



TRAINING PACKAGE ON REGIONAL ANALYSIS TECHNIQUES ★/

by

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## 1. Nature of a Training Package

A Training Package (TP) may be defined as a reduced collection of knowledge on a given topic, its essential characteristic being that it constitutes an almost completely self-contained package. This means that prior input requirements for teaching a TP are minimal and also that the TP constitutes a sufficiently operational item to be used directly in practice without any need for further processing or conceptual elaboration. Furthermore, a TP is client-oriented, i.e., its structure is defined in terms of the characteristics of a specific client-group. This utilitarian sense makes a TP a curricular module which is different from academic subjects matters.

Naturally, however, its characteristic feature as a collection of knowledge which is practically self-contained does not make the TP independent of some kind of framework, theory or general model relating to the phenomenon studied.

## 2. A Training Package on Regional Analysis Techniques

A TP on Regional Analysis Techniques is an application of the above concepts to the field of the quantitative analysis of certain inter- and intra-regional structures and processes.

More specifically, a TP on such techniques is a set of instruments of analysis sufficiently simple in terms of structure not to need prior specialized knowledge, beyond the average level of training of civil servants, and sufficiently operational to apply

/under the

under the normal conditions of information prevailing in the majority of developing countries as regards the regional level of planning.

These characteristics presuppose a process of selection of instruments of analysis to make up the TP, and this selection must satisfy the criteria of simplicity and operability, the latter directly connected with the question of the availability of information. The selection of appropriate instruments of analysis out of the vast range of statistical and economic techniques available should be in keeping with a specific way (theory, model or paradigm) of envisaging the regional question.

### 3. An alternative regional development paradigm

A great many of the prevailing theories regarding regional development and the interregional transmission of economic growth are the subject of severe criticism with respect to their positive validity in developing countries. Whether or not this is justified, the fact is that in practice the regional planner finds it daily more difficult to extract from these theories adequate criteria for proposing policy measures in favour of regional development.

Although this is not the opportunity to develop in full a paradigm from which normative elements can more easily be derived, it is indispensable at least to outline the essential elements of an alternative paradigm which will serve as a framework for structuring the TP on Regional Analysis Techniques.

/The long-term

The long-term development of a region (not only its economic growth) may be considered to be the result of three types of processes which, when they occur in a consistent and non contradictory form, generate a self supporting long-term development process.

In the first place, the development of a particular region is affected by the plans, programmes and projects which the central government, either directly or indirectly through decentralized agencies, designs and implements in the region as a means of stimulating its economic growth. These activities may be of a comprehensive or sectoral nature or even be aimed at specific problems.

Since this type of operation by the central government is not generally restricted to a single region but may be simultaneously directed at two, three, several or all the regions, and since these programmes cannot simply be added on to each other the planning of regional development on a national scale may at least partially be considered as a procedure for articulating such programmes.

Secondly, the development of a region is affected by the impact on that region of macroeconomic and sectoral policies. This is because such policies are conceived of and implemented as if they were aimed at activities, sectors or groups which are essentially homogeneous in their structure and functioning. Since the regions are precisely territorial clusters of activities, sectors or groups with a considerable degree of heterogeneity among them (i.e., among the regions), it may be assumed that the macroeconomic and sectoral policies have positive effects on some regions and negative effects /on others

on others. It frequently happens in practice that the adverse impact overrides and consequently counters the positive stimuli stemming from the specific regional programmes mentioned earlier. If this is actually the case, the regional discrimination of policies should be proposed, or in default of this, special programmes and measures to offset the detrimental effects.

Thirdly, a genuine process of regional development depends on the region's capacity for social organization. This is a matter associated with: (i) the quality and representativity of the regional political authority; (ii) the quality of the technical staff of the regional administration; (iii) the existence, aggressiveness and regional identification of private groups of regional investors and entrepreneurs, i.e., the regional bourgeoisie, and (iv) the existence and role of local non-governmental groups such as small producers' co-operatives, trade unions, and professional, religious or other types of groups.

It is important to note that the absence of this third element may mean that the regional development stimuli incorporated into, specific plans and macroeconomic policies will be taken advantage of by social groups (both national and international) from outside the region, probably giving rise to a process of domination and even generating situations similar to the well-known "economic cycles" because of the withdrawal of these groups when the exogenous conditions of stimulus cease to exist.

/The paradigm

The paradigm thus outlined is useful for showing clearly the importance of some elements exogenous to regional decision-making capacity (plans stimulated by the central government and macroeconomic policies) in the possibilities of long-term development. It is also useful for showing the dependence of regional development on non-economic elements of an institutional and sociological nature.

4. Implications of the paradigm in terms of a TP on Regional Analysis Techniques

If the impact of macroeconomic policies (exchange, external trade, fiscal policies, etc.) on the region is so important, whether in a favourable or an unfavourable manner for its development, a basic question for the regional analyst is to determine initially how similar or different the region is with respect to some type of national average which has served as a base - implicitly or explicitly - for the formulation of a given macroeconomic policy. To put it more precisely, the regional economic structure must be compared with the economic structure of the country, using the latter as a pattern of reference. This can be done in intersectoral terms by resorting to the concept of the regional specialization coefficient. This coefficient not only constitutes a first indicator of the importance which a more detailed examination of the various macroeconomic policies could subsequently have, but also constitutes one of the explanatory elements of regional growth when this is compared

/with average

with average national growth - something which can be measured by using the method of shift and share analysis, applied to temporal data for the region and the country.

Using these two basic techniques of analysis it is possible to derive an interrelated group of methods of analysis on a logical basis which, as a whole, will permit the analyst to gain a global aggregate view of the structure of the regional economy, the essential characteristics of its growth process, and some of the factors which explain this process.

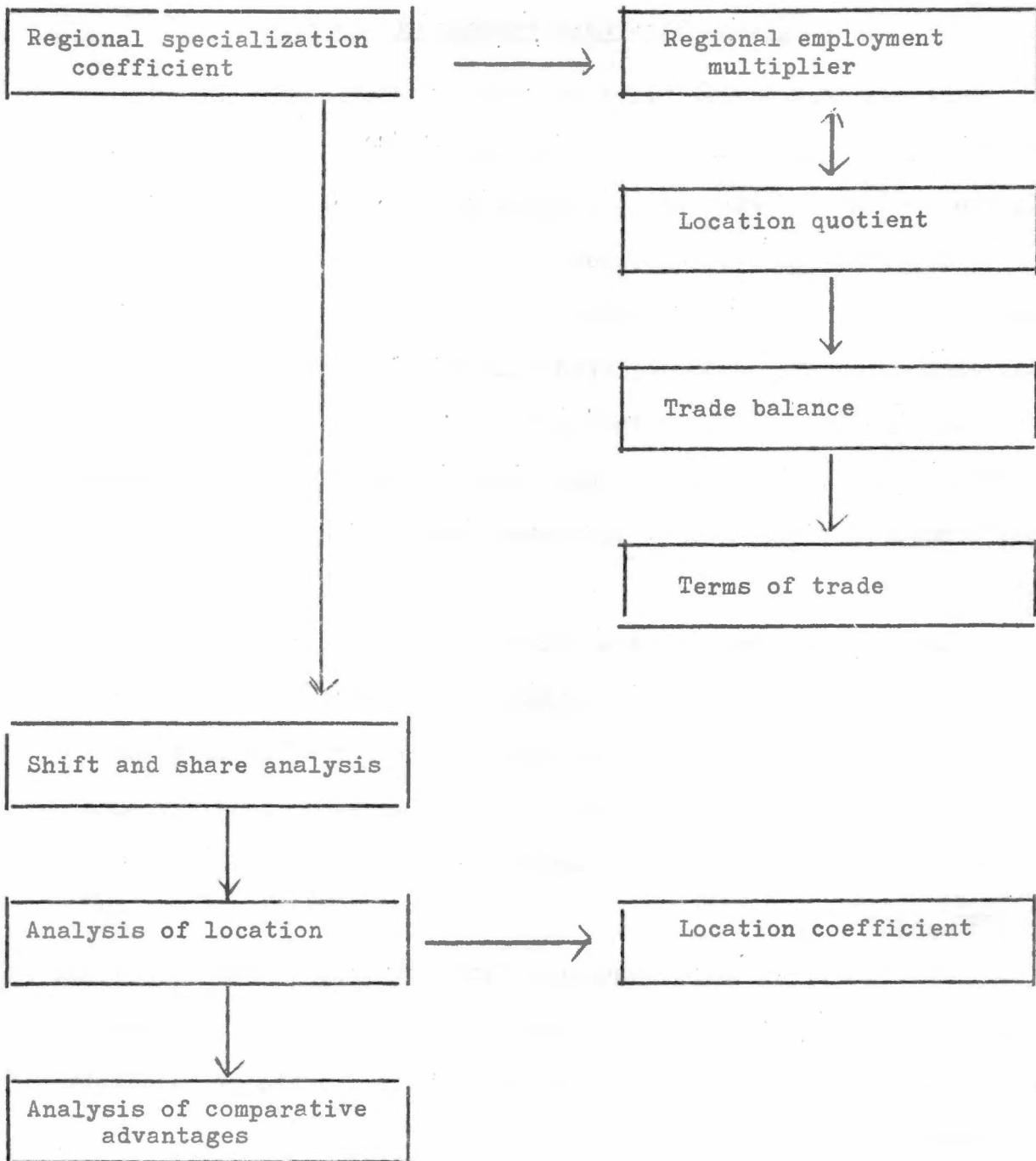
On the basis of the regional specialization coefficient the value of the regional multiplier (e.g., for employment) may be estimated, and this in turn can be directly calculated by using the concept of the location quotient. This latter concept, duly corrected, permits an approximate calculation of the regional trade balance, in order subsequently to appraise the effect of the region's terms of trade.

On the other hand, the estimate of the differential effect by using the method of shift and share analysis gives rise to an analysis of location with the introduction of the concept of the location coefficient and permits a more detailed study of regional comparative advantage.

Lastly, the specialization coefficient and the method of shift and share analysis are linked by the relationship already mentioned between the magnitude of the structural effect and the similarity between the intersectoral structure of the region and of the country.

These linkages are shown below.

/Regional specialization



### 5. Information requirements of the TP

It was said earlier that one characteristic of a TP on Regional Analysis Techniques is its operability, i.e., its applicability in the context of existing conditions of statistical information.

It is not on this occasion necessary to go more deeply into the subject of the data available at the regional level. All planners and at least a proportion of academics are perfectly acquainted with the shortage and debatable quality of data with a subnational reference base, particularly third-order statistical data (technical and behavioural parameters, different types of coefficients, etc., etc.).

The TP prepared earlier, which will be discussed in detail below, has the advantage of being constituted by a group of techniques which may be processed almost exclusively on the basis of primary census-type data normally available even for very low-ranking geographical units, i.e., data on the economically active population (EAP) or labour force.

Naturally, to draw economic inferences on the basis of statistical observations of the EAP may be very dangerous in not a few cases, mainly because of the related problems of employment, productivity and prices.

The "art" of the regional analyst, however, consists precisely in developing sufficient capacity for analysis (partly acquires through practice and partly through formal training) to prepare reasonable economic hypotheses and conclusions on the basis of limited and indirect data.

## 6. Formal structure of the TP

### 6.1 Disposition of the data

The data on the EAP supplied by population censuses or by intercensus estimates must be registered by geographical unit of analysis (region, province, department, etc.) and by sector or branch of economic activity, in the latter case at least at the level of three digits of the International Standard Industrial Classification (ISIC).

For registering these data, a matrix may be used in which the horizontal lines give the sectoral values and the columns the regional values. Using simple mnemonic techniques this matrix can be termed the SECRE(SECTOR/REGION) MATRIX.

In a double-entry table of this type the letter R followed by a numerical subindex will be used to denote a region, while the letter S followed by a numerical subindex will be used to denote a sector. The variable recorded in each box will be described using the letter V followed by two numerical subindexes, the first referring to the corresponding row and the second to the column. A column ( $\sum_i$  SEC) will be used to record the totals for each row and a row ( $\sum_j$  REG) will be used to note the totals for each column. The bottom right hand box of the diagonal shows the global value of the variable, e.g. the country's total EAP

/SECRE MATRIX

REG \ SEC	R <sub>1</sub>	R <sub>2</sub>	R <sub>3</sub> .....	R <sub>j</sub> .....	R <sub>m</sub>	∑ <sub>j</sub> SEC
S <sub>1</sub>	V <sub>11</sub>	V <sub>12</sub>	V <sub>13</sub>	V <sub>1j</sub>	V <sub>1m</sub>	V <sub>1.j</sub>
S <sub>2</sub>	V <sub>21</sub>	V <sub>22</sub>	V <sub>23</sub>	V <sub>2j</sub>	V <sub>2m</sub>	V <sub>2.j</sub>
⋮						
S <sub>i</sub>	V <sub>i1</sub>	V <sub>i2</sub>	V <sub>i3</sub>	V <sub>ij</sub>	V <sub>im</sub>	V <sub>i.j</sub>
⋮						
S <sub>n</sub>	V <sub>n1</sub>			V <sub>nj</sub>		
∑ <sub>i</sub> iREG	V <sub>i.1</sub>	V <sub>i.2</sub>	V <sub>i.3</sub>	V <sub>i.j</sub>	V <sub>i.m</sub>	V <sub>s.r</sub> (∑ <sub>i</sub> ∑ <sub>j</sub> V <sub>ij</sub> )

S<sub>i</sub> == Sector

R<sub>j</sub> = Región

V = Variable

V<sub>ij</sub> = Value of V corresponding to sector "i" in region "j".

$$V_{s.j} = \sum_j V_{ij} =$$

$V_{s.j} = \sum_j V_{ij}$  = Value of V corresponding to the sectoral total  
(sector "i").

$V_{i.r} = \sum_i V_{ij}$  = Value of V corresponding to the regional total  
(region "j").

$V_{s.r} = \sum_i \sum_j V_{ij}$  = Value of V corresponding to the global total.

## 6.2 Presentation of the techniques

The techniques making up this proposed TP are all presented and discussed in Técnicas de Análisis Regional con Información Limitada, which has been made available to the participants at the meeting, although it is in Spanish. For this reason, they are presented in a very much summarized form, mainly from the standpoint of their formalization.

### 6.2.1 Regional specialization coefficient

(a) Formal expression

$$Q^R_j = \frac{1}{2} \sum_i \left[ \left( \frac{V_{ij}}{\sum_i V_{ij}} - \frac{\sum_j V_{ij}}{\sum_i \sum_j V_{ij}} \right) \right] \quad (1)$$

(b) Information required. EAP classified by sector and region.

(c) Problem analyzed. Degree of similarity between the intersectoral structure of activities in a region and in the country. Level of variation ranges from "0" (same composition or structure) and "1" (maximum difference produced when the region specializes completely in one sector and the country specializes in another).

/(d) Main uses.

- (d) Main uses. As an indicator of the degree of regional specialization. As an indicator of possible differential impacts of macroeconomic policies. As an approximate value of the regional employment multiplier. As an explanatory element of regional dynamics.
- (e) Main limitations. All those deriving from the use of the EAP. It only measures the degree of similarity of two relative distributions of activities and consequently depends on the quality of the distribution used as pattern of reference.

### 6.2.2 Shift and share analysis

- (a) Formal expression

$$ET_j = ED_j + EE_j \quad (2)$$

$$ET_j = \sum_i V_{ij}(tn) - \sum_i V_{ij}(to) / rSR \quad (3)$$

$$ED_j = \left[ \sum_i V_{ij}(tn) - rS_i V_{ij}(to) \right] \quad (4)$$

$$EE_j = \sum_i rS_i \left[ \frac{V_{ij}(to)}{\sum_i V_{ij}(to)} - \frac{\sum_j V_{ij}(to)}{\sum_i \sum_j V_{ij}(to)} \right] \sum_i V_{ij}(to) \quad (5)$$

where:

$ET_j$  = Total effect or total relative variation for region "j".

$ED_j$  = Differential effect.

$EE_j$  = Structural effect.

/rSR = Percentage

$rSR$  = Percentage variation at the national level in the variable used between periods "to" and "tn".

$rS_i$  = Percentage variation in the sectoral total between periods "to" and "tn".

- (b) Information required. EAP classified by sector and region for the years "to" (initial period) and "tn" (final period).
- (c) Problem analyzed. Relative changes in levels of regional activity compared with changes at the national level.
- (d) Main uses. As an indicator of the relative global dynamics of a region in a given period. As an explanation of these dynamics in terms of comparative regional advantages (differential effect) and the region's economic structure and degree of regional specialization (structural effect). As a short- and medium-term projection model. As a regional typological base for designing economic policies. As a general framework for regional economic analysis.
- (e) Main limitations. All those deriving from the use of the EAP. High level of disaggregation of the data needed in order to be able to identify correctly the components of the regional dynamics.

6.2.3 Regional multipliers

(a) Formal expression

$$(1+p)R_j = 1/Q_j^R \quad (6)$$

$$(1+p)R_j = \frac{E_T}{E_B} = \frac{1}{\sum_i \left[ \frac{v_{ij}}{\sum_i v_{ij}} - \frac{\sum_j v_{ij}}{\sum_i \sum_j v_{ij}} \right]} \quad i > 0 \quad (7)$$

where:

P = Constant proportion of non-basic EAP to basic EAP.

E<sub>T</sub> = Total regional EAP.

E<sub>B</sub> = Basic regional EAP (exporting sectors)

Q<sup>R</sup><sub>j</sub> = Regional specialization coefficient.

(1 + p)R<sub>j</sub> = EAP multiplier of region "j".

(b) Information required. EAP classified by sector and region.

(c) Problem analyzed. Capacity of generation of jobs in a region on the basis of a basic activity.

(d) Main uses. As a basic regional employment programming model. As an important input in the definition and adoption of a polarized regional growth strategy.

(e) Main limitations. High sensitivity to the level of aggregation of the information. Low capacity for reflecting real interconnexions in the region's economy. High level of dependence on the region's degree of formal economic

/operation. Difficulty

operation. Difficulty in estimating accurately the basic sectors or activities. Use of a static notion of multiplier.

#### 6.2.4 Location quotient

(a) Formal expression

$$Q_{ij} = \frac{V_{ij}}{\sum_i V_{ij}} : \frac{\sum_j V_{ij}}{\sum_i \sum_j V_{ij}} \quad (8)$$

(b) Information required. EAP classified by sector and region.

(c) Problem analyzed. Relative regional size of a sector compared with the relative size of the same sector at the national level. Range covered: all the positive values.

Critical value:  $Q_{ij} = 1$ .

(d) Main uses. As a first approach to the identification of exporting sectors ( $Q_{ij} > 1$ ) and importing sectors ( $Q_{ij} < 1$ ).

As a methodological base for the identification and quantification of the basic sectors in the calculation of the regional multiplier. As a methodological base in the estimate of a region's trade balance.

(e) Main limitations. All those deriving from the use of the EAP.

6.2.5 Regional trade balance

(a) Formal expression

$$\sum_i \text{EN}_{ij} = \sum_i \left[ \frac{V_{ij} \cdot O_i}{\sum_j V_{ij}} - \frac{\sum_i V_{ij} (O_i - X_i + M_i)}{\sum_i \sum_j V_{ij}} \right] \quad (9)$$

where:

$\sum_i \text{EN}_{ij}$  = Value of net regional exports

$O_i$  = Value of the product of sector "i" at the national level

$X_i$  = Value of international exports of sector "i"

$M_i$  = Value of international imports of sector "i".

(b) Information required. EAP classified by sector and region, plus information by sectors on production, exports and imports.

(c) Problem analyzed. Structure of the region's external trade.

(d) Main uses. Appraisal of the impact on the region of the external trade policy and in particular of the exchange policy. Calculation of the effect on the region's economy of the terms of trade. Use of the above results in designing a regional development strategy.

(e) Main limitations. Those inherent in the use of the EAP and those stemming from the assumptions incorporated in the methodology and connected with interregional equality in the profile of apparent consumption.

### 6.2.6 Location coefficient

(a) Formal expression

$$Q_S = \frac{1}{2} \sum_j \left[ \left( \frac{V_{ij}}{\sum_j V_{kj}} - \frac{\sum_i V_{ij}}{\sum_i \sum_j V_{ij}} \right) \right] \quad (10)$$

(b) Information required. EAP classified by sector and region.

(c) Problem analyzed. Degree of regional concentration of a sector or activity. Degree of similarity between the inter-regional distribution of a sector and the interregional distribution of a certain reference pattern. Range covered:  $Q_S = 0$  if the distribution of the sector coincides absolutely with the reference distribution;  $Q_S = 1$  if both distributions show total geographical concentration in different regions.

(d) Main uses. Studies of a sectoral nature. Analysis of the pattern of geographical association of two or more sectors.

(e) Main limitations. All those deriving from the use of the EAP. Value of the coefficient as a measure of dispersion or concentration highly dependent on the characteristics of the reference distribution.

## 7. Basic characteristics of teaching the TP

The TP on Regional Analysis Techniques presented briefly in the foregoing pages can be incorporated into a training programme for regional planners in the following terms.

### 7.1 Duration.

The set of elementary techniques constituting the TP may be taught in 40 effective class hours (one two-hour session per day for four weeks) plus 24 additional hours of exercises (two three-hour sessions per week).

### 7.2 Teaching method.

The most appropriate teaching method would seem to be a mixture of teaching sessions and direct work by the participants. The teaching sessions or formal classes should first and foremost be devoted to a discussion of the type of problem it is sought to analyse using a given technique; secondly to the theoretical and conceptual development of the technique, and thirdly to the development of one or two simple examples with imaginary data. The direct work sessions should be devoted to the study of real examples. In order to organize these working sessions, the participants themselves should collect and arrange the data.

It seems of particular interest to carry out a self-teaching exercise in the initial and final sessions of the TP. This exercise consists of requesting the participants to prepare two SECRE matrixes with imaginary data corresponding to any two years, and prior to

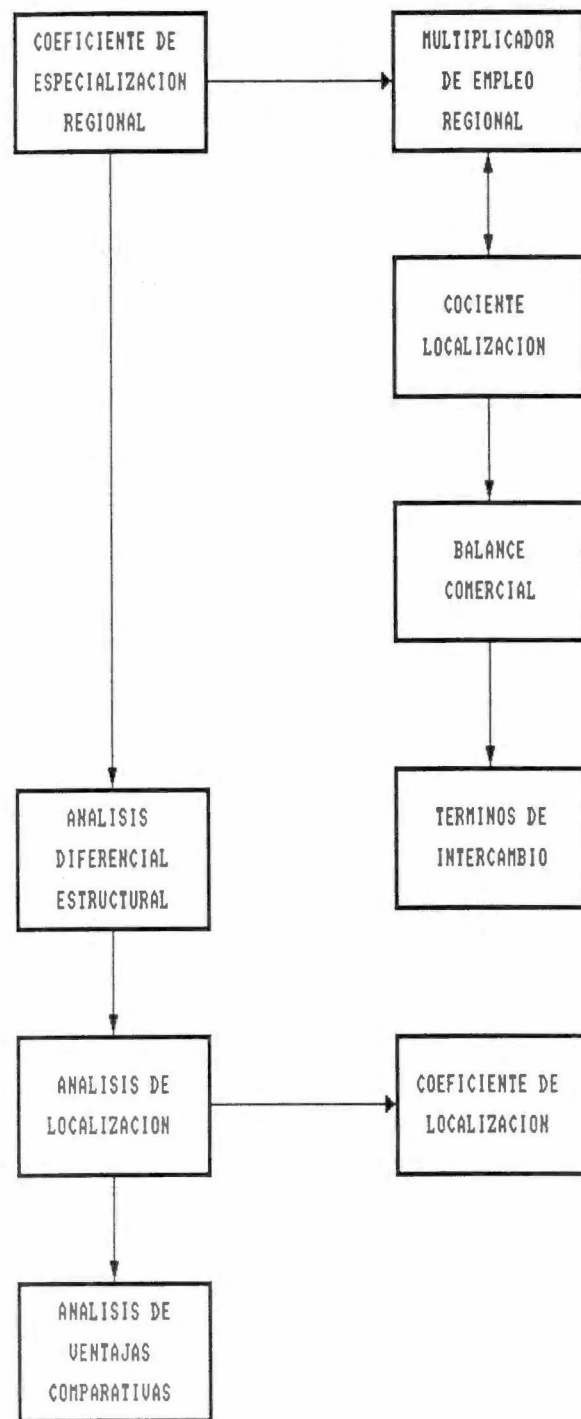
/knowledge of

knowledge of any technique, to write up a brief diagnosis of the multiregional system shown by the matrixes. Once the TP has been carried out, the participants are asked to make the diagnosis again on the basis of the same matrixes and are asked to evaluate the gain - in terms of the quality of the diagnosis - obtained through the use of simple analysis techniques.

### 7.3 Bibliographical support.

Ideally the TP should be supported by an ad hoc text. If such a text is not available, the texts (in English) of Bendavid-Val and Isard are extremely useful, particularly the former; in Spanish, the text by Boisier is equally useful. An auxiliary bibliography should be prepared for each technique, using the numerous theoretical and empirical studies which have appeared in professional journals.

# RELACIONES ENTRE LAS TECNICAS DE ANALISIS REGIONAL



# RELACIONES ENTRE LAS TECNICAS DE ANALISIS REGIONAL

