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Published in:
Organization Studies: An International Multidisciplinary Journal devoted to the Study of Organizations, Organizing, and the Organized in and between Societies

Publication date:
1987

[Link to publication](#)

Citation for published version (APA):
Pennings, J. M. (1987). Structural contingency theory: A multivariate test. *Organization Studies: An International Multidisciplinary Journal devoted to the Study of Organizations, Organizing, and the Organized in and between Societies*, 8(3), 223-241.

Organization Studies

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Structural Contingency Theory:
A Multivariate Test*

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Abstract

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This paper reconsiders structural contingency theory. It presents a discussion of the methodological underpinnings which surround the research activities of this theory. Two research strategies are reviewed. They entail a multivariate examination of the structure–environment–effectiveness relationship. One of these strategies examines deviations from ideal structural profiles, while the second one involves a canonical correlation analysis between structural and environmental attributes for low and high effectiveness units. The results from field research in a commercial bank are used to illustrate the two analysis strategies. They indicate that effective organizational units show strong structure–environment interrelationships and lead one to conclude that there are indeed effectiveness-induced constraints on the choice of an organization's design or its environment. The methodological and conceptual implications of the findings are then discussed.

Introduction

There has been a stimulating debate in recent volumes of *Organization Studies* between Schreyögg (1980, 1982) and Donaldson (1982) on the methodological and conceptual issues surrounding the contingency approach in organization theory. This methodological paper joins in that debate by presenting two possible research strategies to test its tenets.

The contingency approach holds that for an organization (or its sub-units) to be effective, there has to be goodness of fit between its structure and environment. The organization and its managers, designers or owners are constrained by their environment in adopting certain structural designs. Their scope of choice is limited in that uncertain, volatile and complex environments require an 'organic', decentralized and informal structure. In contrast, predictable, static and simple environments call for a more 'mechanistic', centralized and highly formal structure. Lack of congruence or fit will result in reduced performance.

The theory is rather old, dating back to the earlier publications of Dill (1958) and Burns and Stalker (1961) among others. Although there has been a veritable flood of conflicting papers (e.g., Scott 1981; Pfeffer 1982) most textbooks have espoused the theory as valid and employ it to develop prescriptive statements for organization design (e.g., Nadler, Hackman and Lawler 1979; Galbraith 1977).

A key issue in the *Organization Studies* discussion is the extent to which the

environment determines structure. Presumably, contingency approaches allow a certain degree of freedom in selecting or modifying a particular structure. They are less deterministic than the population-ecology approaches (e.g., Hannan and Freeman 1977) which stress the inertia of organizations and the inexorably relentless selection and retention of organizational forms by certain environments. Unlike contingency theory, it accords causal primacy to the environment. Admittedly, this emphasis on environmental determinism has been softened recently (e.g., Longton 1984). However, contingency approaches are much less stringent and acknowledge that organizations can adapt to their environment. They can experiment, select and retain various organizational designs, provided that they stay within certain limits. Otherwise organizational performance suffers.

Opponents of contingency approaches such as Schreyögg (1982) argue that the combination of strategic discretion and environmental determinism is an untenable position. While we have the methodology to test deterministic propositions we do not know how to deal with freedom. The strategic freedom of choice (Child 1972) accorded by contingency theory defies empirical testing and is inconsistent with the deterministic flavour of causal analysis.

Related arguments have been voiced in recent issues of the *Administrative Science Quarterly* as illustrated by Astley and Van de Ven (1983) and Hrebiniak and Joyce (1985). These latter authors suggest separating environmental determinism from the pro-active behaviours of organizations, particularly when considering their strategic choices. They, too, are less inclined to give causal primacy to the environment and challenge the one-sidedness of ecology theorists such as Astley (Astley and Van de Ven 1983).

Unfortunately, these recent papers do not support their new ideas with empirical research. While their work remains conceptual, it raises profound methodological questions. How would one operationalize the scope of choice? What would be the range within which structural arrangements still would enjoy congruence with the environment? Can we consider the structure–environment–effectiveness relationship in a research design that incorporates a large number of variables? Are the relationships between performance and its contingencies of an additive or interactive nature, etc.? These methodological issues are the focus of this paper. This study departs from a two-variable approach to contingency research by considering several organizational, environmental and performance variables simultaneously. It also seeks to develop methodological solutions to the issue of organizations influencing environments and *vice versa*. Such solutions may then shed light on the ways environment and organization interrelate in affecting organizational performance.

Multivariate analyses of the kind proposed here require standardized measures of a fairly large number of organizations or sub-units. This paper will describe such a study. It is based on information about boundary-spanning units in a commercial bank. Data describing the unit pertained to the informal social arrangements rather than the formal structure. Furthermore, data were

collected on the units' immediate geographic and commercial environments as well as their performance. It was therefore possible to examine the relationship between organization and environment under variable levels of effectiveness. The availability of such a data-set lends itself to research which examines the relationship between structural contingency and organizational effectiveness.

Methodology

Contingency as Interaction

Several authors have argued that the tension between situational determinism and freedom of choice precludes a conventional causal analysis in which some variables are classified as independent and other ones as dependent (Luhmann 1976; Schreyögg 1980, 1982). There is a profound conflict between causal and functional analyses. The former assumes a unidirectional impact while the latter postulates an influence from the environment to the organization and *vice versa*. The problems become even more complex if the argument is extended to include 'functional equivalence'. This term refers to the substitutability of different antecedent factors. For example, functional and divisional designs might have the effect of dealing with competitive conditions in the environment. Or, organizations may abandon one market segment for another and thus acquire a greater fit with their internal structure. Each one may be manipulated to secure a fit between them. This is consistent with Child's (1972) strategic choice notion where the organization can choose its location, market, and technology as well as its structural arrangements. Research designs ought, therefore, to consider several variables simultaneously and incorporate them into a complex model which considers interactions among variables.

When contingency theorists hold that there is a relationship between two sets of variables which predicts effectiveness, they are really assuming that an interaction exists between the two sets of predictor variables. This is explicitly recognized by Lazarsfeld (1968), who equates 'contingent' with 'interactive', and Schoonhoven (1981: 351), who asserts that 'explicit recognition should be given to the fact that contingency arguments produce interactive propositions'.

Two versions of interaction can be mentioned; i.e., 'multiplicative', and 'matching' (Schoonhoven 1981). In the first version, it is assumed that effectiveness is high when high levels of both environmental (x_i) and structural (y_i) dimensions are present, but that it is low when either dimension is low or absent. According to the second version, there is a value on a structural dimension for each level of an environmental dimension which will maximize effectiveness. The 'matching' version might be enlarged by stipulating intervals rather than levels such that for every range within x_i there is a range of values

for y_i at which effectiveness is maximized. Naturally, contingency theory would hold that such a match entails a relatively limited range, corresponding to the earlier mentioned bounds of scope of choice; if the range were great, then the force of contingency theory would be nullified and any organizational design would be equally appropriate under a wide range of environmental conditions (Donaldson 1982).

Apart from the issues of directionality and interaction there is the bi-variable versus multi-variable problem. The researcher can limit himself to one pair of organization–environment variables or he may complicate his design to include blocks of variables. Two variable approaches ignore the functional equivalence of other, excluded but joint-determining variables. In contrast, multi-variable study designs treat various variables jointly by statistically examining their co-variation. This is the approach that was adopted in this study.

Data collection

The data for this study were collected in a large commercial bank in the Northeastern United States. The organization comprised twenty-one districts which in turn consisted of a number of branches serving both consumer households and small commercial customers. The formation of districts took place in 1978 and was done on the basis of the socio-economic make-up of their target populations. These districts, in turn, consisted of 'pockets' which coincided with the boundaries of neighbourhoods, suburbs and the like. The pockets are also the units of measurement as used by the U.S. Federal Deposit Insurance Commission to account for all deposits by all banks.

The study site, therefore, was a geographically dispersed organization whose boundary spanning units were the object of inquiry. The bank can be described as 'octopoid' (Weick 1977) in that it reaches out into its environment with a set of imaginary arms, beginning with divisions, splitting into districts which in turn split into branches. Obviously, in the study of intra-organizational boundary spanning units it makes little sense to focus on their formal structure (e.g., authority levels, formalization, job titles, etc.), as this is fairly similar among them. Rather it is more meaningful to examine how boundary spanning people make the formal structure work (i.e. the informal arrangements which they have developed in their interaction with senior management and with their clientele). Variations in these informal arrangements are likely to exist under different environmental conditions. In order to perform adequately, branches need certain information, capital and other resources from central parts inside the bank, but they may also need a degree of local control or autonomy to adapt in a flexible way to local conditions. The degree of communication with corporate staff units and the amount of decentralization might vary and could be depicted in a way that is analogous to the so-called 'negotiated latitude' in the leadership literature (Graen 1976).

According to Graen's concept, subordinates' freedom varies depending on the

latitude which they have negotiated with their superiors. This latitude might hinge on the amount of trust or shared understanding between the leader and his subordinates. Some have more freedom in 'making' their roles than others. As applied to the current bank study, we could likewise argue for the existence of intra-organizational variations in communication or decentralization of control. Branches may differ in their exposure to relevant internal information or in the degree to which they enjoy autonomy from their district management.

The data collection was preceded by a thorough preparation consisting of interviews with key informants, a pilot study in two districts and archival research in the area of marketing, finance and strategy. This preparation led to the development of interviews, questionnaires, and self-recording techniques which were organizationally relevant. By 'organizationally relevant' is meant that the language employed in research instruments reflected the idiosyncratic lingo of the organization.

Entry into the organization was facilitated by a recent reorganization. The firm was interested in assessing the effects of the reorganization on the quality of banking service. The reorganization triggered questions such as whether the branches would become more responsive to customer needs, and whether the creation of a new layer of management with a concomitant decentralization would foster better communication between headquarters, the branches and the customers. It was believed that the reorganization would render the introduction of new products easier and that its success could better be monitored. The investigators gained full access to much of the information deemed relevant to the bank's questions. They were given access to the district management teams, who in turn provided access to branches. A news release was published informing everybody in the retail division about the imminent project.

Interviews with key informants and a pilot study in two districts exposed us to the organization's culture, including its language, values and history. A participant observation study shed further light on the specific roles of tellers, platform people and customers, and added phenomenological insights to the study. Both the pilot study and the participant observation study oriented the research to the salient issues of boundary spanning behaviour and its relationship to both internal and external conditions. It facilitated the wording of questions for the surveys and the delineation of categories used in questionnaires and observational protocols, and legitimized entry into the remaining districts.

The district teams consisted of a district manager, a sales manager, a service manager and in some cases a credit manager. They were supported by a district staff centre processing all the paper work of the district. The sales manager was the most important liaison person between the district team and the branches, as marketing was considered the key factor in banking service. The service manager dealt mostly with the tellers, while the sales manager interacted more frequently with the branch managers and the platform people. Platform people

sit behind desks, providing non-routine services such as loan applications and trouble shooting. These two latter categories of employees are the most crucial boundary spanning individuals. While relatively little non-routine contact or face-to-face communication occurs between tellers and customers, the contacts involving customers and the remaining categories of employees is extensive and often quite personal (Van Wijk 1982).

The number of branches per district varied considerably, ranging from three to over fifteen. The suburban districts were geographically much larger so that the distance between district office and branches was much greater. Information was obtained from branch managers ($N = 108$), their platform people ($N = 198$) and tellers ($N = 1180$) on the internal social arrangements of their branches. Information from customers ($N = 2354$) was collected from a probability sample of customers who were asked to participate in a telephone interview. It was decided to eliminate from the sample the branches from which less than eight customer interviews were available, since below that level the computation of aggregate scores would not be sufficiently stable.

Measurement of the Variables

The measurement of *environmental dimensions* applied to the 'pockets' (or territories) to which the branches belonged. Archival information and customer survey data were used to develop five indicators. They included the share of the market, the number of competing banks in the pocket, and three indicators of customer heterogeneity, where heterogeneity was derived from a coefficient of variation. The indicators were seniority, income and education.

The measurement of *informal arrangements dimensions* included the quality of communication, the slope of power and total amount of power on five branch-related issues (compare Tannenbaum 1968), the frequency of meetings and the freedom of expression. Unlike configurational measures of structure such as supervisory ratio, vertical differentiation or horizontal differentiation, these measures are assumed to vary at different locations of the bank's boundary and can therefore be classified as aspects of informal structure.

Four measures of *organizational effectiveness* were employed: average customer satisfaction with the quality of bank service, interest income, total expenditures and controllable expenditures. The last three measures were adjusted for size, as measured by deposits. A more complete definition of the variables and a listing of the questionnaire and interview items is provided in Appendix A.

Results

Since the study attempted an expanded but modified replication of an earlier study (Pennings 1975) we can bypass a discussion of bivariate analysis results. The earlier study showed modest correlation coefficients between structural and environmental dimensions. Anova and regression results showed that while structural dimensions were strongly associated with effectiveness indicators, the interaction effects on these indicators were generally weak. For example, the better the quality of communication, the greater the frequency of meetings or the flatter the slope of power distributions, the greater the interest income or the lower the expenditures. Such findings have limited relevance for advancing structural contingency theory. Such a test cannot uncover the joint contributions of environmental and structural attributes to the overall conditions of congruence.

Two alternative designs were explored to test multiple contingencies. The first one considers design patterns in terms of deviation scores while the second one adopts a canonical analysis procedure to investigate environmental and structural dimensions simultaneously. The former one is somewhat analogous to the deviation scores of Ferry (1979) and Drazin and Van De Ven (1985). It does not quite conform to the cybernetically derived logic of functional causation since it assumes the environment to be a given factor — an assumption which does not seem to be very incompatible with the predefined territory that a boundary unit in this commercial bank serves. For example, a branch manager has little, if any discretion to determine the number of competitors faced by his unit or the size of the territory that he covers. The branch, therefore, is assumed only to have the discretion to push informal 'levers', the implication being that the scope of choice resides only in an array of informal arrangements of the branch and not in its environment. Under this constraint, the research problem can be described as whether different profiles of informal arrangements can be discerned for low- and high-performing branches which face identical environments.

Most contingency studies gravitate towards a test of organizational designs rather than a test of inter-dependent organizational and contextual designs. Most studies refrain from examining dual contingencies between structural and environmental dimensions. The present procedure is consistent with these simplified contingency studies because the environment here is assumed to be constant. Given low, medium and high levels on relevant environmental attributes, it was expected that the structural profiles of effective branches would be different from the profiles of ineffective ones. Alternatively, certain structural profiles in a given environment would be more conducive to organizational effectiveness. Whenever one or more structural variables departed from the ideal profile, lower effectiveness levels would be expected. Discrepancies between ideal and observed profile scores should then be associated with lower effectiveness levels. The underlying idea is analogous to the ideas of Ferry (1979) and Dewar and Werbel (1979) and can be construed as

a method for testing disordinal asymmetric types of interaction in the sense of 'matching'. Ferry and Dewar and Werbel compute deviation scores to determine whether organizations which deviate from some 'ideal' point are less effective. These latter authors, for example, in their study of credit-reporting agencies, regressed structural measures on environmental measures, and correlated the absolute values of the subsequent residuals with satisfaction and conflict. Their study provided modest support, but unfortunately, the study design was restricted to bivariate relationships.

In the present design all five structural variables were used in a three-step procedure. Profiles of structural scores were obtained for the five most effective branches which belonged to either low, medium or high environmental competitiveness, heterogeneity and so on. Their mean scores on these profiles were treated as if they were ideal points. In the second step, Euclidean distances were computed between the 'ideal profiles' and the profiles of the remaining branches. Those branches' scores which were used to identify ideal points were eliminated from subsequent analysis to minimize statistical bias. Finally, in the last step, the Euclidean distances were correlated with each of the four effectiveness indicators.

More formally, the procedure can be expressed as the square root of the sum of squared differences between ideal and actual profiles:

$$D_{I_i} = \sqrt{\sum_{p=1} (X_{I_p} - X_{i_p})^2}$$

where

D_{I_i} = Euclidean distance from ith unit to its ideal (I) profile
X_{I_p} = score of the ideal (I) unit on the pth structural dimension
X_{i_p} = score of the ith unit on the pth structural dimension

The assumption is made that the greater this distance, the more incongruent is a unit's design with the optimal design as predicted on a given environment. The ideal profile, empirically derived from the most effective units, is presumed to be congruent.

Table 1 presents the product moment correlations between the distance measures and the four indicators of organizational effectiveness. It was expected that incongruence between structural and environmental measures, as inferred from the deviation scores, would be negatively associated with those indicators. The results of Table 1 corroborate the hypothesis. Except for customer satisfaction, effectiveness is correlated with several of the deviation scores. The results are strongest for Interest Income. All coefficients are in the expected direction in which one should recognize of course, that the last two measures, the expenditures indicators, have the opposite meaning to customer satisfaction and interest income. Although the size of the coefficient is modest, the findings are consistent with those of Ferry (1979) and Dewar and Werbel (1979), except that the present deviation measures are not simply the

Table 1
Relationships (Product
Moment Correlations)
between Contextually
Derived Distance
Measure and
Effectiveness

| Effectiveness Variables | Market Share | Contextually Derived Distance | | | |
| | | Number of Competitors | Variability in Customers: | | |
			Seniority	Education	Income
Customer Satisfaction (N = 84)	−.04	−.05	.10	.06	−.01
Interest Income/Deposits Deposits (N = 82)	−.42c	−.37b	−.17a	−.43c	−.15
Total Expenditures (N = 79)	.07	.04	.35b	.19a	.23b
Controllable Expenditures (N = 79)	.13	.17	.33b	.10	.13

a:p <.10, b:p <.05, c:p <.01

discrepancy between expected and predicted regression values from a two variable regression model, but rather the deviation between five-dimensional derived points and the ideal point as projected in an Euclidean space.

An alternative test which comes closer to examining the dual contingency between structural and environmental variables consisted of partitioning the set of bank branches into low and high effective units (with an elimination of those units which fall within the 1/2 standard deviation of the mean), followed by a canonical correlation analysis on the two subsets. This design searched for interactions between multiple environmental and structural dimensions in their relation to the four performance measures. This approach approximates therefore the assumption of multiple contingencies which reside in both the organization and its environment. The findings with respect to the ensuing canonical structure would reveal divergent configurations of canonical weights for the environmental and structural dimensions if there are indeed differences in congruence for high and low effective branches. The results are presented in Table 2.

This table shows the canonical weights and the canonical correlation coefficients for the low and high effective units, respectively. In this case, all effectiveness dimensions have been scaled so that 'low' refers to low customer satisfaction, high income and low total or controllable expenditures, and 'high' refers to the reverse.

Several interesting inferences can be made from Table 2. In the first place, the canonical correlations are much higher for the high effective units, reaching in fact a considerable level of significance, while this finding does not appear for low effective branches. The implications are that, somehow, the environmental and informal arrangements dimensions form a well-fitting set of covariates for these well-performing units, while in the less effective units, these two sets of dimensions vary highly independently. They appear not to be constrained by the need for fit between them.

Second, one might examine the canonical weights and determine which environmental or organizational 'levers' carry a greater weight for establishing congruence. For customer satisfaction, for example, one can see that

Table 2
Canonical Correlations between Environmental and Structural Variables for 'Low' and 'High' Effectiveness Units*

	Customer Satisfaction		Interest Income		Total Expenses		Controllable Expenses	
	Low	High	Low	High	Low	High	Low	High
Environmental Variables								
Market Share	−.45	1.22	−.27	−.52	.05	−.26	.47	−.01
Number of Competitors	.30	.52	−.36	.40	−.72	.60	−.32	.73
Seniority Variability	.63	−.28	−.77	.29	−.63	.14	.09	.25
Education Variability	.04	.72	.04	.10	−.36	.41	.64	.16
Income Variability	.54	−.18	−.57	.20	.51	.24	.24	.46
Structural Variables								
Communication	−.23	.91	.46	−.98	.80	−.97	1.14	−.96
Slope of Influence	−.69	.59	.88	−.80	.08	−.71	.70	−.98
Total Amount Influence	−.60	.42	.61	−.01	−.44	.17	−.77	.01
Meetings Frequency	.12	1.08	−.59	.04	.44	−.21	−.87	.15
Freedom of Expression	.61	.55	.60	.03	.58	.07	1.28	−.05
Canonical Correlation	.55	.75	.60	.75	.65	.73	.60	.69
N	44	32	35	41	33	43	32	43
P	.19	.02	.31	.09	.15	.01	.28	.08

* All effectiveness indicators are converted into low–high dichotomies such that 'low' signals low 'customer satisfaction', low 'interest income' or high 'expenses'.

communication quality and meetings frequency are more pronounced design variables, while number of competitors and educational variability predominate among the environmental variables. Communication quality is a critical variable for each of the four effectiveness conditions while number of competitors is among the more important environmental attributes. These observations apply, of course, to the effective subset of branches, where the canonical correlations are relatively high, implying a constraining presence on the relative magnitude of the canonical weights. Going across various effectiveness variables is a procedure which tentatively highlights which environmental and structural variables are critical in establishing congruence, regardless of the nature of the effectiveness variables. In a less ambitious way, we can gauge the sets of weights within each effectiveness domain and identify variables (such as slope of influence for level of controllable expenses, i.e. −.98) which signal the greatest saliency in delimiting the scope of choice.

The difference in canonical correlations and the magnitude of canonical weights increases substantially if one adds other organizational or environmental dimensions. Adding dimensions increases the number of degrees of freedom, thus making the analysis more prone to capitalize on change. Nevertheless, the addition of one organizational attribute — for example branch service consensus (Schneider et al. 1980) pushes the significance level for effective units to beyond the .0001 level, while no such improvement is discernable for low effective branches.

Discussion

The present study is a replication of previous studies on the relevance of the structural contingency theory for organizational effectiveness (e.g., Pennings 1975), but unlike many of these studies, which assume some form of environmental determinism, the present paper has conformed to views which espouse an equifinality argument. Luhmann (1976), Galbraith (1977), Mohr (1982), Van de Ven and Drazin (1985), Ferry (1979), Child (1975) and Kerr and Jermier (1978) among others have suggested that different designs 'lead to Rome', i.e. there is a multitude of configurations of organizational and environmental variables that do not jeopardize effectiveness. Many of the previous arguments and studies somehow assumed a one-to-one match between an organizational and environmental variable, and corroborated it with simple product moment correlations between them. The strategies presented and simulated in this note not only depart from the two-variable approach, but also allow for substitutability and mutual causality.

Some treatments are a far cry from environmental determinism assumptions which are implicit or explicit in many of the previous studies on contingency theory. The strategies presented, and the robustness of the testing displayed stand in stark contrast to those studies. They therefore significantly improve upon prior methodologies and ought to typify future research strategies in this area.

In the present study, equifinality was reviewed with the notions of functional equivalence and multiple, dual contingencies. The study considered multiple interactions between environmental and structural variables. By showing such interactions it was possible to indirectly reveal the presence of boundaries in the scope of strategic choice. The scope was examined by having the multiple environment–structure relationships constrained by organizational effectiveness. The analysis of deviation from ideal points and canonical correlation analysis were performed to shed some light on this issue of scope of choice.

The equifinality argument as applied to the foregoing analysis, however, is tenuous in identifying the scope of choice. One could use an older analog, the so-called 'space of free movement', in order to identify the range on which each organization and/or environment dimension could vary, without putting the system's effectiveness in jeopardy. We do not know whether a certain unit of space of free movement on one dimension (e.g., centralization of decision-making) is proportionate to a unit of space of free movement on another dimension (e.g., communication). Although this might be a somewhat unrealistic assumption, the dimensions were treated as if they could be subjected to statistical weighting procedures. However, in their true meaning, each dimension might not be equally important in accomplishing conditions of congruence. The presence of multiple contingencies also makes it difficult to try to map the space of free movement, since this would require some hyperplane within which a manager could pick a certain point. Thus the

concept of multiple contingency presents huge and near-insurmountable difficulties in empirical attempts to delineate the bounds of the space of free movement. The greater the number of contingencies which are incorporated in the design of study, the more complex would be attempts to identify such bounds.

As stated before, there might be configurational combinations which are more likely than others. The likelihood might be due to managers (at least those designing organizational structures or manipulating environments) having cognitive or value dispositions to certain types. This scenario is suggested by Downey and Brief (1983), who imply that managers or entrepreneurs have 'implicit organization theories', i.e. models or organizations that they believe to be superior and which they imprint into their firm. The likelihood might also be attributed to organizational scientists who could discern a preponderance of certain profiles under certain conditions. However, the state-of-the-art has not sufficiently advanced to incorporate such profiles into a study design. This is most clearly borne out in Mohr's (1982) discussion of organizational effectiveness as an elusive concept. Mohr suggests that eventually organizational research might uncover structural designs which have been tried, selected and retained such that they become part of a limited repertoire of designs from which organizations can choose. We are far from such a state-of-the-art. According to him we need more 'process research' in which we can understand the steps that organizations go through in the design of their structure and the learning that follows it. Organizations accumulate routines, programs which form their repertoire of skills for dealing with environmental conditions (Nelson and Winter 1982). These intervening processes remain outside the purview of this study but will be of utmost important in future research.

The scope of choice implies the concept of statistical interaction which might be either multiplicative or of the matching type. The deviation from ideal point analysis, used in the first research strategy, assumed congruence as occurring within certain broad intervals (e.g., low, medium and high competitiveness or market share) rather than specific data points. The canonical correlational analysis, used in the second research strategy, invoked a multiplicative algorithm by adopting a subgroup analysis (low versus high effectiveness). This latter analysis has, therefore, affinity with so-called moderator variable analysis, which is a variant of multiplicative regression analysis. After all, it examines whether the correlation coefficients and their corresponding weights vary from subgroup to subgroup; the variables used for partitioning become the moderating condition for the relationship. If the coefficients vary, interaction can be inferred.

By way of analogy, one could say that in certain environments certain structural arrangements are more likely than other ones and that we should converge toward the more likely ones, lest performance deteriorates. These arrangements can be condensed into types as some have done (e.g., Miller and Mintzberg 1983; Lammers 1983). There are mechanistic and organic types,

harmonious and conflicting and autocratic and democratic ones. One could argue that these types fit some environments better than other ones. Of course, there are also numerous environmental taxonomies. The present study does not go so far as to suggest a pairwise typology of organizations and environments. It is possible, however, to interpret the above analysis as an attempt to juxtapose certain organizational by environmental configurations under variable effectiveness conditions. For example, the canonical weights could be an initial step toward some typological development. A major difference with previous typological work, however, is that this development would construct organizational and environmental typologies at the same time. Typologies such as those of the Aston Group were organizational typologies, constructed without regard to the commensurate environments. The juxtapositioning of the two blocks of variables presents awful complications, however. It becomes even more difficult if one recognizes the variables within each block to be correlated. The 'manipulation' of one variable therefore has repercussions on other variables. Organizations may be loosely coupled systems, but by virtue of their dimensions being linked, tinkering with one has ramifications for the others.

Naturally, the above analyses do not negate the issues with respect to the relative weights that some dimensions might carry in predicting effectiveness. Furthermore, the organizational or environmental effects might be non-monotonic, even though the canonical analysis forces them into a linear interaction pattern when they have no other means of expression. The distance analysis, however, softens the assumption of linear, monotonic effects since it decomposes the environmental dimensions into low, medium and high, thus permitting at least some degree of non-linearity. Nevertheless, both procedures have little, or no robustness in uncovering non-linear effects. The present state-of-the-art does not permit the precise disentangling of main and interaction effects where the analysis invokes a functional (bi-directional) rather than a causal (one-directional) pattern of interrelationships between three sets of variables, i.e., organizational, environmental and effectiveness variables. When one consolidates main and interaction effects of environmental and organizational variables, there appear to be effectiveness induced constraints in the choice of variables or their relative magnitude. The specific interrelationships or pertinent processes remain hidden in the 'black box'.

There may be a difference in the study of organization structure in the sense of formal design versus informal social arrangements. The informal arrangements may evolve spontaneously in response to external pressures. The formal design which was not considered in this study may be less amenable to wilful or arbitrary manipulation, especially by employees at lower echelons. One should be concerned about the degree of inter-organizational structural variations. As was shown, there was considerable variance in the variables under study. For example, the one-way analysis of variance of organizational measures yielded highly significant F-ratios. More sophisticated analysis procedures, examining

the degree of consensus as derived from the questionnaire measures likewise revealed considerable branch-specific variance on relevant attributes (Pennings and Van Wijk 1983). These findings indicate, therefore, that this sample of branches can legitimately be employed for testing structural contingency hypotheses.

The issue of level of analysis is also raised in other contexts (e.g., Pfeffer 1982). It has been argued here that informal arrangements rather than formal structure can be the focus of inquiry. The formal structure represents the blueprint of each branch and includes the positions of branch manager, platform people and tellers, whose role behaviour is governed by a number of rules and procedures, all highly formalized. At this level, however, there still remain many blanks that the employees have to fill out. The formal design belongs to the bank level of analysis, the 'filling out' or informal arrangements to the branch level. These levels should be kept separate. At this level of analysis we see profound differences in communication, influence patterns, which clearly co-exist with distinct differences in the types of customers, amount of competition which prevail in their 'pockets'.

This line of thinking is quite consistent with the position of Kieser and Kubicek (1978). For them the organization is too aggregative when testing contingency propositions. The organization should not be viewed in its entirety or as a holistic phenonemon. Similar arguments were advanced by Lawrence and Lorsch (1967) when they proposed to narrow down the relevant focus to departments (rather than organizations) and to sub-environments (rather than the environment).

Finally, it can be pointed out that apart from sampling issues, this study was restricted to five environmental and five organizational indicators with a certain degree of idiosyncracy. Other variables, from other research traditions or schools, could have been selected as well; there is a large and bewildering array of measures from which organization scientists can choose. The question, however, is whether results are method bound. Within the constraints of the present study, measures were taken that are presumed to sample fairly the relevant domain of attributes. The field should eventually establish agendas of research in which measurement convergence is enhanced, thereby mitigating the method-boundness of findings.

There is a profound discontinuity among successive studies in the use of measures or the definition of domain from which one samples measures of organizations or their environment. Recent interest in organizational culture exacerbates this problem by its revelation of a wholly new 'layer' of organizational realities. These revelations instigate organizational researchers to search less for structural arrangements and more for symbols, myths and ceremonies. Eventually, one would hope that the field will heed the Price and Johnson (1985) suggestion to agree on a repertoire of organizational measures that render research more cumulative. Until that state-of-the-art has arrived, we have to resign ourselves to studies which reflect the idiosyncratic luggage of an investigator's journey.

Conclusion

This paper presented two strategies for examining contingency approaches and found that congruence between structural and environmental variables predicts variations in organizational effectiveness. The first procedure constructed a profile of high performing units under three environmental conditions, and then showed that a deviation of a unit's structural profile relative to these effective unit profiles is significantly correlated with effectiveness indicators. The second procedure, canonical correlation analysis, did not hold environment constant, but rather assumed that both environment and structure exist in a multiple, dual-contingent relationship *vis-à-vis* indicators of organizational effectiveness. Both analyses showed that high performing units remain within the scope of choice as presumed to exist under conditions of high congruence and high effectiveness. The results were relatively strong for financial effectiveness indicators. The results also imply that additional functional methodologies need to be developed. Much of the organizational reality cannot be examined with linear causal models; the line of causality between the choice of environment and the choice of organizational arrangements runs both ways. This study has presented some ways for approximating such a reality.

Note

Appendix A: Measures of Environmental, Structural and Effectiveness Variables

Environment

Market share: the proportion of the bank's deposits relative to deposits of all five large commercial banks.
Number of competitors: the number of commercial banks which operate in the pocket.
Customer variability—senority: coefficient of variation of customers with respect to a five-point scale: 'Approximately how long have you been a customer of bank X?' (1) less than 1 year; (2) 1–5 years; (3) 6–10 years) (4) 11–15 years; (5) more than 15 years.
Customer variability—education: coefficient of variation of customers with respect to a six-point scale: 'What is the last grade of school you had the opportunity to complete?' (1) grade school; (2) some high school; (3) graduated high school; (4) some college; (5) graduated college; (6) graduate or business school.
Customer variability—income: coefficient of variation of customers with respect to a six-point scale: 'What is your total annual household income?' (1) under $10,000; (2) $10,000–$14,499); (3) $15,000–$19,999; (4) $20,000–$24,999; (5) $25,000–$34,999; (6) $35,000 or more.

Organization

Communication quality: this scale composed the following items:
(a) 'Does your boss try to give advance information about changes which might affect you?' Always, usually, sometimes, rarely, never.
(b) 'How satisfied are you with the information from management about what is going on in the bank?' Very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, very dissatisfied.
(c) 'The objectives and benefits of the (reorganization) have been clearly explained.' Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree.
(d) 'In my area there are banks for which no one has been made clearly responsible.' Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree.
(e) 'How satisfied are you with the information about job opportunities?' Very satisfied, satisfied, neither satisfied nor dissatisfied, very dissatisfied.
(f) 'How satisfied are you with the information about job grading?' Very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, very dissatisfied.
(g) 'There are good two-way communications between managers and their subordinates.' Strongly agree, agree, neither agree nor disagree, disagree, strongly disagree.
(h) 'Does your supervisor give continuing feedback on your performance in addition to regular performance review?' Never, seldom, sometimes, usually, always.

Slope of power distribution: average difference in 'influence' between district manager and branch manager in five areas: 'In the following questions we have listed five areas such as "transfer of branch personnel" and "overdrafts". We have also listed several groups which may have a certain degree of influence in these areas. Please indicate below how much *say* or *influence* these groups have in the five areas. Use the following codes below: 1 = little or no influence; 2 = some influence; 3 = quite a bit of influence; 4 = a great deal of influence; 5 = a very great deal of influence. The areas were "transfer of branch personnel", "dismissal of employees", "overdrafts", "banking hours" and "deciding how strictly procedures should be followed"'.

Total amount of power: average rating of influence of district manager, sales/service manager and branch manager over five areas.

Meetings frequency: a four-point scale based on the following items: 'At scheduled meetings, what items involve the sales manager and platform personnel'.
(a) sales manager given information about new policies and procedures
(b) sales manager given information about new products
(c) sales manager finds out from us how things are going in the branches
(d) sales manager discusses with us how to deal with specific problems.
These items were followed by frequently, occasionally, rarely, never.

Openness of speech: based on a single item with a five-point scale:
(a) 'In these meetings . . . you can express your own ideas, suggestions and criticism?'
    (1) to a great extent; (2) considerable; (3) moderate; (4) some; (5) not at all.

Effectiveness

Customer satisfaction: this measure was based on ten items inquiring after a customer's satisfaction 'about the quality of services provided by your X bank'. All followed by a five-point scale: (1) completely satisfied; (2) very satisfied; (3) somewhat satisfied; (4) not very satisfied; (5) not at all satisfied:
(a) courteousness of tellers
(b) willingness of bank officers to respond to your inquiries
(c) its banking hours

(d) courteousness of bank officers
(e) efficiency of tellers in processing your transactions
(f) accuracy of your monthly statements
(g) bank officers' knowledge of X's products and services
(h) ease of cashing a check at your regular branch
(i) the average time spent waiting in line
(j) tellers' knowledge of X's products and services.

Interest income: income on various loans adjusted according to branch's size.
Controllable expenses: expenses considered to be controllable by the branch or district (e.g., salaries, fringe benefits, postage, entertainment, etc.) adjusted for size.
Total expenses: the total of all controllable and non-controllable expenses, adjusted for size. Non-controllable expenses includes leasing and taxes, among others.

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