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The concept of organizational structure

The concept of organizational structure pervades theory and research on organizations. Diverse theoretical works attempt to account for the structure of organizations in terms of size (Blau, 1970), technology (Perrow, 1967), and the degree of certainty or uncertainty arising in the environment (Thompson, 1967). Contemporary research studies comparing organizations have likewise analyzed data describing organizational properties, as opposed to characteristics of individual people, in order to test and refine propositions about structure. Surprisingly, neither these theoretical developments nor research studies comparing organizations have pursued the implications of denoting as structure certain relational properties of organizations such as levels of hierarchy, spans of control, and the like, as well as more global properties of organizations such as their rules and decision-making practices. One implication is that reporting relationships and rules, usually outlined on organization charts and in manuals, reflect actual configurations of behavior in organizations. This raises, of course, the issue of validity; and it is not of central concern here as it can be argued that formal representations of reporting relationships and rules are themselves of interest. A second implication is that configurations of behavior in organizations are in fact recurrent—that, at least for short intervals, there is some stability

in allegedly structural features of organizations. In other words, the attribution of structure to organizational characteristics asserts that they change less over time than things not structured.

Concepts describing organizational structures have figured most prominently in so-called closed-system or rational models of organizations. These include Taylor's (1911) prescriptions for scientific management, Gulick and Urwick's (1937) discussion of specialization, unity of command, span of control, and the like, and Weber's (1946) ideal–typical model of bureaucracy. Closed-system models ask what organizational arrangements are most effective for a given organization purpose. The question itself, not any particular answer to it, carries the implication that structure has a reality apart from the individual persons who happen to be in organizations, and that structural arrangements in organizations are as enduring as the purposes for which organizations themselves were created. Structural concepts also abound in recent research studies concerned with the effects of size on other organizational properties; studies of this sort appear with high frequency in *Administrative Science Quarterly*. (See especially Kimberly's [1976] review article on organizational size.) Although not explicitly using the closed-system model of the classical administrative theorists, such research studies are implicitly closed system in that the nexus of causation is within organizations, and variables describing the environment are not usually considered.

It should be noted that the concepts of structure and structured behavior are not monopolized by closed-system theories of organizations. Open-system theories such as Thompson's (1967) treat organizations as intendedly closed, hence intendedly stable and predictable, even though in fact they are open to the environment and hence affected by uncontrollable and unpredictable events. The imagery of intended closedness despite actual openness is very suggestive, for it portrays organizations as essentially stable at their

technical cores and somewhat less stable at their peripheries where boundary spanners mediate environmental influences. Organizational structure, then, becomes a means of preserving calculability and rationality despite unpredictable elements in the environment. A tentative hypothesis is generated: Over relatively short intervals, organizational structures will exhibit somewhat more stability than critical elements in their environments, and especially so at their technical cores. No prediction about long-run organizational change is made because organizations remaining stable over long intervals will be rendered inconsistent with their environments and replaced.

Another version of open-system theory views structure very differently. Weick's (1976) discussion of "loose coupling" suggests that organizational activity is much less well coordinated than commonly believed. Lack of coordination occurs in the absence of imperatives preserving organizational structures, and accounts for the relatively low stability of supposedly structural elements. A more radical view elaborated by J. Meyer and Rowan (1977) treats structure as isomorphic to institutionalized myths and intended to satisfy expectations for rational administration but largely decoupled from the actual activities of organizations. Because the larger social environment demands ritual conformity of organizations, but organizations do not similarly constrain their environments, the J. Meyer and Rowan formulation predicts as much or more stability in institutional environments than in organizations—contrasting vividly with Thompson's model of organizational stability in the midst of environmental uncertainty. A hypothesis can be derived from theories of loose coupling and structure as institutionalized myth: Glacial drifts in the environment compel parallel changes in formal representations of organizations, but actual behavior in organizations tend to change somewhat more erratically, resulting in less stability in organizations than in environments surrounding them.

One aim of this chapter is to begin testing open- versus closed-systems theories of organizations and discriminating between the variations of open-systems theory sketched above. The results cannot but have implications for these ideas. But the immediate purpose is to ask whether elements of organization normally labeled as structural have sufficient stability and interrelatedness to be worthy of study by themselves; or whether, contrariwise, there is apparent instability and unconnectedness in organizations such that organizational patterns require explanation primarily in terms of external events. At stake here is not only whether there are environmental effects on organizations. The more fundamental question is whether formal organizational structures are of interest apart from environmental elements in the longitudinal analysis to be undertaken here. Most organizational research, although not theory, has proceeded as if organizational structures were of interest in their own right. This assumption is questioned below. A variety of factors, some intrinsic to the organizations studied and some arising in their immediate environments, combined to produce a pattern of apparent instability in organizational structures and dependence on environmental elements.

Changes in the environment

Because we are interested in the stability of organizational structures compared with their environments, perhaps it is best to begin by asking how one can describe meaningfully changes in both occurring over the interval between the two surveys of finance agencies. Changes in organizational structures, of course, will be evident from the data describing organizations themselves, but environmental shifts may not be as accessible. This occurs for several reasons. First, environments are likely to be more complex than organizations. Organizations, it will be remembered,

cope with and presumably reduce uncertainty (Thompson, 1967) or equivocality (Weick, 1969) in their environments. The clear implication is that greater complexity lies outside organizations than within them. Second, organizations respond to multiple environments, some of which affect all organizations of a given type, some of which do not. This holds even for public agencies, which do not compete openly. All finance agencies, for example, share a common market for local-government securities, and a common environment of federal regulation. Elements of the environment that may not be shared include characteristics of the cities, counties, and states that finance agencies serve. But differences between local environments may not be significant. Some recent research on policy innovations suggest that the intrusiveness of federal programs is such that states can no longer be considered independent entities (see Rose, 1973). The same may now hold for cities where the federal presence is substantial and accelerating.

Changes in the larger environment

If it is the case that a complex national or societal environment, what was labeled earlier as the larger environment, ultimately governs much of the behavior of local finance agencies, then statements about the stability or variability of the environment over time cannot be made easily over a single interval such as that between the 1966 and 1972 surveys. Two observations of one environment—in this instance, the national environment—cannot yield measures of uncertainty or variability. More observations and, perhaps, more environments are needed. A description of changes in this environment is, however, possible.

The six years from 1966 to 1972 was a period of rapid growth for local government. The scope and scale of local services increased substantially as a result of two factors: The urban crisis in the late 1960s and the proliferation of federal

categorical-grant programs funneled mainly through the Department of Housing and Urban Development to cities and the Department of Health, Education, and Welfare to the states. The Department of Housing and Urban Development had been established in 1965, and the Model Cities Program was funded the next year. (Revenue-sharing funds did not reach local government until 1973; and federal block grants to cities, which simplified greatly application and reporting requirements compared to categorical grants, did not appear until 1974.) Widespread rioting in urban areas in the late 1960s signaled discontent of minority populations; the growth of federal aid to local communities was, of course, the tangible expression of President Johnson's Great Society program. Rising unemployment rates after 1969, similarly, triggered passage of the Emergency Employment Act of 1971, which authorized direct federal subsidization of local-government payrolls. The impact of both urban unrest and massive federal funding of local programs is clearly evident in the growth of local-government employment and of budgets, which will be discussed presently.

Aside from these social and political changes in the larger environments of finance agencies, a number of changes occurring between 1966 and 1972 reflect shifting beliefs about appropriate organizational forms for the finance function, in what might be termed the environment of the public-finance profession. These changes included: the emergence of data processing and budgeting as local-government functions in their own right, distinguished from routine fiscal activities; the emergence of new organizational forms for the finance function, especially departments of administration and of management; and the imposition of federal personnel standards upon local governments. The separation of data processing and budgeting functions from finance will be discussed at length in Chapter 4, new administrative forms will be the subject of Chapter 5, and the effects of earlier federal laws affecting personnel matters as well as of the Inter-

governmental Personnel Act of 1970 will be covered in Chapter 6. What is important for the present discussion is that beliefs about appropriate administrative forms, like larger social and political environments, shifted with some uniformity. To be sure, only a minority of finance agencies actually lost their data-processing and budgeting functions during the interval between our two surveys, very few were actually transformed into more comprehensive departments of administration or of management, and not all altered their personnel practices toward conformity with federal standards. But, like forces arising in the larger social and political environments, a common professional environment was present for almost all local governments; and when it triggered actual organizational changes, the direction of change was fairly predictable. A high level of uncertainty and turbulence such as that triggered by the 1975 New York City fiscal crisis did not characterize the environments of local-government finance agencies during the 1966–72 interval.

Changes in the immediate environment

Some quantitative indicators of environmental elements in cities,countries, and states, the immediate environments of finance agencies, also suggest a pattern of fairly uniform change or predictability. Table 2 displays shifts in these indicators for the 215 ongoing finance agencies and the 14 reorganized cases together. Briefly, Table 2 shows that local-government employment in the jurisdictions studied increased about 20 percent in the 1966–1973 interval, from a mean of about 7,300 to about 8,700 full-time equivalent workers. General-fund expenditures covering common services such as police, fire, recreation, and health, *but not federal grants,* increased about 110 percent in the same interval, from 88 to 185 million dollars. Total expenditures, *including federal grants,* jumped some 150 percent, from about 148 to about 359 million dollars for the cities, counties, and states

covered in our surveys. Finally, the average population of the cities, counties, and states covered increased about 8 percent over the ten-year interval from 1960 to 1970, from 850,000 to about 920,000.[1]

These four measures—general-fund expenditures, total expenditures, local-government employment, and population—indicate partially the level of demand for services of local-government finance agencies. Although they change considerably over time, the demand measures have high predictability across cities, counties, and states as shown by their autocorrelations. The autocorrelation for general-fund expenditures is .8327; for total funds administered it is .8240; for government employment it is .9602; and the autocorrelation of population over a ten-year (1960–70) interval is .9446. These estimates of predictability, it should be noted, are reduced only slightly by logarithmic transformation, indicating that they are not caused entirely by skew distributions.[2] In summary, measures describing the demand for services of finance agencies in the jurisdictions studied increased subtantially during the 1966–72 interval, but changes in demand were highly predictable. Strong

Table 2. *Means, standard deviations, and autocorrelations of demand variables. (N = 229)*

Variable	1966 Mean	1966 S.D.	1972 Mean	1972 S.D.	Auto-correlation
General Fund [a]	87,625	268,843	184,917	496,808	.8327
Total funds administered[a]	147,880	398,712	359,016	914,044	.8240
Government employees	7,342	17,256	8,718	20,461	.9602
Population [a]	849.8[b]	2,144.7[b]	920.4[c]	2,286.5[c]	.9446

[a] Figures are in thousands.
[b] 1960 mean and S.D.
[c] 1970 mean and S.D.

trends but high predictability characterized the quantifiable aspects of immediate environments of local-government finance agencies.

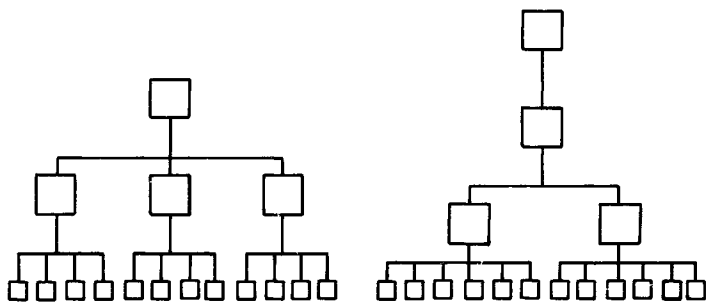
The stability of organizational structures

Given the predictability of change in the immediate environments of finance agencies, it might be expected that organizational structures would also change predictably. Increased demand in the environment might be accompanied by growth of finance agencies, and increased task complexity would be mirrored in organizational complexity as indicated by numbers of subunits, levels of hierarchy, and the like. A close correspondence between environmental changes and organizational adjustments, in other words, would be posited. Indeed, following traditional theories of administration, one might expect more uniformity or predictability in organizations than in their environments due to deliberate efforts to buffer the environment if not due to other forces tending toward inertia.

The alternative model, consistent with the metaphor of loose coupling, portrays organizational changes as somewhat more chaotic. Though possibly counterintuitive, the notion that organizational structures are more variable than environments is appealing on several counts. For one thing, close correspondences between organizational structure and the environment may be required by efficiency considerations or if survival is problematic. But if there is no easy calculus of efficiency, and if survival can be assumed, at least for the short run, then a wide range of organizational structures may be acceptable in a given environment. Second, work is often shifted both within organizations as well as between them, resulting in major changes in structure in response to only incremental changes in the environment. Firms, for example, commonly alternate between contracting for intermediate goods and vertical integration of producers of these goods—a major organizational shift—depending

upon market conditions (Williamson, 1975). Public agencies may be grouped together into superagencies (e.g., New York City's garbage is now collected by their Environmental Protection Services Administration) to reduce the number of department heads, or superagencies may be dismantled in order to reduce layers of hierarchy. Finally, the logic of hierarchy is such that small changes in staffing patterns can produce important alterations in quantitative measures of administrative structure. Figure 4 illustrates the variability of hierarchical structures when positions are reordered. The hierarchy at the left has one department head and three division heads with four subordinates each. Should one division head become the department head's deputy, and his subordinates be split between the two remaining division heads, the hierarchy at the right of Figure 4 results. This minor adjustment in reporting relationships yields substantial changes in quantitative measures of structure. The number of divisions decreases from three to two, the number of levels of hierarchy increases from three to four, and the span of control of first-line supervisors also increases from four to six. The sensitivity of quantitative measures of structure to minor changes in reporting relationships, coupled with ab-

Figure 4. Changes in measures of organizational structure.



sence of threats to organizational survival and the ease with which the work can be shifted between units, suggests that some instability in organizational structures should be anticipated.

Changes in organizational structure

Table 3 displays means, standard deviations, autocorrelations, autocorrelations net of size (or, technically, autoregression coefficients), and effects of size for eight basic organizational variables used in the study. The construction of these variables is described in Table 4. It should be noted that all the organizational variables are based upon multiple items or redundant responses to the same items from multiple informants. Data describing the 215 ongoing finance agencies are reported in Table 3. The fourteen reorganized agencies are deleted because their organizational structures have, by definition, little temporal stability. I shall discuss first the overall trends in the eight variables describing organizational structures between 1966 and 1972. I shall then turn to predictability of organizational structures over time and then to the effects of size.

Table 3. *Means, standard deviations, autocorrelations, autoregression coefficients net of size, and effects of size for organizational variables (N = 215)*

	1966 Mean (1)	1966 S.D. (2)	1972 Mean (3)	1972 S.D. (4)	Autocorrelation (5)	Autoregression net of size (6)	Effect of size (7)
Size	102.3	167.9	126.7	212.5	.9497	—	—
Divisions	5.730	2.767	5.623	2.440	.5765	.5285	.1194
Levels	3.945	.906	4.084	.968	.5700	.4290	.2700
Sections	11.944	9.677	12.403	8.805	.6385	.4147	.3351
Span of control	7.135	5.293	6.833	4.325	.4068	.2573	.3091
Formalization	.6403	.2968	.6969	.2816	.6859	.6843	(.0190)
Responsibilities	6.344	2.562	6.270	2.628	.6642	.6668	(.0183)
Competitors	2.595	2.304	2.479	2.267	.6851	.6750	.1293

Note: Coefficients in parentheses are less than twice standard errors.

Trends. Only two of the eight basic variables describing the structure of finance agencies exhibit strong tends between 1966 and 1972. These are size and the index of formalization of personnel procedures. The mean size of finance agencies increased from 102 to 127 full-time employees over the six-year interval between surveys, paralleling the increase in local-government employment generally. It should be noted that some, although not all, of this increase is due directly to positions funded by the Emergency Employment Act.

Table 4. *Variables describing organizational structures of finance agencies*

Size	Number of full-time employees. Information given by department head, checked for consistency with information given by division heads.
Divisions	Number of subunits whose heads report to department head or his deputy. From organization chart.
Levels of supervision	Mean number of levels of hierarchy in divisions, plus one level for department head. Information given by division heads, checked for consistency with total division employees.
Sections	Total number of subunits within divisions; divisions without section heads are considered to have one section. Information given by division heads.
Span of control	The mean ratio of nonsupervisory employees to first-line supervisors in divisions. Information given by division heads.
Formalization	An index of formalization of personnel procedures described fully in Chapter 6. Information given by department head.
Responsibilities	The number of finance functions for which a department has full responsibility. Information given by department head.
Competitors	The number of *other departments* in a city, county, or state having partial or full responsibility for finance functions. Information given by department head.

Note: Appendix 1 describes the questionnaire items used in constructing these variables.

Whereas no such positions existed in 1966, finance agencies had an average of 4.59 EEA jobs in 1972.

The change in the index of formalization of personnel procedures, a scale running from 0 to 1.0, seems modest at first glance, but the increase from .6403 to .6969 is but part of a very long historical trend toward adoption of "merit" standards in personnel matters that will be described in Chapter 6. Had the interval between the two surveys been longer, the increase in formalization of personnel procedures would, in all likelihood, have been much greater. The marginal change in the index of responsibilities held by a finance agency, which runs from 0 to 13, is surprising. This index encompasses, however, only fiscal responsibilities and does not include the data-processing function. As will be noted in Chapter 4, a substantial number of departments that had the data-processing functions in 1966 lost them by 1972; and many fewer added data processing during this interval.

No discernible trends are evident in the other variables describing the organizational structure of local-government finance agencies. There appear to be slightly fewer divisions in finance departments over time, more levels of hierarchy, more sections, but smaller spans of control at the lowest level of supervision. Interestingly, the number of competitors—other local government agencies having one or more primary financial responsibilities that might have been placed in the focal finance department—does not change much either. Again, the number of competitors does not include units in charge of data processing outside of the finance agencies studied.

Predictability. A measure of the predictability of organizational structures over time is provided by the autocorrelations of the various measures of structure. The size of finance agencies has a much higher autocorrelation than other organizational elements, .9497. (Logarithmic transformation of size reduces the autocorrelation to .8371, however.) The

autocorrelations of other organizational variables, save for a span of control at the lowest level, are in the range of .6—high enough to indicate a modicum of predictability but low enough to suggest substantial changes over time, and substantially lower than the autocorrelations of the four measures of environmental demand. When size is controlled, however, the autocorrelations—or autoregression coefficients—of the four variables describing formal administrative arrangements in finance agencies drop, and in some instances considerably. Net of size, the autoregression coefficient for divisions is .5765; it is .4290 for levels of supervision, .4147 for sections, and only .2573 for spans of control at the lowest level. By contrast, the zero-order autocorrelations of measures of formalization, responsibilities, and competitors are hardly disturbed when size is controlled. Indeed, size has a statistically significant effect only on the last of these.

Effects of size. The right-most column of Table 4 shows cross-lagged path coefficients generated when each of the 1972 measures of organizational structure is regressed on 1966 size, net of the comparable 1966 measures of structure. The column is labeled "Effect of Size." Size has a slight although significant effect on the number of divisions, and substantial effects on numbers of supervisory levels, sections, and first-line spans of control. These results fit exactly the findings from a study of somewhat smaller number of finance agencies over a five-year interval (Meyer, 1972b), and they need not be elaborated here. What is important, aside from autocorrelation, is that formal administrative arrangements of public bureaucracies appear to be caused mostly by size. Of equal interest, and not reported in the earlier study, is the absence of significant effects of size on formalization of personnel procedures and on responsibilities. This runs contrary to results from other research (see especially Pugh et al. 1968) and can be explained by the fact that finance agencies

are not wholly autonomous organizations but are instead nested in larger structures of government, which control, among other things, their personnel rules and the range of tasks for which they are responsible. The positive effect of size on competitors occurs partly because the largest agencies—those in the largest jurisdictions—are growing least, and partly because other units with fiscal responsibilities are spawning fastest. This process will be explored in some detail in Chapter 5.

Summary. The quantitative results so far can be summarized as follows: Measures of environmental demand for the services of finance agencies as well as the size of these agencies exhibit upward trends but high predictability over time. Measures describing the organizational structures of finance agencies do not exhibit strong trends, and their predictability is substantially less than that of size or environmental demand measures. Importantly, variables describing organizational structure are dependent upon size, and their predictability drops substantially when size is controlled. Like measures of organizational structure, formalization of personnel procedures, responsibilities, and competitors do not exhibit strong trends; although formalization increased somewhat over the six-year interval between the 1966 and 1972 surveys. The predictability of formalization, responsibilities, and competitors was substantially higher than that of the measures describing structure, although their predictability was somewhat lower than measures of environmental demand and size. These results showing, first, environmental demand and size to have the most predictability, second, formalization and responsibilities having intermediate predictability, and, third, traditional measures of organizational structure having least predictability are disturbing to conventional theories, for they suggest one of two things. Either organizational structures truly exhibit more variability than environments—in which case the metaphor of "loose coup-

ling" seems more apt than the conception of organizations as open to the environment but intendedly closed – or organizational stability will have to be sought elsewhere than in measures of predictability of formal administrative arrangements.

Why structure?

In the absence of high predictability of elements of organizational structure over time, one must ask two questions. First, why has the metaphor of structure been used and why does it persist in describing administrative arrangements in organizations? And, second, why is uncertainty said to characterize environments of organizations? Perhaps the answer lies in the following: The interdependencies among elements of administrative hierarchies in organizations are highly stable over time, even though actual structures consistent with these interdependencies vary considerably. By contrast, causal laws governing environment – organization ties may be variable, creating uncertainty and conditions that, in the long run, trigger fundamental change. We shall examine these possibilities.

Interdependencies within organizations

Representations of organizational structures, at least for public agencies, are almost always hierarchical. Each person, save for the highest official, reports to one, and only one, superior. Classical administrative theory calls this unity of command. The implication of hierarchy for measures of organizational structure is that new positions require new subunits, added levels, or increased supervisory ratios. Within the constraint of hierarchy, there is an upper limit to the number of people who can be monitored effectively by one supervisor. Classical organizational theory calls this span of control. The implication of span of control is an upper bound to the size of work groups, hence that organizational size and the number of work groups present should

be highly correlated. Importantly, the rules for representing administrative hierarchies do not specify how work is to be divided among units. Classical theory discussed division of labor by person, process, client, and place, but it never suggested one clearly preferred alternative. The implication here is that within constraints of hierarchy and span of control, variables describing organizational structures need not be causally related to one another.

What evidence we have is consistent with the notion of stable interdependencies within organizational structures but variable outcomes consistent with the principle of hierarchy. The first piece of evidence is that correlations among variables describing size and structure are quite stable over time. Table 5 displays cross-sectional correlations of size, divisions, levels, sections, and spans of control for both the 1966 and 1972 waves. The 1966 correlations are to the left of the solidi, and the 1972 correlations are to their right. Very little change in these correlations occurs between the two surveys. The only noticeable differences are in the correlations of the number of sections with numbers of levels and spans of control. This indicates that roughly the same patterns govern the construction of organizational structures in both years. Second, the effects of size are ubiquitous. This was shown in the longitudinal analysis (the left-most column of Table 3 merely replicates the findings of Meyer, 1972b), and the pervasive effects of size are also evident in the top row of Table 5. Ubiquitous effects of size suggest that the

Table 5. *Correlations between size and measures of organizational structure (1966/1972 correlations)*

	Divisions	Levels	Sections	Span of Control
Size	.4019/.3882	.5224/.5160	.6680/.7208	.4837/.5034
Divisions	—	.0036/–.0718	.5304/.4887	.1319/.1446
Levels	—	—	.2853/.4358	.3493/.4461
Sections	—	—	—	.3430/.5749

principle of hierarchy is operating because new positions require adjustments in spans of control, subunits, or levels. Third, the strongest effect of size in the longitudinal analysis (Table 3) is upon numbers of sections, and the largest cross-sectional correlations (Table 5) are also between size and sections. Because sections are units in finance agencies most closely resembling work groups, this suggests strongly that span-of-control limitations are operating. Fourth, net of size, most relations among variables describing structure vanish. This was also shown in the earlier study (Meyer, 1972b), and it necessarily occurs in longitudinal analysis of the data presented here because of the low autocorrelations of supposedly structural elements. Importantly, about the same result obtains in cross-sectional analysis of the 1966 and 1972 waves. Net of size, there is a negative association between the number of divisions and of levels of hierarchy; and there is a positive association of divisions with sections in both the 1966 and 1972 data. The latter result, the association between divisions and sections, is at least partly artifactual because all divisions are considered as having at least one section. Otherwise, consistent interrelations among the measures of organizational structure do not appear cross-sectionally, once size is controlled.

Clearly, much more needs to be known about the stability of organizational structures. The need for further investigation is evident in the following: Whereas little stability obtains in measures of organizational structures—divisions, levels, sections, and so forth—the rate at which finance agencies as whole departments were either replaced or totally reorganized between 1966 and 1972 was about 1 percent annually, 14 out of 229 cases in six years. This suggests considerable stability of departments if not of units within them. It may be that entire departments are anchored to stable environmental elements (probably statutes and other institutionalized beliefs about the necessity of certain government function) more closely than their subunits and sections. This explanation of apparent stability of departmental

units, it should be noted, is not inconsistent with the explanation of instability of internal structure. To the conventions of hierarchy and span-of-control one need only add the notion that highly institutionalized activities (e.g., accounting and auditing) must be represented visibly at the departmental level. Unfortunately, the time span of the study does not permit further tests of the institutional hypothesis. To test the idea that institutional elements sustain the structures of finance agencies at the departmental level but not below, changes in these elements must be observed and compared with actual organizational shifts occurring over time or across societies. Such shifts can be captured only in historical investigations covering intervals of greater than six years or in comparative, (i.e., cross-national) research.

Environment–organization linkages

Whereas relationships among elements of organizational structure were essentially stable or were enhanced between 1966 and 1972, linkages between quantitative dimensions of the environment and organizational size deteriorated over time. Table 6 shows quite clearly that the rate of growth of finance agencies was much smaller in the largest cities, counties, and states, those over one-million population, than in medium-sized jurisdictions of one-quarter of a million to one-million population. The uneven pattern of

Table 6. *Mean size of finance agencies in 1966 and 1972 by type of jurisdiction and 1970 population*

	Cities			Counties			States		
1970 Population	1966	1972	*(N)*	1966	1972	*(N)*	1966	1972	*(N)*
50,000–99,999	35.9	38.2	(46)	—	—		—	—	
100,000–249,999	55.0	62.8	(51)	34.0	35.7	(9)	—	—	
250,000–499,999	94.5	118.6	(23)	45.4	57.2	(14)	—	—	
500,000–999,999	166.8	205.3	(13)	79.2	128.2	(19)	231.5	382.3	(6)
1,000,000+	161.0	164.3	(4)	159.9	182.1	(8)	338.0	398.6	(22)

growth results in a slippage in the correlations of the four demand variables with the size of finance agencies. The correlation of general-fund expenditures with size drops from .5592 in 1966 to .4552 in 1972; the correlation of total expenditures with size is .4897 in 1966 and .4887 in 1972; that of the total government employment with size declines from .6894 to .6194; and the association of population served with the size of finance agencies drops from .6686 to .6166. It will be argued in the chapters below that these deteriorating correlations reflect a causal process, namely the absence of growth or actual contraction of finance agencies in the largest cities, counties, and states with shifts of resources and responsibilities to other agencies.

Aside from the question of what causal processes account for these deteriorating correlations, this pattern necessarily triggers uncertainty or instability for finance agencies. Retrospectively, uncertainty is introduced because declining correspondences with the environment either did not hold in the past or could not have held for long. Prospectively, instability is created because, past a point, continued deterioration of correspondence with the environment will not be allowed and fundamental organizational change will ensue. The slippage in environment–organizational correspondence is in contrast to the relative stability of relations among variables describing organizational structure, and in this sense the environment is less certain and stable for finance agencies than are relations among their internal elements.

Strategic implications

The results sketched above posed a number of questions, indeed puzzles, at the outset of this research. First of all, the low autocorrelations of variables describing organizational structures–divisions, levels, sections, and spans of control–all but foreclosed the possibility of finding causal relations among them over time. Thus what remained was the uncomfortable choice between elaborating a complex,

contingent model of change in public bureaucracies, one somewhat idiosyncratic from the perspective of conventional organizational theory, and abandoning altogether the longitudinal study of bureaucracies. Needless to say, the first strategy has been chosen. Secondly, the deteriorating relations between categories describing environments and organizations raised the dilemma of whether or not to introduce descriptive and historical materials that might explain apparent complexity but that do not vary for the set of organizations studied at the time of research, hence cannot be introduced into quantitative models. I have opted for incorporating such materials even though explanations hinging upon them are not strictly verifiable within the confines of this study. The alternative would be a series of empirical generalizations without implications for organizations other than those studied. The reader will note that the amount of descriptive and historical material in the following chapters is somewhat greater than is common in quantitative organizational research.

Research issues

Aside from these broad questions concerning strategy for this study, a number of implications for research arise from these first empirical results. Some specific research questions include the following:

Reliability versus stability. Apparent instability in measures of organizational structure (or anything else) can have its source in random measurement error, which degrades both autocorrelations and path coefficients. Because most attributes of organizations are not manifestations of some underlying construct that is the focus of inquiry (e.g., conservatism), the use of multiple indicators for organizational attributes is normally precluded. The use of multiple informants is not, however, and measures of organizational structure (e.g., levels, sections, and spans of control, for which multiple

indicators are not available) were constructed from reports given by several informants, an average of six per organization. Measures of formalization, responsibilities, and competitors are based on multiple indicators. Panel or time-series designs can separate reliability from stability, but only under very stringent conditions. These include the availability of at least three and preferably four waves of data, equal measurement intervals, measurement intervals corresponding to causal lags (i.e., a system in lag-1), and constant causal laws. Clearly, our research design does not permit these criteria to be met or even approached. We do not have three waves of data at equal intervals; there is no guarantee that our measurement interval corresponds even closely to actual causal lags; and there is reason to believe that within the bounds of the systems studied quantitatively—finance departments and their immediate environments—causal laws are anything but constant. Because most of the measures describing formal administrative structures are based on multiple responses, however, there is reason to believe that the reliability of our measures is not unacceptably low.

Accounting for low autocorrelations. Assuming the problem of reliability to be manageable, a further question is whether there are identifiable conditions in organizations enhancing or attenuating the stability of organizational structures over time. Research has usually been directed toward explaining organizational structures, but not their temporal stability. The search for factors associated with stability or instability of organizational structures focused first on the effect of leadership change, which is described in detail in Chapter 4.

Accounting for the declining correspondence of environmental demand with the size of finance agencies. Another empirical question was why, for the 215 ongoing finance agencies, the correlations between measures of environmental demand and agency size deteriorated over the six-year interval. Impor-

tantly, this decline did not occur for the 14 reorganized cases. Quite the opposite, the correlations of environmental demand with size increased markedly for the reorganized units. The search for factors associated with declining (or increasing) associations of size with environmental demand gave rise to Chapter 5, on domains. But as Chapter 5 and Chapter 6 point out, there may be a regular cycle of change in organizations regardless of internal conditions: Correspondences between environment and organization are established at the time of formation or reorganization; the fit between environments and organizations then decreases until replacement or reorganization occurs again.

Theoretical issues

Some basic questions concerning the direction of thinking about organizations are raised in finding somewhat less predictability in organizational structures than in their environments over time, and in declining correspondences between environments and organizations. These questions include the following:

Are studies of organizations to be directed toward explaining administrative structures? The answer will have to remain open for a while, but the preliminary evidence suggests not. It should be remembered that early research on organizational structures assumed implicitly their stability compared to attitudes and predilections of individual people in organizations. This assumption is now in doubt. Abstract categories describing numbers of units, subunits, and levels are mainly functions of size. The *principle* of hierarchy, however, as opposed to the distribution of individuals in offices within hierarchies, holds universally for the agencies studied, hence is invariant across them. It may be that less-abstract categories—those having more organization-specific content, for example, whether or not a finance agency operates its own data-processing unit—will have higher temporal stabil-

ity, hence yield greater insights, than quantitative measures of administrative structures. The loss in generality in using such organization-specific variables is more apparent than real. To pursue our example for a moment, the presence or absence of data processing from finance determines its position in the information flow of local government. Access to information is as generic an organizational variable as span of control. How this concept is measured will vary across types of organizations, however.

What remains for closed-systems theories? If variables describing administrative structures are of little interest in their own right apart from the pervasiveness of hierarchy, then closed-system models of organizations are unlikely to yield many more results than are already in the literature; and they are unlikely to have much applicability to organizations' problems. Because empirical interrelations among elements describing organizational structures are sparse, save for effects of size, no optimal fit among these elements is likely to be found. Hence sociological theories of organizations will focus primarily upon external elements and boundary-spanning relations. This does not preclude developing closed-systems models that are social–psychological in character (e.g., the bulk of the literature on supervisory style does not take into account external conditions). But this does preclude studies of structure without explicit environmental referents. Contingency theories, it should be noted, take a first step in this direction in acknowledging that interrelations among organizational elements depend somewhat upon work technologies and the environment.

Which version of open-systems theory is to be pursued? As noted at the outset of this chapter, one version of open-systems theory treats organizations as intendedly closed despite openness, whereas a more radical version finds organizational structures responsive to institutionalized elements and

largely decoupled from day-to-day activities. The low predictability of administrative arrangements in finance agencies over time and the much higher predictability of elements in the environment despite strong trends suggest that the more radical version of open systems be given some credence. But the relative stability of interdependencies within organizations compared to deterioration of environment–organization linkages supports the more conventional view. Clearly, research ignoring either perspective is in danger of overlooking critical causal elements in the environment. The problem is how to design research that captures both variation in the immediate environment and variation in larger societal environments from which definitions of appropriate organizational forms for given purposes emanate. The present investigation was not intended originally to take into account the latter sort of variation; but the empirical results could not, in many instances, be generalized beyond the organizations studied without reference to societal and historical processes. As the reader will note, the environments of finance agencies are described in Chapters 4, 5, and 6 as much in qualitative as in quantitative terms. In part, this is due to a measurement problem. What constitutes, for example, stability (or instability), homogeneity (or heterogeneity), placidity (or turbulence) *for finance agencies* is not easily grasped except through the researcher's understanding of the peculiarities of these organizations. But this also reflects invariance in key environmental properties, namely the developments affecting all finance agencies that altered correspondences between quantifiable aspects of environments and organizations. Organizational elements such as leadership, claims to domain or domain consensus, formation, and reorganization mediated effects of these developments on individual agencies. The following chapters will explore environmental shifts and the organizational mechanisms through which processes of change in public bureaucracies are either accelerated or impeded.