AD-A152 624 TESTING THE ORGANIZATIONAL ASSESSMENT MODEL OF WORK UNIT DESIGN A SYSTEMS..(U) MINNESOTA UNIV MINNEAPOLIS STRATEGIC MANAGEMENT RESEARCH CENT.. C GRESNOV ET AL. 1/1

UNCLASSIFIED FEB 85 N00014-84-K-0016 TR-8-ONR F/G 5/9 NL

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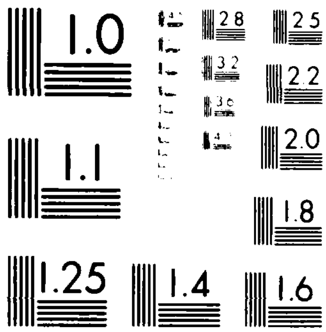

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Testing the Organizational Assessment Model of Work Unit Design: A Systems Approach

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THE STRATEGIC MANAGEMENT RESEARCH CENTER

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Support for this research was provided in part by the Wisconsin Job Service Division of the Department of Industry, Labor and Human Relations, the California Employment Development Department, and by the Program on Organizational Effectiveness of the Office of Naval Research under contract number N00014-S4-K-0016.

Submitted to the Organization and Management Theory Division of the Academy of Management for Presentation at the 1985 Meetings.

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ONR Technical Report #8	2. GOVT ACCESSION NO. AD A152 624	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Testing the Organizational Assessment Model of Work Unit Design: A Systems Approach		5. TYPE OF REPORT & PERIOD COVERED Interim Technical Report
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Christopher Gresnov, Robert Drazin and Andrew H. Van de Ven		8. CONTRACT OR GRANT NUMBER(s) N00014-84-K0016
9. PERFORMING ORGANIZATION NAME AND ADDRESS Strategic Management Research Center, University of Minnesota, 271 - 19th Avenue S, Minneapolis, MN 55455		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS NR #170-966
11. CONTROLLING OFFICE NAME AND ADDRESS Office of Naval Research, Organizational Effectiveness Group, Code 4420E, Arlington, VA 22217		12. REPORT DATE February, 1985
		13. NUMBER OF PAGES 43
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

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17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Contingency Theory, Organization Design, Organizational Assessment, Work Unit Design, Job Satisfaction

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

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S/N 0102-LF-014-6601

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Testing the Organizational Assessment Model

of Work Unit Design: A Systems Approach

ABSTRACT

A systems approach to testing contingency theory propositions is presented and used to test a contingency theory of work unit design. Focusing on job satisfaction rather than efficiency, results show an improvement over a previous study that addressed efficiency. Suggestions are made as to the extension of the systems approach and its further refinement.

At the heart of all contingency theory lies the basic proposition that high performance is the result of a "fit" between contextual elements (e.g. environment, task, technology) and internal organizational arrangements. Poorer performance, conversely, is felt to be the consequence of "misfit." Despite the centrality of the notion of "fit" in organization research, few scholars have explicitly examined or elaborated its implications in the development and empirical testing of contingency theories (Schoonhoven, 1981; Tosi and Slocum, 1984; Van de Ven and Drazin, 1985). While propelling many of the models and theories of the last two decades, the "fit" concept itself has been largely relegated to a metatheoretical background issue.

The apparent instability of contingency theory findings (Pennings, 1975; Tosi and Slocum, 1984; Van de Ven and Drazin, 1985) however, has led to greater attention being devoted to the concept of "fit," and a variety of alternative approaches and formulations have been developed to test for it. In their review of the fit concept in contingency theory, Van de Ven and Drazin (1985) point out that at least three distinct approaches have been developed, which they have termed Selection, Interaction and Systems. In the Selection approach, fit is an assumed premise in causal models relating context and structure. The causal mechanism is generally viewed as natural and/or managerial selection. Methods generally involve the test for significant correlations or regression coefficients of context on structure, though in current views variables subject to universal switching rules should exhibit higher correlations than more particularistic variables.

The Interaction approach generally defines fit as an interaction of pairs of organizational context-structure factors on performance.

Consequently, research employs MANOVA or regression to assess the significance of context-structure iteraction terms. In a current variant of the Interaction approach, fit is viewed as conformity to a linear relationship between context and design. Residuals from the hypothesized linear relationship, when regressed on performance, should be significant.

Van de Ven and Drazin (1985) have suggested a third approach which they term the Systems approach. The Systems approach conceives of fit as the internal consistency of multiple contingencies, structural, and performance characteristics. Given a contingency formulation, a certain ideal-type design will be appropriate, deviations from which result in poorer performance.

Drazin and Van de Ven (1984) compared and tested the three approaches on a single set of data and found the Systems approach performed well, relative to the others. Given these results, it is felt that the Systems approach deserves further development and extension. While including job satisfaction as a performance variable, the focus of their analysis was on work unit efficiency. In an attempt to replicate and extend their findings, the research applies the Systems approach primarily to the performance variable of job satisfaction. The Systems approach will described in greater detail, followed by a presentation of a task contingent theory of work unit design and satisfaction. The results of the Systems approach test of the theory will be followed by conclusions regarding this particular approach to fit studies and speculations regarding directions for future research.

The Systems Approach to Fit

The Systems approach to fit is holistic, as opposed to reductionistic, in formulation. Reductionistic approaches treat the design of an organization as decomposable into parts whose implications for performance can be assessed separately, with the assumption that the knowledge derived is then easily reaggregated in an additive fashion. Systems theorists, on the other hand, conceive of organizations as wholes that are more than simple sums of parts -- the pattern of relations between parts is an additional element that logically contributes to an understanding of the whole. Consequently, examination of the pattern of coherence between design components is a crucial feature that distinguishes the Systems approach to fit analysis from other alternatives. Thus, this approach posits that high performance results both from fits between design components, as well as fits of individual components to context alone (Child, 1975; Tushman and Nadler, 1978).

In Van de Ven and Drazin's (1985) formulation, a coherent pattern of design components that "fits" a particular context is construed as an "ideal pattern." Focusing then on the multi-variate nature of design, they hypothesized that departures or deviations from the ideal pattern along any or several dimensions will result in lower performance. An important feature assumed here is that departure or deviation in any direction results in a similar performance penalty. Thus, deviation is an "omnidirectional" possibility, so long as the component score in the ideal pattern lies within the observed range along that dimension. Thus, the Systems approach avoids the "More (or less) is better" characterization of many other formulations.

Van de Ven and Drazin (1985) suggest a three-step procedure to test this approach to fit. First, ideal patterns of design scores are generated either theoretically, or empirically (as in Ferry, 1979). Second, distances from actual organizations to their respective ideal types are calculated according to the following euclidean distance formula:

$$DIST_{ij} = \sqrt{\sum_{s=1}^{N} (x_{is} - x_{js})^2}$$

where $DIST_{ij}$ = euclidean distance from the j^{th} focal organization to its ideal type i, and,

x_{is} = score of the ideal type organization on the s^{th} structural dimension, and,

x_{js} = score of the j^{th} unit on the s^{th} structural dimension.

The final step lies in the actual test of the contingency theory by correlating the derived distance with the selected performance variable. The fit proposition is demonstrated if lack of fit or "misfit" (observed as euclidean distance from the relevant ideal type) correlates significantly and negatively with performance.

Finally, it should be noted that the Systems approach is conceptually distinct from contingency notions -- it is possible, especially in the case where ideal types are derived empirically, to observe a strong negative relationship between distance and performance and yet not have a contingency factor that results in radically different ideal types. The extent of the difference between ideal types is assessed with MANOVA and ANOVA, as will be shown in the course of the analysis.

The Task Contingent Model of Work Unit Design

The Systems approach can fruitfully be applied to a test of a task contingent model of work unit design developed by Van de Ven and associates (Van de Ven and Delbecq, 1974; Van de Ven, Delbecq and Koenig, 1976; Van de Ven, 1976a, 1976b; Van de Ven and Drazin, 1978). This model has been extended and incorporated as a core part of the larger Organizational Assessment (OA) framework and instruments (Van de Ven and Ferry, 1980; Ferry, 1983). The OA research program aims to develop a conceptual framework and related measurement instruments for assessing the performance of jobs, work groups, inter-unit relationships, and organizations on the basis of how they are organized and the environments in which they operate. At the heart of the OA research effort is a contingency theory of job, work unit, and organizational design. Here the focus is specifically on the OA task contingent theory of work unit design. By definition, the work unit is the smallest collective group in the organization and consists of a supervisor and all personnel who report directly to that supervisor.

OA task contingency theory in part proposes that high-performing units which undertake work at low or high levels of difficulty and variability will adopt systematized or developmental programs or modes of structure to organize repetitive activities. Figure 1 shows the underlying structure and process dimensions that distinguish between these programs.

The structural elements of these programs are defined in terms of: (1) specialization, the number of different work activities performed by a unit, (2) standardization, the procedures and pacing rules that are followed in task performance; (3) discretion, the amount of work-related decision making that the supervisor and employees exercise; and (4) personnel expertise, the skills required of personnel to operate the program. Process is defined as the coordination pattern among unit personnel who execute the work program. Coordination is indicated by of the frequency of verbal and written communication, as well as the frequency of conflict and the methods used to resolve that conflict among unit personnel.

Unit efficiency (output per person) and the average level of job satisfaction of unit personnel are hypothesized in this model to be a function of the fit between the level of task uncertainty faced by the unit and its internal pattern of structure and process.

- - - - - - - - - - - - - - -
Insert Figure 1 about here
- - - - - - - - - - - - - - -

This analysis focuses primarily on job satisfaction as a performance indicator. Dewar and Werbel (1979) noted that satisfaction allows "a better comparison of universalistic and contingency predications because internal organizational characteristics such as structure and control styles, are more likely to determine satisfaction ... then they are other performance variables, such as growth and profit" (p. 427). The primary focus of Drazin and Van de Ven's (1984) earlier Systems tests of the OA task contingency model was on unit efficiency. A worthwhile replication effort should focus on a Systems analysis of job satisfaction, especially since the predictions the model makes for satisfaction equate to those for unit efficiency.

Figure 1

Hypotheses in Task Contingent Model of Work Unit Design

Task Contingent Factor Task Uncertainty (Difficulty and Variability)	If Low	If High
Unit Structure		
1. Unit Specialization	High	Low
2. Unit Standardization	High	Low
3. Personnel Expertise	Low	High
4. Supervisory Discretion	High	Low
5. Employee Discretion	Low	High
Unit Processes		
6. Verbal Communication	Low	High
7. Written Communication	Low	High
8. Frequency of Conflict	Low	High
9. Conflict Resolution By:		
a. Avoidance	High	Low
b. Smoothing	High	Low
c. Authority	High	Low
d. Confrontation	Low	High
Performance (With Above Pattern)		
Job Satisfaction	High	High
Unit Efficiency	High	High
Performance (With A Different Pattern)		
Job Satisfaction	Low	Low
Unit Efficiency	Low	Low

Source: [illegible]

Sample and Measurement Procedures

Data were obtained from 629 employment security units in 60 offices located throughout California and Wisconsin in 1975 and 1978. These units administer the Department of Labor's Job Services, Unemployment Insurance, Workman's Compensation, and Work Incentive programs at the local community level.

With the exception of unit efficiency, all the dimensions in Figure 1 were measured with the Organization Assessment Instrument (OAI), as developed and evaluated by Van de Ven and Ferry (1980). Questionnaires were completed by all unit members and supervisors during business hours after an OA research team member explained the purpose and use of the study. The data reported here are at the unit level and were the result of an aggregation procedure which gave equal weight to the response of the unit supervisor and the average of all responses of the unit personnel reporting to the supervisor. Measures of efficiency were obtained from organizational performance records for each unit and consist of the amount of output produced per full-time equivalent position.

The 475 units for which scores were obtained on the satisfaction and task uncertainty scales are used in the analysis. Units scoring in the middle third on task uncertainty were dropped from the analysis, in order to better demarcate the distinction between high and low task uncertainty and the systematized and developmental modes of organizing.

OA task contingency theory is in essence a theory of organization modes, rather than a collection of individual task-design hypotheses. As logically coherent patterns of structure and process, the systematized and developmental modes are expected to be associated, respectively, with low and high levels of task uncertainty. Lack of correlation should

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Footnotes

[1]Because a sizable number of the one-way ANOVAs mentioned above were not significant, an additional analysis was conducted to determine whether contingency effects (represented by those variables for which the ANOVAs were significant) versus universalistic effects (represented by those for which differences were not significant) predominated. Dewar and Werbel (1979) found both universalistic and contingency effects in their analysis of the effect of technological routiness (equivalent to task variability) and structure on satisfaction outcomes. The structure and process variables with significant ANOVAs were separated to create a "contingent" distance measure. "Contingent" distance correlated significantly at -.17 with both satisfaction ($p < .007$) and efficiency ($p < .066$). This result leads to the conclusion that over the range of this set of data anyway, contingent effects on satisfaction were not predominant.

performance contours do not retain the same slope over the range of the data, or where ideal points are negative (implying the worst possible performance, with deviation resulting in improvement) rather than positive (Carroll and Chang, 1970). For these reasons, the search for innovative methodologies is likely to continue, possibly outside the scope of those methods currently in vogue among organizational scholars.

Despite these caveats, it is evident that the Systems approach (in whatever form) should be extended both to different classes of data and to a wider class of contingency propositions. One obvious conclusion from this research is that the body of contingent propositions that has entered into the "folk wisdom" of organizational research with little empirical support is still amenable to rigorous empirical investigation. A program of research guided by the Systems approach holds the promise of a tremendous accumulation of replicable findings. Further, such a body of findings will simultaneously fulfill demands for both descriptive and normative theories, since any analysis involving the identification and test of ideal patterns implies both the development of descriptive theory and the documentation of normative propositions.

importance of using multiple performance variables in fit analyses. It may very well be possible, as Dewar and Werbel (1979) have suggested, that task uncertainty-design variable combinations have a more immediate and binding effect on outcomes such as satisfaction than on more objective performance indicators such as growth, profit, or efficiency. On the other hand, it may very well be the case that in social service organizations of the type represented in this data base, the goals and objectives that guide overall design choices are geared more to the optimization of employee satisfaction than that of other performance indicators.

It should be noted that the assumptions employed by this particular approach to systems analysis somewhat restrict the attempt to analyze and discriminate between ideal patterns. First, deviation from ideal pattern is assumed to be related linearly to lower performance, i.e. penalties in the form of lower performance are proportionally constant regardless of the magnitude of the deviation. Second, ideal patterns are viewed as being optimal only (there is, given a particular context, no one "worst way to organize" only a best one). Third, ideal types are singular. The approach does not provide for the possibility of multiple ideal types, or equifinality, given a particular context. In fact, should an equifinality principle be operative, there would be a tendency for correlations between distance and performance to be lower. More sophisticated refinement of the methodology is required, in order to be able to identify the operations of equifinality in the presence of multiple ideal types. In addition, the restrictive assumption of a linear relationship between distance from ideal type and lower performance may not be entirely justified. It is possible to envisage instances where

TABLE 2

Correlations of Distance Measure

With Job Satisfaction and Unit Efficiency

Job Satisfaction	-.503[a]
Unit Efficiency	-.314[b]

[a] $p < .0001$, $N = 248$

[b] $p < .0008$, $N = 114$

($p < .0008$). These results compare favorably with those obtained by Drazin and Van de Ven (1984), who obtained significant correlations of -.14 ($p < .003$) for satisfaction and -.25 ($p < .0001$) for efficiency, in an analysis in which high performers were identified on the basis of unit efficiency, as opposed to job satisfaction.[1]

Insert Table 2 about here

Summary and Conclusions

This paper has argued that the concept of fit is central to the development and testing of contingency theory models. While several approaches to fit have been advanced in recent years, the Systems approach developed by Van de Ven and Drazin (1985) and Drazin and Van de Ven (1984) appears to hold great promise. This observation holds particularly for tests of theories that are essentially models of organizing modes, such as the OA contingency of work unit design. Because it focuses on ideal types and multivariate deviation from them, the Systems approach appears well suited to explore propositions that involve not only individual decision-context interactions, but patterns of coherence between them. As such it recognizes both the multivariate nature of design and the concept of fit that is its essence.

The present research has extended the results obtained by Drazin and Van de Ven (1984), as well as providing some cross-validation for the systems approach itself. When high performers were identified and ideal patterns derived on the basis of job satisfaction rather than unit efficiency, the correlations of the distance measure with both performance variables was markedly improved. The results highlight the

Table 1

Profiles of Mean Unit Structure and Process Scores for Highly Satisfied Low and High Task Uncertainty Units[1]

	Task Uncertainty			
	Low	High	F	p <
UNIT STRUCTURE				
Unit Specialization	3.167	2.938	0.11	.744
Unit Standardization	3.721	3.150	5.84	.0205
Personnel Expertise	2.853	3.004	2.75	.106
Supervisory Discretion	3.200	2.858	1.87	.179
Employee Discretion	3.253	3.879	12.29	.0012
UNIT PROCESS				
Written Communication	1.447	2.012	14.42	.0005
Verbal Communication	1.881	2.721	27.67	.0001
Frequency of Conflict	1.444	1.750	1.28	.264
Conflict Resolution by:				
Avoidance	1.556	1.826	0.77	.387
Smoothing	2.556	2.304	0.56	.456
Authority	3.222	2.957	0.25	.620
Confrontation	3.611	4.043	2.64	.1125

[1] An overall MANOVA using all 12 variables produced an $F = 2.99$ ($p < .0089$).

The last column indicates the results of one-way ANOVAs to determine if the means of the profiles on each dimension were different. Differences in means for four of the structure and process dimensions were significant, and an overall MANOVA using all twelve variables was also significant ($F = 2.99$; $p < .009$). Further, it is worthwhile noting that in all but one case (the exception being conflict resolution by authority) the differences were in the same direction as that hypothesized in the OA contingency model presented in Figure 1. Thus the high performing profiles present fair approximations of the systematized and developmental modes posited in the theory.

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Insert Table 1 about here
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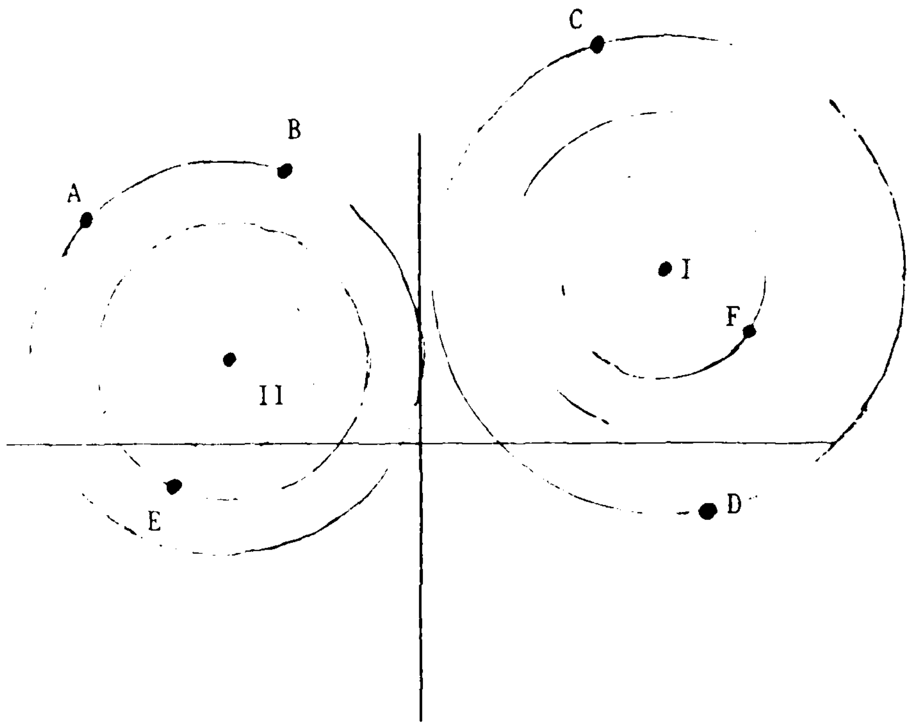
The second step of the analysis involved the calculation of the difference between design profiles of individual units and their respective ideal pattern. This was done according to the euclidean distance formula presented above. Lack of fit, or deviation from ideal pattern, should result in poorer performance; hence, the distance measure should correlate negatively and significantly with the two performance measures, job satisfaction and unit efficiency. In order to avoid the possible tautology of testing the same high performing units from which the ideal patterns were initially derived and to be certain that the results would not be influenced by these units, the high performers were dropped from the final step of the analysis. Thus the final step involved the correlaton of the distance measure for the remaining units with their respective performance scores. As Table 2 shows, distance correlated with job satisfaction -.50 ($p < .0001$) and with unit efficiency -.31

Exhibit 1

The Systems Appr oach: A Geometric Representation



The Systems approach first identifies ideal patterns appropriate to different levels of context. These patterns are depicted as points (here, I and II) in n-dimensional space, where n is the number of structure and process dimensions. Distance from the ideal point results in proportionally lower performance, regardless of the direction of the deviation involved. The circles can be conceived of as iso-performance contours. Thus, any two units on a circle (and therefore equidistant from the ideal point) will have the same performance, despite the fact that their structure and process scores may be fairly similar (A and B) or very different (C and D). In this example, A and B, C and D have equal performance, but the proximities of E and F to their respective ideal points give them superior performance.

result a lower performance, regardless of the direction in which departure from ideal-type pattern occurs. (See Exhibit 1.)

Data and Results

Conceptually, the Systems approach is similar to the deviation score analysis referred to in the brief description of the Interaction approach above. However, with the Systems approach deviation is measured as the distance from a point in a twelve-dimensional, geometric profile rather than as the distance from a single linear equation line. Thus, systems analysis focuses on differences in pattern profiles and accounts for the full set of all twelve unit structure and process variables. In contrast, the Interaction approach analyzes the fit between task uncertainty and each of the unit design characteristics only one dimension at a time.

The three-step procedure described above was used to analyze the pattern form of fit in relation to job satisfaction. Pattern profiles were generated for the highest performing units (based on the satisfaction measure) under conditions of low and high task uncertainty. The mean scores on these 12 structure and process dimensions were considered as empirically derived "ideal" types representing the systematized and developmental modes. ANOVA and MANOVA tests were run on these ideal types to determine if their profiles actually differed and a comparison was made between the profiles generated and the theory shown in Figure 1 to determine if the derived values matched the predicted ordinal relationships of the OA task contingency theory.

Table 1 shows the unit design profiles of highly satisfied (hence high-performing) units under conditions of low and high task uncertainty.

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Headquarters, U.S. Marine Corps
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