CONTENTS AND MEASUREMENT OF SOCIO-ECONOMIC DEVELOPMENT

Statistical Studies of Social Development undertaken by UNRISD*: A Review

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The United Nations Research Institute for Social Development recently published a study entitled "Contents and Measurement of Socio-Economic Development", which was prepared by a group consisting of D. V. McGranahan, C. Richard-Proust, N. V. Sovani and M. Subramanian.

The authors attempted to formulate quantitative methods of analyzing and measuring the socio-economic development level of countries, and at the same time tried to find an indicator based on the most objective considerations. The need for such a study arises from the fact that the indicators used so far, such as *per capita* national income, etc., do not take social phenomena sufficiently into account.

The proposed method and the first preliminary results are of interest, and may contribute to a better knowledge of international differences in socio-economic development. This does not mean that the methodology and the results of the study should be accepted unconditionally in a large number of cases. The authors themselves realized that, describing many controversial questions in the course of their work.

Although the method itself will not be considered here in detail, it is worthwhile to present briefly its main elements. The first stage consists in the selection of the basic sectors which determine the socio-economic level of a country and in the choice of a set of statistical indicators for each sector. It should be added that only those indicators which show the greatest cross-correlation have been used in the final calculations and that all of them have been recalculated to "adult-equivalents". Indicators showing little correlation are rejected. The set of basic cross-correlated statistical indicators (19 such indicators were adopted—see list of core indicators) which are representative of specific sectors of development are related to each other in the so called "correspondence system". Various statistical methods, which cannot be considered here owing to limitation of space, are applied. In very general terms, the "correspondence system" determines the level at which a given indicator is usually situated when other indicators are at a certain level. For example, if an average life expectancy of 59 years corresponds to a housing occupancy rate of 2.1 persons per room, and the figure of 2.1 persons per room corresponds to a *per capita* national income level of $600 then, according to the "correspondence system" of indicators, the *per capita* national income level of $600, a housing occupancy rate of 2.1 persons per room and an average life expectancy of 59 years are correspondence points at a particular level of development. These points are linked to form a curve which joins the correspondence points of the nineteen basic indicators used in this study.

The next, extremely important, stage is the definition of a general scale for all statistical indicators covered by the "correspondence system". The authors adopt a scale ranging from 0–100; points 0 and 100 are the lowest and highest level of each indicator, through which passes a line joining the correspondence points. If, for example, the lowest line passes through the correspondence point at which average life expectancy is 40 years, 80 percent of the population derive their main means of subsistence from agriculture and 21 percent of children of school age attend school, then these values determine the zero points of the corresponding indicators. The points 0 and 100 are therefore determined not arbitrarily but objectively, on the basis of empirical data.

*Report No. 70.10, Geneva 1970.

The next fundamental problem relating to the scale concerns the development of methods for determining intermediate values between 0 and 100. The establishment of a suitable scale for this purpose, referred to by the authors as "scale transformation", should depend on the principles used in connexion with the pattern of changes in the values of a given indicator. As the authors of this method show, economic factors such as production levels show a geometric progression and an increase from 100 to 110 and from 500 to 550 is regarded as equal growth rate. However, this approach cannot be adopted in the case of values relating to social phenomena (for example, an increase in average life expectancy from 40 to 44 years does not correspond, in terms of rate of change, to an increase from 60 to 66 years).

The authors of the study considered that the appropriate corresponding internal scales (from 0 to 100) for individual indicators should lead to a levelling-out of the lines joining correspondence points on the graph. In other words, they came to the assumption (which is not very clearly stated in the study) that all the correspondence points joined by a line, i.e. corresponding to a given stage of development, should be on one level of the scale in the "correspondence system" (on an untransformed scale, these points were at various levels).

The last stage consisted in the calculation of a "general development index" by weighting the values of individual indexes which have been calculated on the transformed scale. Mean correlation coefficients were used as a weighting system, greater weights being assigned to indicators showing closer correlation with others. Since all the indicators used in the study were intercorrelated (in accordance with general assumption), the calculation of the mean weighted and nonweighted value obviously gives results that are so similar that the differences are of no practical significance.

In addition to the description of the methods used, the authors presented also in the study under review the results of calculations for 58 countries.

Their interesting study calls for some general reflexions and for some critical remarks.

It seems that statistical methods of investigating the level of social development have shown considerably less progress than methods of studying the level of economic development. One of the main reasons for this may be the fact that, in studying economic phenomena, we use and, with some reservations, should use value expressed in terms of price as a general indicator, whereas no such general indicator is available for the investigation of social phenomena. This is probably because the relative importance of a certain activity in the social development process cannot be measured in terms of price nor in terms of its cost. Moreover, in studies of the level of social development, there is a whole series of factors of vital importance to such development which not only have no yardstick in common with others, but also completely exclude the possibility of quantification (such as social insurance, civic liberty, etc.).

This can be illustrated by a simple example. When we examine differences in household consumption levels on the basis of foodstuffs and goods other than foodstuffs, we usually express each of these groups in terms of a certain price system, and then add up these values on the assumption that the value of each group reflects its weight and importance within the household consumption aggregate under consideration.

On the other hand analyzing the overall difference in the degree to which social needs are met in the fields of health and education, we would still be unable to assign to the indicators for each of these fields (assuming that we succeeded in finding such indicators) a suitable weight so as to obtain an overall indicator for the entire aggregate.

Lastly, it should be noted that various social development criteria might be accepted in countries with different social and economic systems or in countries situated in various geographical regions, and that a European's point of view often does not coincide with that of an African, South American or Asian. The United Nations Research Institute for Social Development using only the most basic indicators has little or no need to take into account the specific criteria and features of development at various countries or regions. But although this is very convenient from one point

of view it is at the same time a serious drawback since insufficient attention is paid in the study to the need for defining social development criteria. A definition of this kind will be necessary in all future studies.

The study under review represents a considerable step forward in the development of research on social phenomena. It represents only a "first step", however, and much remains to be done in this field.

The application of "correspondence system" and "scale transformation" concepts is an interesting technical device, but they do not permit due importance to be attached to individual factors governing overall social development; nor, despite some progress made by the authors of the study in this field, do they permit to introduce completely objective relations between scales which measure the rate of change of each indicator.

The use of weights corresponding to correlation coefficients in the study under review does not, of course, solve the problem. It can be stressed that weighting does not significantly change a calculated mean unweighted value. Could such a result of weighting be of useful value? The question remains undecided, but I have my personal doubts.

The principles of scale transformation aimed at levelling out the lines joining the correspondence points in the "correspondence system" graph are in a certain sense mechanical because, when this method is used, the same importance is attached to changes in various factors, in accordance with the empirically simultaneous appearance of these changes. The true, social significance of changes in various sectors may be different, irrespective of the parallelism of the changes.

Thus, it should be emphasized that in the study there seem to be no clear theoretical reasons given for the choice of a certain scale for a particular indicator, such as a logarithmic scale for *per capita* national income data, and an exponential or semi-exponential scale for average life expectancy data. An example clarifying this problem is the use, for calculation purposes, of a logarithmic scale for data on the number of telephones per 10,000 inhabitants, and a semi-logarithmic scale for data on newspaper circulation figures per 1,000 inhabitants. The use of different scales in this instance would be difficult to explain for any other reasons which are not strictly mathematical.

The most interesting part of the study under review is concerned with the "correspondence system" concept (and relevant graphs) which permits comparative analyses to be made between the structure of social development in a given country and an average or "normal" structure against a general economic development background. I have purposely stressed problems of a social nature since these constitute the essence of the study. It is indeed in this field that the study introduces many new research tools and throws fresh light on a large number of phenomena, since economic development can be analysed successfully by the use of other statistical methods (comparisons of the structure and physical volume of the national product and income and of its components, correlation and regression analysis, etc.).

The idea, however, of a general development indicator" seems more doubtful because, in addition to the above-mentioned reservations, the calculation of a single indicator of a country's development without any breakdown is always not very informative and of little analytical value.

Finally, the interpretation of the results obtained by the use of a "general development indicator" and the results of comparing per capita national income, is in my opinion rather misguided. The statement (p. 20) that it makes more sense in certain cases to rank countries on the basis of a general indicator score rather than on the basis of their *per capita* national income is too vague, because the criteria used in defining the "sense" are not given. Each of these indicators answers in my opinion a question posed in a different way, and answers such a question in a certain sense. Each has certain advantages and shortcomings arising both from the definition of the indicator and from differences in methodology.

The doubts and criticisms expressed here do not detract from the value of the study under review, which introduces many new elements into the discussion of possibilities of studying levels of social development.

LIST OF CORE INDICATORS GIVING ADJUSTMENTS FOR AGE-STRUCTURE AND
TRANSFORMATIONS, IF ANY

No.	Indicator	Adult-equivalents for age group (in years)			Transformation
		<15	15–64	65+	
1.	Expectation of life at birth	—	—	—	Demi-exponential[1]
2.	Population in localities of 20,000 and over as per cent of total population	—	—	—	Demi-logarithmic[2]
3.	Consumption of animal protein, per capita, per day	$\frac{1}{2}$	1	$\frac{2}{3}$	Demi-logarithmic
4.	Combined primary and secondary enrollment as per cent of age group 5–19	—	—	—	—
5.	Vocational enrollment as per cent of age group 15–19	—	—	—	Logarithmic
6.	Average number of persons per room	$\frac{1}{2}$	1	1	—
7.	Newspaper ('daily general interest') circulation per 1000 population	$\frac{1}{3}$	1	1	Demi-logarithmic
8.	Telephones per 100,000 population	$\frac{1}{3}$	1	1	Logarithmic
9.	Radio receivers per 1000 population	$\frac{1}{3}$	1	1	Demi-logarithmic
10.	Per cent of economically active population in electricity, gas, water, sanitary services, transport, storage and communications (ISCO divisions 5, 7)	—	—	—	—
11.	Agricultural production per male agricultural worker (ISIC division 0), in 1960 U.S. dollars	—	—	—	Logarithmic
12.	Adult male labour in agriculture as per cent of total male labour (ISCO division 0)	—	—	—	—
13.	Electricity consumption, kwh. per capita	$\frac{1}{2}$	1	$\frac{2}{3}$	Logarithmic
14.	Steel consumption, kg. per capita	$\frac{1}{2}$	1	$\frac{2}{3}$	Logarithmic
15.	Energy consumption, kg. of coal equivalent per capita	$\frac{1}{2}$	1	$\frac{2}{3}$	Logarithmic
16.	GDP derived from manufacturing as per cent of total GDP (ISIC divisions 2–3)	—	—	—	Demi-logarithmic
17.	Foreign trade (sum of imports and exports) per capita, in 1960 U.S. dollars	$\frac{1}{2}$	1	$\frac{2}{3}$	Logarithmic
18.	Salaried and wage-earners as per cent of total economically active population	—	—	—	Demi-exponential
19.	P.C. GNP	$\frac{1}{2}$	1	$\frac{2}{3}$	Logarithmic

[1]The demi-exponential transformation values of an indicator are obtained by averaging the arithmetic and the exponential values (on 0–100 scales) of that indicator. The values are more or less the same as those obtained by using "square" transformation.

[2]The demi-logarithmic transformation values of an indicator are obtained by averaging the arithmetic and the logarithmic values (on 0–100 scales) of that indicator. The values are, more or less the same as those obtained by using "square root" transformation.