

THE CREDIBILITY OF SCIENTIFIC TYPOLOGY AND AGGREGATE  
DATA IN CROSS-CULTURAL ANALYSIS<sup>x</sup>

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Introduction

In order for non-Western societies to evolve into being active participants of the scientific and technological transformation, instead of being passive consumers of innovation, a tremendous amount of scientific thought must be diffused into the countries. At this point in history, national development is closely tied in with scientific and technological advancement. The question becomes how is this information to be successfully transmitted in a way that will satisfy the non-Western societies' aspirations for economic independence and raise them above the grasp of exploitation to becoming equal and active members of the world economy. The methods of modernization of these countries should include social, political, economic and cultural approaches. This involves, as a first step, dissemination of scientific thought through mass education and training. Secondly, in order to establish a modern scientific infrastructure, the developing countries should be able to manufacture equipment and machinery that is of the same calibre as the latest world standards.<sup>1</sup>

Taking into consideration the fact that different countries will have different starting points and aims for scientific and technological modernization it becomes necessary to develop scientific

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<sup>x</sup>This exposé is a segment of a research project in progress by the authors exploring the contradictory phenomena of our time. Its focus is on such questions as political development, progress and its dilemmas, public policy and its externalities, cognitive dissonance, political ...

typologies pertinent to the varying needs of the developing states. Some political scientists believe that these countries ought to be classified according to the level and type of their production forces which utilize any form of technology. It is generally agreed that some form of generalized indicators should be used to enable researchers to compare the development levels of various countries as well as to determine their strategic aspirations of development. In the past, per capita national income was used as an indicator. But this measure has proved unreliable as it does not include the socio-political variables of developing countries such as the system of values as it is related to their cultural and historical background.<sup>2</sup> In other words, a set of indicators must be found that will include the vital necessities of each particular country. For example, the "affluent" and "consumer" society, which has been the outgrowth of modernizing influences in the West is part of the ideological and political basis of Western man's aspirations. This Western orientation of development is not congruent with the goals and values of many non-western countries. An erroneous methodological qualitative comparison between the values of these two systems would be to divert the developing countries away from their original and specific needs and throw them into a supine position in the face of the technological neocolonialistic dictates of Western technocrats. It is therefore vital that the indicators be valid abstractions directly related to the development orientation of each particular system.<sup>3</sup> The internal social, cultural, political and economic conditions of each developing country will determine the individual kind of technical development it will need according to its own internal social system. They will also determine the phases of such development, as well as the time needed to transform its present state into a "modernized" one. The problem is in determining a unified set of dimensions by which to analyze the diffusion of scientific thought into non-western societies.

## DIMENSIONS OF CROSS CULTURAL ANALYSES

When studying cross-cultural, political and economic systems of non-western societies, with respect to the diffusion of scientific thought, it is important to take into consideration the wide range of variables and facets peculiar to each country in terms of the fundamental contradiction and social priorities of each system. One way of arriving at the basic levels of comparison is through taxonomic typologies which aid in pointing out dimensions of national difference. The use of the empirical method will help eliminate the influence of cultural myths upon the comparison while at the same time overcoming biases or prejudgement concerning countries of geographical similarity.<sup>4</sup>

When studying physics or maths a formal system of equation is used to analyze highly generalized models whose constituents are in the form of standard units of specific dimensions. But where are all the main dimensions of social and political reality? Would it be possible to claim an absolute standard for a set of dimensions while trying to allow for the openers of systems? Since the scientific revolution new epistemological and metaphysical perspectives have been added to the structure of scientific methodology. The paradigms change with time but there continually remain certain parameters and standard dimensions with which to work.<sup>5</sup> The social sciences, on the other hand, have been at a loss for a dimensional unity in the pre-paradigmatic stage of which its main authorities are prone to select relevant and

predominant variables of a chosen theoretical style which are seldom in dimensional form. The study of information transfusion to the non-western world becomes a quite expansive and complex one without a set of standards by which the construct self contained political and economical models of the complex social processes involved. Interrelated variables such as economic, scientific, social, cultural, political and personal variables of the less developed countries play in any attempts by developed countries to interfere in a less developed country's status quo. The dimensions of influence in one realm must be taken into consideration when evaluating the influence of another. For that reason a mean problem exists in effecting a translation between different conceptual realms. The difficulty in establishing a set of basic dimensions in the realm of social sciences for a comparative analysis is due mainly to the high percentage of variance of the variables.<sup>6</sup> It must not be forgotten that, unlike math or science, we are not dealing with standard sets of numbers but with human beings whose emotions and prejudices cannot be confined to a predictable pattern. This, itself, is what impedes the attempts to educate or technicize less developed countries. The use of quantitative measurement of particular qualitative experiences in exploring the human estate creates various adversities. On the one hand, mathematical and statistical equations are formed as a result of generalizing spatial and quantitative properties and the intra-relationship of objects, processes and symbols which are of an inanimate nature. On the other hand, the human estate, as a living organism and self-regulating system, consists of fortuitous experiences and it becomes almost impossible to define, formalize and reduce it to parameters alien to its state.

Many analytic approaches can be used to dimensionalize the societal variables of cross-cultural diffusion of scientific information.<sup>7</sup> Some examples of the numerous processes are: pragmatic, inductive, social physics, empirico-deductive factor analysis, deductive, facet theory,

cluster analysis and Euclidean space methods. The choice of a convenient aggregation is the fundamental problem in practical applications. The dimensions of political processes, alone, cover a vast scope of factors. When comparing political systems, the level of analysis shifts from the object of observation (which may be individuals or groups) to the social system in which the observations are made. Obtaining data on this level is subject to a somewhat random or personal selection of data for variables which therefore inherently include the possibility of error. One consideration to be made is that of using units of observation and generalization which provide for variance on the dimensions. Secondly, the validity of the measurement statements must render the data reliable. Thirdly, assuming the first two have been achieved, there is still a question as to whether the data is expressed in equivalent language of measurement.<sup>8</sup>

Variables for comparative data can be attained in terms of analyzing the differences between systems as a whole. They can also include non-relational characteristics of the components of the system. Certain cultural-historical factors must also be considered as well as a system's basic social processes and development. The effect of the characteristics of the system upon the attitudes and goals of the people is also a determining factor influencing the degree to which the information transformation will be successfully achieved.<sup>9</sup>

The ideology of the systems concerned is one of the major variables which influence the transfer of scientific knowledge to non-western world in terms of the interpersonal values and political orientation. An omnipresent problem in comparative studies is to develop a measurement of variables that cut across and take into consideration different political systems. The terminology and

concepts used should have a meaningful cross-national applicability. In many cases concept designations are dependent upon the level of development of the country. Finlay, Simon and Wilson's study of cross-national research contends that individual self-designation (respondents view of himself in regard to any number of dimensions) was a most effective way of determining value and perception preferences. They could, therefore, gain an introspection into the political culture by evaluating the respondents' cognitive, emotive and effective reflections of themselves.<sup>10</sup> They began with the determination of interpersonal values as indicators of Left/Right political orientation in 13 countries. But their conclusions led them to believe that their measures of values were Western-oriented because their scales indicated much more variance between Left and Right orientation in developed countries than in LDCs. A more accurate conclusion would be that the Left/Right clarity is something that can only be interpreted accurately within the context of the country itself.<sup>11</sup> Again, this point out the difficulty in obtaining unity in a dimensional analysis. The determination of categories as measures of political orientation in LDC's become a dubious task when the same categories must also apply to developed countries. Often, cultural influences change the meaning or expression of certain attitudes even on the basic level and render comparisons unequal or biased by the particular culture of the researchers themselves. The determination of a country's inhabitants' ideological self-designation as being Leftist or Rightist is such an example of the relativity of terminology.<sup>12</sup> For example, the use of political activity as a measure for politicization becomes a meaningless indicator in those countries where voting enforced or rigged by a dominant or single presidential candidate as it has been in most Third World countries. Such data is obviously Western-oriented and will be of no value to researchers as it fails to include the political peculiarities of the system's modus operandi.<sup>13</sup> One of the consequences of a scientific and technological infusion into non-western societies

is that it is being carried out by the Western societies and is therefore subjected to their bias. A common fear among scientists of the non-capitalist society of the USSR is the rise of a trend toward "technological neo colonialism" of Westernism. The USSR (which is also a western country) is using almost the same technique but under the name of Scientific Socialism. This rivalry supports the fear that "scientism" is not value free but is manipulated by a particular ideological bias.

In the transfer of scientific thought it is difficult to obtain a consistent pattern of relationships to help gauge the efficacy with which such information will be received.<sup>14</sup> Social indicators which are culture bound or system-specific have proved unreliable and biased when applied to other socio-political systems. The disparity arises from over-generalized and unidentified linkages between theories and applications.<sup>15</sup> The problem of applying concepts across systems is that indicators vary according to the function of the theories from which they originated as vs. just the frequency with which they occur from system to system. The researcher should be aware that his indicators are dependent upon his models and should use this to help explain the variance in his findings, to improve the quality of operationalizations and increase the intersubjectivity of his inquiry.<sup>16</sup>

In forming indicators, the reliability can be assessed by the degree to which they are ambiguous. Error will be directly related to this variance. Validity is another important aspect of an indicator by which it must measure accurately the internal as well as external relation to the total concept.<sup>17</sup> For example, a direct indicator would be more valid than inferred one. It is usually the social laws which are transferred into inferred indicators. Arriving at a valid indicator, then, becomes a highly technical problem. For example, if a researcher wants to compare the level of education between two populations with the desire to increase higher education in certain LDC's he might count the number of schools there based on his theory

that more schools means more education. But this assumption fails to acknowledge that perhaps in some countries the schools are relatively useless institutions or perhaps are only attended by members of a particular social class.<sup>18</sup> In this case the researcher's indicators would be totally contingent upon his implicit or explicit mode. His model, being presumptuous and Western-oriented, his indicators likewise will reflect the error in his basic theory and therefore will not be a valid source of information. For this reason many political and social scientists advocate an orderly and deductive procedure for indicator determination that encompasses the full range of operationalization of variables based on the valid antecedents of the general theory. Further, it is a sensitive process to transfer ideational concepts into non-abstract and observable indicators. But this is the means by which we devise categories of empirical observation of concepts; i.e., it is a common means of operationalizing abstract as well as non-abstract theory. But, to be valid, the information in any category must maintain a high degree of interrelatedness to the nature of the conceptualizations.

Likewise, the linkage of the indicators to each other is equally important in terms of unifying and validating the original concept. The confusion of overlapping operationalizations can be avoided by formal methods of identifying multiple indicators rather than with process of conjecture. This also facilitates hypothesis-testing. When a disparity is found among indicators it could be a result of the application of different conceptual frameworks to similar systems. It is important that one refer constantly to his theoretical framework to avoid corrupting his data by subjective and indirect linkages between his variables. The crucial awareness which should be developed is to the impact of the researcher's theory upon his indicators. This relationship should then be used constructively.<sup>19</sup>



The problems involved in the diffusion of scientific thought to non-Western world are many. The scientific method of inquiry is not adequate for this comparative method of socio-political inquiry. Comparative methodology cannot arrive at "laws" of behaviour because it is virtually impossible to standardize the information in terms of valid indicators. For that reason scientific typologies are needed as a methodology for comparative analysis.<sup>20</sup>

#### FOOTNOTES

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