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## **Cross-cultural Organizational Analysis: Research Methods and the Aston Program**

Cross-cultural analysis of managerial structures and processes and of their impact on the productivity and innovation of industrial enterprises is an area of continuing controversy in organizational behavior research. Many authors point to the importance and to the difficulty and complexity of ongoing research endeavor in this extensive domain [1-3].

Cummings [2] suggested that one of the new directions of organizational behavior research in the 1980s was to be study of cultural context as a contingency factor in understanding organization effectiveness, and since 1980, considerable research effort has focused on the study of organizations in varying cultural settings. The results of cross-cultural organizational analyses have, however, been inconclusive. In some studies the use of increasingly quantitative analytical methods has served as a basis for rejecting hypotheses associated with cultural contingency (see, for example, Marsh and Mannari [4] and Azumi and McMillan [5]).

My objective here is to consider analytical methods for modeling cross-cultural differences in organization structures and processes, with a focus on the Aston Program. Examples are cited to illustrate the strengths and limitations of multivariate modeling methods for theory development and testing.

### **National culture and organization**

Many complex problems associated with the definition and operationalization of

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culture as an organization-relevant construct must be resolved before progress can be made in this important area [1,3]. The dilemmas faced by researchers include the persistent lack of agreement regarding the meaning of the concept, difficulty in definition of the appropriate unit of analysis, problems of instrumentation, lack of empirical justification of organizational variables as culturally relative to their societal context, and lack of specification of relationships between culture-based variables and dimensions of organizational behavior [3,6]. These dilemmas require not only construct definition, identification of relevant organizational variables, and specification of models of organizational behavior but also development of corresponding research designs and analytical methods. The objectives of cross-cultural organizational research need to be pursued to respond to the rapidly growing needs of management engaged in international business [6,7].

Authors on cross-cultural psychology advance credible justification for pursuit of the scientific approach. Their arguments are equally relevant to the study of organizational behavior and theory [8]:

—Cross-cultural psychology most importantly forms a basis for establishing which associations among variables are truly universal laws.

—Where independent variables are confounded—for example, are highly positively correlated—in a single cultural setting, the causal relationships between these variables and a specified dependent variable may be better understood by study of behavior in widely varying or deviant cultures.

—Varying cultures offer natural quasi-experiments to test the effects of ecological variables on social organization and individual human responses.

—Observations regarding the relative frequencies of behaviors or events in different cultures provide evidence to determine what behavior may be manipulated through changes in the social organization or other aspects of the environment.

Brislin [9] suggests further that cross-cultural research can expand concepts and theories developed in a single cultural setting, particularly those developed in the United States. Certain cultures may also offer better opportunities than others for studying particular phenomena because of their social structures or value systems, including the status they accord to researchers. Finally, culture shock experienced by the researcher in a foreign environment may stimulate the learning process. These arguments suggest what contributions cross-cultural research can make to organizational behavior and theory.

It is impossible to review here the vast literature attempting to define the complex concept of culture; rather, a brief commentary will serve as a basis for what follows. This commentary focuses on the following points: defining culture, choosing a unit of analysis, examining patterns of organization structures and processes across cultural contexts, and generating useful recommendations for managerial practice.

*Defining culture*

According to Parsons [10], culture may be defined as a system of meaning, including patterns of ideas and values that contribute to shaping individual and collective behavior. Triandis [8,11] cites the very simple definition of Herskovits [12] as a starting point: Culture is the human dimension of the environment, including physical objects and the set of subjective responses to the physical components of culture. This definition of culture is useful in the study of organizations since it encompasses measurable dimensions of objective organization, such as size, ownership, and structuring of activities, as well as subjective individual responses, such as job satisfaction and commitment, that form the basis of organizational behavior. The organization can be viewed as an objective structure that shapes individual attitudes and behavior.

*Choosing a unit of analysis*

The choice of unit of analysis in research on culture and cultural differences varies widely, from the individual member of a culture to the national state. Triandis [8] refers to Naroll's [13] "cultunit," defined as "people who are domestic speakers of a common district dialect or language and who belong either to the same state or the same contact group" (P. 248). The organization itself seems an appropriate unit of analysis since it satisfies this definition of the "cultunit" and, in general, organizational systems represent more homogeneous populations, with clearer boundaries, than larger cultural groupings such as races, religions, or nations.

The comparison of organizations as cultunits in cross-cultural research permits examination of relationships among organizational variables to verify the universality of such relationships and the study of other associations among variables that may be contingent upon the cultural context. For example, results of organizational studies based on the Aston Program have tended to support the universality of the highly significant positive relationship between organization size and structuring of activities [14-17], whereas dependence with regard to external organizations may have differing effects on structuring of activities across national cultures [18,19].

*Examining patterns of organization  
structures and processes  
across cultural contexts*

It is difficult to differentiate culture-based variables relevant to organizational behavior from other variables generally describing the economic context, the structure of the focal organization, and individual values, attitudes, and behavior in organizational settings. An alternative is to view organization-relevant culture

as a pattern of relationships among universal variables rather than as a distinct variable in itself. A set of variables such as those developed in the Aston Program may be considered universal dimensions relevant to the description and explanation of organizations across cultures, and cultural contingency is specified by the unique pattern of associations among these universal variables in each cultural context and by the differences in extent of these variables observed in organizations across cultures.

This view is consistent with the framework presented by Lammers and Hickson [20] in which four types of difference are identified in cross-cultural research focused on the organizational level of analysis. First, organizations in different cultural contexts may display differences in degree with regard to a particular variable dimension such as centralization of decision making. Second, cross-cultural analysis of organizations may reveal "trait" differences; organizations in one setting may yield a score of zero on certain traits pertinent to the profile of organizations in another setting. Third, differences in the direction or significance of an association between two variables may be characterized as relational differences. Fourth, type differences refer to varying configurations of variables reflecting, for example, different patterns of control by centralization of decision making and structuring of activities through formalization of rules, procedures, and communication. Consideration of these categories of differences among organizations in varying cultures would provide a comprehensive, comparative analysis encompassing both organizational structure (differences in trait and degree) and managerial processes (relational and type differences).

Recognizing that organizational configurations within a particular cultural context present certain unique features, the researcher can improve comparative analyses through careful control strategies for maximizing variance at the organizational level of analysis and through interpretation of cultural, contingency, and political-economy factors affecting study results [21].

*Generating useful recommendations  
for managerial practice*

The rigor of analytical method applied to cross-cultural organizational analysis is closely related not only to the progress of theory development but also to the relevance and generalizability of results and conclusions for managerial practice. To the extent that specified variables can be manipulated by managers or organization designers, the patterns of relationships identified among variables are of more immediate interest to managerial practice. A summary of proposed criteria for assessment of analytical approaches to cross-cultural organizational analysis follows:

- generalizability of the framework or model for development of comparisons across a variety of cultural settings; this criterion requires an attempt at definition of variables universal to the description of organizations;

—multivariate character of the approach to permit specification and testing of differences in trait profiles, differences in degree of traits observed and measured, and relational and type differences [20];

—accessibility to managerial manipulation or influence of variables specified in the framework or model.

The next section presents a discussion of the Aston Program for organizational research in light of these assessment criteria.

**The Aston Program:  
Recommendations for cross-cultural  
organizational analysis**

The Aston Program was developed for the study of organizational behavior, structures, and processes at three integrated levels of analysis: organizational, group, and individual [22]. The focus of the following discussion is the organizational level of analysis for which the Aston researchers developed scales to measure structure and context. Structural variables are specified as functional specialization, role formalization, standardization of rules and procedures, centralization of decision making, and organization configuration. Contextual variables include origin and history, ownership and control, size, charter, technology, location, and interdependence with external constituencies such as suppliers and customers.

Many criticisms have been expressed concerning the work of the Aston group, but no other research program has been as widely used in cross-cultural organizational research. The availability of some of the data through the Survey Data Archive of the University of Essex, England, provides an important opportunity to test cross-cultural organizational theory [23]. Although it is certain that the Aston Program requires important revision and adaptation for use in longitudinal studies across varying cultures, its continuing relevance for evaluation of contemporary organizations is impressive. Birnbaum and Wong [24], Lincoln, Hanada, and McBride [25], and Hsu, Marsh, and Mannari [26] have demonstrated the use of scales adapted from the Aston Program for measurement of dimensions of organization structure.

In spite of its continuing relevance, weaknesses of organizational research based on the Aston Program include convenience sampling procedures, scaling and scoring of variables describing organization structures and processes, the use of factor analysis for data reduction and identification of “underlying” dimensions of organization, and interpretation and generalizability of results, particularly causal inferences drawn from cross-sectional analyses in some studies. Much of the criticism of the Aston measures and methodology, however, overlooks the unique requirements of cross-cultural organizational research [27,28]. The following recommendations are emphasized to guide cross-cultural research

efforts focusing on comparative analysis of organizational structures and processes.

#### *Research cooperation*

The Aston Program for data collection has generated an important data bank [23], including studies conducted in Canada, the United States, Japan, Great Britain, West Germany, and Sweden. This body of research data provides a significant opportunity for preliminary testing of comparative models of organization. Researchers should avail themselves of this opportunity and should continue to cooperate in ways consistent with the example of the Survey Data Archive of the University of Essex [23,29].

#### *Sampling*

The objectives of random sample selection should, where possible, include more systematic identification of comparable organization populations such as a single industry within the public or private sectors. When such systematic objectives cannot be met, the consequences of the convenience nature of the samples should be carefully included in the interpretation of research results and the discussion of study limitations. Matching samples to control certain variables may be appropriate in some comparative studies, but this strategy should be undertaken with caution. For example, a systematic difference in organization size distinguishing samples of U.S. and Japanese manufacturing firms may be due to an aspect of industrial organization such as degree of reliance on subcontractors for parts and services. Such differences cannot be effectively controlled by matching samples, but must be discussed in the interpretation of study results.

#### *Construction and validation of measures*

The Aston measures of macro-organizational variables can be adapted for use in contemporary organizations in a variety of settings. First, particular attention should be given to the elaboration of certain variables whose definition has significantly developed since the inception of the Aston Program. Measures of production and information technology should be adapted to assess evolving applications of microcomputing to process technology and information systems. Other measures such as functional specialization, standardization of rules and procedures, and role formalization need to be extended to reflect contemporary organization. For example, Azumi and co-workers [5,30] have added two items to the functional specialization scale to include the presence of specialists in computing and internal auditing. Hsu and colleagues [26] used this modified scale in their study of Japanese manufacturing organization.

Second, some of the difficulties in scaling of the Aston measures may be

addressed by use of Likert-type scales to assess the degree of an organization dimension rather than its simple presence or absence within the organization. For example, the degree of final authority to create a new job may be measured rather than presence or absence of such authority scored as one or zero. The internal consistency (coefficient alpha) and test-retest reliabilities should be assessed for such measures, and patterns of covariation among items and their factor structures as well [31].

Third, the assumed universality of macro-organizational dimensions should be evaluated across cultural settings by verification of similarity of item statistics and factor structure of measures, with attention to subtleties of language where translations of instruments are required. Brislin [32] suggests a number of useful translation strategies of interest to organization researchers. In general, presentation of study methodologies should include complete descriptions of translation procedures to permit replication.

If the psychometric properties of measures are not similar for a variety of cultural settings, the universality of specified organizational dimensions should be challenged [33,34]. New items should then be introduced to develop measures of functionally and conceptually equivalent organizational variables [33]. The Aston measures applied in settings other than North America and Western Europe constitute an imposed "etic" framework [33], with the associated risk of ethnocentric interpretation of research results. Care should be taken in each cultural setting to incorporate experimental items, as suggested by Starbuck [27], to reflect aspects of an organizational dimension that may be considered specific to that context ("emic" perspective).

The strategy suggested by Child and Tayeb [21] is based on comparisons of selected organizational features with sensitivity to differences in significance of these features in varying cultural contexts. Lincoln and co-workers [25], for example, modified the Aston centralization scale to distinguish between formal authority to make a decision and responsibility for operating decisions. This distinction was of considerable interest, both in understanding the decision-making process in Japanese manufacturing firms and in comparative analysis with U.S. firms.

Researchers should also realize that some authors [24,35] justify use of the Aston scales without adequate foundation. Birnbaum and Wong [24] refer to the Aston instrument in general as having been shown highly valid and reliable for measurement of macro-organizational variables in a variety of national settings; in fact, these measures have frequently been used without systematic evaluation of reliability or cross-cultural validity. Future research should focus more carefully on procedures for evaluation of cross-cultural reliability and validity of instruments measuring macro-organizational variables.

#### *Multivariate analysis*

Multivariate analytical approaches need to be applied to cross-cultural organiza-

tional studies. Factor analysis has been useful in determining the underlying multidimensional nature of organizational structures and processes, and it is critically important in the validation of measures for use in cross-cultural organizational study. However, other multivariate approaches are more appropriate for assessing complex patterns of relationships among macro-organizational variables.

Starbuck [27] suggests that the body of research reported by the Aston group suffers from a lack of interesting, strong relations among the dimensions of organization (P. 193). The Aston group has reported a number of significant bivariate associations among variables in studies of organizations in a variety of settings, such as between organization size and the dimensions of structuring of activities, including standardization of rules and procedures, functional specialization, and role formalization [19,36]. Although these significant associations may not be of great scientific interest in themselves, the multivariate pattern of such relationships in cross-cultural analysis provides insights into differing structures and processes. Starbuck [27] and Sekaran [6] suggest the use of multivariate statistical analyses such as simultaneous equations methods for the study of complex patterns of relationships among organizational variables.

A multivariate modeling approach such as path analysis [37,38] may be applied in assessing differences in trait profiles, degree of traits observed, and relational and organization types [20]. Path analysis is an analytical method developed by Sewall Wright [39] for the study of relationships among variables specified in a system of equations. Relationships among variables of the model are expressed as path coefficients (standardized partial regression coefficients), defined by Wright [29] as "the fraction of the standard deviation of the dependent variable (with the appropriate sign) for which the designated factor is directly responsible, in the sense of the fraction which would be found if this factor varies to the same extent as in the observed data while all others (including the residual factors...) are constant."

In general, the same basic statistical assumptions apply to path analysis as to multiple regression. This method is appropriate for testing an explicit, a priori model formulated by a researcher based on theory and existing knowledge. Hage [40], Hsu and co-workers [26], and Séror [41] use this method to develop comparative organizational analyses.

The choice of an approach such as path analysis is also closely related to the eventual relevance of future research. Many variables defined and operationalized in the Aston Program to measure organization, including decision-making autonomy, functional specialization, role formalization, and standardization of rules and procedures, are accessible to some manipulation by organization designers and managers. Multivariate analysis to draw conclusions regarding the nature of patterns of relationships among these variables in organizations across a variety of cultural contexts would contribute to knowledge of transferability of organizational structures and processes.



*Model specification and validation*

Although comprehensive models of organizational structures and processes have not been specified, the Aston research has raised theoretical questions appropriately answered by model specification and testing [14–17]. Child's propositions [16,17] describing organizational control strategies provide such a framework. The system of relationships among organizational size, structuring of activities, and centralization of decision making can be specified and tested by a multivariate modeling approach such as path analysis. Similarly, the debate regarding organization size versus production and information technologies as critical antecedents of structuring of activities suggests such an approach [19,36,40].

Some attempts at cross-cultural testing and validation of models of relationships among macro-organizational variables in U.S., British, and Japanese firms have been published [4,25,26,30,40–43]. The objectives of these studies include testing of hypotheses regarding managerial control strategies and the technological imperative. The models specified include hypotheses of differences in direction and significance of relationships among macro-organizational variables. Lincoln and associates [25] tested for cross-cultural differences in regression slopes. They and Séror [41] also tested hypotheses of differences in degree of variables by combining samples of U.S. and Japanese manufacturing organizations and introducing a dummy variable coded 1 or 0 for a U.S. or a Japanese context. Future comparative model specifications should include hypotheses of differences in degree of organizational dimensions and in relationships among such dimensions [20].

The studies cited above show how multivariate modeling methods can be applied to test an a priori system of relationships among organizational variables. Some often cited criticisms of the Aston research reexamine patterns of relationships among certain variables without appropriately applying these analytical methods [28]. The use of percentage of explained variance to evaluate alternative model specifications is not a procedure recommended for theory testing or development. The theoretical basis for "causal" ordering of variables when multiple regression or path analyses are applied to cross-sectional data should be firm. There are several advantages to explicit, a priori specification of the model [44]: arguments are made consistent so as not to modify premises "surreptitiously" (P. 130), and the conclusions drawn are more precise since which analyses support the explicit model and which do not can be determined. The conclusions are also more accessible to subsequent empirical verification.

Continued research in this area requires attention to rigorous methods of cross-cultural model-testing and validation. After the psychometric properties of measures, covariation, and factor structure have been verified as consistent across cultural settings, the model of comparative organization itself may be tested and validated. The place of each construct in a theoretical framework or nomological network must be demonstrated in relation to other constructs in the model.

According to Irvine and Carroll [34], research such as that produced from the Aston Program employing an imposed etic theoretical framework should integrate a methodology with both etic and emic aspects. An integrative approach can serve to decrease the risks of ethnocentrism and self-fulfilling prophecy [21]. To achieve this methodological objective, Irvine and Carroll [34] suggest demonstration of cross-cultural convergent validity by application of a modified multi-trait-multimethod paradigm [45]. Using the multitrait-multimethod matrix, convergent validity between measures constructed on the principle of stimulus identity and measures designed to guarantee conceptual and functional equivalence can be evaluated. Significant correlations between these classes of measures would support convergent validity between dimensions of etic and emic perspectives.

Future research should also focus on the development of longitudinal research designs to validate the causal ordering of variables that can only be inferred from analyses of cross-sectional data [6,19].

### Summary and conclusions

The development of theory in the area of cross-cultural organizational study presents special dilemmas in the design of research strategies and choice of appropriate analytical methods. Child and Tayeb [21] emphasize the consequences of theoretical orientation for choice of research design. The objective of the discussion presented in this paper is to encourage integration of universal and cultural theoretical perspectives through identification of systems of organizational variables pertinent across cultural contexts with additional dimensions to reflect unique aspects of a particular setting.

The criteria identified for assessment of analytical approaches are: generalizability of the framework or model across cultural settings, multivariate character of the approach to permit specification and testing of organizational comparisons [20], and accessibility of specified variables to managerial strategy formulation.

These criteria form a basis for assessment of the Aston Program for cross-cultural research. Conclusions from the Aston studies contributing to knowledge of cross-cultural organizational analysis have been summarized by Hickson and associates [36] and by Pugh [19]. Reanalyses of data drawn from the Aston studies using the path modeling approach reveal nuances in patterns of relationships among macro-organizational variables that are particularly useful in understanding the coherence of such patterns and their variations within and between cultures [40,41]. Recent studies [24–26] have used Aston scales adapted to reflect contemporary organizational realities or to better operationalize hypothesized cross-cultural differences. These studies demonstrate the continuing relevance of the Aston Program for data collection with analysis by multiple regression and path modeling methods.

Future development of cross-cultural organizational analysis based on the Aston Program requires systematic research cooperation, more rigorous sam-

pling of comparable organization populations, careful construction and cross-cultural validation of measures, appropriate specification and validation of multivariate models of organizational structures and processes, and development of longitudinal research designs. These broad recommendations, together with the examples cited, are intended to encourage researchers to undertake the long-term development of this area of study. Through synergistic efforts, the important scientific and pragmatic objectives of cross-cultural organizational research can be addressed.

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