great extent with large sector in 'mixed economies'.

The application of this same principle to the programming of a system of regions seems fairly obvious, and yet in current literature on regional economics no specific attempts to apply it are to be found.

(c)   *The centralized or fixed-targets method*

Generally speaking, economic models can be classified in two major categories, according to their structure. Thus, we speak of 'criterion function' models or 'fixed-targets' models. The former are optimization models in which no predetermined target is established, but a function is postulated subject to a maximization or minimization process; typical examples of models of this type are to be found in the field of linear programming. The second kind are models in which one exogenous target is defined (or several) and the model establishes the conditions and requisites that must be met in order to attain it (or them). Most of the growth models in common use belong to this category.

The 'fixed-targets' or centralized method in regional programming is really one which uses a 'criterion function' model at the interregional level but which obliges each of the regions in the system to operate with 'fixed-targets' models.

The essential characteristic of the method is that it makes the establishment of each region's targets dependent upon the work of the Central Office. In other words, to guarantee beforehand the consistency and coherence of the various regional programmes, the Central Office determines, with the help of a mathematical model, the set of regional growth targets and the corresponding investment requirements, both variables being duly sectoralized.

Consequently, each region receives from the central level a very specific frame of reference which reduces to a minimum the degrees of freedom for regional (intra-regional) planners.

Basically, the method seeks to determine —at the central level— the growth rate most appropriate for each region, on the basis of background data prepared by the regional offices themselves and in accordance with the general principles for regional development established at the national level. This process of determining regional targets is conducted in such a way as to produce global and sectoral results which are perfectly consistent with the respective targets set up in global and sectoral plans.

The criterion used to determine an optimal solution of the problem is that of minimization of the use of resources in short supply (as a general rule only capital), although it is not necessarily the only one applied.

As can be seen, the 'centralized' method almost entirely sacrifices the possibility of regional participation for the sake of efficiency in planning, which makes it highly recommendable in those cases where the technical team available is small, and can be most advantageously concentrated in the central agency.

Nevertheless, the possibilities of regional participation in the formulation of a development plan are by no means exhausted. The centralized method metes out to each region a small number of key targets, on the basis of which must be fashioned a plan of greater content.

The principal data handed over to each region by the central agency are targets (and rates) in global and sectoral terms, and the corresponding geographical investment requisites.

On the basis of this body of data, each regional office must formulate its own programme, within which emphasis will have to be placed on such aspects as location, employment, income distribution, financing and identification of specific investment projects.

The process is not of course terminated at this stage, and a subsequent iterative mechanism will always be brought into use until complete adjustment is achieved. By the adoption of this method, however, a good deal of time has been gained through centralizing the resolution of many of the problems of consistency and co-ordination.

Mathematically, the model used in this method may be set forth as follows:

$$\text{Min } Z = \sum_{r=1}^{n} \sum_{h=1}^{m} {}^r x^h \cdot {}^r_k h$$

$$\sum_{h=1}^{m} A_{ih} \, {}^r x^h + c^i \, y^r = {}^r_x i \quad (i = 1, 2, \ldots, g)$$
$$(r = 1, 2, \ldots, n)$$

$$\sum_{r=1}^{n} {}^r x^h = x^h \quad (h = 1, \ldots, e)$$

$$\sum_{r=1}^{n} {}^r x^h - e^h + m^h = x^h \quad (h = e + 1, \ldots, m)$$

$$\sum_{h=1}^{m} A_{oh} \, {}^r x^h = {}^r y \quad (r = 1, 2, \ldots, n)$$

$$\sum_{r=1}^{n} \sum_{h=1}^{m} A_{oh} \, {}^r x^h = SRR$$

$$ {}^r_x h \geqslant 0$$

where:

$$
\begin{aligned}
r &= 1, \ldots\ldots\ldots, & n &= \text{number of regions} \\
h &= 1, \ldots\ldots\ldots, & m &= \text{number of sectors} \\
i &= 1, 2, \ldots\ldots, & n &= \text{regional sectors} \\
e &= g + 1, \ldots, & e &= \text{national sectors} \\
m &= e + 1, \ldots, & m &= \text{international sectors} \\
& & x &= \text{increment in gross production} \\
& & k &= \text{capital-output coefficient} \\
& & c &= \text{coefficient of final demand} \\
& & y &= \text{increase in regional income} \\
& & e &= \text{exports} \\
& & m &= \text{imports} \\
& & A_{ij} &= \text{technical coefficient} \\
& & A_{oj} &= \text{coefficient of net product} \\
& & SRR &= \text{total (exogenous) increase in gross domestic} \\
& & & \quad \text{product}
\end{aligned}
$$

As can be seen, the foregoing model is no other than the 'Rotterdam model' already discussed in the previous chapter, in relation to the problem of determining regional sectoral targets.

The three methods discussed seek to resolve a dual problem: the economic programming of each region within a system of regions, and the linkage between the interregional and intra-regional sublevels of planning.

One of the elements in evaluating the relative efficiency of each method is its information requirements.

From this point of view, probably the semi-centralized method is the most exigent as regards statistical information, since its efficient application implies detailed knowledge of the technological matrix for each region and the degree of mobility of resources. In the case of the fixed-targets method, on the contrary, what is required is to ascertain the degree of mobility of products, which as a general rule seems simpler.

Rigorous application of this latter method also calls for some knowledge of the technological structure of each region (technical coefficients, capital coefficients, etc.). In practice, however, by means of the adoption of appropriate working hypotheses, it is possible to proceed largely on the basis of national information, although this always implies some sacrifice of quality in the information 'produced' by the model.

It is difficult to establish in advance the information requirements of the decentralized method, since under this system the actual way in which each regional programme is to be constructed is not specified. But the information needed in this case seems to be less elaborate than that required for the other methods.

A second element that must be taken into consideration in choosing one of the proposed methods is the technical capacity available in terms of human resources. Computer capacity may also create, at a given moment, a bottleneck for the application of a particular method.

It seems clear enough that once again it is the semi-centralized method that makes the heaviest demands from this point of view. Although the method in itself does not involve major complexities for anyone familiar with analysis of activities, the trouble is that a team well-trained in this field is needed in each of the Regional Offices, and this may be a limiting factor in most cases. In this connexion, the advantage attaching to the centralized method is obvious; as has already been pointed out, it allows maximum utilization of the available talent (always in short supply) by concentrating it in the central agency. The decentralized method calls for a type of technical qualification which is of a more general nature, and therefore easier to find in each region.

The last two methods proposed necessarily entail the use of computers to solve the corresponding models, although this service may be centrally established.

In this context, a major problem which is more efficiently dealt with by means of the centralized method is that of consistency and coherence between the global level and the regional level of planning. It is precisely for this reason that the model used in this method has been called a 'regional sectoral compatibility model'. In contrast, the decomposition method also has an important conceptual advantage inasmuch as it enables the 'external effects'

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produced by operating with a system of regions to be quantified and consequently makes it possible for the country as a whole to 'internalize' these effects. The two foregoing arguments are perhaps the most cogent in favour of one or the other method, and both must be carefully weighed by those responsible for the selection.

Along with the choice of one of these alternatives for centralization (and for the implicit programming method), there are other questions that must be settled in relation to the organization of the regional planning system.

For example, it will be necessary to determine, *inter alia*, the relative size of the Regional Offices and of the Central Office, in terms of the technical and human resources with which they are to be equipped.

This depends precisely upon the degree of centralization with which the system is to operate and upon the (physical) size itself of the regional system. The cases of Peru and Chile serve to exemplify the problem.

In Peru four major planning regions have been identified, and at the same time work is being conducted on fairly decentralized lines. In this case, each of the regional technical teams is of considerable size, embraces almost all the disciplines required for an interdisciplinary approach to regional planning, and is consequently qualified to tackle independently nearly all the tasks proper to the planning process.

In Chile, in contrast, work has been permanently based on twelve or thirteen regions, in each of which there is a Regional Planning Office. The technical team in most of these offices is very small, sometimes comprising only two or three persons. Concurrently, the team working in the Central Regional Planning Office has usually been of considerable size (about 40 or 50 technical experts), highly diversified professionally and technically well-trained. This type of distribution corresponds, of course, to a decidedly centralized regional planning system. In the case of Peru, the central team is, on the contrary, of very small size.

Both situations are logically grounded on very clear and specific practical reasons.

Where there are a few large regions (as in the case of Peru), the necessity and pressure for decentralization becomes an important element in the system. Intra-regional (or loan) aspects of regional planning acquire, up to a point, preponderance over interregional questions. Consistency problems are reduced to a minimum, and the main concern of the central team is to ensure coordination of the work of the Regional Offices.

Conversely, a large number of relatively small regions automatically generates the need for a powerful central agency, capable not only of co-ordinating the activities of all the Regional Offices but above all of resolving in advance the consistency problems which very often arise in complex multiregional systems. Similarly, the existence of a large number of small regions (exhaustively covering the territory) means that virtually any action on the part of the central government (for example, the construction of a dam) immediately has effects of an interregional type, that is, affects the interests of two or more regions. This leads directly to the need for a central (regional) agency to be responsible for the administration of projects of this type.

Of course, the role played by the Regional Offices is completely different in one situation and the other.

This difference may be epitomized as follows. In the case of a large number of small regions (a centralized system, in practice) the principal role of the Regional Offices is to perform a function of information and communication *vis-à-vis* the central level, and a function of rationalization of local aspirations and pressures, in the sense of giving these pressures (which are politically originated and channelled) a technical groundwork before they are transmitted (via parliament, for example) to the central executive power. A proliferation of *ad hoc* regional solutions is thus avoided.

In the case of a small number of large regions, the role of the Regional Offices includes not only the information and rationalization functions referred to above, but also the substantive role of really preparing the regional development plan, by completing each of the classic stages in the planning process. Of course, this will be meaningful only if the decentralization of the regional planning function is accompanied by a real capacity for taking decisions and managing each region's resources.

A propos of the general question of the institutional organization of the regional planning system, reference may pertinently be made to a number of policy and administrative problems with which regional planning will usually find itself faced. These problems are of varying kinds, but all have a common denominator: the different power structures with which the regional planner is confronted and which react to his proceedings in different ways.

Putting into operation a really efficacious regional planning system means changing or modifying the established power relations in several sectors of society. Regional planning is, of course, an innovative element (at least in its initial phase) and will therefore encounter a natural reaction of repudiation in all the power structures that are already consolidated.

Paradoxical as it may seem, the most immediate problem with which regional planning system has to deal with is its relationships with the rest of the economic planning system.

The regional planning subsystem usually makes its appearance when the rest of the economic planning system already has long years of experiment and consolidation behind it. This is true at least of nationwide regional planning efforts in Latin America. Irrespectively of the specific degree of success achieved by global and sectoral planning efforts (a success which in Latin America can easily be called in question), there can be no doubt that planning activities have helped to create a closed bureaucratic élite whose legitimization has its roots (partly) in the use of higly sophisticated language and, in particular, techniques. Generally speaking, the methodological and technical instruments of both global and sectoral planning are backed by over thirty years of experiment, at least as far as their Keynesian fundamentals are concerned.

Into this order of things, then, a new function —regional planning— is introduced which possesses very few instruments of analysis (nothing that in practice is anything like an impressive input-output matrix, much less any theory with the logical strictness of the neo-classical allocation of resources model); which generally assembles a nucleus of young technicians lacking the experience conferred by long years of routine; and which, worse still, proposes an inter-disciplinary approach to the work of planning, that is, negatives the closed character of the small economic society of planners.

In these conditions, of course, the repudiation of the system is an almost natural reaction. Only the technical calibre that regional planners can show, plus the necessary political support they must have, will be capable of bringing about integration with the rest of the planning team. The worst solution, in this case, would be sheer political enforcement of an authoritarian type.[50]

Another type of political problem with which regional planners will be faced has to do with the relationship between regional planning and the public administration in general. Given the type of evolution which generally characterizes the State in Latin America (inorganic horizontal aggregation of functions), the public administration has tended to be structured in such a way as to form veritable 'States within the State', that is, power groups with an exceptional capacity for management of resources and a high degree of independence (in practice) with respect to the central government. For example, a moment's reflection on the significance, in some countries, of certain Ministries such as that of Transport and that of Finance, or of some decentralized public corporations (the Chilean Corporación de Fomento de la Producción, is, in reality, a super-Ministry) will give an idea of how the State has been parcelled out in units that at times are difficult to control. This type of agency of the public administration generally acts in conformity with very rigid and consequently routine bureaucratic patterns. Any innovation signifies a disruption of the established order, a disruption of the balance of power, which gives stability to the institution.

But if a regional development plan is really to be implemented, all these institutions will have to introduce new considerations —of a locational type, for example— into their internal decision-making process. Many of them will be obliged to embark upon territorial decentralization.

Regional planning will have to break with this order of things. But here the strife will not be waged around technical questions but in exclusively political terms. In this sense, if the regional planning function cannot rely upon sound top-level political backing, the probability of imposing its point of view is very slight. Political support for regional planning partly depends upon the position and status of the complete planning system within the public administration. Here there are several alternatives, ranging from a technical unit subordinated to a Ministry, to a super-ministerial position depending directly upon the Chief of State. This subject is of course outside the scope of the present notes.

It will be noted in many cases, however, that irrespective of the power position of the entire planning system, the regional planning subsystem enjoys special political support. This is undoubtedly because the government is capable of visualizing the political dividend (in terms of support) that can be obtained through regional development. Obviously, regional planners must not fail to take advantage of this favourable set of circumstances.

A political problem of a slightly different nature which frequently crops up in practice relates to the very definition of the regional system.

In a good many cases, a region will be administratively structured by grouping together several units of the politico-administrative partition in force

[50] See J. Friedmann and W. Stöhr, "The uses of regional science: Policy planning in Chile", *Papers*, R.S.A., Vol. XVIII, 1967.

(several provinces or several states, for example). Each of these units has a clearly-established political authority of similar hierarchical status to the rest. Clearly, the region's political administration will have to be based on a carefully-studied mechanism for co-ordination between the established political authorities. The first solution is preferable, but it will involve obvious political problems. It is true that the responsibility for resolving this type of problem falls mainly within the sphere of political power rather than upon regional planning itself. Nevertheless it must be borne in mind that a problem of this kind may seriously hamper the regional development effort.

Unquestionably, the principal political problem that regional planning will encounter is the reaction of the regional communities themselves to the specific measures deriving from the plan. If the regional development approach aims at a transformation in depth of the structures in force and at the modernization of regional society, this effort will obviously work against certain social sectors and in favour of others. It must be assumed that the plan is designed to improve the situation of the majority of the population, but the negative reactions of the minority whose interests will be affected must not be underestimated. From this angle, the primary political task of regional planners and of the regional political forces that are in favour of the programmed change is to broaden as far as possible the groundwork of political support for the plan so that the process of change can be carried out efficiently and at the lowest possible social cost. The popular sectors and the modern élites in each region must constitute two cornerstones of this action. Such support will of course be all the easier to obtain, the closer the correspondence between the plan and the region's situation and prospects —something for which regional planners are directly responsible. Again from the same standpoint, it must not be forgotten that not all regions can be developed and assisted at one and the same time. For some of them, and for some while, the nationwide regional development plan will not mean very much. Among these regions will be those that are higly capitalized and probably some of those that are most backward. In such regions, the political problem will assume another guise: that of pressures exerted by all social groups in favour of State action. Coping with and controlling this type of pressure is one of the greatest challenges to regional planning.

B. Policy instruments

It was pointed out in the preceding section that a policy could be described by reference both to its general aims and to its component elements and the economic instruments (control variables) identified in order to influence the course of specific functions or variables.[51]

Before discussing specific economic policy instruments which have been proposed in various regional planning experiments, it is useful to begin by offering a theoretical synopsis of the principal instruments both of economic policy in general and of regional policies in particular.

[51] In Tinbergen's terminology, the controlled variables in a model are the policy instruments and the non-controlled variables representing objectives are the targets; non-controlled exogenous and endogenous variables also appear in the model.

The classic instruments of economic policy are usually grouped in the following categories:

(a) instruments of public finance, which cover most of the income and expenditure items of the central government and local governments as well as the balance between income and expenditure;

(b) monetary and credit instruments, which include everything that makes the borrowing of money easier or more difficult both for individuals and for enterprises and the government;

(c) the exchange rate, i.e., the ratio between the national currency and foreign currencies; the management of the exchange rate includes overall devaluations and revaluations as well as modifications for specific transactions or in relation to particular currencies;

(d) instruments of direct control, such as the capacity of the State to fix prices, values or quantities;

(e) institutional instruments, i.e., changes which affect the basic system within which the other instruments are used (for example, a substantial change in the financial market) or changes introducing new institutions, whether national or international.

From the more detailed standpoint of regional development policy, a different classification of policy instruments has been proposed by Siebert (Siebert, 1969), according to whom the instruments of regional policy can be classified in the light of three different criteria: (1) by the determinants of regional growth which they affect; (2) by the size of the area where they are applied; and (3) by the intensity of their intervention in market mechanisms.

1. If instruments are classified according to the type of growth factor which they influence, the following categories are obtained:

(a) *Measures affecting the manpower supply.* Under this head are classified all the policy variables by which the regional supply of manpower is either quantitatively or qualitatively conditioned. Examples are such instruments as measures to step up or to control the birth rate, measures affecting migratory movements, training of manpower and measures bearing on the individual choice between idleness and work, such as progressive wages, for instance.

(b) *Measures affecting the supply of capital.* These comprise a whole set of measures or instruments designed to modify the available supply of investment funds in each region, as well as those measures whose object is to increase regional investment opportunities. Specific examples in this connexion are the creation of regional financial associations, the management of the rate of interest, the construction of basic social capital, etc.

(c) *Measures affecting the available supply of technical know-how.* In this group are included all measures whose effect is to raise the region's stock of technical know-how, as, for example, measures introducing incentives to regional technical research and development, the improvement of the channels whereby technological innovations are disseminated, the reduction of the average age of the stock of capital via accelerated depreciation, and others of a similar nature.

(d) *Instruments affecting demand.* Under this head are grouped all those measures which aim at increasing internal demand or external demand at the regional level, or at varying its structural composition. Direct public expenditure and the encouragement of export markets are two outstanding examples of measures of this type.

(e) *Measures affecting the location of activities.* While the instruments described above have a manifest locational effect, a location policy, both for industry and for the tertiary sector, includes a number of other components. Usually, industrial location policy (as a complex of complementary measures) will be one of the principal instruments of regional policy.

(f) *Measures to increase mobility.* Lastly, within this first classification of instruments, come those measures whose object is to increase the degree of geographical mobility of resources, persons and technical know-how. It is common knowledge that if other conditions remain constant, the efficiency of the regional system increases in direct relation to the degree of mobility existing in it. The construction of transport systems and of communication systems constitutes a leading measure in this connexion.

2.   If instruments are classified in accordance with the size of the area where they are applied, two categories can be distinguished:

(a) *Regional instruments.* All policy measures specifically affecting a given region are classified in this way. Regional development corporations and regional financing companies are two distinctive examples of these instruments. Of course, since this second classification criterion is independent of the first, many of the policy measures reviewed in the preceding paragraphs may also be of a purely regional character.

(b) *Nationwide instruments.* As their name suggests, these instruments correspond to policy measures which are applied throughout the country. They may be measures whose application is homogenous or aspatial, as is the case with most of those comprised in the country's fiscal policy; again, they may be instruments whose application throughout the country is differentiated in regional terms. In this last case, some examples may be found in the establishment of different bank interest rates by regions, or in the usual mechanism of compensatory pay according to the place of work (post allowances).

3.   Lastly, if policy instruments are classified in accordance with their degree of intervention in the market mechanism, the following typification is arrived at:

(a) *Direct government activities.* In a modern economy the government's direct development activities are usually of extraordinary importance. Commensurately with the degree of socialization of the economy, the government becomes the leading agent of development. Among its many direct activities, at least three are worth mentioning which are relevant to the regional theme. They are: (i) the planning function itself; (ii) territorial decentralization of the public administration; and (iii) entrepreneurial activity directly undertaken by the State.

(b) *Direct controls.* There are several policy instruments which represent direct controls exerted by the State over economic activity. The most important of these is price control, which may be used as a function of interests of the regional system. The establishment of production quotas and the regulations governing interregional transport of goods, respectively, likewise exemplify measures of this type.

(c) *Indirect controls.* In most cases the State regulates economic activity through the use of indirect controls which affect either government revenue or the level of government expenditure. Taxation is an example which may be, and *de facto* is, clearly differentiated in regional terms. For example, within the

framework of an industrial location policy, taxes are usually lower in those regions which it is desired to favour by the installation of new industries.

(d) *Information measures.* A way of interfering with the market system in a lesser degree is to improve the quality of the information available for economic agents. Here it is a question of indirectly influencing investment, location and migration decisions, by means of well-timed and efficient transmission of information designed to produce the closest possible association between these decisions and the objectives of the plan. Undoubtedly, the plan itself will be the most important piece of information.

(e) *Measures of moral persuasion.* On a good many occasions moral persuasion constitutes an efficacious measure complementary to purely economic instruments. In particular in countries that are passing through periods of revolutionary change or are being subjected to external pressures, this type of mechanism affords highly satisfactory results. For example, it can be used in the control of environmental problems, creating both in the community and in enterprises awareness of their nature and of the contribution that each can offer to their solution.

This general presentation of some instruments that can be used to give expression to regional policy may now be followed by more detailed discussion of some of the several specific instruments which will be proposed in the regional plan.

In the absence of a formalized and quantified model of regional economic policy the most difficult task of the whole technical process of planning is constituted by the selection, application and harmonization of policy instruments.

There are various ways of presenting the discussion of policy instruments, and the planner will probably have to experiment —by trial and error— with different ways of approaching the problem in order to secure minimum guarantees of arriving at a coherent whole. For example, the application of each instrument could be discussed as a function of its usefulness in each of the policies summarized above. Another way of tackling the matter is to ascertain —at the level of each individual region— whether the basic stumbling blocks to regional growth have their origin on the demand side or on the supply side [52] and to consider in each case the use of the most appropriate instruments. In the end the two forms of analysis will certainly have to be combined.

Possible ways of applying some of the commonest economic instruments will be discussed below.

(a) *Taxes in general.* The range of taxes usually levied by the authorities (both central and local) is quite wide and includes in the first place direct taxes (on natural or juridical persons) and indirect taxes (on economic activities or transactions) and secondly taxes of a territorial character. Taxes on persons, in turn, may affect their net wealth, their income or their profits, while indirect taxes may affect transactions, juridical acts or production of goods and services.

In the most general terms it is possible to consider utilizing taxes on natural and juridical persons as well as taxes of a territorial character with a twofold end in view: (i) to aim at equalization of private and social costs, particularly in the 'centre'; (ii) to tap the surplus of the 'centre' for production or distribution purposes in the 'periphery'.

[52] This is analytical simplification which has its sources in the Keynesian and post-Keynesian growth models.

In the first respect, suffice it to recall that a good many of the theories which attempt to explain the steady growth of the 'centre' (assimilated here to the idea of a primate urban centre) are based on the divergence between private and social costs of urban expansion (the former being the lower) and on the difficulty of calculating social costs and allocating them to users. In this case the use of taxes would represent a mechanism for controlling the expansion of the 'centre'. As regards the second point, the basic aim of the tax would be to make the typically metropolitan population and enterprises pay for the advantages of the agglomeration economies existing in the 'centre', considering what is 'urban' or 'metropolitan' as an economic good and then taxing the consumer surplus, to use a classic terminology. Although in practice the two tax objectives tend to merge with each other in some cases, the grounds on which they are established are different.

The product of these taxes can be used through various financial mechanisms: through the regional public-sector budget, of course, and also as a source of financing for some type of 'regional development fund'.

At more specific levels, the territorially differentiated treatment of taxation should be designed to influence the decisions —particularly those of a locational character— adopted by individuals and enterprises, in order to bring them nearer to the programme postulates of regional planning.

(b) *Subsidies in general.* The subsidies used may be direct (payments) or indirect (reductions on taxation in force). One of the general aims pursued through the use of subsidies is to orient the combination of the factors of production that will be used in different activities. For this reason the subsidies most commonly proposed in regional development experiments are subsidies on the use of labour and subsidies on the use of capital.[53] In reality, in Latin America subsidies on capital have been more often used, mainly in the form of liberalization of tariff duties on imports of capital equipment. Chile's (nation-wide) regional development policy during the period 1964-1970 and the policy of industrialization of the North-East in Brazil are two cases in point.

In connexion with the Brazilian experiment, several empirical studies produce evidence of the distortion of relative prices as between capital and labour which has been brought about by the use of explicit or implicit subsidies on capital. This distortion is reflected in the selection of highly capital-intensive technologies and lesser impacts in terms of absorption of manpower.

For example, in the North-East of Brazil the Superintendencia para el Desenvolvimento do Nordeste (SUDENE) approved 448 new industrial projects between 1962 and the beginning of 1970, representing an investment of 1 091 million dollars. Assuming them to be in full operation, these new projects would seem to have implied the creation of 73 500 new direct employment opportunities, which involves an extremely high capital labour relation, of about 15 000 dollars.[54]

[53] For a discussion in depth of this point see G. Borts, "Criteria for evaluation of regional development programs", in W. Hirsch (ed.), *Regional Accounts for Policy Decisions,* Baltimore, John Hopkins Press, 1966.

[54] See D. E. Goodman, J. J. Ferreira, R. Cavalcanti de Alburquerque, "Os incentivos financieros a industrialização do Nordeste e a Escolha de Tecnologias", *Pesquisas e Planejamento,* Vol. 1, No. 2, Rio de Janeiro, Ministry of Planning and General Co-ordination, Institute of Economic and Social Planning (IPEA), 1971.

In contrast, subsidies on employment of labour have been less used.[55] This is perhaps because the point of departure has been the hypothesis of the relative abundance of labour, which makes it, in the absence of other intervention mechanisms, the cheapest factor; but the indiscriminate application of subsidies on capital reverses the situation in real terms and the result is a capital-intensive industrialization process. In industrialized countries, on the other hand, it has been a more widely used instrument. There are, of course, various specific ways of applying a subsidy of this kind.

(c) *Prices.* The management of prices in general represents a classic instrument of economic policy. From the standpoint of regional development, prices may be used as mechanisms to sustain a given activity —as in the case of support prices for agricultural commodities— or again to supply some regional activities with certain inputs at low cost. Reduced power and transport tariffs are a couple of relatively widespread examples. From another angle, price fixing or control might be important in some cases of regional economies with notoriously monopolistic activities.

(d) *Rates of exchange.* Although the rate of exchange is a price, its particular position as an instrument of policy means that it must receive separate treatment. The management of the exchange rate —or exchange policy in general— is a classic and simple example of differentiated regional effects resulting from the application of a homogenous overall measure, and it is impossible to guess why this instrument could not be handled on territorially discriminatory lines. For example, the establishment of an exchange rate above parity (undervaluation of the national currency) implies a subsidy or at least an incentive to exporter activities and regions, while importer regions are penalized via higher prices. The regional plan will at least have to define the exporter or importer character of each region, and diverse exchange rate alternatives and various possibilities for differentiation by regions or by localized activities will have to be evaluated.

(e) *Interest, discount and bank reserve rates.* All these instruments (which are also prices) affect the available supply of money and credit. If it is possible to prevent interregional filtrations (for example, the borrowing of money at a low price in region A to invest it in region B), these instruments should be discriminatorily handled according to the type of region and its money and credit requirements. As was pointed out earlier, if problems of insufficiency of demand are observable in the region, the bank reserve, interest and discount rates may do something towards remedying the situation. Apparently it has been assumed in practice that it would be very hard to prevent filtrations, but there is no difficulty in tying cheap credits to specific well-located investment projects. Another function, no less important, which can be fulfilled, for example, by the rate of interest, is the tapping and retention of both regional and extra-regional financial resources.

(f) *Public expenditure.* The expenditure of the public sector (treasury plus decentralized agencies) is undoubtedly the principal and most widely used instrument of regional economic policy. The specific forms that may be taken

[55] The Government of Chile has recently put into practice a system of subsidies on employment of labour in several regions.

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by public expenditure (excluding subsidies) are many and various, and range from grants to direct construction of social capital and of direct production capacity. Here the basic problems relate, in the first place, to the amount of public expenditure that can be allocated to regional purposes; secondly, to regional priorities (both interspace and interregional) for the allocation of resources; and, thirdly, to institutional mechanisms (public-sector budget, corporations, etc.). Here, in connexion with countries with a federal structure and countries with a unitary structure some interesting questions arise which are regrettably outside the scope of the present text.[56]

By way of example, in terms of the volume of resources that may be committed in the use of this instrument, it should be noted that the average annual allocation to these purposes amounted in Italy to 2 448 million dollars for the period 1971-1975, in Belgium to 112.8 million dollars for the period 1970-1973 and in France to 207 million dollars for the period 1970-1972 (OECD, 1974).

For the regional planner the essential problem with all these instruments (those of an institutional character have not been included, nor have all those of an economic nature) is to structure a coherent whole.

"The challenge for regional policy is to bring together the bewildering variety of policies established at the several levels into a cohesive whole to make sense in terms of regional development objectives. Perfection in this regard will probably remain out of reach, but modest gains in this direction from time to time will be most helpful." (Fischer, 1967.)

To conclude this section it is instructive to quote the system of regional policy incentives used in France, from the narrower angle of industrial location policy. It can be inferred from the study of this system that regional development policy in France (as in other industrialized countries) holds an outstanding place within overall economic policy. The following list briefly describes the various incentives or policy instruments applied.

I.   *Geographical coverage of incentives.* Aid to areas covers the west, the south-west, the Massif Central, Corsica and the mining areas in the North, Lorraine, Central France and the South. These together account for 44% of the territory and 36% of the population.

II.   *Principal kinds of incentives*

1. *Grants for investment.* The maximum grant for investment purposes ranges from 12% to 25%, depending upon the area. In all areas grants are limited to 15 000 francs per job in the case of new installations and 12 000 francs in that of expansion.

2. *Loans.* These are granted as exceptions by the Economic and Social Development Fund (FDES) to encourage industrial decentralization and reconstruction programmes. The loans may cover about one-third of the investment. The current rate of interest is about 6.57%, 2 points below the market rate.

3. *Shares in capital of enterprises.* Regional development corporations can hold shares in the capital of enterprises up to a limit of 35% for a maximum period of 15 years.

[56]For a Latin American example, see F. Rezende, *Avaliação do setor público na economía brasileira, Relatório de Pesquisas,* No. 13, Rio de Janeiro, Institute of Economic and Social Planning and Research Institute (IPEA/INPES), 1972.

4. *Incentives to decentralization:*

(a) A grant covering about 60% of the cost of removal incurred by companies that move outside the Paris region or outside the five cantons south of the Oise, always provided that they leave unoccupied an industrial building site of at least 500 square metres;

(b) Decentralization allocations, which amount to 10, 15 or 20% of investment, according to the nature of the activities concerned, are available for switching tertiary activities away from the Paris region. The allocations are limited to 15 000 francs per job generated;

(c) Reimbursement of part of the vocational training costs incurred by companies that settle in or move to the provinces; aid for training and refresher courses; reimbursement of expenditure on transport and installation of staff;

(d) The authorities can intervene to reduce the cost of land for the site, as the case may be, by up to 10 francs per metre or 6 francs per metre in the West, figures which compare favourably with corresponding average values of 15 and 25 francs per square metre in industrial areas;

(e) Certain discounts on energy costs may be granted, for example, in respect of natural gas in the south-west, or electricity in Brittany.

5. *Tax aids.* The following cumulative but not automatic benefits may be granted:

(a) Accelerated amortization of 25% of the cost of construction of buildings in the first year (normally the rate is 5%);

(b) Partial or total exemption from the local patent requirement for a period of 5 years, subject to approval by the local authorities;

(c) A 10% to 5% reduction of the tax on capital gains accruing from the sale of developed land;

(d) Reductions of the transfer tax.

In Latin America one of the largest-scale and most coherent examples of the application of regional policy instruments is afforded by the whole experiment in regional development in the North-East of Brazil, although in this case a nationwide conception of regional development is lacking. Among the copious literature existing on this subject it is worth while to single out a study of this experiment prepared by the Latin American Institute of Social Research (Instituto Latinoamericano de Investigaciones Sociales - ILDIS) (Koch-Weser, 1973).

C. Plan control and evaluation

The last stage in the planning process is that of control and evaluation of the plan.

Planning should be conceived not as a linear process, which begins and ends at given points, but really as a circular process with a profound feedback effect. Furthermore, an elementary condition for efficient planning is flexibility. It is precisely the stage of control and evaluation that provides (although not exclusively) the feedback effect and the condition of flexibility.

What media can be used in this stage of regional planning? Who is responsible for control and evaluation? These are the two basic questions in relation to this phase.

Control is naturally a matter of checking-up, of measurement. Instruments of measurement must therefore be devised to ascertain how far the plan has progressed.

This problem may be posed as either a short-term or a long-term question. Different indicators will be used in each case.

For short-term control three types of indicators may be suggested. In the first place, the regionalized programme and performance budget of the public sector is undoubtedly the most complete instrument of control. Each project and each programme is clearly identified in relation to its sources of financing, time schedule of receipts and expenditure and institutions responsible for its execution. Thus the budget (plus cash balances) makes it possible to follow up, from the financial angle, the development of each project. Secondly, physical control of the progress of works is another instrument which complements (or in some cases replaces) financial control. Thirdly, from a more aggregated standpoint, a system of conjunctural indicators must be available for each region. These indicators must make it possible to discover, on a quarterly or half-yearly basis, the overall behaviour of the regional economy. If they also have a counterpart at the national level, this will considerably enrich the analysis. Tax revenue, retail sales, consumption of electric power, bank deposits and other easily-collected indexes may constitute the basis of the system.

For the long-term control and evaluation of regional development, the only instrument that can be suggested is the devising and calculation of a system of regional social accounts, however rudimentary this may be at first. Only thus will it be possible to give a reply to two basic questions: how far the region changes its position within the regional system and how far the distribution of regional income is affected by the plan.

As regards who is to undertake control and evaluation, several alternatives may be proposed. Of course, the planners themselves might assume responsibility for this task, and this has in fact been a common practice. It does not seem desirable, however, to be 'judge and party in the same suit', and several arguments could be adduced against the twofold role of planner and evaluator.

On the other hand, an *ad hoc* agency independent of the planning system might conceivably be set up to handle the task of evaluation and control. In some countries this function is handed over to the same agency that is responsible for the national statistical system. Here too arguments may be found both for and against this alternative.

Lastly, and this appears to be a potentially more fruitful alternative, the regional community itself may join, through its representative organizations, in the work of evaluation and control. Here there would be plenty of room for channelling popular participation (in addition to the field opened up by the generation of projects and local financing). In this case evaluation and control should be envisaged as a joint task of the regional planning system and the local community; otherwise, this mode of participation might take a dangerous turn in the direction of a sort of popular political judgement upon the planners, which would be absolutely out of place.

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Chapter IV

A TENTATIVE INTRA-REGIONAL PLANNING MODEL IN THE FRAMEWORK OF A SYSTEM OF REAL CENTRALIZATION AND FORMAL DECENTRALIZATION

A. Background information on the problem

Although the keynote of this book is its strong emphasis on the interregional level of planning, it is interesting to complete the circle by briefly presenting a few ideas on the way of structuring the intra-regional level of planning.

The model of organization for intra-regional planning which will be presented in the following pages was originally devised in response to the specific subnational planning situation (at the level of states in this case) existing in a given country whose internal structure of government is of the federal type. Nevertheless, the model has enough elements of generality to be applicable in countries where the conflict denoted by the title of the present chapter becomes apparent: that is, countries where a structure of government that is formally decentralized in territorial terms exists alongside a marked tendency towards centralization, mainly in functional terms.

Moreover, what has been implicitly maintained throughout this document is a concept of semicentralized regional planning which displays considerable similarities with the above-mentioned situation. This at least partly justifies the discussion which follows.

In Latin America, the federal type of internal political situation is relatively common, especially in the territorially larger countries. Argentina, Brazil, Mexico and Venezuela have a political and administrative structure in the federal style. Federalism presents particularly interesting characteristics from the standpoint of the regional system and planning process, partly because, in theory at least, it is consistent with a decentralized decision-making mechanism, and this decentralization is of both a functional and a geographical type.

In many cases, however, federalism is no more than a legal fiction and the state governments are in practice devoid of any meaningful decision-making capacity. In this sense, and in real terms, they are not very different from the subnational authorities in countries where the political régime is unitary.

Even in Brazil, from any standpoint the most decentralized country in Latin America, the central government is increasingly absorbing responsibilities which formerly were incumbent upon the states, and Brazilian federalism is tending to give way to a semi-decentralized structure, although all or almost all the formal aspects of the federal system are kept intact.

In Argentina, the process of transferring decision-making from the provinces to the central (federal) government dates back much farther, and 'the return to true federalism' is a political slogan which is widely bandied about in various circles, although not less utopian on that account.

Why has this equivocal situation come about? There are several complex reasons for its emergence, not all of which are generally applicable. A few of them at most will be mentioned here.

In the first place, the increasing degree of interdependence of economic decisions today makes centralized handling of them a manifest necessity. We need look no farther for an example than the decision to construct (in a country with a very extensive territory) a steel mill for which the main inputs (iron ore, coal, lime, electric energy, water, etc.) come from different points quite far apart and for which the markets are to be found both inside and outside the country. Without even mentioning the problem of assembling the necessary investment funds, it is easy to imagine the difficulty of effectively co-ordinating so many separate decisions and measures.

Secondly, it is a truism that the financial resources of federal units are generally considerably more inelastic than national resources. This fact, combined with the subnational government's growing expenditure requirements (deriving from population growth or from heavier public responsibilities) makes the federated units more and more dependent upon the federal government's resources.

Similarly, as was discussed at the beginning of this book, it is increasingly often recognized that from the geographical standpoint countries function as systems grouping together several spatial subsystems. This fact strengthens, from another angle, the interdependence argument and therefore accentuates the trend towards centralization of decision-making.

The foregoing argument can easily be illustrated with practical examples like the one set forth below, which demonstrates the need for the process of determining objectives and establishing targets to be the responsibility of the central government or of a central planning office.

During the period 1964-1970 several development strategies and plans were drawn up in Chile for some of the planning regions into which the country had been divided. Two of these are the Bío-Bío Region and the Maule Region (names which correspond to the catchment basins of the principal rivers in the two regions). The first of these has a predominantly industrial economic structure while the second is of an essentially agricultural character. The two regions have a common boundary.

In the development strategy for the Maule Region it was proposed, among other targets, to double the region's gross domestic product per capita within a given space of time. On the other hand, in the development strategy for the Bío-Bío Region the target established was to increase the Region's gross domestic product per capita at an annual rate of 4.5%. Lastly, the overall growth rate of the economy postulated by the Government for the same period was 5.5%, also in terms of the gross domestic product.

The question is, then: are the global strategy and each of the regional strategies reciprocally compatible? If not, how can the lack of coherence be explained?

There is no need to go into the details of the arithmetical exercise required to ascertain this. By recourse to the harmonization method expounded in chapter II of the present book the conclusion can be reached that the target for the Maule Region implies an overall annual growth rate of about 4.65%, if the aim is to guarantee in advance a consistent solution; the target for the Bío-Bío Region, in its turn, would imply, under the same constraint, a global annual growth rate of 7.2%.

From the foregoing figures a twofold inconsistency can be clearly deduced: (i) the regional target for the Bío-Bío Region is not consistent with the overall target; (ii) the two regional targets are inconsistent with each other. The global target and the Maule regional target are not exactly inconsistent, but neither is there coherence between them; given the parameters of the problem (not explicitly presented here), the Maule Region could grow more rapidly than was proposed.

The explanation of the situation just described is simply that at the time when the strategy for the Maule Region was prepared an explicit global strategy already existed, whereas the strategy for the Bío-Bío Region was drawn up before the global strategy. In other words, in neither of the two cases was there a clear-cut set of directives of a global type to guarantee a consistent solution.

The important point is that in this as in other similar cases the lack of consistency between several targets can exist only in *ex ante* terms. Obviously, from the *ex post* standpoint the inconsistency is resolved in one way or another, presumably by means of implicit side adjustments. But then the question is: in favour of whom or in favour of which region is the problem resolved? The answer would seem to be that in practice this type of conflict is settled in favour of the politically more powerful region, in so far as the inconsistency becomes increasingly explicit via investment decisions. It is therefore to the interest of regions in a weaker position to accept a central orientation system which will see that its interests are respected and given prevalence.

In certain cases, too, the tendency towards centralization in federal countries is dictated by needs arising out of certain political conjunctures. In this connexion, once again Brazil affords an enlightening example. Political centralization (inevitable in a *de facto* régime) has reached the point of making such radical changes as the replacement of direct election of local governors by their designation by the federal government. Thus, what differentiates the governor of a federated unit from a personal representative of the President of the Republic in a political administrative unit in a unitary system? Formally a great deal, but in reality the differences are slight.

Lastly, the widespread shortage of qualified personnel or their overconcentration in geographical terms is another cause which to some extent contributes to the real centralization process.

What, then, is the explanation of the subsistence of the federal régime in these countries?

It is not difficult to account for this situation. To begin with the change implied in the switchover from a federal régime does not appear a manifest necessity; after all, the efficiency of the central administration is not necessarily dependent upon the unitary or federal nature of the country and a hybrid situation like that described might satisfactorily serve both central and local interests. In other words, the benefits of so sweeping a change do not seem clearly to exceed the costs involved in it.

Substantively, however, it is for political reasons that the federal.régime survives.

Particularly in countries with a very extensive territory, federalism generates or is generated by political forces of a regionalist type. These regional political forces generate in their turn power centres or power structures whose

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justification lies precisely in the maintenance of local interests of a federalist type. Over the long term federalism may even give rise to cultural patterns or factors of a region's own. These forces are not, of course, negligible, and the central government (one of whose aims is after all to guarantee national unity) is hardly likely to wield enough power to overrule altogether pressures for the maintenance of federalism.

In these circumstances, and assuming that the federated units (provinces in Argentina or states in Brazil) can be regarded as planning regions, it is worth while to enquire how the regional planning function should be approached.

When the matter in hand is planning for one region considered separately from the rest of the country (Guayana in Venezuela, for example, at least during a certain lapse of time), which in one way or another is endowed with resources and with the autonomy necessary for their use, it seems legitimate to repeat at this level the regional (interregional) planning system summarized in the present document. This would correspond to what Kuklinski calls regional planning 'Situation No. 2'. Save for some minor questions, such a region could be regarded as a set of local subsystems in which the classic planning process can be successfully tried out.

The reason is that in this case the region is free to determine its own objectives and effectively controls the usual instruments of economic policy.

This might be, by extension, the ideal or theoretical example of a perfect federal system in which the central government is concerned chiefly with external or defence questions, or with a minimum degree of co-ordination.

In conditions of formal decentralization and real centralization, corresponding in practice to the empirical situation prevailing in federal systems or in unitary countries which introduce a nationwide regional development policy in a framework of semi-decentralization, the situation cannot be the same as in the preceding case.

In this instance, reproducing to scale in each region the orthodox planning process leads nowhere and necessarily culminates in the practice of a completely useless exercise. This is due to two simple causes. In the first place, as soon as the country is considered as a multi-regional system, the determination of the objectives for each subsystem must necessarily be handed over to the central level; otherwise the system will never operate optimally. Secondly, virtually all the instruments of economic policy in this instance are centrally controlled; in unitary countries because this is consubstantial with the system and in federal countries because of the tendency described above.

There are two elements, however, which cannot be transferred to the central government, and advantage must be taken of them in a revised approach to intra-regional planning. These two elements are the political bargaining capacity possessed by the subnational units and their capacity for generating information.

Thus, consideration may be given to the idea of formulating an intra-regional planning process consisting in utilizing and maximizing for their own benefit this negotiation and information capacity possessed by the regions, in a framework of central-regional collaboration. It would not seem inappropriate to term this negotiated planning.

Under such a system, and in the sphere of economic decisions, the main function of the regional planning offices (and of the subnational governments) would be to obtain from the central government an optimum set of economic decisions enabling the region to reach its objectives within a framework that would be coherent in relation to the other regions.

Negotiated planning will concentrate its efforts on two main aspects of the problem. One of them relates to the development of the line of argument required to determine location decisions on the part of the central government. It should be noted in this connexion that except in the agricultural and mining sectors and a few other highly specific activities, many investment decisions in a modern economy enjoy considerable locational freedom of choice. It is true that as regards the installation of a petrochemical plant in Argentina, for example, not all the provinces (regions) could compete at the national level for its location, but some of them could do so.

Another point to note is that in planning experience sectoral planning has always implied more explicit decisions than those corresponding to the global or spatial levels. It may be assumed that from sheer historical inertia this situation will be maintained in the immediate future, which will help to facilitate the task proposed at the regional level.

What is required for regions to develop the type of rational argument which will enable the central government to adopt an equally rational locational decision? Two things, apparently: political access to the central decision-making level and above all deep and well-substantiated knowledge of sectoral projects and of the region's real economic and social situation.

Each region must seek political access to the decisional spheres of the central government by availing itself of the power and status of the regional government. In this sense, the situations prevailing in unitary and federal countries may be dissimilar, and there will even be different situations within the federal group (for example, a governor in Argentina has not the same power and status as a governor in Brazil).

In other words, regional bargaining capacity, essential for the exercise of 'negotiated planning', has its cornerstone in the negotiating power of the regional political authority.

The other condition required to establish the central government-regional government dialogue is of an essentially technical nature. If this dialogue is to be maintained in terms of objective judgements it is necessary for the regional planning offices to know in detail the sectoral outlines (objectives, targets, programmes and projects) of national development policy. This knowledge in turn involves the existence of an expeditious central-regional communication process and mechanism, and also the presence, in each region, of a technical cadre sufficiently well qualified to receive and understand the information in question.

Since the ultimate aim is to achieve a sort of optimal allocation of sectoral activities to geographical units it is not enough for the regions to be thoroughly familiar with sectoral proposals; in addition, and above all, they need sound knowledge of the structure, functioning, potentialities and advantages of the regional economy. Within the framework of 'negotiated planning' the regions compete with one another on a technical basis, and their arguments must be

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supported by rationality and not by power positions. The type of knowledge referred to will derive, of course, from the regional diagnosis.

The second thing on which the exercise of 'negotiated planning' is based is the capacity that the regions must develop for obtaining from the responsible central agencies a satisfactory differentiation or territorial discrimination between certain instruments of economic policy (it should be recalled that this question has already been discussed in passing in earlier chapters).

Generally speaking, the various instruments of economic policy (prices, taxation, etc.) are conceived and put into practice with a view to attaining specific global objectives of overall economic policy. Furthermore, these instruments are usually quantified (for example, the value of the rate of taxation on profits of enterprises) as a function of the average national values of the relevant economic variables and parameters. Clearly, in countries where the behaviour of some economic phenomena betrays considerable variations from one part of the territory to another, average national values are of little use as an efficient basis for devising any economic policy measure. Thus, there can be not the smallest doubt that the application of territorially homogenous instruments of economic policy to a space which is fundamentally heterogeneous is liable at least to maintain (or aggravate) interregional disequilibria.

What really matters, however, is that with the sole exception of the greater technical and administrative complexity, there is no essential reason why the same global results cannot be achieved through the territorially-differentiated use of these instruments.

The foregoing considerations draw attention to the need for the regions —particularly those that are less developed— to equip themselves to negotiate with the central government for efficient territorial discrimination in the application of certain economic policy instruments.

To this end, the regions must be capable of convincing the central authorities, on technical grounds, that a mechanism for territorial differentiation will not affect the achievement of global objectives. Furthermore, they must prove that the benefits of such a measure outweigh the higher administrative costs of its application and control.

Ideas very similar to these were parallelly developed by Neira (Neira, 1972) in the context of the regional development experiment in what is known as the 'Reconcavo Bahiano' in the North-East of Brazil. The writer says that *"the viability of the strategic concept of regional development largely depends upon the realism and timeliness with which the interrelationships between the economy of the region and the national economy are handled.* In countries like Brazil, whose growth is exceptionally dynamic, circumstantial changes are very frequent, so that a region would have to possess analytical capacity of its own and mechanisms to ensure rapid and well-timed political intervention. This is an indispensable requisite for taking advantage of dynamic factors of exogenous growth and averting, as far as possible, the depressive effects that frequently accompany external investment in a model where growth goes hand in hand with dependency.[57]

[57]The italics are the present author's.

"In practice, in this type of model measures adopted by the public and private sectors in the periphery are bound to constitute essentially responses or reactions to measures taken in the centre. This does not necessarily imply that the responses may not be creative or innovative in so far as they are realistic, and given the capacity to seize the opportunities afforded from time to time by the development of the centre.

"The possibility of creating such dialectic capacity in underdeveloped regions in countries that are likewise underdeveloped might seem utopian but for the fact that the lack of policital rationality is not an inevitable by-product of underdevelopment. The existence of economic liberalization processes in countries whose capital formation was begun under a régime of foreign investment, and, on a different scale, experiences such as that of the petrochemical industry in Bahía, suggest that it is possible, although undoubtedly not easy, to generate increasing economic autonomy on the basis of concentrations of investment attributable to external factors.

"But for all this to be possible it is necessary to introduce institutional changes in the region's technical and administrative media. In the first place, the region will have to be permanently equipped for analysis of the regional economy and the national situation. There is no economic development plan or diagnosis in existence that does not have to be systematically and periodically revised to adapt it to the dynamics of development. Regional development strategy calls for a modern system of analytical information and instruments. Underdeveloped regions are lacking, for example, in systems of social accounts, and in means of regional quantification of economic and social phenomena. As a general rule, the level of synthesis of whatever scanty information exists is such as to make it virtually inapplicable for the purposes of examining the internal situation of the region. It is worth while to note that the degree of synthesis of the information always depends upon the interests of the user and that consequently the existing stock of statistics is determined by the interests of the centre and not of the region.

"The creation of institutions responsible for information on and analysis of the regional economy must be, therefore, a *sine qua non* for the preparation, execution and continuing revision of a regional development strategy such as is suggested in the present study.

"*Institutional innovations will also have to be introduced in the administrative sphere in order to increase the capacity for political intervention in questions of such importance as central decisions on what concerns the region, reinvestment of the internally-generated product, generation of strategic projects, location of economic activities and the domestic market.* It will also be needful to secure greater political continuity and to expand the bases for participation in policy decisions, production and consumption. The incorporation of the local élite and of a steadily increasing volume of the labour force, the training of local personnel, and incentives to development of regional technical services are means of ensuring greater integration and encouraging the formation of autochthonous capacity for initiative and identification with the region.[58]

[58]The italics are the present author's.

"In many respects regional development is a conflict of interests between a powerful centre and a periphery which has to muster all its forces for an unequal struggle. Only the integration of local capacities and clear-cut sense of regional identity can provide the conditions for success. This is especially true for strategic projects, which could hardly be identified and studied by technical groups outside the region. This is why so much importance attaches to the *systematic training* of technical cadres both in the public sector and in that of private enterprise. In order to develop in present conditions a region needs a system of intellectual support formed by the technico-political élite of the government, the university and the local firms of consultants. To create the conditions for the emergence of such a system is one of the chief responsibilities of the public sector as far as development is concerned.

"Besides an increase in efficiency in the formulation of policy alternatives (regional analysis) and in the capacity of the administration for political action, yet another necessity will be to start a gradual process of improvement of the internal administrative organization and of the methods and procedures it uses. A programme of this type is an indispensable requisite for ensuring that any innovations which may result from the two levels of action mentioned above are permanently consolidated by the regional administration. The readaptation of the regional administrative machinery is always a long-drawn-out process in which innovations must be continually introduced to adapt it to the strategy. The first step may possibly have to be a programming system, starting with the translation of the general terms of development strategy into sectoral targets and programmes, at the level of the whole State (government programme), integrated in spatial programmes (microregions). In the case of Bahía, the Reconcavo must be considered as a priority subregion where, as a first hypothesis, public-sector investment will have to be initially concentrated. On the basis of a preliminary definition of programmes and of available supplies of resources the budget should be prepared. Co-ordination of the implementation of programmes and projects should constitute an accompanying subsystem which is the responsibility of co-ordination units in the direct and decentralized executing agencies of the public sector. Lastly, at the end of each fiscal year, another subsystem, that of evaluation, should examine achievements under the head of programmes and projects in order to incorporate the real results of the process into programming for subsequent periods.

"Of course all these tasks are difficult to carry out and call for well-trained and psychologically-motivated personnel. But the difficulties should not be *reason enough to abandon all effort to rationalize* the development process; especially since it is precisely this effort that is one of the few instruments which can be used to attain regional objectives and targets that would otherwise depend upon the free play of external forces upon the emergence of spontaneous solutions. The lessons of historical experience give sufficient grounds for the belief that this pattern of development is not very efficient and cannot always ensure regional development even though growth may exist." (Neira, 1972.) (Unofficial translation.)

B. Content of the model

The corollary to the foregoing propositions is a complete reformulation of the praxis of intra-regional planning.

In this sense, 'negotiated planning' might be described as a circular planning process based on a chain of five sequential stages. These stages, which replace the classic stages in the planning process described in the substantive part of the present document, would be the following: (1) generation of information; (2) diagnosis and prognosis; (3) allocation of roles; (4) negotiation; (5) control and evaluation. A brief description of each phase is given below:

(1) *Generation of information.* No planning system whatever the pattern followed, is conceivable without the prior development of an information system. As this point has been sufficiently analysed in the course of the present book, all that is of importance here is to stress that the object of such a system is not only to generate intra-regional information, but also to provide expeditious channels of communication between the regional level and the central level of government. Given the type of planning proposed, the information generated will closely relate to such problems as existing natural resources, markets, transport and communications, existence of regional entrepreneurial groups, saving capacity, etc.

(2) *Diagnosis and prognosis.* In this case the stage of diagnosis and prognosis is no different from the corresponding stage described in relation to interregional planning, and practically all that was said in that context could be repeated here. It is only worth while to emphasize the fact that the result of the negotiation and consequently of the whole planning process will depend directly upon the quality of the diagnosis.

(3) *Assignment of roles.* The name 'assignment of roles' has been given to the stage at which the region receives information relating to the nationwide-regional directives established by the central government. This stage is equivalent to and replaces three phases in the classic planning process: selection of objectives, specification of targets and selection of strategy.

The nomenclature of the stages is dictated by the fact that —in the system proposed— the central government is responsible for 'controlling the behaviour of the interregional system' in the sense of establishing the future objective-image of the system and indicating the instruments that will be used to effect the transition from the current image to the future image.

This type of action on the part of the central government means that it must indicate what contribution is expected from each region to the task of attaining specific national objectives which are expressed with varying degrees of generality.

Thus, for example, if national objectives are ranked in relation to their generality or specificity, each region must know what role it is to play in relation to economic growth (first-order objectives), to price stability (second-order objectives), to the improvement of health conditions (third-order objectives) and so forth. By means of this mechanism, each region is assigned various roles which, to use the language of sociology, define its status in the interregional system.

As has been pointed out, these roles are centrally assigned on the basis of global and/or sectoral and/or spatial criteria. Hence in this stage each region assumes an eminently passive or receptive role, although an iterative process would be conceivable.

(4) *Negotiation.* Obviously, in a planning exercise interpreted as maximization of regional bargaining capacity, the stage of negotiation proper becomes the key-stone of the whole process.

Little can be added, however, in this context. If this regional bargaining capacity is to materialize, a basic requisite is to make maximum use of the political power of the political authority governing the region or the state or the province. This political power of the regional authority is either conferred by the central government or else results from an essentially regional political process, as the case may be. In any event, the support of the region's class organizations and of the political groupings will be a determining factor in the use of political power.

With regard to this stage, then, it only remains to repeat that the principal objective of regional government-central government negotiation is to obtain locational decisions which are favourable to the region and to contribute to the application of territorially-differentiated economic policies.

(5) *Control and evaluation.* As stated above, the stage of control and evaluation closes the circle of the planning process by means of a feedback effect. There is no significant differences between this stage in intra-regional planning and the corresponding phase discussed in earlier pages in the context of inter-regional planning.

Lastly, from the following table a clear idea can be formed of the differences between a classic or orthodox planning process and the process termed here negotiated planning at the intra-regional level.

STAGES IN THE REGIONAL PLANNING PROCESS

Classic Planning	*Negotiated Planning*
1. Diagnosis	1. Generation of information
2. Objectives	2. Diagnosis
3. Targets	3. Assignment of roles
4. Strategies	4. Negotiation
5. Policies	5. Control and evaluation
6. Projects and financing	
7. Control and evaluation	

All that has been presented here, of course, is a synthesis —probably incomplete— of the 'negotiated planning' process. The aim pursued has been, first and foremost, to close the circle of the mechanics of regional planning by presenting an intra-regional model which seems appropriate to a variety of specific situations and which undoubtedly needs further improvement.

To bring this book to a conclusion, it is perhaps worth while to stress that decision, support and political courage are needed to carry out a regional development plan. Not the most subtle technical wrappings can hide the considerable political content of a process of change in a regional system. Personal courage is also needed: no planner who has once read *La Divina Comedia* will ever be able to forget the penalty that Dante inflicts on seers and astrologers: to live for everlasting looking back over their shoulders, towards the past.

Annex

AN EMPIRICAL EXAMPLE OF EVALUATION
OF A REGIONAL STRATEGY

Once again with the aim of illustrating as fully as possible the discursive analysis of regional planning with concrete examples taken from (Latin American) reality, the initial section of the first appraisal (made in 1968) of the *Estrategia para el Desarrollo Económico de la Región del Bío-Bío, 1966-1970* is reproduced here. This strategy was one of the most important documents that have been produced within Chile's regional planning experience, and the Region of the Bío-Bío (the country's principal catchment basin) for several years constituted the priority development region. This very fact enabled the planning process in that region to attain stages and levels which it was impossible to reach in other regions of the country.[59]

1. *Evaluation as a stage in the planning process*

In development planning we can distinguish several successive stages which form a tightly-integrated process. One of these relates to the evaluation and revision of the plans or programmes under way.

Evaluation implies looking into concrete achievements and comparing them with the targets set up, a process by way of which the causes of the possible gaps between targets and achievements will be ascertained. Thus, fuller background information is accumulated whereby resources can be reorganized to promote more efficient implementation of the plan, certain targets can be reformulated, the information itself can be completed and other knowledge can be made available to enrich the planning process.

In the case of the Bío-Bío Region, formed by the provinces of Ñuble, Concepción, Bío-Bío, Malleco and Arauco, the National Planning Office, a dependency of the Office of the President of the Republic (Oficina de Planificación Nacional de la Presidencia de la República — ODEPLAN) drew up a regional development programme entitled "Estrategia para el Desarrollo Económico 1966-1970", in conformity with the lines laid down by the National Development Plan. This programme was put into practice by the various public-sector institutions operating in the region and was designed to guide or orient the private sector, so that, in conjunction a high growth rate of the regional economy could be attained, with a view to turning the Bío-Bío Region into a driving force behind national development which, at the same time, could achieve self-supporting growth.

The programme having been in force for two years, it is worth while to evaluate, albeit only in part, its implementation over the two-year period 1966 and 1967, to which end the methodology explained below will be followed.

Stress should be laid on the importance of accomplishing this stage in the planning process. It is often thought that a plan is completed at the moment of its promulgation, and no heed is paid to its evaluation and its adaptation to new circumstances. This means running the risk of carrying out academic planning

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[59] See *Estrategia para el Desarrollo Económico de la Región del Bío-Bío*, Regional Planning Office (Oficina Regional de Planificación — ORPLAN), Concepción, Chile, 1967.

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which might be highly perfected, but whose usefulness for the purposes of government action would be diminished. All the more in the field of regional planning is it necessary to avoid neglect of the evaluation stage, not only because it is more necessary, so to speak, than in other kinds of planning on account of the more direct contact with economic and social reality involved, but also because the country has less experience in this field, so that it has to advance more cautiously.

2.   *Objectives of evaluating the implementation of regional development strategy*

For reasons that were explained in the appropriate context, the regional development strategy was characterized by affording a general frame of reference, both global and sectoral, to serve as a guide for regional economic and social activity. From this standpoint, investment targets were established, especially for the public sector, in keeping with the overall policy by which the strategy was guided, with the object of enabling the regional economy to attain certain levels of growth.

To make the evaluation consistent a similar pattern will be followed pursuing, within this context, the following general objectives:

(i) To quantify the relation existing between what was programmed and what has actually been achieved in the two-year period;

(ii) To analyse the course followed by the region's economy in the period under analysis and the possible causes that have determined this course, relating it, whenever possible, to the national plan;

(iii) To define the basic lines of action which will have to be followed if it should prove indispensable to remedy some situation which is preventing the fulfilment of the objectives and targets established in the strategy, and to modify these whenever it seems advisable for the success of the regional programme; and

(iv) To test the usefulness of the strategy for the purposes of co-ordinating public-sector action in the region and guiding private-sector decisions.

Since planning is an essentially dynamic process the evaluation will also serve as a means of making minor corrections and completing the statistical data in the socio-economic diagnosis, which, in turn, will make it possible to polish this regional diagnosis with a view to future planning tasks.

3.   *Methodological bases for the evaluation*

As stated above, the regional economic development strategy was expressed in global and sectoral terms so that it might serve as a frame of reference for public-sector action. Consequently, one of the bases of the methodology to be pursued will be the maintenance of a similar approach. In this sense it is as important to evaluate quantitative results as to make a qualitative analysis of various trends.

The strategy set up targets to be attained in each sector in the five-year period 1966-1970. In order to compare these targets with what had actually been done in the two-year period 1966-1967 it was necessary to consider each sector individually, since the target proposed for the first two years did not necessarily represent two-fifths of the total target of the programme.

In order to compare achievements during the period under analysis with the benchmark figures for the year 1965, it was necessary to follow the same methodology that had been used to determine these data. This involved difficulties in some cases where statistical information was not available in the

same form, so that sources had to be used where the information in question is not grouped. It also meant that the assumptions previously adopted had to be carefully analysed in order to maintain them and make the evaluation consistent.

To ensure that the evaluation refers to significant aspects of the regional programme, only those fields will be analysed where an important change is likely to have taken place in the course of two years. For that reason, no quantitative evaluation will be made of regional population trends. An evaluation is, in essence, a comparison of real facts with targets. In the case of the population and other indicators of the same kind, final data are only obtainable through censuses or samples. The population census is taken every ten years and sampling has been carried out only at certain points in the region.

For similar reasons, no quantitative evaluation of the regional product will be made, although it would have been the best indicator. Furthermore, the calculations of the product, at the level of regions, are undergoing a new form of statistical processing, a circumstance which did not justify undertaking a very costly task in relation to a period of only two years.

Again, the strategy fixed some targets in quantitative and others in qualitative terms; obviously, the evaluation will be made in the same way that the targets were established. In some cases, too, an indirect method was followed: the degree of application of certain variables in the region's economic and social reality was measured by the effects produced, and *vice versa.*

Lastly, it is necessary to state that in the work of evaluation certain difficulties had to be overcome owing to the lack of systematic statistical information in the region and in some cases to a want of consistency in certain series.

Summary of the evaluation for the years 1966 and 1967

In order to present a general picture of the implementation of the regional development programme laid down in the strategy, the main conclusions of the evaluation for the years 1966 and 1967, in their global, sectoral and spatial aspects, will be set forth below.

1. *Global evaluations*

The global evaluation of the development strategy will be made basically in relation to regional public investment,[60] since the other indicators, such as population trends and growth of the product, could not be used on this occasion for the reasons stated above.

[60]Public investment is taken to mean the use made of their financial resources by the institutions forming the public sector. Expenditure of this type embraces the following concepts:

    – *Direct investment,* corresponding to the purchase of new goods (domestic or foreign) and secondhand goods from abroad which increase the fixed and immovable assets of the institution;

    – *Indirect investment,* which is constituted by financial investment, transfers of capital and purchase of old assets, and expropriation of land.

    For fuller information see ODEPLAN, *Inversión Pública Directa e Indirecta* 1961-1967, April 1968.

For the two-year period 1966-1967 the regional public investment target for those institutions where such investment can be regionalized was in the neighbourhood of one thousand one hundred and twenty eight million escudos (E° 1 128 000 000) at its ceiling level and eight hundred and sixty one million escudos (E° 861 000 000) at its floor level, both figures expressed in the 1967 currency.[61]

In the course of the years 1966 and 1967 public investment in the region amounted to approximately E° 938 000 000, thus exceeding the minimum target by 8.9% and reaching 83.1% of the maximum target.

It was also postulated that for the two-year period 1966-1967 75.5% of the public investment susceptible of regionalization should be channelled towards the directly productive sectors, reversing the trend observable between 1960 and 1965, when on an average 66.4% had been channelled into the infrastructure sectors, with a minimum limit of 62.7% in 1961 and a maximum of 72.0% in 1962.

In this respect the target proposed was partly attained, a significant tendency in that direction being evidenced in the fact that 56% of investment in the two-year period was earmarked for the productive sectors, although, as will be seen later, the minimum target in this sector was not reached.

Moreover, it must be pointed out that the relative share of investment in the Region in the national public investment that can be regionalized rose from 17.3% in 1965 to 20.1% in 1967. This increase is in accordance with the nationwide regional policy defined by ODEPLAN.

In the directly productive sectors (agriculture, mining, industry and energy and fuels) public investment during the two-year period amounted to approximately 522 million escudos, which, as already said, fell short of the minimum target, especially in the agricultural sector. In the infrastructure sectors (housing, transport, education, health and public buildings) investment in the years analysed reached approximately 416 million escudos which, generally speaking, practically implied attainment of the maximum target. In the transport sector the target was even exceeded by a wide margin, and in the two-year period 1966-1967 the whole of the investment in the Region programmed for the quinquennium was expended, so that the sectoral targets for the rest of the period will have to be modified.

In the distribution of investment in the Region by provinces there was an increase in the relative share of the province of Ñuble (23.8% in 1965 as against 41.9% in 1967) and a decrease in that of the province of Concepción (53.7% in 1965 as against 37.2% in 1967), while in the rest of the provinces the proportions remained more or less constant.

In the regional development strategy for the period 1966-1970, an annual growth rate of between 7.6 and 9.6% was programmed for the gross domestic product (GDP), in accordance with minimum and maximum investment, respectively. Assuming that there were no major variations in the capital-output

[61] In order to ensure the comparability of the monetary figures in escudos cited in the present document they have been deflated to escudos of the year 1967. Accordingly, although this circumstance is not specially mentioned in every case, it should be understood that the values in national currency referred to later on correspond to escudos at 1967 prices.

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ratio[62] and that private investment was maintained in the terms envisaged, it can be inferred from the public investment placed during the two-year period that the right conditions existed for attainment of the expected economic growth of the Region, as expressed in terms of a substantial increase in the Region's gross domestic product.

To the foregoing remarks should be added, as an indirect indicator, the fact that consumption of electric power in the region in the year 1966 rose by 20% in relation to 1965 and in 1967 by 6% in relation to the preceding year, which implies an average increase of 13.6% for the two-year period. If we bear in mind that between the years 1961 and 1965 the annual increase averaged 6.4% in the Region and 5.6% in the country as a whole, and that in the year 1967 the increment in the country's consumption was only 3%, we may conclude that in view of the relation between economic growth and the consumption of electric power, the figures corroborate significant growth of the regional economy.[63]

Another indicator connected with the above results is the increase in industrial output. A survey of the industries of the region which employ 100 persons or more, and which represent 80% of the value of the Region's industrial production, reveals that this increase amounted to 12.8% in 1966 and 9.6% in 1967 (both percentages in relation to the preceding year); this gives an average annual growth rate of almost 12% over the two years, which compares favourably with the expansion of the sector in the whole country during the same period.

Lastly, another item of information that bears out the foregoing conclusions relates to the amount of credits issued to medium-sized and small enterprises in the industrial and agricultural sectors, which in the aggregate increased by 102.0% between the year 1965 and the average for the two-year period 1966-1967, in terms of currency with the same purchasing power. This expansion of credit to the industrial and agricultural sectors, mainly through the activities of CORFO and the Institute for Agricultural Development (Instituto de Desarrollo Agropecuario — INDAP), apart from bank credits, must have given a powerful impetus to output in these directly productive sectors, which is revealed by the indicators mentioned above.

In conclusion, one of the basic global targets of the strategy, which was to ensure heavy public-sector investment to support regional development, was satisfactorily attained.

It must be pointed out, however, that for public investment to have an intensive multiplier effect in the Region an indispensable requisite was the participation of the entire regional community in the process, through an increase in saving and in regional investment. As will be seen in due course, private investment during the two-year period, which was considerable, was largely based on nationwide saving, so that entrepreneurs in the Region did not play a decisive part. Hence it would seem that this objective was not fulfilled in the terms envisaged.

[62]This assumption is based on the fact that no major changes came about in technology or in the use of installed capacity. It is even likely that in some sectors, such as industry, the capital-output ratio may have been more favourable.

[63]In the Bío-Bío Region in the year 1967, 80% of gross consumption of electric power was attributable to industry and 6% to mining (including self-generators).

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This weakness in the regional saving and investment mechanisms must also have had unfavourable repercussions on the attainment of another important objective of the regional programme: the generation of an adequate number of jobs in relation to the predicted increase in the population. One of the characteristics of the regional economic structure is the high capital density in its basic industries, which will be intensified by the investment that is placed in the sector during the five-year period, and the relatively small amount of manpower for which this investment creates permanent demand.

Thus, the development of medium-sized and small industry, besides being necessary in order that the multiplier effect of large-scale investment may be turned to good account, is indispensable in order to close the gap between the supply of new jobs required and the demand for labour generated by large-scale industry.

The figures available on the growth of the economically active population in the industrial sector show that during the two-year period 1966-1967 there was an increase of a little over 3 000 jobs in the industrial sector in the Region. Out of this increase industries employing 100 persons or more contributed only 1 482 jobs, although it was in them that investment in the sector was mainly concentrated. Furthermore, in other sectors, such as construction, despite the fact that the regional programme envisaged a significant decrease in the number of active persons, pressure on the supply side continued to be very strong, especially in the Intercommune of Concepción. This has had serious social consequences, whence the conclusion must be drawn that a drive needs to be made, during what remains of the five-year period, to improve the implementation mechanisms for the development of medium-scale and small industry in the Region.

Another important target to be attained in the quinquennium covered by the Strategy is the adjustment of the institutional mechanisms of the region which, in the first place, afford it the means of self-expression and, secondly, serve as instruments for the promotion of regional development with adequate decision-making power.

In this respect very important progress has been made which justifies the hope that by the end of the five-year period the Region's institutions for the promotion of economic development may have been definitively consolidated.

To begin with, it is a striking fact that the idea of the Bío-Bío Region has successfully penetrated into all spheres in the regional and even the national community, with the result that in all sectors there is keen awareness of the Region's real situation and its potentialities. This result has been mainly brought about by the action of the public sector, headed by the intendants of the provinces that form the Region; the work done by most of the institutions representing the private sector; and in particular, the wide diffusion that the idea of the Region has been given in all the regional press, radio and other publicity media.

In the second place, some public-sector institutions have been able to organize themselves on a regional basis at an acceptable level of deconcentration in relation to their respective Santiago offices. Cases in point are the Technical Co-operation Service (Servicio de Cooperación Técnica), the National Institute for Vocational Training (Instituto Nacional de Capacitación Profesional –

INACAP), and, latterly, the Production Development Corporation (Corporación de Fomento de la Producción — CORFO) in the industrial sector, and the Department of National Land and Goods (Dirección de Tierras y Bienes Nacionales) in the agricultural sector.

Lastly, the private entrepreneurial sector has shown signs of positive interest in participating in the discussion of regional development programmes, which means that in the three-year period 1968-1970 a better result may be hoped for in respect of the private sector's investment in the Region.

In closing this summary of the global evaluation of the implementation of the Strategy for the Economic Development of the Bío-Bío Region, it is worth while to say a word or two on its promotional utility.

Undoubtedly, the general frame of reference provided by the strategy has served to impart greater rationality to the decisions of the public sector and has been an effective instrument for achieving co-ordination in the activities of its component institutions at the regional level. For example, this has led, in many cases, to the timely detection of obstacles to regional development whose removal has helped to speed it up.

In this connexion, the methodology adopted has also proved its validity, since although the strategy did not present a complete diagnosis of the real socio-economic situation of the region, the research conducted served to establish the general framework for a programme which has demonstrated its usefulness in the two years it has been under way.

By the end of the quinquennium it will be possible to view the planning methodology followed in a perspective better fitted for evaluating it in its full dimensions, but clearly it has already emerged favourable, in part, from the test of these two years.

2. *Sectoral evaluation*

The main conclusions of the evaluation of the implementation of the regional programme in the years 1966 and 1967 in the different sectors of the economy will be summarized below.

On this occasion the trade, finance and tourism sectors have not been included, since two years is a very short space of time for which to evaluate the measures proposed in these sectors.

(a) *Industrial sector*

In the regional development programme, just as in the National Development Plan, the industrial sector had a key role to perform, so as to become one of the basic driving forces behind the Region's economic growth.

During the years 1966 and 1967, sixty-three (63) industries in the Region employing one hundred persons or more, and representing 80% of the sector's total output and 68% of employment in industry, expanded their production by 23.9% in relation to 1965. In the year 1966 the increase was 12.8% and in the year 1967, 9.6% (both figures in relation to the preceding year).

Considering that medium-scale and small industry largely provides inputs required by major industry, and taking into account the high participation of the latter in the sector's total regional production, we may assume that in the period evaluated the industrial sector in the Bío-Bío Region grew at a similar rate, which is highly satisfactory in relation to the targets envisaged.

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Within the sector, the subsector with the highest growth is that of food products, whose output increased by approximately 50% in the two-year period, thanks in particular to the construction of the beet sugar plant in Cocharcas and the expansion of the existing plant in Los Angeles. Significant increases were also recorded in the following subsectors: manufacture of chemicals (31.8%); manufacture of furniture (21.9%); and petroleum products, represented by the ENAP refinery at San Vicente, which entered production in 1966 and raised its output in 1967 by 168.2% in relation to the preceding year.

The following were the subsectors in which considerable decreases in production were discovered: construction of transport equipment (36%), where the drop was due to the reduction of services contracted by the naval dockyards (ASMAR) in Talcahuano; manufacture of metal products (57.5%); and manufacture of non-metal mineral products (glass), which despite an 11% increase in 1966, fell by 20% during the two-year period, because of the contraction in building activities throughout the country.

Employment in the Region's industrial sector increased by 3 049 persons between the years 1965 and 1967, i.e., by 7.6% in the two-year period under consideration. It must be taken into account that these figures do not include unemployed persons or those temporarily absent, which means that the increment in the economically active population in the sector was greater.

The rise in the number of economically active persons in the industrial sector may be considered low, since the percentage of growth is only slightly higher than that of the Region's labour force. But it must be pointed out that the strategy foresaw this phenomenon, and allowed for an increase of only 5 000 economically active persons in the quinquennium, if the maximum regional investment targets were attained. As stated above, this situation came about because comparatively little manpower was absorbed by the major industrial projects in course of execution.

Public investment in the industrial sector amounted to about 320 million escudos in the two-year period —a spectacular increase in comparison with the corresponding figure for 1965, which was only 93 million escudos. This upswing is attributable in particular to the National Sugar Industry (Industria Azucarera Nacional, S.A. – IANSA), which invested 150 million escudos in the construction of the Cocharcas sugar plant. CORFO stepped up its investment in loans to industry plus its direct investment to about 35 million escudos in the period, outstanding instances being its contributions to the construction of slaughterhouses, the industrial precinct at San Vicente, and wine-growing centres. The Technical Co-operation Service, for its part, virtually doubled in 1967 the amount of its loans to small and artisanal industry in relation to 1965, although this level is still insufficient to secure a major increase in small industry's share in the sector's output.

If we also take into account the investment placed in the petroleum products subsector, in which the National Petroleum Enterprise (Empresa Nacional del Petróleo – ENAP) invested 128 million escudos in the construction of the San Vicente oil refinery, total public investment in the industrial sector during the two-year period under consideration reaches the figure mentioned above.

Private-sector investment, although its total amount was not discoverable, also followed a marked upward trend, essentially in large-scale heavy industry

projects. The most important projects executed in the two-year period, i.e., the expansion of the Compañía de Acero del Pacífico (CAP) (tin plant), the expansion of INCHALAM, the COMPAC tube factory, the EQUITERM soldered profiles plant, the CAMANCHACA crayfish processing plant and a phosphate fertilizer plant, represent direct private investment of roughly 90 million escudos, apart from the loans issued by CORFO for these projects and included in that institution's investment.

(b) *Agricultural sector*

In the agricultural sector, the targets established in the strategy essentially provided bases for action to promote a change in land use in the region, with a view to increasing production, especially in the area of industrial crops, livestock production, industry deriving from agriculture, and forestry.

Another important objective was to slow down migration to certain urban centres, especially the Intercommune of Concepción, by strengthening agricultural services centres and increasing income and employment in the areas with the biggest agricultural and forestry potential.

The area under seed in the region was enlarged by 8 000 hectares during the two-year period. This increment can be broken down by provinces, as follows: in Ñuble, the area increased by a little over 7 000 hectares, sown especially to wheat, oats, barley and sugar-beet; in Concepción, it decreased by 5 000 hectares, comprising mainly wheatfields; in Arauco and Malleco the area under seed in 1965 was maintained, and in Bío-Bío it increased by over 5 000 hectares, mostly under oats.

The land used for forestry was expanded by about 28 000 hectares in the two-year period.

In brief, bearing in mind that two years is a very short time for evaluation of a target like that of a change in the use of agricultural land in the region, the existing indicators —such as the decrease in the area under wheat in Concepción (mainly due to INDAP's policy of discouraging this type of crop among small farmers in the Cordillera de la Costa), the expansion of industrial crops and pastureland and the success of the reforestation programmes— lead to the conclusion that if current trends are still continuing in 1970 much will have been done towards attaining the targets proposed.

Wine production in the region gradually recovered from the serious slump in 1965, reaching about 70 millions litres in 1967, which represents an increase of 104%.

In the two years under study production of fish and crustaceans increased by 35% in relation to 1965, the catch amounting to 166 000 tons. This expanded production was used almost entirely for industrial consumption.

The strategy contemplated a significant increase in the active population in the agricultural sector during the period 1966-1970. Unfortunately, no data are at present available for evaluating progress towards this goal. In any event, the level of employment must certainly have risen in the forestry subsector, thanks to the large-scale expansion of forest plantations, although the increases observed in agricultural machinery would appear to indicate that in the crop subsector decreases may have occurred.

Regionalizable public investment in the region's agricultural sector rose by 40.1% in 1966-1967 in relation to the year 1965, and the relative share

of the sector in total regional investment also climbed from 8.1% to 9.4%. This increased investment in the agricultural sector was concentrated almost exclusively in Ñuble and in particular Arauco, because of the land reform measures applied by the Corporación de la Reforma Agraria (CORA), while investment declined in the Province of Bío-Bío and rose slightly in Concepción and Malleco.

Attention must also be drawn to the increase in public investment in the shape of loans earmarked for the purchase of agricultural machinery, for which CORFO was responsible, and which particularly benefited the province of Malleco, where investment for this purpose increased by almost E^o 1 300 000 in relation to 1965.

While there was in general a significant increase in public investment, as programmed in the strategy, it must be pointed out that investment in irrigation works fell short of what was envisaged, so that during the rest of the five-year period it will be necessary to step up investment vigorously in this respect.

(c) *Mining sector*

As in the Strategy, only coal-mining will be analysed in this sector, because it is the region's chief mining activity and because of the social problems which have derived from its present situation.

In 1966 and 1967 output of coal in the region followed the downward trend observed in the preceding years, although less sharply. The region's net output of coal in 1967 was 1 357 000 tons, of which 77% was produced by Lota-Schwager and 23% by the mines in the province of Arauco. In 1965 net regional production had reached over 1 544 000 tons. During the two-year period analysed, however, sales increased in relation to the year 1965 at an average annual rate of 3%, amounting to 1 511 000 tons in 1967, and thus eliminating the problem of the producer enterprises' stocks, which was having very serious repercussions on their financial system.

According to the projection of demand presented in the strategy, the domestic market for coal should have reached 1 443 000 tons and 1 520 000 tons in the years 1966 and 1967, respectively. Real demand in those same years was practically the same as in the projection, which is a promising sign for attainment of the projected figures in the coming years.

Employment in coal-mining decreased by 4% in 1966 in relation to 1965 and increased by 6% in 1967 as compared with the preceding year. This improvement in employment levels was particularly due to the rationalization of mining shifts in Lota-Schwager, which implied taking on more personnel. In 1967 there were 13 082 persons employed in coal-mining in the region, a figure which represented 98.2% of employment in this sector in the whole country, and was made up of 9 047 persons in Lota-Schwager and 4 039 in the mines in the province of Arauco.

Public investment in the sector amounted to a little over 2 million escudos in the two-year period, in the coal mines held by CORFO in the province of Arauco.

Generally speaking, with respect to the current coal-mining situation and to the policies established in the strategy, it can be noted that in the years 1966 and 1967 the position was stabilized, and the rapid deterioration that had been taking place since 1960 was halted, so that a more optimistic view can be taken

for the rest of the five-year period. Attention should be drawn, however, to the necessity of intensifying certain measures whereby a national policy of support for this branch of production could be more firmly implemented.

(d) *Energy and fuels*

In the presentation of this sector, following the same lines as in the strategy, only the question of energy will be dealt with, since petroleum and petroleum products are analysed in the industrial sector and coal in the mining sector.

By the end of 1967 the electric power installed in the region amounted to 204 368 kW, which implied an increase of almost 20.3% over the 1965 figure. The whole of this increment corresponded to self-generators (ENAP, Compañía Manufacturera de Papeles y Cartones Laja, and IANSA in Cocharcas), this public service being maintained at the same level of installed capacity as in 1965.

Generation of electric energy reached 1 107.8 million kWh in 1967, representing 16.1% of total generation in the country, and implying an increase of 52.8% in relation to the corresponding figure for 1965. Yet this substantial increment was not enough to satisfy the additional consumption of electric energy in the region, which stepped up its gross consumption in the years 1966 and 1967 by 27.3% in relation to 1965. As a result, through the ENDESA interconnected system energy had to be transferred from other regions, of which the net balance in 1966-1967 amounted to 419 million kWh. This means, moreover, that the region significantly enlarged its relative share in the country's gross consumption of electric energy, raising it from 15.2% in 1965 to 18.2% in 1967.

The prospects for consumption of electric energy in the Bío-Bío Region make it necessary to speed up construction of the BOCAMINA thermo-electric plant at Coronel to the maximum during 1968, a measure which also has the advantage of considerably increasing consumption of coal in the region.

Public investment in the energy sector during the two-year period reached almost 270 million escudos. The whole of this investment was placed by ENDESA, and most of it was earmarked for the construction of the El Toro power station on Lake Laja.

(e) *Economic infrastructure*

Under the head of economic infrastructure will be analysed the transport sector (overland, maritime and air) and the telecommunications sector.

(i) *Transport Sector*. In the regional development programme the transport sector was analysed from three points of view:
— determination of future demand in the road, rail and maritime subsectors;
— key projects which needed to be given immediate impulse; and
— a study programme for the analysis of projects, in the light of projected demand and infrastructure requirements.

With the aim of evaluating fulfilment of the projection of demand for road transport, a new sources and uses survey was carried out at the beginning of the year 1968, which, in broad outline, confirmed the trends that had been predicted for the five-year period. Total flows of goods traffic in the region increased by 5% in relation to the findings of a similar survey undertaken at the

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beginning of 1966. It was also possible to note a rising trend in the intra-regional transport flow, which coincides with the objectives of the strategy, and a considerable increase in the volume of goods carried on the roads connecting the Intercommune of Concepción with the North of the region (roads from Concepción to Bulnes and from Concepción to Cabrero), as had been foreseen.

As regards the specific projects to the execution of which the strategy accorded priority, the only one that was practically completed in the two-year period was the construction of the Nonguén-Chaimávida stretch of the two-lane highway connecting the Intercommune of Concepción with the North. Substantial progress was also made in the construction of the road which links Concepción and Collipulli, passing through Santa Juana, Nacimiento and Angol. The construction and servicing of the road between Curanilahue and Tres Pinos in the province of Arauco was completed and progress was made in the building of two new bridges, the Puente Carretero on the Bío-Bío and the Puente Perales on the Laja. Other road works of less importance which were finished in the two-year period were the roads from Quirihue to Coelemu and from Chillán to Pinto in Ñuble, and from Victoria to Traiguén in Malleco.

In the years 1966-1967 surfaced roads in the region increased by about 180 km, totalling in all over 1 000 km under concrete or macadamized.

Moreover, the first phase of the Carriel Sur Airport in Concepción was completed, and so was the terminal building of the María Dolores Airport at Los Angeles, while a start was made on the construction works at the Port of San Vicente and the enlargement of the jetty at Talcahuano.

Public investment in the transport sector in the Bío-Bío Region during 1966-1967 amounted to 217 million escudos (of which the larger sum —124 million escudos— was invested in the year 1966), which signified an average increase of 6% in the two-year period in relation to the year 1965.

Of this investment 80.5% corresponded to the Highways Department (Dirección de Vialidad), 10% to the Airports Department (Dirección de Aeropuertos), and 1.5% to the Department of Port and Harbour Works (Dirección de Obras Portuarias).

Investment in the transport sector far exceeded the amount programmed, partly on account of investment in airports which heavily influenced the total. Even so, there were important projects, such as the bridge over the Río Malleco at Collipulli, which were not so much as started.

As regards the proposed studies of strategic projects in the transport sector, it should be pointed out that the evaluation of the alternatives put forward for strengthening the links between the Intercommune of Concepción and the North has not yet been completed, and urgently needs to be brought to a conclusion at the earliest possible date.

In general, progress was made in attaining the objectives established in the strategy for the transport sector in the Bío-Bío Region, with due regard to the fact that this is a supporting sector for other economic activities. Since the investment target proposed for the two-year period was exceeded, new undertakings in the rest of the five-year period must be kept down to those projects that are really indispensable for the sector in the context of regional development targets.

(ii) *Telecommunications Sector.* During the two-year period 1966-1967 the microwave equipment of the National Telecommunications Enterprise (Empresa Nacional de Telecomunicaciones — ENTEL) was installed, with a capacity of 120 channels between Santiago and Concepción, as was programmed, allowing of rapid communication by telephone, telex and other similar media.

The Telephone Company (Compañía de Teléfonos de Chile) for its part launched an expansion plan, in the cities of Concepción and Talcahuano, which provides for the installation of 5 000 new telephones throughout the Region.

(f) *Social infrastructure*

As in the strategy, in the social infrastructure sector the housing and town planning, education and health subsectors will be analysed.

(i) *Housing and Town Planning.* During the years 1966-1967 the public sector in the region started construction of almost 7 000 housing units through the public housing corporations CORVI and CORHABIT. During the same period the private sector began work on about 2 300, which gave a total between the public and private sector of over 9 000 dwellings on the way to completion.

Out of the above-mentioned public-sector total, 4 134 housing units were begun by CORVI and 2 796 by CORHABIT, through direct and indirect action.

Over 60% of the dwellings started in the region by the public and private sectors were concentrated in the Intercommune of Concepción, and the remainder were distributed throughout the cities in the other provinces.

In the strategy the housing deficit existing in 1965 was analysed and a global indication was given of the targets to be reached between the years 1966 and 1970, which meant that the public and private sectors would have to make a great effort in order to commence work on about 5 100 urban housing units in the region every year. Although the numbers started in the years 1966 and 1967 represented only 90% of this target, owing in particular to the decline in the private sector, the action taken by the public sector was considerable and if it were maintained on the same terms for the rest of the five-year period could ensure important progress in equipping the region with housing by 1970.

In the course of the two-year period the savings and loan system, through the associations operating in the region, helped to finance 1 395 housing units, broken down by 910 units in 1966 and 485 in 1967.

Public investment in the housing and town planning sector in the years 1966-1967 amounted to 148 million escudos, which implied, on an average, a drop on 10% in relation to 1965. Of this investment 55% corresponded to CORVI and 20% to CORHABIT. The public investment target for the housing and town planning sector which the strategy had established for the two-year period was 151 million escudos, so that the goal programmed was virtually reached.

During the biennium the private sector invested 53 million escudos, of which more than 80% was concentrated in the Intercommune of Concepción.

(ii) *Education.* In the Bío-Bío Region in 1967 school enrolment in basic education numbered 196 000 pupils, which represented an increase of over 13 000 pupils in relation to 1965, i.e., an increase of 4.6% in the two-year period. Out of this total, 89.3% attended State schools, as against 83% in 1965.

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During the biennium the Sociedad Constructora de Establecimientos Educacionales brought 76 824 m² under construction, an effort which signified an average annual increase of 72.1% in relation to 1965, and was concentrated in the completion of 540 new school buildings.

Public investment in the education sector, including that placed by the Department of Architecture of the Ministry of Public Works, amounted to 22.7 million escudos in 1966-1967, a figure that represented an average annual increase of 25% over investment in 1965, which had already been very high owing to the requirements of the special school building plan.

Investment in the education sector conformed to the targets established in the strategy for the two-year period, and, in broad outline, the projections of demand for basic education in the region were fulfilled.

An outstanding feature of the distribution of investment by provinces is the great increase registered in the province of Bío-Bío, where the Sociedad Constructora de Establecimientos Educacionales boosted its investment from zero in 1965 to 60 million escudos in 1967.

In the field of vocational, industrial and agricultural training, noteworthy work was done in the region during the two-year period by the National Vocational Training Institute (Instituto Nacional de Capacitación Profesional — INACAP).

(iii) *Health.* The investment placed in the region during the biennium by the Sociedad Constructura de Establecimientos Hospitalarios and the Ministry of Defence amounted to almost 20 million escudos. Of this investment, 50% was concentrated in the Intercommune of Concepción, especially in the construction of the Las Higueras Hospital and the Naval Hospital.

The Sociedad Constructora and the Ministry of Defence brought 62 000 m² under construction during the years 1966-1967, the most important projects including the following hospitals: Las Higueras, Naval, Mulchén, Angol, Santa Juana and Cañete.

The investment analysed, which was earmarked for construction on the number of square metres mentioned above, signified the habilitation of 1 320 new hospital beds in the region.

3. *Spatial evaluation*

The regional development programme contemplated, as one of the component elements of the plan, a strategy for the spatial organization of the Region's economic and social activity, the aim of which was to establish a ranking of the central places whereby they could all be efficiently interrelated in accordance with their potentialities.

This strategy, in broad outline, provided for consolidation of the metropolitan area of Concepción to enable it to fulfil the function of a regional development pole which was assigned to it in accordance with the nationwide regional development policy defined by ODEPLAN.[64] It also postulated the strengthening of certain centres in the agricultural area (Chillán and Los Angeles in the first place) through the promotion of agricultural industries and the equipment of services required for the rural sector.

[64] ODEPLAN, *Política de Desarrollo Regional,* mimeographed text, 1968.

Although two years is a very short time in respect of which to evaluate the results of this strategy completely, it is worth while to analyse the relevant trends observable with the aim of ascertaining whether the programme is being implemented.

In 1966-1967 about 65% of investment in housing and town planning was concentrated in the Intercommune of Concepción and some 12% in Los Angeles. This distribution is in accordance with the above-mentioned strategy, and although in Chillán investment in the housing and town planning sector was not outstanding, investment in road-building did increase considerably; the characteristic of these new roads was to link Chillán with the cities and towns in its area of influence, thus helping to strengthen its role as an intra-regional form of growth. On the other hand, it was a matter of greater urgency to assist the growth of Los Angeles, a town that as an intra-regional focus of growth was relatively less developed and consolidated than Chillán.

In another field, from the results of the most recent sources and uses survey of the flow of goods carried on the regional road network it can be inferred that there was an increase in relation to 1965 in transport between the Intercommune of Concepción and the intra-regional focal points and also between these focuses and other important centres in the region. For example, in this connexion a significant increase could be observed in the transport flows between the Angol-Collipulli area and Los Angeles and, to a lesser degree, to and from Chillán and the Intercommune of Concepción.

As far as implementation of industrial projects was concerned, the highest percentage of investment was concentrated in Chillán (Cocharcas) in the construction of the IANSA beet-sugar plant; in Los Angeles, in the expansion of a similar plant already existing; and in the Intercommune of Concepción, in the construction of industries deriving from the industrial base currently installed (steel profiles and metal tubes), expansion of the existing industries and installation of new industries to develop the resources of the area (fish industry).

In other important centres in the region, such as Angol, Mulchén, Lebu and Cañete, considerable investment was placed in social infrastructure, especially hospitals, which strengthened their position within the hierarchy of central places in the Bío-Bío Region.

In consequence of this strategy for the spatial organization of the region, greater population concentration should be occurring in the regional development pole and in the intra-regional focuses and subfocuses of growth. It is impossible to evaluate this result on the present occasion, for the reasons already indicated, but the distribution of investment mentioned in earlier paragraphs leads to the conclusion that the conditions in which such concentration will take place are being produced. This is borne out by some indirect indicators, such as school enrolment in basic education, which has developed in accordance with the demographic trends predicted for the main population centres of the region.

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