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ENVIRONMENT OF PUBLIC ORGANIZATIONS: ITS MEASUREMENT AND INFLUENCE ON SOCIETAL DECISION-MAKING

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I. INTRODUCTION

The aim of this research is to formalize a taxonomy of the environment as applied to public organizations, to classify the environment of California cities accordingly, and, using previous results of decision models ocurrences in the same cities, to test a suficient condition of a Contingency Theory relating environment types to societal decision making models.

In this research the theory of the environment of public organizations will be reviewed briefly; the scope of past research will be assessed, a research hypothesis referring to types of environmental of public organizations will be formulated, methodology necessary to test the hypothesis will be presented, and, finally, the results obtained will be displayed and discussed.

The environment has been studied from three different perspectives: (a) the political and socioeconomic processes within society, (b) the external factors affecting the organization structure, and (c) the causal textures in which a system interacts. The emphasis of the first perspective is to relate policy making to process variables within the environment. These are already reviewed as the "Ecological Theory" in a previous work (Bento, 1980). The emphasis of the second perspective is on the organization design and structure most suitable to a given context -- a set of external factors. The last perspective focuses on "those processes in the environment itself which are among the determining conditions of the exchanges (between the system and its environment)..." (Emery and Trist, 1965, p. 242). Therefore, we may say that the ecological theory is primarily concerned with the environment, the organization design theory with the organization structure, and the systems theory with the relationships between environment and organizations as shown in Figure 1.

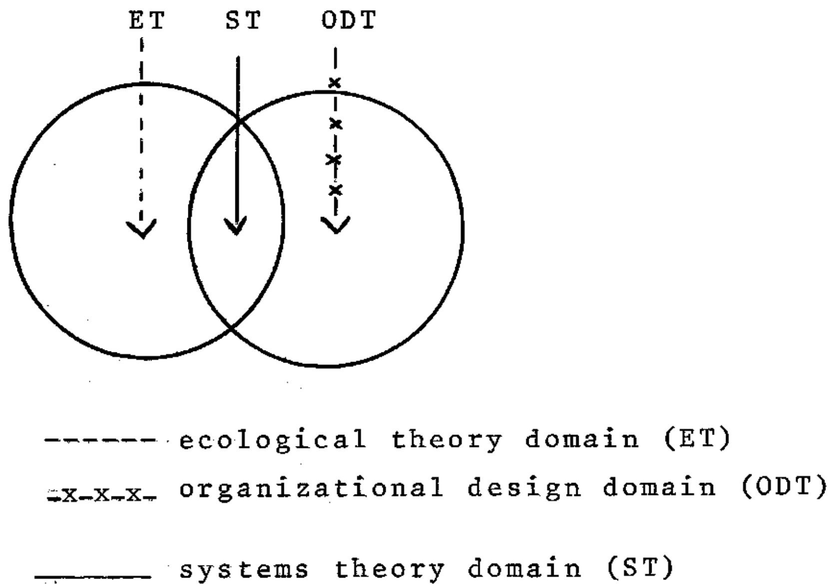


Figure 1

Relationships Between Environment and Organizations

In this section we will review the last two perspectives and relate them to our objectives in this research. Again, this is not an exhaustive bibliography on the subject, but rather a summary of the major contributions as shown in Figure 2.

The concept of environment which is still prevailing comes from Simon (1957, p.262):

> *...the term* _environment_ *is ambiguous. We are not interested in describing some physically objective world in its totality, but only those aspects of the totality that have relevance as the "life space" of the organism considered. Hence, what we call the "environment" will depend upon the "needs", "drives", or "goals" of the organism, and upon its perceptual apparatus.*

He then proceeded to define two types of environment one in which the goals are randomly distributed, and another where "clues"

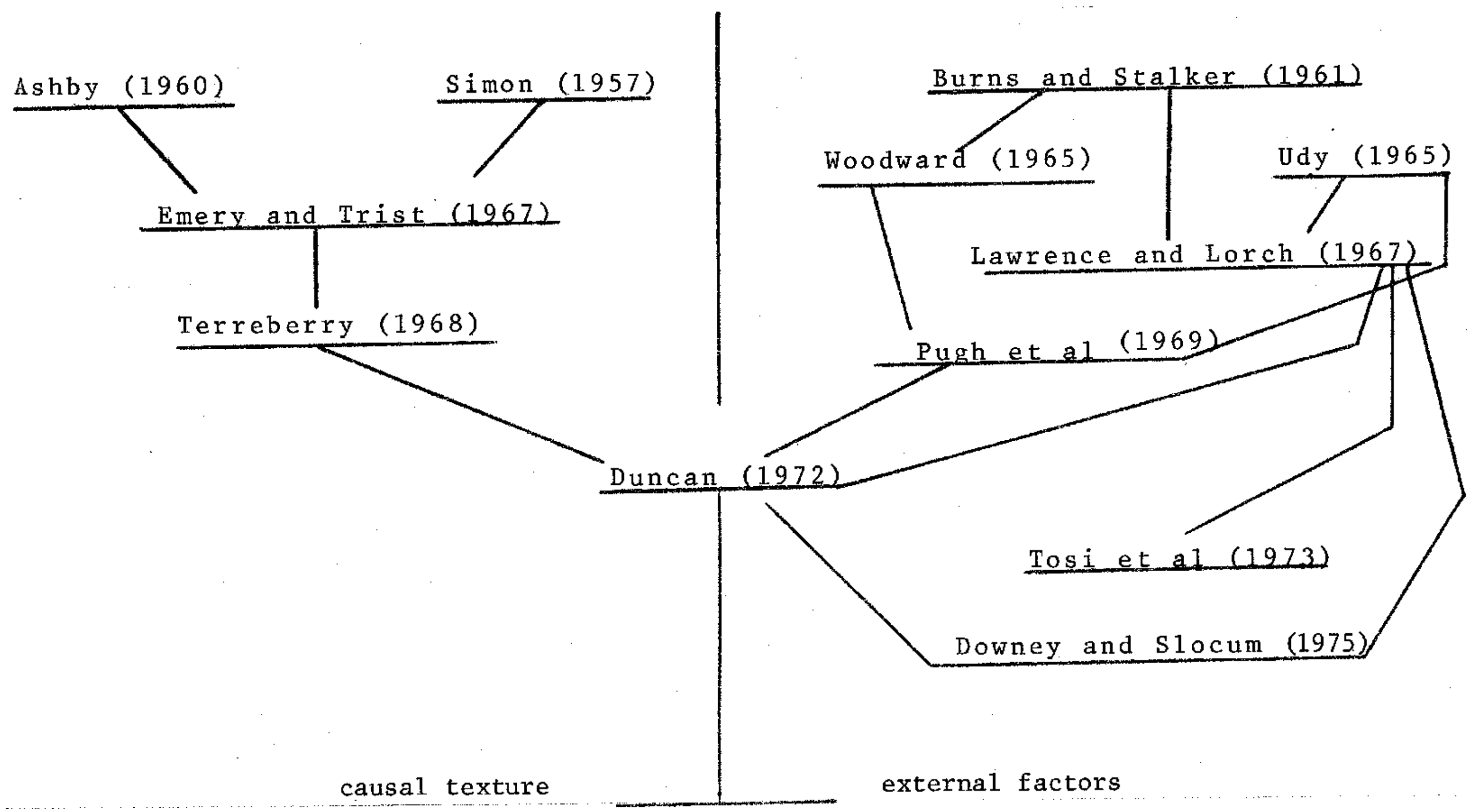


Figura 2
Environment Theory Tree

of the existing goal regions exist as intermediate points in the life space of the organism. From these postulates he derives "rational" decision-making behaviors in these environments: a random search for the goals and a probabilistic search for the same goals based upon the "clues".

Ashby (1960, pp. 80-99) introduced the concept of "ultra stable system" as:

> *Two systems of continuous variables (that we called "environment" and "reacting part") interact, so that a primary feedback (through complex motor channels) exist between them. Another feedback, working intermittently and at a much slower order of speed, goes from the environment to certain continuous variables |c| which in their turn affect some step-mechanisms |a mechanism showing a step-function as its main characteristic|, the effect being that the step-mechanism change value when and only when these variables pass outside given limits. The step-mechanisms affect the reacting part by acting as parameters |S| to it. They determine how it shall react |adapt| to the environment (p.98).*

Figure 3 shows a graphical representation of the ultra-stable system. Furthermore, he classified the environment in four types: iterated, serial, poorly joined, and fully joined. In the

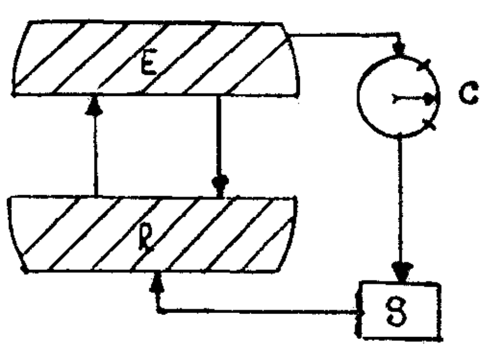


Figura 3
Ultra Stable System

interated environment the subsystems of R are interrelated with the subsystems of E, but each subsystem of R and E is independent of any other subsystem of R or E. The serial environment follows the same rule, but the subsystems R-E are joined as a chain, so that adaptation must occur in sequence, subsystem A first, then B, then C, as illustrated in Figure 4. The poorly joined environment is characterized by each subsystem affecting the other weakly, occasionally or throught other subsystems -- a series of serial adaptations taking place until a joint adaptation is established. Finally, the fully joined environment is one in which each subsystem affects the other as much as its own variables. The organism cannot adapt and transform the system into a serial environment for practical purposes.

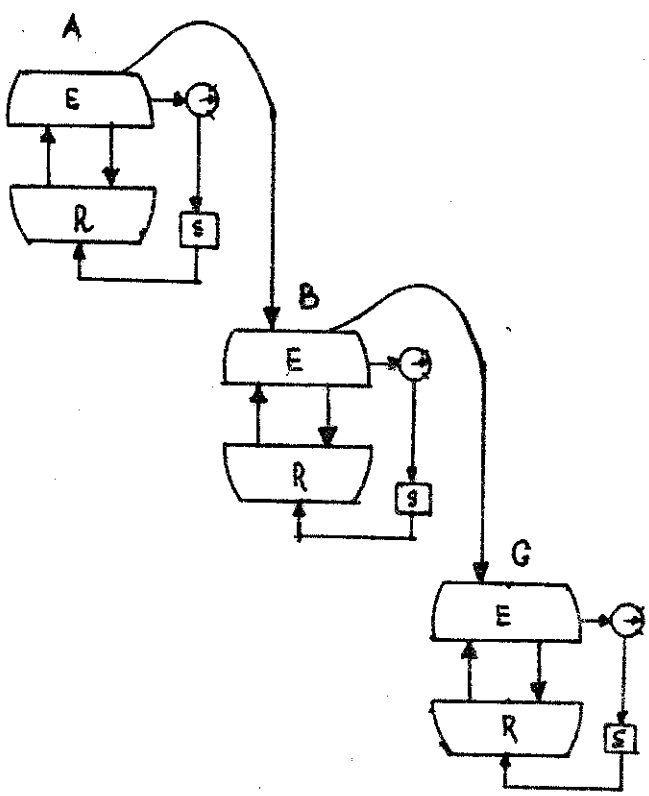


Figura 4
Serial Environment

Certainly, the most widely accepted taxonomy of environment came from Emery and Trist (1965). It is also a synthesis and extention of Simon and Ashby. Emery and Trist introduced a classification system based upon the "causal texture of the environment", as previously defined. This is a first departure from considering the environment as solely a perception of relevant parts, with regard to the organization's purpose, of the physical objective world. They introduced, in addition to the areas of transactions of the organizations with the environment -- input (L_{21}) and output (L_{12}) -- "the area of interdependencies that belong within the environment itself" (L_{22}) -- therefore for the first time considering the environment as an entity by itself. Finally they classified the environment in four types: placid, random; placid, clustered (which we will rename "reactive"); disturbed-reactive; and turbulent. Table I summarizes the main characteristics of each type based upon Emery and Trist (1965, 1973).

Drawing upon the work of Emery and Trist, Terreberry (1968) introduced the notion of evolution of the environment, such that it passes through different "ideal types" devised by them. She asserted that "a major corollary is that evolution of environment is characterized by an increase in the ratio of externally induced change over internally induced change in a system's transactional interdependencies (L_{21} and L_{12})" (p.599). She also proposed an "interorganizational" integrative framework to organizations and environment that would consider the organization as part of a larger social system. For our approach to treat the agencies decision-making process as a particular case of the overall process of societal decision-making, and our initial formulation of the three decision models with regard to their interaction with the environment, we are much indebted to her thoughts.

The study of Burns and Stalker (1961) was the basic piece of work that originated the present contingency theory. The external characteristics considered in the study were the rates of change in the technology and markets of 20 industrial firms in the United Kingdom. Burns and Stalker characterized two "ideal" types of

Table I

Environment Causal Textures

Type	Characteristics	Learning Behavior and Survival Strategy	Planning Mode
1. Placid Random Environment	goals and noxients are distributed randomly and independently throughout the environment; correspond to the perfect competition market.	the survival of an organization is a function of availability of goal and the approach-avoidance operation available to the organization. There is no learning behavior involved, as there is no element of goal seeking, the organization is just conditioned.	there is no distinction between operations and strategies; the optimal strategy is the simple operation of attempting to do one's best on purely local basis; no plan involved.
2. Placid Clustered Environment	goals and noxients occur together in space and time with varying probabilities that are potentially knowable for the organization; correspond to the monopolist market.	survival of the organization becomes conditional upon its knowledge of its environment to identify clusters of goals and noxients; the learning behavior is goal directed meaningful behavior.	the choice of strategies emerge as distinctively more adaptive than choice of operations; operations become dependent on strategies; the satisfaction model is the appropriate one.
3. Disturbed Reactive Environment	it is a placid clustered environment in which there is more than one system of the same kind, and hence the environment that is relevant to one is also the survival of the other; correspond to the oligopolist market.	survival of the organization is a function of the knowledge of the environment and of the behavior of the other organizations in the environment; the learning behavior is related to the identification of the causal patterning of the environment and the possible and probable recombinations of the causal pattern, given the other organizations' behavior.	the distinction between strategy, tactic and operations become relevant. The strategies will be broader and be longer to emerge than in previous environments, taking in consideration the behavior of competing organizatio s; the rational model is he appropriated one.

Table I (cont'd)

Environment Causal Textures

Type	Characteristics	Learning Behavior and Survival Strategy	Planning Mode
4. Turbulent Environment	it is a disturbed reactive environment but with dynamic properties arising not only from the interactions; but also from the environment itself, the most important cases are when this process emerge as unplanned consequences of the actions of the constituent systems, such as: large sets of organizations' relations, interdependence between economic and other facets of the society, competition capacity dependent of R & D, and fast communication means.	the survival of an organization is a function of its capacity of reducing the turbulence to the point where the learnt responses of the disturbed reactive are again plausible; the adaptation behaviors are: superficiality, segmentation and dissociation; the directive correlation behavior is the emergence of values which have an over-riding significance for the organizations in the environment; matrix organization and systems management are ways of increasing by design the adaptiveness of the organizations.	the strategic objective become institutionalization; organizational achievement or survival is confounded with institutional success; the strategic planning becomes oriented toward a selection of the goals path that offer a maximum convergence of the interests of the other organizations involved -- the process become interorganizational; the incrementalist model is the appropriated one.

organizations -- mechanic and organic -- which were appropriated for stable environments and changing environments respectively. They concluded that effective organization of industrial resources does not follow a unique pattern, but varies in significant proportion on the environment factors considered.

Woodward (1965) studied the characteristics of the technology, existing management practices, and business efficiency of 100 firms in the United Kingdom. Her main conclusion was that the pattern of management varied according to the technology used in the technology used in the production system, and the better the adaptation of the organization structure to teh technology employed, the better the business performance of the firms. She also concluded that "the widely accepted assumption that there are principles of management valid for all types of production systems seemed very doubtful..."

Udy (1965) studied the relationship between technology and organization structure in non-industrial societies, using a sample of 426 organizations from all parts of the world. His major conclusion was that authority, division of labor, solidarity, ownership, and recruitment could be explained by technology alone. Although his study was in non-industrial societies, it lent large scale cross-cultural support to the hypothesis that organizations immersed in different task-environments must be structured differently.

Lawrence and Lorsch (1967), drawing primarily upon Burns and Stalker, Woodward, and Udy, formally proposed a contingency theory for organization structures and tested it. Their main conclusion was that "the states of differentiation and integration in effective organizations will differ depending on the demands of the particular environment. In a more diverse and dynamic field, ..., effective organizations have to be highly differentiated and highly integrated. In a more stable and less diverse environment, ..., effective organizations have to be less differentiated, but they still achieve a high degree of integration" (p. 108). The environment characteristic they used to classify environment settings was uncertainty of scientific, marketing, and techno-economic parts of the environment.

Pugh et al (1969) have criticized the unidimensional characteristic of the above studies: "There have been few attempts, however, to relate these factors |environmental| in a comparative systematic way to the characteristic aspects of structure, for such studies would require a multivariate factorial approach in both context and structure" (p.91). Using this approach as a "superior" one, their conclusion was that organization structure was related to size, dependence on a parent organization, charter, technology, and geographic location. As pointed out by Pfeffer (1978, pp. 129-130) the controversy over the one multi-dimensionality of the environment is far from over. In this study an intermediate approach to the subject was taken -- two dimensions were assumed (complexity and rate of change) derived logically instead of through factor analysis, because "using factor analysis with ortogonal rotation to test whether bureaucracy |or environment| is a unidimensional or multidimensional concept tends |by intrinsic characteristics of the method| to presuppose the result..." Pfeffer (1978, p.130).

Duncan (1972) represented the merging of both perspectives, the causal texture and environment as external factors affecting the organization structure. For the first time an attempt was made to define environment characteristics and the perceptual image of the environment factors as distinct objects. He used the concept of "perceived uncertainty" as a measure of the factors affecting the organization, following Lawrence and Lorsch, but relating it to managers' verbalization of uncertainty. He identified three components of uncertainty: (a) the lack of information with regard to environment factors associated with a given decision situation; (b) the uncertainty of the outcome of a specific decision in terms of affecting the organization's results; and (c) the inability to assign probabilities to factors in regard to possible results.

His operationalization of environment was: "environment is thought of as the totality of physical and social factors that are taken directly into consideration in the decision-making behavior of individuals in the organization". He identified 25 factors which were common to the 22 decision units he studied. Based upon Emery and Trist, Terreberry and others, he defined two environment dimensions: (a) simple-complex, and (b) static-dynamic dimensions. Table II summarizes his measurement criteria for these dimensions.

He concluded that (a) dynamic-complex environments provided the greatest perceived uncertainty, (b) the static-simple environment provided the least perceived uncertainty, (c) no significant differences with regard to perceived uncertainty were found between the static-complex and the dynamic-simple environments, and (d) the static-dynamic dimension was found to be the more important contributor to perceived uncertainty.

In the present work much will be drawn from Duncan's study. However, non-reactive measures will be used instead of reactive instruments: the factors will be identified on the basis of archival methods rather than through perceptions of decision-makers, and no concept of uncertainty will be used. This point will be discussed later.

The works of Tosi et al (1973) and Downey and Slocum (1975) were primarily replications, methodological discussions and revisions of the work of Duncan and Lawrence and Lorsch. But the contribution of Tosi, Downey and Slocum was so influential that there has been no major work published in the field since. Tosi et al have replicated the work of Lawrence and Lorsch and shown the inadequacies of the uncertainty instrument and scales they used. Downey and Slocum examined "the conceptual and methodolical adequacy of Duncan's uncertainty instrument, compare |d| the uncertainty instruments of Lawrence and Lorsch and Duncan, and replicate |d| Duncan's analysis of his complexity-dynamic hypothesis" (pp. 613-614). They criticized the non-standardization of the scales used by Duncan because the subscales scoring was highly dissimilar, introducing unintended weighting in favor of scales with higher possible scores. The

Table II

Measurement Criteria for Environment Dimensions

Dimension	Sub-dimensions	Measure of Sub-dimensions	General Index
Simple-Complex	1. number of factors involved (F)	average score attributed by decision unit members	simple-complex index =
	2. homogeneity of the factors (C)	number of environment components the factors belong to	$= F \cdot C^2$
Static-Dynamic	1. degree of stability of factors affecting a decision over time (S)	average of the sum of scores, for each factor, attributed by decision unit member	static-dynamic index = $S + f$
	2. frequency in which decision unit members take in consideration new and different environment factors (f)	average score attributed by decision unit members	

Source: Duncan, *op. cit.*, pp. 314-317.

findings were: (a) Lawrence and Lorsch's uncertainty subscales were not internally reliable; they were reconceptualized in order to proceed with the study; (b) Duncan's uncertainty scales using standardization were found reliable, except in one subscale; (c) Lawrence and Lorsch and Duncan's instruments were found not to correlate, meaning that they measure different dimensions, concepts; (d) the uncertainty measures derived from both instruments were found to be not correlated to four criterion uncertainty measures used to construct validity of the uncertainty instruments. Therefore, they concluded that either both instruments have no validity, or the criterion measures are inadequate or inaccurate; and (e) their replication of Duncan's study does not support Duncan's results, and, in fact, suggests that perceived environment complexity might be inversely related to uncertainty perception.

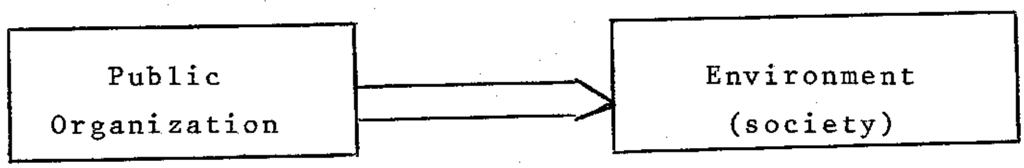
Perhaps their final comments might have been responsible in part for the effects their work generated:

> *Beyond the methodological adequacy of specific research instruments, the inconsistent results obtained in this study between Lawrence and Lorsch's and Duncan's uncertainty measures raise even more serious questions. Uncertainty concepts as presently used in organization theory involve much ambiquity. This does not mean all contingency theory need be restricted to one meaning for uncertainty. Moreover, it does not mean that contingency theory must wait for the development of the one meaning of uncertainty. These interpretations would reduce theory development to a pedantic exercise. The findings and discussions presented, however, should serve to place the researcher on guard against at least some potential pitfalls involved in current uncertainty conceptualizations and their application (p.628).*

In a previous work, Bento (1980) has presented an overall classification for the societal decision making models that are to be used here.

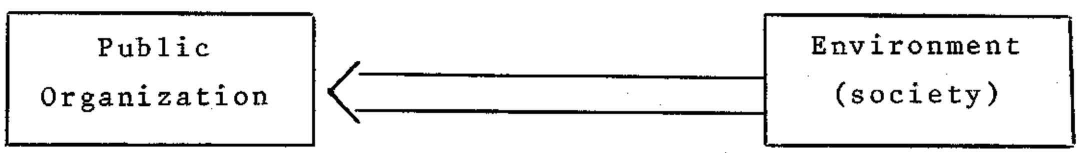
There are at least four theories explaining the process of societal decision-making: (a) bureaucratic theory, (b) ecological theory, (c) analytical or sinoptic theory, and (d) contingency theory.

Bureaucratic Theory: Decision-making in public organizations affects the environment but is remotely affected by it. Decision-making is internal to the bureaucracy, relying on the dynamics of the organizational life and on the cognitive and informational constraints existing in the turbulent society we live in.



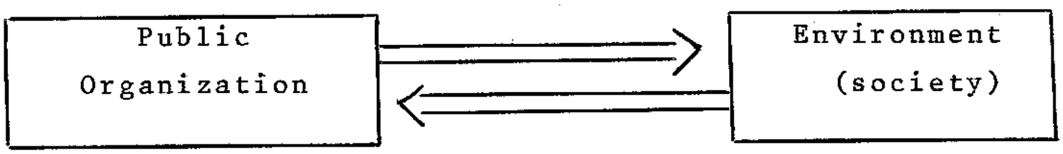
The "Politics of bureaucracy" is the best explanation of public policies being enacted by public organizations.

Ecological Theory: Decision-making in the environment affects public organizations but is remotely affected by them. Decision-making is external to public organizations, and public policies and services reflect the socio-economic characteristics of the environment, the society.



The demand for services and "consumer" satisfaction is the best explanation of public policies which reflect the satisfaction of societal needs by public services and goods.

Analytical Theory: The decision-making process of public organizations affects and is affected by the environment. The decision-making is internal but based on externally determined problems and issues of the society.



The rational analysis of societal problems -- the definition of "public interest" or a societal "welfare function", -- and the definition of alternatives to cope with them, are the best explanation of public policies.

Contingency Theory: The type of relationship between the public organization and society in the decision-making process depends upon the characteristics of the society in which the organization is immersed. There is no such thing as the best explanation; one theory will explain the relationship of organization-environment to each set of circumstances better than others. For the purpose of this research the contingency theory is also proposed. It will use all of the above theories as possible explanations, depending upon the characteristics of the environment as follows (Emery & Trist, 1965, 1972): (a) bureaucratic theory in turbulent environments, (b) ecological theory in reactive environments, and (c) analytical theory in disturbed-reactive environments.

To verify and "prove" a societal decision-making contingency theory requires a test of the following conditions:

Necessary: There are at least two different models to explain the societal decision-making process in that model i has superior explanatory power over model j in environment i, and model j has superior explanatory power over model i in environment j.

Sufficiency: There are at least two types of "causal textures" of the environment that logically imply different relations between public organizations and society in the societal decision-making process.

This research, alhough still exploratory, will test the sufficient condition of the contingency theory. The sufficient condition will be studied by identifying a series of environment settings through the characteristics of the local communities of the 13 cities to be studied. A set of 17 environment factors is used to describe these communities, including physical, social, and economic characteristics attributes. The relevant factors -- as measured by their association with the societal decision-making process, or its surrogate, the budgets -- to each environment space of each agency will be identified. The environment settings will then be classified as to type, and the relationship of these types to the society decision-making ones will be measured.

II. PAST RESEARCH

The studies on the environment using the concepts of causal texture, or organizational development as adaptation to the environment, have been conducted primarily with regard to business organizations. The literature is reasonably scarce with regard to the application of these concepts to the study of the environment of public organizations. In the case of organization development theory, it is important to note that many studies exist regarding the "organization" aspect of public organizations; that is processes of differentation and integrations, be it as adaptations to social changes or new technologies, etc. In this research we are not concerned with the organization side of organization development, but rather with the "environment" side -- the identification of the environment factors which affect public organizations and public policy.

The empirical studies dominating the literature are of the ecological theory type. Since we have already reviewed the main works of this theory in a previous work (Bento, 1980) we are going to limit the review to studies that either follow the new concepts -- causal texture or organization development -- or that can be interpreted as having similar views of the environment, even though they might come from a different tradition or school of thought. Unlike other parts of this research, no claim of representativeness can be made of the studies to be reviewed as "past research". This is due to the fact that it is too early in the "life-cycle" of both theories to identify the works that will be generated by these new paradigms. Nevertheless, I do believe that the works selected constitute germinative ideas towards the development of these theories with regard to public organizations. The present research is also an attempt to provide ideas on how to apply the causal texture theory to the study of the environment of public organizations.

Organization Development Theory: Three different approaches are evolving in the study of the environment: case analysis, relationship between structure and environment factors, and identification and measurement of the "task environment" -- the interorganizational environment.

Pfeffer (1978, pp. 195-221) has used case analysis to study the environment of (public) universities. He identified the basic factors in the environment related to the universities, governance and the conflicting groups in the environment that influence this governance -- the students, the alumni, the legislature and board of regents, the state board of education or educational planning, and the population at large or taxpayers. He discussed the way the university administration copes, both in terms of power and organization structure, with these influences of the environment.

Friend, Power and Yewlett (1974) were initiators of the analysis of public policy through the inter-organizational relations, which they "mapped" as shown in Figure 5. They have defined a compreensive model for the policy system -- "any set of organizational and inter-personal managements which has envolved to deal with some identifiable class of decision problems" (ibidem, p.24) -- and using this model and a technique called AIDA -- Analysis of Interconnected Decision Areas -- they studied the case of the negotiation for the "Town Expansion Agreement" at Droitwich, England, 1959-1963. Their results are much more descriptive of the approach and the technique, rather than of any specific conclusions

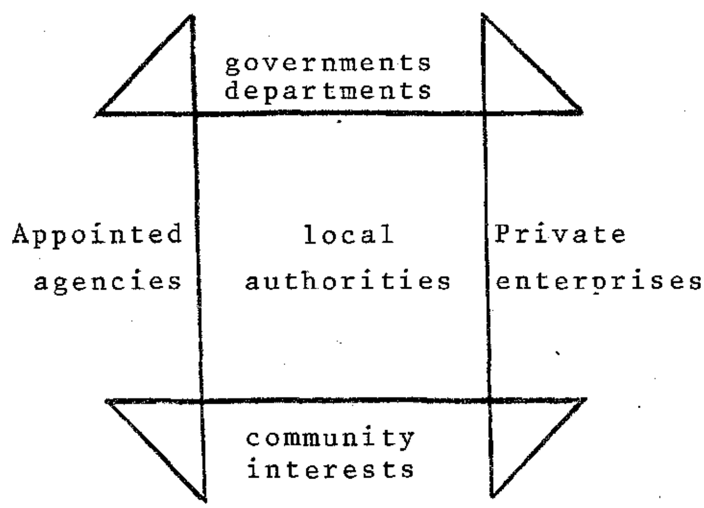


Figure 5
An Institutional Map

regarding specific factors. Nevertheless, they were able to illustrate the interrelationship of the various organizations participating in the policy process, based on the model referred to previously and depicted in Figure 6 of the policy system. A detailed review of this model and of the experiment performed, given its complexities and characteristics, is beyond the scope of this study.

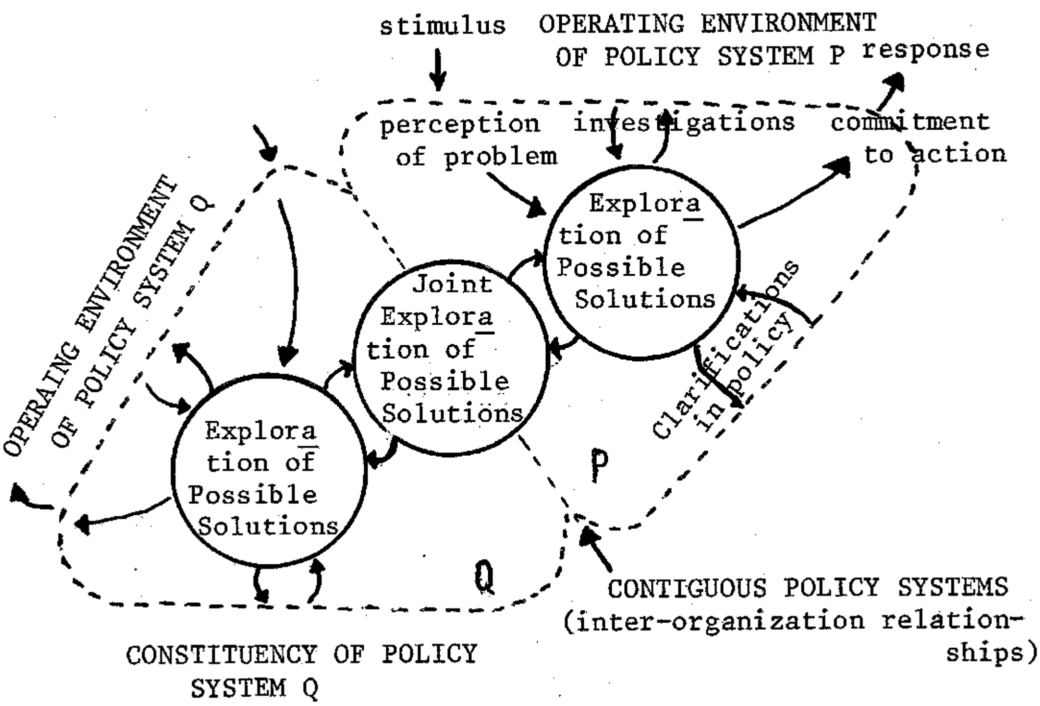


Figure 6
The Policy System Model
Source: ibidem, pp. 26, 32, 38 (adapted)

Nuehring (1978) studied 30 community mental health centers (CMHCs) in Region IV of the office of the Department of Health, Education and Welfare, in Atlanta, Georgia, in 1973. Using factor analysis, six types of task environment patterns -- inter-organizational relations -- were identified and correlated with aspects of the organizational context. Three of the task environment patterns were found to be related to contextual aspects of the CMHCs. The "entrepreneurial" and "collaborative" environments were characteristic of privately sponsored CMHCs, while "altruistic" task environment patterns were characteristic of rural CMHCs. But "the major implication of this study is that it establishes the existence of diversity among TEs in some specific and empirical... ways, and suggests the focal organizational contexts in which certain patterns may be most feasible" (ibidem, p. 441).

For example, the studies of Dewar and Hage (1978) and Glisson (1978) on human services organizations -- comprising correctional, aged, welfare, mental health, mental retardation, children, drug abuse services, etc.-- in regard organization structure and technology as well as other aspects, are frontier studies of the environment as represented by organizational factors. This type of study is a direct application and refinement of the studies of Burns, Stalker and Woodward on the public sector, and looks for the prevailing relationships among various organization characteristics and the processes of differentiation and integration. Some of these studies shed light on understanding environmental influences because they use variables internal (to the organization) that reflect environment characteristics -- for example, technology and market competition and characteristics.

Much remains to be done in terms of empirical research before a systematic body of knowledge evolves in this tradition as an integrated view of the environment of public organizations.

<u>Causal Texture Theory</u>: To my knowledge no significant empirical study has been made in the public sector using this theory explicitly. The works of Cnudde and McCrone (1969), Tompkins (1975) and Shepard and Godwin (1975), can be interpreted as attempts to depict the relationships of environmental variables of public organizations. Starting with Easton (1965) a series of hipotheses have been made with regard to variables in the environment of public organizations and their relationships to policy outputs. While the main concern of these studies were with the "determinants" of public policy, they identified a series of variables in the environment --

for example, industrialization, income, ethnicity, interparty competition, voter turnout, family life structure, etc.-- and, in the process of studying the relationship of these variables to policy outputs, they have studied their relationships. In fact, the works we referred to above (Cnudde and McCrone, etc.) were much more concerned with the relationships between the political variables and socioeconomic variables, as explanatory factors to policy, than to determining their relationship to policy outputs. In this sense we can see these studies as moving toward the identification of the causal texture of the public organization's environment.

III. RESEARCH HYPOTHESIS

The overall research question addressed by this research is:

> Is the sufficient condition for a societal decision-making contingency theory satisfied in the cities of California?

The data on the societal decision making models came from Bento (1980). Table III summarizes the results obtained in the classification of the cities studied by decision model found to explain the local departments/divisions behavior in regard to public policies enactment.

The data for the environment study came primarily from official statistics published in the California Statistical Abstract regarding environment factors, and the Annual Report of Financial Transactions Concerning Cities of California.

The assumptions that predicate this part of the study are quite different in nature from similar studies and previous research, given the objectives of the present work.

In the first place, the environment is conceived as "the totality of physical and socioeconomic factors that <u>in practice</u> affects the societal decision-making process of a public organization". Instead of using the perception of decision-makers as a source of measurement, the traces left behind by society in the decision-making process, namely, budget allocations, are used. The environment factors that characterize a society are measured throught statistics of these characteristics. So that, the environment factors that belong to the environment space of a public organization are those that better explain, affect, or relate to their specifics decisions or their surrogates, the budgets.

Table III

Decision Models by City Frequency

THEORY / CITY	BUREAUCRATIC	ECOLOGICAL	ANALYTICAL
Alameda	5	2	0
Alhambra	3	3	1
Berkeley	5	1	1
Compton	2	3	2
Long Beach	5	2	0
Los Angeles	3	2	2
Oakland	5	2	0
Sacramento	7	0	0
San Diego	4	2	1
San Francisco	4	3	0
San Jose	7	0	0
Santa Ana	1	4	2
Whittier	4	1	2
Total	55	25	11
% of Total	60.4	27.5	12.1

Source: Bento (1980, p.54).

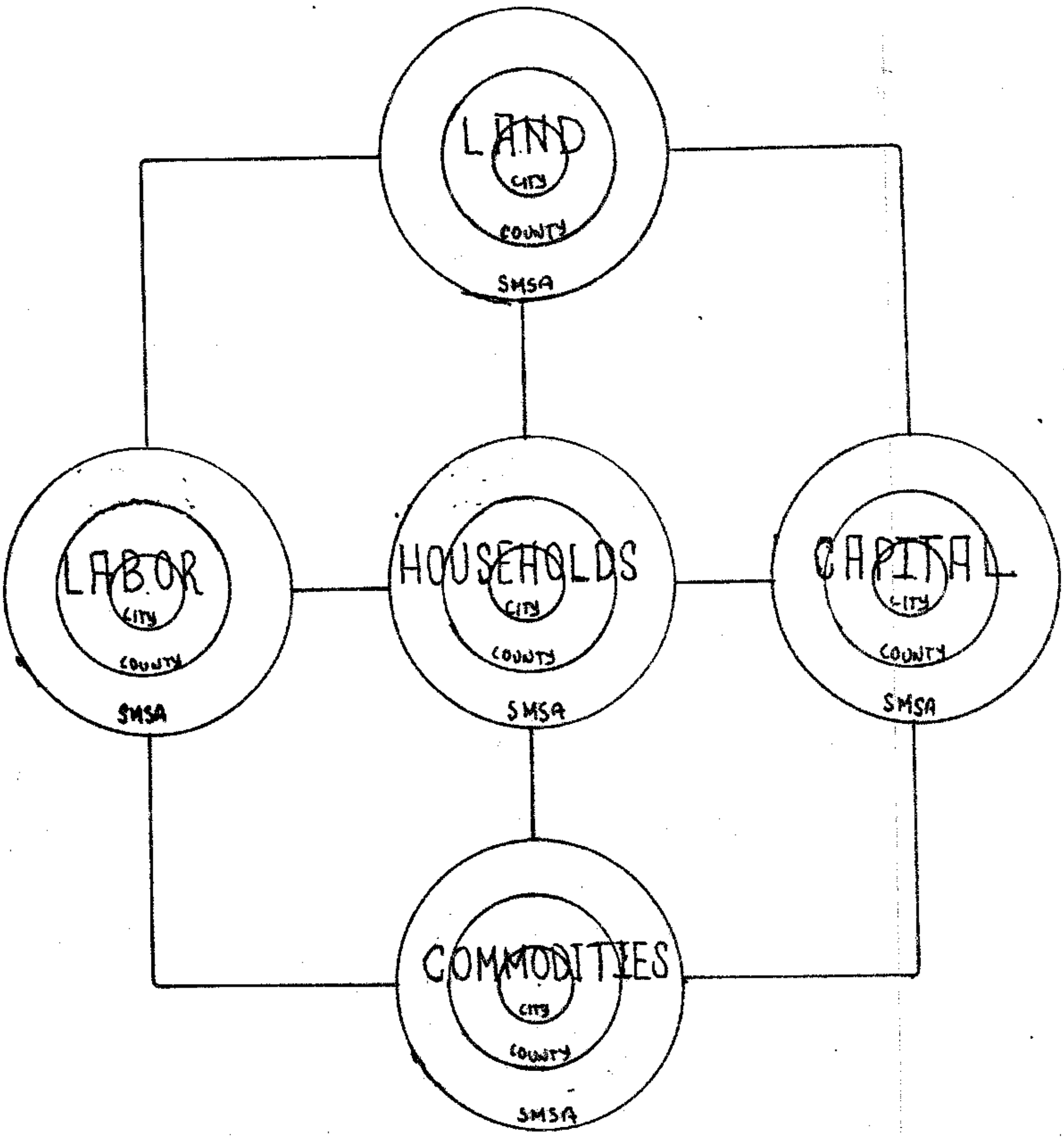


Figure 7
Environment Model

that are significant between the infrastructure variables and policy outputs, we can be assured that they would be higher if we had not ommited the superstructure variables (considering the direct and indirect effects).

The problem of feedback from public organizations to

The model of the environment assumed came from the tradition of Economics, but is adapted to the reality of local government. Economic relationships do not occur in a vacuum, except in some physical instance. Therefore, data from the city, as well as the country, and SMSA to which the local government belongs were assumed to be also relevant. Figure 7 summarizes the main components of the environment model which is assumed, and shows the various layers of physical influences affecting public organizations. What is presented as one component --let's say labor -- in fact occurs in part in each of the layers considered. Although the scope of this research did not allow us to pursue a better understanding of the relationships of the main components of the environment to the specific physical instance where they occur, it seems to me that there do exist, for the most part, instances where each of the major components take place. For example, the labor component is a phenomenon that can only be analyzed in terms of SMSA, probably because of labor force mobility, and because the proximity, and means of transportation make it impossible to be limited to the legal, and somewhat arbitrary, limits of a city.

From a theoretical standpoint the environment model which is assumed is an oversimplification because political and social variables other than the economic ones were not considered, nor was the possible feedback from departments to the environment components. The first part of the problem -- the omission of superstructure variables -- might have the effect of diminishing the degree of association between the values of the variables of the infrastructure and the values of the policy outputs. But the problems of introducing representative variables of the superstructure which is well documented by the extensive literature on the subject and wich was reviewed previously -- are greater than what we assume we will lose by omitting them. Given the exploratory nature of this research, it was assumed that the results we would obtain would be underestimations of those we would have if we included representative variables of the superstructure. Therefore, if we obtain measures of association the environment threatens our results more seriously. In the present situation we will only be able to measure the net effect of two flows -- from the environment to the departments and vice-versa. (See Figure 8). Consequently, we might be under or over-estimating the level of relationship between the environment and the departments. Again, given the exploratory nature of this study, the problems associated with estimating simultaneous equations in a large number of cases -- 91 departments and 17 environmental factors -- are beyond the scope of this research. As will be more fully discussed in the methodology section, we are already estimating, 3,185 equations using step-wise regression, thus qualifying this study as a major effort to tackle the problem. Simultaneous equations treatment in the present case would be burdensome in view of the fact that we have no estimate of any improvement in the results. Therefore, our results should be qualified by using the net effect of the environment on the policy output of the departments.

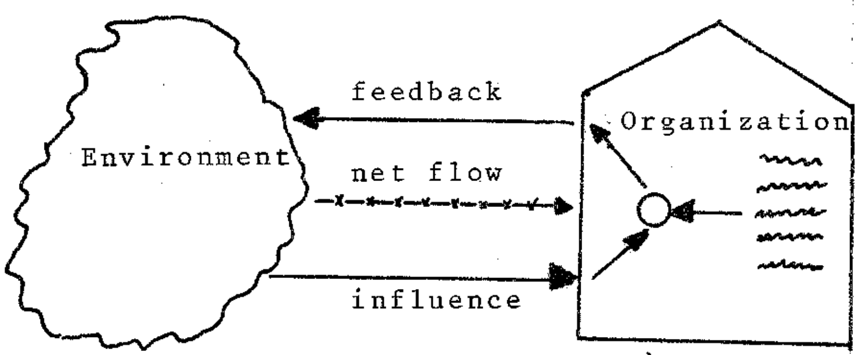


Figure 8
Net Flow From Environment

Table IV shows the specific factors used to measure the main components of the environment, as well as the layer of the environment to which each factor belongs. These factors except for political variables are those which seem to be relevant to the policy outputs in the previously reviewed literature of the Ecological Theory.

Given the definition of environment assumed in this research and the set of factors shown in Table IV, the environment space of a given department is operationalized as:

> *the subset of environment factors found significant to explain policy output -- the budgets -- in a step-wise regression of all factors in Table IV with the budgets.*

We also hypothesize that different departments will have different subsets of environment factors as best explanatory variables, given the different characteristics of the tasks performed by each department. Also, the order of importance of these factors will be different to explain the budgets of different departments. It is beyond the scope of this research to establish the possible types of relationships that might exist between each department and a given configuration of factors of the department environment space. All we will try to assure is that different patterns do exist in the population. In order to do so, let us define P -- the production function of a given department environment space -- as: $P = f(K,L,l)$, where K stands for capital, L for labor, and l for land. In general, three possible configurations can be thought to exist relating P, H (households), and Co (commodities): (a) $H \rightarrow P \rightarrow Co$; (b) $P \rightarrow Co \rightarrow H$; and (c) $Co \rightarrow H \rightarrow P$. Therefore, for the purposes of this research, this hypothesis will be tested by verifying the existence of significantly different occurrences of the above patterns in the population.

Following Duncan (1972) we will use complexity and rate of change as dimensions of the environment. Complexity -- the

Table IV

Environment Components and Factors

Component	Layer	Factor
LABOR	SMSA	Labor force
	SMSA	Unemployment
	SMSA	Mfg. avg. weekly wages and salaries
CAPITAL	City	Gross value of property
	County	Net property value
	County	Mfg. capital expenditures
LAND	City	Land value
	City	Value of land improvement
	County	Mileage of roads per 1,000 inhabitants
	County	Climate variation - precipitation (avg.)
	County	Water area per 1,000 inhabitants
COMMODITIES	County	Taxable sales (Retail and Wholesale sales)
	County	Mfg. value added
	County	Agriculture, Forestry, and Fishing indicator (labor force)
HOUSEHOLDS	City	Population
	County	Population density
	County	Income per capita

Notes:

(1) The items of gross and net value of property include the values of the capital of corporations owned by individuals as well as real estate property also owned by the individuals. The net value of property reflects the allowances provided by state law with regard to business inventories, etc.

(2) Land value has been used as a surrogate to the area of the city and its usage -- assuming that the price of land is higher when its usage is urban, and lower when rural. Therefore the larger the area, and the more urbanized it is, the higher the land value.

(3) No aggregated measure of the primary sector output is available. Therefore we used the labor force -- an input measure -- as the output surrogate to the Agriculture, Forestry and Fishing sector.

level of connection between environment parts -- will be measured by the number of environment factors that are correlated in a given department environment space. The complexity index is defined as follows:

C index = C/F, where:

C=the number of correlated factors in a given department environment space.

F=the total number of factors found significant in a given department environment space.

Rate of change -- the degree of change in the number of parts of an environment -- will be measured by the number of non-common environment factors in two temporally different environment spaces of a given department. The rate of change index is defined as follows:

R index = D/F', where:

D=the number of non-common factors in the two temporally different environment spaces of a given department.

F'=the maximum number of factors found significant to explain the policy outputs in the two different environment spaces of a given departments.

Using these two dimensions, the types of causal texture of the environment will be operationalized as seen in Table V.

Here, unlike Duncan, The Placid-Random environment is taken as defined by Emery and Trist and Simon -- the parts of the

Table V

Environment Types Operationalization

TYPES DIMENSIONS	COMPLEXITY	RATE OF CHANGE
Placid-Random	0	<.5
Reactive	<.5	<.5
Disturbed-Reactive	<.5	>.5
Turbulent	>.5	>.5

environment are randomly distributed in the environment space; therefore there is no relationship between the parts of the environment. If, using our operationalization, there are correlations between environment factors in a given department environment space, then the Placid-Random causal texture cannot be assumed to exist. This is a large departure from Duncan's approach, because he considered low complexity instead of no complexity. And given his method to categorize the environment, he always finished with some environments classified as Placid-Random; while we will have environments classified as such only if no complexity is found in the given environment area.

Furthermore, he categorized environment dimensions using a relative measure -- the average of the sample. And again, by construction, he would always end up with some environments classified by each type. In this research we will use the theoretical, or absolute, average of the population (.5), so that we can see through the results where the environment types are clustered, and where no cases do occur. This is possible because both the complexity and the rate of change indexes are measured in a scale that varies between 0 and 1, which can be easily deduced from their definitions.

Finally, following Woodward, Lawrence and Lorsch, etc. we assume that the results of our study could be misleading if an agency were using an inappropriate decision-making model with regard to the environment it confronts, if we do not control for perfomance of the agencies. We should be able to distinguish between decision-making models that make the organization perform poorly, and those which make it perform properly. As pointed out by Anthony and Herzlinger (1975, pp. 39-52 and 133-156), in case of public organizations, performance measurement is an issue yet to be resolved. In the specific case, we also have the problem of circularity of the measures, because environment and budgets can be seen both as a cause and a consequence. Thus no measure of effectiveness -- measures of impact on environment factors on public policies -- can be used. Direct measures of efficiency are also hard to define, considering that budgets can also be considered measures of outputs produced by agencies. Therefore, although recognizing the possible adverse impact of not controlling for performance, we will, again, assume that we can afford to have this limitation, given the problems we would have to avoid it.

We are now ready to formalize the hypothesis of this research:

1. Different departments will have different subsets of environment factors which are the best explanatory variables of the policy outputs: This hypothesis will be tested by verifying the existence of significantly different occurrence of the patterns combining Households, Production Function, and Commodities in the population.

2. There are at least three types of environmental causal texture influencing the departments' policy outputs: This hypothesis will be tested by the significative occurrence of cases of the categories of causal texture. Given the results obtained previously by the ecological theory, it is also hypothesized that no Placid-Random is to be found as environment of public organizations.

3. There are at least three types of societal decision-making associated with at least three types of environment: specifically our hypothesis is that each type of societal decision-making is associated with one type of environment shown bellow:

SDM type	Environment type
Ecological	Reactive
Bureaucratic	Turbulent
Analytical	Disturbed-Reactive

IV. RESEARCH METHODOLOGY

The methodology used to determine the decision models explaining the local departments/divisions behavior in regard to public policies enactment is described in Bento (1980, pp.42-53).

The environment factors data come from the California Statistical Abstract of 1958 to 1979 and the Annual Report Financial Transactions Concerning Cities of California, Office of State Controller, 1958/59 to 1979.

In order to measure the dimensions of the environment and to classify agencies accordingly, the following methodology will be used:

1. F computation - a step-wise regression analysis will be conducted using the following equation:

$$Y_t^* = \sum_{i=1}^{17} a_i \cdot f_{it} + e_t; \text{ where:}$$

Y_t^* = budget to the year t

f_{it} = statistic of the factor i in the year t

e_t = the error term in year t

Next, we will look for the above equation formulation that maximizes the ARSQ and minimizes the standard error of the estimation as the best fit. The maximum number of formulations possible for the above equation using step-wise regression is seventeen for each department. The equations will not necessarily be formulated in this way, because after a certain point no improvement in the F statistic is possible and the SPSS system will automatically stop the estimates.

F will be equal to the number of factors in the best fitted formulation of the above equation.

This hypothesis will be measured through the strength of the relationship between S_i and E_i, where:

S_i=societal decision-making type = 1- Ecological
2- Analytical
3- Bureaucratic

E_i=environment type = 1- Reactive
2- Disturbed-Reative
3- Turbulent

2. C computation - Again, using the best fitted formulation of the above equation, the number of factors, among the ones found significant, with correlation coeficients with other significant factors greater than or equal to 3 will be counted, and C will be equal to this value.

3. Complexity Index - We will compute C/F, and will categorize the results as: 0, if C/F equal to 0; 1, if C/F $\leq$ .5; and 2, if C/F > .5.

4. Environment patterns - Also, using the best fitted formulation of the above equation, the factors found significant will be ordered according to each factor's contribution to the explanation of the variance of the budgets, from 1 (the most important) to F (the least important). Then an average of importance for each environment component will be computed, and the resulting statistic will be assumed to be the value of K, L, 1, H, and Co. P will be computed by the formula: P= (K+L+1) /3. Finally, the three patterns hypothesized will be counted and tested for significance using X^2 and Smirnov-Kolmogorov statistics. Hereinafter the three patterns will be named as follows:

Pattern	Name
H -- P -- Co	Model 1
P -- Co -- H	Model 2
Co -- H -- P	Model 3

In fact, a weak form of the three patterns will be used. Instead of the full ordering shown above, we will use one that, for example, will assure that H is more important than P and Co, but the ordering of P and Co will not be checked. So that, in the same example, model 1 will represent not only the Pattern H -- P -- Co, but also the pattern H -- Co -- P. This simplification does not change our main purpose which is to show that different environment subsets of environment factors do occur in different departments.

5. F'Computation - The time series for the environment factors will be divided in two sub-samples: (a) one from 1950, 1958 to 1967, and (b) another from 1968 to 1978. Using the same equation shown in the F computation step two step-wise regression analysis will be performed in each of these sub-samples. The number of factors found significant in each sub-sample will be counted -- F_1 and F_2. F'will be equal to the larger of the two numbers of factors ($F' = \max\{F_1, F_2\}$).

6. D computation - D will be equal to the number of non-common factors in the formulation of the basic equation where the number of factors is equal to F'.

7. Rate of Change index - we will compute D/F' and will classify the results as: 0, if D/F' equal to 0; 1, if $D/F' \leq .5$; and 2, if $D/F' > .5$.

8. Classification of department environments - Using the schema defined in Table V and the values obtained for the Complexity and Rate of Change indexes, the environment of the departments will be defined. The significance of the occurrence of the different cases of environment types will be then tested, using contingency analysis and the X^2 statistic.

At this point we finish testing the minor hypothesis of this part of the research and guarantee the existence of significant environment types by departments -- hypothesis 1 and 2. We are ready to proceed to test the sufficient condition -- hypothesis 3.

To test the sufficient hypothesis we should note that we are confronted with a situation in which:

(a) no assumptions of normality or any exact form of the population distribution function can be made, either to the environment, or to societal decision making.

(b) both variables -- S and E -- are ordinal scales at least with regard to complexity dimension.

Therefore we are limited to nonparametric, ordinal tests and measures. This type of measure is in a developmental stage (Hildebrand et al, 1977, pp. 7-17), and the information it can provide, with regard to data analysis, is still subject to controversy. But, to me, there is no sense in using an interval type of measures to study an ordinal type of data, as did Duncan (1972, pp. 322-324)and Dowey et al (1975, p. 63). The numbers we associate with ordinal data have no meaning, other than to indicate a rank among states of the observed variables -- it is not a count or attribute of the variable itself.

The measures we will be using are the tau_B (τ_B) and Somer's D (symetric) derived from rank-order correlations of the variables, as described by Blalock (1972, pp. 415-426). These measures will be used to establish the strength of association of the variables, in this case S and E, by the following procedure:

1. The results from the societal decision-making and environment classification procedures will be brought together.

2. A contingency analysis of S and E will be conducted. The values of tau and d will be computed and their significance tested. Then, we will be able not only to test the hypothesis, but also to state the strenght of the relationships between S and E.

3. Finally, we should compare the results of using tau -- non parametric -- with ones that would be obtained if we used r-- parametric --. If the numbers we have used to represent our categories do not introduce pathological case, then tau and r should be close; otherwise we will observe wild differences between these measures.

A Word of caution should be introduced here because the results we are to analyse in light of the present methodology do not account for influences of possible relevant variables other than the environment to explain societal decision-making other the variables.

V. RESULTS AND CONCLUSIONS

The overall results of this research confirm our hypothesis that the sufficient condition of the contingency theory occurs in practice as can be seen in Table VI. There is evidence to conclude that the type of causal texture influences the type of societal decision-making taking place in a given public organization.

The rank correlation between environment type and societal decision-making is .43 and is significant at .00001. The Pearson's r was found to be .45722, significant at the .00001 level, and although not quite different from Kendall's Tau, it tends to superestimate the strength of the relationship between the two variables. Since both τ_B and r are close we conclude that the numbers we assigned to the types of environment and decision-making did not introduce any pathological behavior with regard to the common treatment of the variables through parametric statistics.

It is important to note that 57 of the 91 cases (63%) conform perfectly to our hypothesis. This can be seen in the diagonal of the above contingency table. The most striking deviation from our hypothesis are the cases where societal decision-making was incremental and the environment reactive. This occurs in 19% of the cases. Since no control for efficiency or effectiveness was feasible within the scope of this research, we are left with the question of the effects of this abnormality on the performance of the 17 departments in this situation. The other deviations can well be understood as resulting from the crudeness of our measures, which are still exploratory in nature, other types of measurement and random errors, given their small size.

There is evidence to say that different types of causal texture do occur in the environment space of the departments studied. As can be seen in Table VII, 43% of the cases were found to be Reactive, 20% Disturbed-Reactive, and 37% to be Turbulent.

Table VI

Summary of the Results

SDM	Count / Row Pct / Col Pct	Env: Reactive 1	Disturbed -Reactive 2	Turbulent 3	Row Total
Satisficing	1	18	5	2	25
		72.0	20.0	8.0	27.5
		46.2	27.8	5.9	
Rational	2	4	7	0	11
		36.4	63.6	0.0	12.1
		10.3	38.9	0.0	
Incremental	3	17	6	32	55
		30.9	10.9	58.2	60.4
		43.6	33.3	94.1	
	Column Total	39	18	34	91
		42.9	19.8	37.4	100.0

Kendall's tau B = 0.43198   Significance = 0.0000

Somers's D (symmetric) = 0.43064

Table VII

Frequency of Types of Department Environment Space by City

City	Reactive	Disturbed-Reactive	Turbulent
Alameda	2	2	3
Alhambra	6	0	1
Berkeley	2	2	3
Compton	5	1	1
Long Beach	3	1	3
Los Angeles	3	3	1
Oakland	4	1	2
Sacramento	0	1	6
San Diego	1	3	3
San Francisco	5	0	2
San Jose	2	0	5
Santa Ana	4	2	1
Whittier	2	2	3
TOTAL	39	18	34
% of Total	42.9	19.8	37.4

To measure the significance of our results a series of counter-hypotheses were considered and tested against the overall hypothesis that the three types of causal texture of the environment did exist in practice:

(a) There are only reactive causal texture environments,

(b) There are only turbulent causal texture environments,

(c) There are only reactive and turbulent environments, the results obtained for disturbed-reactive are due to random errors, and

(d) The results could have been obtained from random numbers chosen between 1 and 3.

These counter hypotheses were translated in terms of expected frequencies in each of the environments types as in Table VIII.

Using the X^2 tests we are able to reject the first three counter-hypotheses at .001 and the last at .02 levels. Therefore, it seems that the three types of environment did exist in the population.

In Appendix A the detailed results of the estimation of the complexity and rate of change indexes are shown as well as the ARSQ values for the best fitted equations and the factors ordered by explanatory power of the budget variance. In general, the ARSQ obtained were alll over .9, with very few sporadic exceptions. Therefore, we can say that a much better fit of the environment factors explaining policy outputs was found than in the case of the societal decision-making models. Table IX summarizes the relative frequency found for environment complexity and change. No department environment space was found to be with 0 or no complexity, or with zero rate of change.

Finally, there is enough evidence to say that different environment factors do occur in different departments. Table X

Table VIII

Counter-hypothesis Expected Frequencies (%) and X^2 Values

Type of Environment	Reactive Only	Turbulent Only	No Disturbed Reactive	Random Numbers
Reactive	100	0	50	33
Disturbed-Reactive	0	0	0	33
Turbulent	0	100	50	33
X^2 statistic	467.5	572.2	36.1	8.7

Table IX

Relative Frequency of Environment Complexity and Change

Level / Dimension	Complexity %	Rate of Change %
Low	45.1	42.9
High	54.9	57.1

Table X

Frequency of Environment Patterns

Model/Frequency	Absolute	Relative (%)
1	32	35.2
2	23	25.3
3	36	39.6

summarizes the absolute and relative frequency of occurrences of the three models of the pattern of relationship between H, P and Co.

In fact, we cannot reject the hypothesis at .25, using X^2 test (=2.93), that our sample is a random sample of the three models of patterns of the environment. This result guarantees that our sample is a representative one with regard to these different patterns of environment.

Our purpose in studying the environment of public organizations was to assure that different types of causal texture did exist in the environment space of public organizations, that these environments were different with regard to their pattern of relationships, and that they have an influence on the societal decision-making model used in a given public organization. The results obtained allow us to say that such a thing does happen in the cities studied, and given the nature of the sample, that the result can be extended to cities in California with more than 50.000 inhabitants.

Finally, the results obtained can be also seen as contributing to give a resolution, using Rittel's terminology, to an existing apparent contradiction: both internal and external factors to the public organizations have been found as the sole explanation to the policies enacted by public organizations, in different (and much replicated) empirical studies. The following table (from Sharkansky, 1975, p.21) will serve to illustrate the problem:

Coeficients of Simple Correlation Between
State Government Total General Expenditures
Per Capita (1962) Selected Independent Variables

Total population	-.32
Percentage of labor force in manufacturing	- 51
Value added by manufacturing/capita	- 38
Population density	-.30
Percentage of state and local expenditures spent by local governments	-.54
Previous state spending per capita (1957)	-.85

If one considers the first four variables as components of the "level of economic development" (as Dye, 1966), this new variables -- the socio-economic basis of the environment -- will explain the policies of state governments in approximately the same proportion as previous levels of policy -- the internal factor more related to policies (as Wildavsky, Sharkansky, among others).

It is an apparent contradiction in the sense that both are related and explain the great majority of policy variations, when it would be expected that one of the two alternative hypotheses -- internally or externally determined -- would be true and the other would be false, or a combination of them, but never either of them alone. To solve this situation we should be able to understand on a higher level what these measures represent, what type of phenomena are involved with the measures. The following schematic model of reality will serve to illustrate our argument to solve the apparent contradiction:

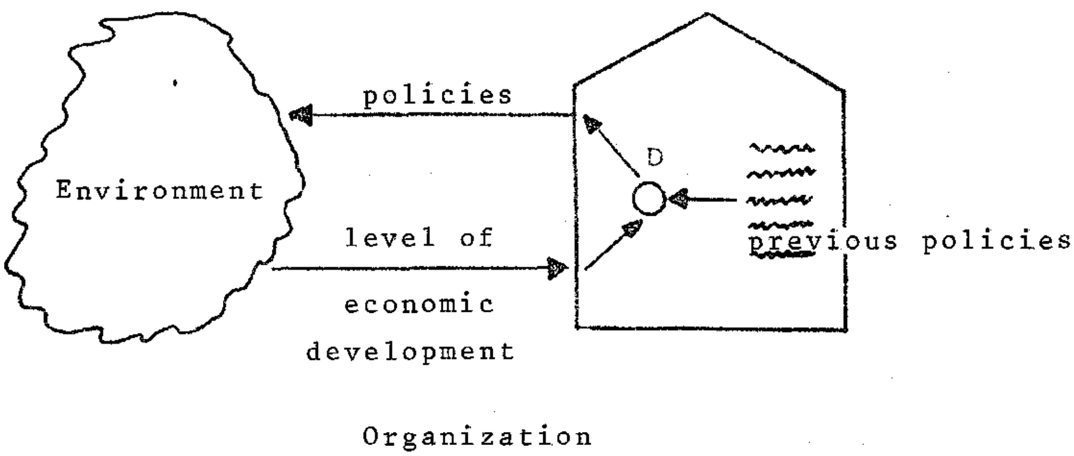


Figure 9

Environment-Organization Model

Referring to the decision point (within the public organization) -- D -- we can see the two sets of factors, variables, affecting the policy decisions. If one considers for a moment that it cannot be argued that, in general, public organizations are the reason for the existence of the environment, but rather that the environment is the reason for the existence of the organization -- to whom it is supposed to render services -- then it becomes clear that the two measures are measuring different phenomena. The correlation between policies and the level of economic development is a measure of the level of response of the organization to its environments; while the correlation between policies and previous policies is a measure of the form of the decision function acting on the point D. Furthermore, if this is true, the form of the decision function -- the way the societal decision-making is materialized through public organizations -- and the types of demands and supports the level of economic development poses upon the public organizations are the actual relevant phenomena taking place, and I will hypothesize that the former is determined, at least in part, by the latter.

It is important to note that the results obtained follow the same pattern as previous studies, if accounted by non-linearity and the new methodology introduced in this research. But, sice we separated the study of the decision function affecting policy in point D (see figure 9) from the environment influences conditioning this same function, we were able to see the two phenomena taking place by turns. The societal decision making models explaining public policies, and the environment types explaining the societal decision making models used by the local divisions/departments.

APPENDIX A

MEASURES OF THE ENVIRONMENT

City/Dept.	Labor	Capit.	Land	Commo.	House.	C	F	D	F'
Alameda									
Police	6.7	2.7	10.7	9.5	6.0	8	13	4	9
Fire	8.5	3.0	5.7	7.7	9.0	7	12	5	9
Golf Course	10.0	6.3	7.5	10.0	2.3	4	13	5	9
Library	4.0	4.0	8.6	10.5	5.0	10	13	4	8
Streets	7.5	10.0	2.0	7.0	4.0	4	9	5	9
Parks & Recreation	10.0	5.0	4.3	3.0	8.5	4	10	7	9
Bldg & Inspections	7.0	10.0	6.8	9.0	7.0	12	14	4	9
Alhambra									
Police	6.0	4.0	8.3	4.5	5.0	6	11	4	9
Fire	9.0	4.0	6.0	6.7	6.0	4	12	5	9
Buildings & Planning	3.3	1.0	10.5	5.0	7.5	5	12	3	9
Street	7.0	7.5	7.5	2.3	12.5	5	13	3	9
Sanitation	6.0	6.5	8.8	6.7	11.3	4	15	4	9
Library	6.0	4.0	9.0	11.5	6.7	7	13	4	9
Parks & Recreation	8.3	5.3	6.3	1.0	11.0	8	12	4	9
Berkeley									
Police	3.0	6.3	7.0	7.0	6.5	8	11	6	9
Fire	6.0	3.3	7.5	8.0	6.5	1	11	5	9
Health	10.7	11.0	5.2	6.0	5.7	8	14	4	9
Public Works	6.5	5.0	7.0	8.0	2.5	5	11	3	9
Recreation & Parks	9.0	4.0	7.0	5.7	2.0	4	8	4	8
Library	9.0	3.0	7.0	7.3	2.0	7	10	5	9
City Manager	1.5	6.0	7.0	9.0	3.5	4	8	4	8

MEASURES OF THE ENVIRONMENT (cont'd)

City/Dept.	Labor	Capit	Land	Commo	House	C	F	D	F'
Compton									
Police	7.0	9.0	7.5	5.0	4.5	8	12	3	9
Fire	9.0	7.5	8.0	2.0	2.7	8	11	5	9
City Attorney	8.0	10.0	6.0	2.5	5.5	6	11	3	9
Public Works	10.00	11.5	6.0	6.0	6.7	5	14	4	9
Parks & Recreation	7.0	8.0	6.5	2.5	3.5	6	10	4	9
City Manager	6.3	9.5	8.6	6.7	9.5	8	15	4	9
Buildings & Safety	4.0	6.5	7.3	1.5	6.5	3	10	6	9
Long Beach									
Police	5.3	8.7	7.3	1.5	12.0	6	13	6	9
Fire	5.0	9.0	8.8	1.5	3.0	6	12	5	9
Health	8.0	9.7	6.5	2.5	2.0	5	12	4	9
Public Service	5.0	8.0	6.7	2.0	5.0	5	10	6	9
Parks & Recreation	1.5	8.0	4.7	5.5	9.0	5	7	6	7
Planning & Building	9.0	10.3	7.5	3.0	8.5	4	14	4	9
Library	6.0	5.0	6.5	4.7	1.0	4	15	4	9
Los Angeles									
Fire	5.0	9.0	3.7	7.3	10.5	6	13	6	9
Police	6.7	10.5	9.8	6.7	2.5	10	14	2	9
Public Works	4.0	7.0	7.0	4.5	13.0	8	14	4	9
Building & Safety	3.0	8.0	4.0	5.0	9.0	5	7	5	7
Recreation & Parks	6.7	11.0	6.7	2.5	7.0	6	11	6	9
Public Util. & Trans.	8.3	5.0	6.6	3.0	10.0	9	13	3	9
Personnel	8.0	5.0	7.3	10.0	4.0	8	12	6	9

MEASURES OF THE ENVIRONMENT (cont'd)

City/Dept.	Labor	Capit	Land	Commo	House	C	F	D	F'
Oakland									
Police	6.0	6.3	7.2	10.0	10.0	8	16	3	9
Fire	8.3	6.3	11.3	7.3	4.5	10	15	4	9
Public Buildings	8.0	3.0	6.0	4.5	4.5	5	10	6	9
Public Works	8.0	5.5	4.7	6.0	10.0	5	13	5	9
Parks & Recreation	8.0	7.3	8.0	6.7	4.5	9	13	5	9
Library	7.3	7.3	10.2	9.0	10.3	8	16	3	9
Finance	5.5	1.0	4.3	5.5	9.0	7	8	3	8
Sacramento									
Police	4.0	5.0	6.0	2.0	2.0	2	4	4	4
Fire	5.0	10.0	5.0	3.0	5.7	4	9	6	9
Bldg & Inspections	6.0	4.0	6.3	7.0	7.0	5	11	5	9
Public Works	1.0	2.0	6.0	5.0	5.7	4	8	6	8
Recreation & Parks	5.0	2.0	7.5	5.0	4.3	4	9	7	9
Library	3.5	9.0	8.5	2.0	4.7	8	11	5	9
City Manager	9.3	3.5	10.0	5.0	4.3	6	12	5	9
San Diego									
Police	3.5	10.0	5.0	4.5	9.0	6	10	7	9
Fire	8.5	1.0	4.0	5.0	5.0	8	9	5	9
Bldg Inspections	8.3	5.0	4.3	6.0	8.0	6	12	4	9
Public Works	3.0	7.0	3.0	4.5	8.0	0	7	4	7
Parks & Recreation	8.0	10.0	7.5	4.0	9.7	2	14	5	9
Library	10.7	6.0	6.8	7.7	5.0	5	14	5	9
City Manager	6.0	1.0	6.7	5.3	11.0	6	11	5	9

MEASURES OF THE ENVIRONMENT (cont'd)

City/Dept.	Labor	Capit	Land	Commo	House	C	F	D	F'
San Francisco									
Police	2.0	11.0	8.0	4.7	6.5	5	10	4	9
Fire	8.7	6.3	9.3	5.3	6.5	4	15	5	9
Health	3.0	6.3	13.0	8.3	7.5	8	15	4	9
Public Works	9.0	4.0	5.5	4.5	2.0	5	11	6	9
Recreation & Parks	4.3	8.0	8.0	6.3	6.0	7	12	4	9
Library	3.3	6.0	9.5	3.0	7.5	4	12	2	9
City Attorney	9.0	12.0	6.3	2.7	6.0	2	12	2	9
San Jose									
Police	3.5	5.0	6.3	7.7	1.0	5	10	4	9
Fire	4.0	12.0	3.1	6.0	6.7	5	11	6	9
City Manager	4.3	12.0	7.3	5.0	8.0	5	11	5	9
Public Works	6.3	5.0	6.7	10.0	6.0	9	13	4	9
Parks & Recreation	7.0	5.5	5.0	5.5	2.0	4	10	5	9
Library	6.0	7.0	4.3	9.3	7.0	5	12	5	9
Property & Code Enforc.	2.0	6.7	7.5	2.5	6.5	5	10	5	9
Santa Ana									
Police	6.0	2.0	8.5	11.0	5.5	7	12	4	9
Fire	7.0	3.3	8.5	7.5	3.0	7	10	4	9
Finance	6.5	7.0	12.3	2.7	6.7	3	14	2	9
Public Works	4.0	6.3	5.5	1.0	6.5	6	9	4	9
Recreation & Parks	6.5	6.7	1.0	5.7	7.5	6	11	5	9
Library	9.0	8.0	7.0	13.0	1.5	4	15	9	9
Building Safety	10.0	5.0	7.0	7.7	9.7	11	15	6	9

MEASURES OF THE ENVIRONMENT (cont'd)

City/Dept.	Labor	Capit	Land	Commo	House	C	F	D	F'
Whittier									
Police	4.5	6.0	4.0	8.0	1.0	5	8	6	8
Fire	7.0	8.0	4.7	5.0	4.7	7	11	3	9
City Manager	5.3	6.0	5.0	10.0	6.7	1	12	5	9
Public Works	9.0	9.3	7.0	5.0	4.5	9	13	3	9
Parks & Recreation	10.0	9.0	7.5	4.7	2.3	4	9	5	9
Library	7.5	8.0	5.8	2.5	7.5	6	11	6	9
Building & Safety	8.5	3.0	6.0	4.5	3.5	3	9	5	9

APPENDIX B

GOODNESS-OF-FIT OF ENVIRONMENT EQUATION
(ARSQ)

ALAMEDA

Equation	Police	Fire	Golf Course	Library	Streets	Parks & Recreation	Bldg & Inspec.
All 22 years	.99845	.99740	.98562	.99921	.98916	.96606	.99937
First 11 years	1.00000	1.00000	.99992	.99574	.99973	.86131	.99811
Last 11 years	.99995	.99999	.99738	.99794	.99987	1.00000	.99973

Alhambra

Equation	Police	Fire	Buildings & Planning	Street	Sanitation	Library	Parks & Recrea.
All 22 years	.99720	.99721	.96197	.98280	.99611	.99175	.98941
First 11 years	.99964	1.00000	1.00000	.99836	1.00000	.99925	.99978
Last 11 years	.99997	.99939	1.00000	.99754	.99985	1.00000	.96394

Berkeley

Equation	Police	Fire	Health	Public Works	Recreation & Parks	Library	City Manager
All 22 years	.99874	.96379	.99887	.96682	.96707	.98954	.99104
First 11 years	.99980	.99999	.99962	.99997	.99855	.99970	.99989
Last 11 years	1.00000	.99977	.99924	.99998	1.00000	1.00000	.99999

Compton

Equation	Police	Fire	City Attorney	Public Works	Parks & Recreation	City Manager	Building & Safety
All 22 years	.98688	.98391	.93953	.97534	.95599	.97879	.91290
First 11 years	1.00000	1.00000	.99999	.99993	1.00000	.99045	.97044
Last 11 years	.99933	.99853	.99424	.99946	.99998	1.00000	.99998

GOODNESS-OF-FIT OF ENVIRONMENT EQUATION (cont'd)
(ARSQ)

Long Beach

Equation	Police	Fire	Health	Public Service	Park & Recreation	Planning & Building	Library
All 22 years	.99823	.99598	.99440	.99904	.98466	.97955	.97506
First 11 years	.99999	1.00000	1.00000	.99994	1.00000	1.00000	1.00000
Last 11 years	.99981	1.00000	.99883	.99961	.99913	.99973	.92512

Los Angeles

Equation	Police	Fire	Public Works	Building & Safety	Recreation & Parks	Public Util. & Transp.	Personnel
All 22 years	.99918	.99838	.99801	.99290	.99809	.98715	.99793
First 11 years	.99998	1.00000	.99997	.99998	.99999	.99998	.99644
Last 11 years	.99998	1.00000	.99994	.99870	.99893	.95026	.99997

Oakland

Equation	Police	Fire	Public Buildings	Public Works	Parks & Recreation	Library	Finance
All 22 years	.99603	.99244	.98680	.98141	.99801	.99581	.99278
First 11 years	.99994	1.00000	1.00000	.99999	.99983	1.00000	.97658
Last 11 years	.99992	.99998	1.00000	1.00000	1.00000	.99980	.99957

Sacramento

Equation	Police	Fire	Building Inspections	Public Works	Recreation & Parks	Library	City Manager
All 22 years	.99710	.99748	.97507	.97550	.99606	.99768	.97262
First 11 years	.99829	.99996	.99607	1.00000	.99993	1.00000	.99816
Last 11 years	.99999	1.00000	.99990	.99990	.99998	1.00000	.99425

San Diego

Equation	Police	Fire	Building Inspections	Street	Parks & Recreation	Library	Solid Waste
All 22 years	.99887	.99796	.99937	.64845	.99659	.99923	.99839
First 11 years	1.00000	1.00000	1.00000	.92663	.99967	.99827	.99999
Last 11 years	.99999	.99995	1.00000	.99051	.99736	.99980	.99999

GOODNESS-OF-FIT OF ENVIRONMENT EQUATION (cont'd)
(ARSQ)

San Francisco

Equation	Police	Fire	Health	Public Works	Recreation & Parks	Library	City Attorney
All 22 years	.99491	.99729	.99730	.99327	.99724	.99039	.99421
First 11 years	.99712	.99684	.99877	.99849	.99931	1.00000	.99836
Last 11 years	.99830	1.00000	1.00000	.99982	1.00000	.99998	1.00000

San Jose

Equation	Police	Fire	City Manager	Public Works	Parks & Recreation	Library	Property Code Enf
All 22 years	.99797	.99871	.98023	.99870	.99851	.99626	.92989
First 11 years	.99997	.99993	.99817	1.00000	.99994	.99957	.99885
Last 11 years	.99914	.99728	1.00000	.99955	1.00000	.99907	.99926

Santa Ana

Equation	Police	Fire	Finance	Public Works	Recreation & Parks	Library	Building Safety
All 22 years	.99148	.99785	.98995	.98845	.99278	.99911	.99806
First 11 years	1.00000	.99999	.93135	.99968	.99997	.99999	.99972
Last 11 years	1.00000	.99999	1.00000	.99574	1.00000	.99868	.99990

Whittier

Equation	Police	Fire	City Manager	Public Works	Parks & Recreation	Library	Building & Safety
All 22 years	.99330	.99196	.88745	.98303	.99719	.99502	.98678
First 11 years	.99963	.99999	.99970	.99957	.99998	1.00000	1.00000
Last 11 years	1.00000	.99994	1.00000	.99949	1.00000	1.00000	1.00000

DEPARTMENT'S ENVIRONMENT SPACE

ALAMEDA

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	Golf Course	Library	Streets	Parks & Recreation	Building Inspection
Labor force	-.61663		-.44604	-.41943	-.27466	-.42405	-.33175
Unemployment	.48570	.23993	-.28305				.46249
Mfg. Avg. Salary	-.33691	-.31684	-.48250	-.56876	-.44336		-.59830
Gross Value Property	.99408		-.42392				
Net Property Value	.42143	.63462	-.22096	.53437		.55167	.70329
Mfg. Capital Expen.	.39333	.52416	-.48977				.59593
Land Value		-.32060		.51814			.60430
Land Improvement	.50948	.99419		.98422	.97095	.93634	.96769
Miles of Roads p/ 1,000 inhabit.	-.47349	-.49800	.27403	.36342	.44668	-.43229	-.56117
Climate Variation		-.35849		-.49146	-.45564		-.42710
Water area p/ 1,000 inhabit.	-.42346		-.32914	.44775	.39630		.35224
Taxable Sales	.31021	-.53832			-.25837	-.47014	.33384
Mfg. Value Added		.32613	.33866	-.72439			
Agric/Forestry, Fishing	-.29422	-.49007	-.26607	-.62877	.31941	-.40241	
Population	-.58666		-.64616	-.46901	-.34758		.68691
Population Density			.97474	.74171	.81038	.46358	.82408
Income p/capita	.40468	.27828	.41396	.61542	.53005	.30320	.72071

DEPARTMENT'S ENVIRONMENT SPACE

ALHAMBRA

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	Buildings & Planning	Street	Sanitation	Library	Parks & Recreation
Labor force	.44059	.50419	-.26224	-.46598	.48441	.46907	.35391
Unemployment	.58164	.56392	-.38806		.37171	.39756	.45308
Mfg. Avg. Salary	.58045		-.47761	-.34434	.99033	-.46556	.52594
Gross Value Property						.97349	.57118
Net Property Value	-.57399	-.35353	.90879	.40663	.44760	-.35011	-.60835
Mfg. Capital Expen.				-.37612	-.40516	.37467	.58324
Land Value			.36682	-.30455	-.32680	-.46344	-.37264
Land Improvement		.25295	-.33210	.28237		.46464	
Miles of Road p/ 1,000 inhabit.	-.45290	-.66266	.60115	-.26749	-.51631		-.66424
Climate Variation	-.45893	-.63124			-.33523		-.41614
Water area per 1,000 inhabit.	-.21457	-.29001	.37777	-.32364	-.39282		-.44487
Taxable Sales		.29688		.95946	.59240		
Mfg. Value Added	.58405	.63068	-.32334	-.66363	.38643	-.42239	.94186
Agric., Forestry, & Fishing	-.39346	-.46457	.27004	.43028	-.49664	-.38182	
Population					.26381	.31784	
Population Density	-.31964	-.33232	.36019	-.52272	-.39014	.68230	
Income p/capita	.99056	.98825	.70468	-.52397	-.43312	.50391	-.32307

DEPARTMENT'S ENVIRONMENT SPACE

BERKELEY

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	Health	Public Works	Recreation & Parks	Library	City Manager
Labor force		-.36927	.37552	.41194			-.83397
Unemployment	.41138	.30887	-.52366				
Mfg. Avg. Salary	-.68613		-.47366	-.49366		-.28722	.94743
Gross Value Property	.58495	.35830			.60220	.32106	-.38831
Net Property Value	.98616	.97641	.61945	-.63949			-.61473
Mfg. Capital Expend.	.34388	.29281		.41270	.50525	.48327	
Land Value	.42991		.62852				
Land Improvement	.66367		.49278	.34579		.45437	.27811
Miles of Road p/ 1,000 inhabit.		-.30870	.34163			.51033	
Climate Variation			.46814	.43503			
Water area per 1,000 inhabit.		.34488	-.43085		.43893		-.41942
Taxable Sales	.67340	.40130		-.48270	-.35439	.39103	
Mfg. Value Added	-.55614	-.16089	-.49764	-.39862	-.38951	-.54611	
Agric., Forestry, & Fishing			.49927	.39866	.37918	.39063	
Population	-.52480	-.25079	-.46450			-.44094	.68119
Population Density	.56118	.16431	-.40635	-.47072	-.58956		
Income p/capita			.99335	.91095	.93360	.98159	.41679

DEPARTMENT'S ENVIRONMENT SPACE

COMPTON

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	City Attorney	Public Works	Parks & Recreation	City Manager	Building & Safety
Labor force	-.36663	-.33002	-.42353	-.47388	-.41465	-.32804	
Unemployment			-.52194	.30995	-.57854	.34163	.48371
Mfg. Avg. Salary	.27579					.37257	
Gross Value Property		.46593		-.53096		.31760	
Net Property Value	-.54976	-.36889			-.27229		-.12427
Mfg. Capital Expend.			-.32014	-.68501	-.35023	.40363	.25376
Land Value	-.30783	-.49331	-.57428	.33395		-.66989	
Land Improvement				-.38499		.38746	.51804
Miles Road per 1,000 inhabit.	.33733	.42463	.30447	.29394	.34508	.59362	-.49666
Climate Variation	.35544	.45791	.35544		-.30881	.44317	.33209
Water area per 1,000 inhabit.	.39288	.36071	.33821	-.61858		.62179	
Taxable Sales	-.49734	-.66885	.82127	.88034	-.37538	.91549	.84589
Mfg. Value Added	-.48450		.71883	-.47405	-.75351	-.31944	-.66064
Agric., Forestry, & Fishing	-.40604			-.50186		.42067	
Population	.63761	.48283	.30459	-.38244	.22602	.45702	-.36182
Population Density		-.47665		.31484			
Income p/capita	.96976	.95339	.44695	-.53072	.90363	-.42623	-.23156

DEPARTMENT'S ENVIRONMENT SPACE

LONG BEACH

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	Health	Public Services	Parks & Recreation	Planning & Building	Library
Labor Force	-.50924	-.58879		.37571		-.31870	.40011
Unemployment	.61046	.39140	-.45289	.47021	.67177	-.32775	.36687
Mfg. Avg. Salary	.51936		.43339		.97192		
Gross Value Property	-.36816	-.22999	-.53399			-.42827	-.38124
Net Property Value	.33567		.32268	.52000		.33790	.27666
Mfg. Capital Expen.	.56882	-.30406	.45393	.41684		-.37546	.29690
Land Value		.25945	.49081			.31301	.62244
Land Improvement	.65559	.55451	.80277	.76413	-.46674	-.49529	.93916
Miles Road per 1,000 inhabit.	.33058	-.38867	-.39117	-.39611			-.46105
Climate Variation		.31442			-.44679	.24619	-.49526
Water Area per 1,000 inhabit.	.48944	.20205	.33438	.63676	-.41210	.42575	
Taxable Sales	.98723	.98131	.94179	.99119		.84496	-.39202
Mfg. Value Added	-.63058	-.80570	-.77521	-.41667	.50007	-.87218	.27880
Agric., Forestry, & Fishing					.36943	-.43916	.36281
Population	.40398			-.76761		.46360	-.47448
Population Density	-.47285		-.44923				-.54468
Income per capita		.64174				.63048	-.37577

DEPARTMENT'S ENVIRONMENT SPACE

LOS ANGELES

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	Public Works	Building & Safety	Recreation & Parks	Public Util. & Transp.	Personnel
Labor Force	-.65279		.42876	.27256	.46104	-.56794	-.42364
Unemployment	.68966	.80222	.67756	.70180	.61532	.21900	-.35846
Mfg. Avg. Salary	.48539	.41378			.41176	.45646	-.39741
Gross Value Property	.57934	-.26224	.35223			-.68097	
Net Property Value	-.50152	-.36223					.80337
Mfg. Capital Expend.		-.39829	.50822			.20150	-.66853
Land Value	-.29490		-.24755	.97864		.96616	
Land Improvement		.98956	-.48207	-.40718	-.43417	.47321	.65851
Miles Road per 1,000 inhabit.	.48267	.50706	.22904		.54677	.42562	
Climate Variation	-.61742	-.27805	-.40483	-.52563	-.43020	-.32293	-.41775
Water Area per 1,000 inhabit.	-.44263	-.72475				.54677	.36446
Taxable Sales	-.46977	-.46851	.48429	.36013			
Mfg. Value Added	.74375	.59741	.98885	.60983	.98784	.61198	
Agric., Forestry & Fishing	-.31906	-.55065			-.37346		.43631
Population		.40943	-.49509		.36281	-.46498	-.43952
Population Density	-.60788		.47729		.72555	.20880	-.75676
Income per capita	.98246	-.50940	-.37249		-.65996		.96623

DEPARTMENT'S ENVIRONMENT SPACE

OAKLAND

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	Public Buildings	Public Works	Parks & Recreation	Library	Finance
Labor Force	.29532	.40618	-.27880	.28778	-.36362	.95399	-.47814
Unemployment	-.21687	.29227		-.35010		-.47385	.38444
Mfg. Avg. Salary	-.56963	-.19114	-.33000	-.82114		-.67939	
Gross Value Property	-.48144	-.30432		-.36730	-.62659	-.54800	
Net Property Value	.96722	.95352	.71338	.43467	-.43554	.63234	.97071
Mfg. Capital Expend.	-.44620	-.28647			-.59554	-.47442	
Land Value	-.34230	-.68746		.88305		.50448	-.44932
Land Improvement	-.75485	-.57340	-.62048	.62661	-.30571	.29444	-.74651
Miles Road per 1,000 inhabit.	.64330	.37689	-.29802		-.43386	.29227	
Climate Variation	-.31611	-.38433		-.33032	.36127	-.24025	
Water Area per 1,000 inhabit.	-.74234		-.63388		-.62954	-.38153	-.45399
Taxable Sales	.31963	.32600	.92470		.95848	-.24858	.71067
Mfg. Value Added	.55686	-.77080	.41485	-.28198	.34845	-.28304	-.38932
Agric., Forestry & Fishing	-.21835	-.29389		-.29793			
Population	.41897	.38988	.69655	-.35626	.41046	-.79650	
Population Density	-.26969	.67896		-.57823	-.91772	.66381	
Income per capita			.41538	-.58073	.49157	-.27900	

DEPARTMENT'S ENVIRONMENT SPACE

SACRAMENTO

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	Building Inspections	Public Works	Recreation & Parks	Library	City Manager
Labor Force		-.34175	.43793				.27481
Unemployment		.43561	.92586	.96330	.51866	.41180	-.48479
Mfg. Avg. Salary	.36795		-.45525			-.34171	-.65223
Gross Value Property				-.54196		-.44581	
Net Property Value			-.23923		-.65936		-.31946
Mfg. Capital Expend.			-.52563				-.45818
Land Value		.53137	-.48787	-.58429		.67638	-.61206
Land Improvement		.45317	-.48754			.46592	
Miles Road per 1,000 inhabit.						-.31837	
Climate Variation					.32021		
Water Area per 1,000 inhabit.		.37159	.24040		.30708	.53041	.45546
Taxable Sales			.42923	.40704	.43807	-.76454	.50379
Mfg. Value Added	-.58035	-.44706			-.66492		-.36097
Agric., Forestry & Fishing				.51379			
Population	.82207	-.39162		.36571	.41806	-.49645	.31809
Population Density		.53712	.52263	.33997	.81129	.63915	.39641
Income per capita	.99366	.99575	.64337	-.19582	.97326	.98133	.91267

DEPARTMENT'S ENVIRONMENT SPACE

SAN DIEGO

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	Building Inspections	Street	Parks Recreation	Library	Solid Waste
Labor force			.58311		.38768	-.46592	.33432
Unemployment	-.38213	.60505	.53142	-.40762	-.31538	.47937	-.43865
Mfg. Avg. Salary	-.36312	-.53451	-.36834		-.16194	-.60871	-.31239
Gross Value Property		.99004			-.36568	.99482	.99504
Net Property Value			.64166			.48961	
Mfg. Capital Expend.	.37601		.55835	.28272		.21734	
Land Value	.72996	.63095		.28501	.99445	.53094	.49986
Land Improvement	.99577		.99636				
Miles Road per 1,000 inhabit.	.48012	.28474	.55012	.46458	.47384	.54395	
Climate Variation					-.37841	-.25649	-.39268
Water Area per 1,000 inhabit.	-.26594	-.80254	-.41940	-.71126	-.57778	-.48211	-.25643
Taxable Sales	.51460	.38621	.43267		.51619	.62615	.70463
Mfg. Value Added.				-.24899	-.27497	-.40177	-.40650
Agric., Forestry & Fishing	.40646			.32867	-.26528	.65350	.51060
Population			-.38007		-.55145		-.62252
Population Density	-.69823	-.35436	.57368		.47148	.48167	
Income per capita		.38246	-.46180		.22713		

DEPARTMENT'S ENVIRONMENT SPACE

SAN FRANCISCO

PARTIAL CORRELATION

Environment Factors	Police	Fire	Health	Public Works	Recreation & Parks	Library	City Attorney
Labor Force		-.28559	-.49343	.36347	.22269	.94464	.21195
Unemployment	.61108	.61385	.56223	.49687	.52273	.65233	.34515
Mfg. Avg. Salary	.97202	.32077	.97833		.98898		-.22877
Gross Value Property		.97074	.44407	.96845			
Net Property Value		.40538	.59288	.61394		.64598	-.36632
Mfg. Capital Expend.		.40772	.53278		-.25092	.42566	
Land Value	.54455	-.40719	-.61309	-.32963	.35078	.37760	.16964
Land Improvement							
Miles Road per 1,000 inhabit.	.32583	.44365	-.29043	-.49427	-.41359	.34958	-.36671
Climate Variation	.54211	.67831	.53245	.60060	.48298	.52249	.40553
Water Area per 1,000 inhabit.		-.42914	-.30100	-.40414	-.55926	-.38634	.35987
Taxable Sales	.47926	-.22225	.46504	-.65030	.50502		.99362
Mfg. Value Added	.57486	.46213	-.24062		-.25926		-.60134
Agric., Forestry & Fishing	.70970	.82557	.63391	.31409	.60442	.66936	-.45707
Population	-.42784			-.56920	-.71207	.50019	
Population Density		-.63937	-.54596				
Income per capita	-.41241	-.31226	-.43822			-.26199	-.29087

DEPARTMENT'S ENVIRONMENTAL SPACE

SAN JOSE

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	City Manager	Public Works	Paruks & Recreation	Library	Property & Code Enforce.
Labor Force		.48767	.42337	-.59775	-.60949	.32493	
Unemployment	.53887	.31195	.39922	-.63191	-.71700		.22740
Mfg. Avg. Salary	.60228	.53698	-.35570	.59535	.32032	.38381	
Gross Value Property							.47211
Net Property Value	-.50334			.44339	.70094	-.35347	-.54583
Mfg. Capital Expend.				-.71626	.31872	-.31207	.42345
Land Value			.45392	-.28314		-.31933	
Land Improvement	.34394	-.51291		.97522	.99097	.99597	-.47899
Miles Road per 1.000 inhabit.		.55727	-.23561		.30836	.60980	
Climate Variation	.39984	.55982	.37013	.36288		.27078	-.39508
Water Area per 1,000 inhabit.	.70872						
Taxable Sales	.42007	.34297	.65784	-.37972	-.36781	-.33793	.63486
Mfg. Value Added	-.30682	.39471	.94696	.50133		.33685	.83699
Agric., Forestry & Fishing	.39956		-.31421	-.37603	.43972	.40482	-.44873
Population		.48187	-.43445	-.78544			
Population Density		-.39102	-.66052	-.61961	-.67254		
Income per capita	.99315	.99628				.19479	-.26140

DEPARTMENT'S ENVIRONMENT SPACE

SANTA ANA

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	Finance	Public Works	Recreation & Parks	Library	Building Safety
Labor Force	-.64768				-.45813	.39665	-.27617
Unemployment	.46269	.70140	-.22729	.37584	.57040	.57054	.41211
Mfg. Avg. Salary	.29592		.26825	.21456		-.21385	.67328
Gross Value Property		.99324		-.38622	.47113		
Net Property Value	.98417	-.64990	-.28328	-.54506	-.34224	.36822	-.44224
Mfg. Capital Expend.	.45928	.43951	.34788	.47222	-.42819	.36080	.35517
Land Value	-.32506		-.34482		.97805	-.53390	-.65738
Land Improvement	.32301	.26009				.43772	.99100
Miles Road per 1,000 inhabit.	.29505		-.28508			.54003	
Climate Variation	.48522	.26616	.38533	.51478		.27997	.26841
Water Area per 1,000 inhabit.			.49033	.48061		-.49795	.68152
Taxable Sales	-.37783	.26282	.97031	.98038	.38797	-.36869	.35974
Mfg. Value Added		.52848	-.38364		.45324	-.42331	-.43686
Agric., Forestry & Fishing			-.66677		-.45821	.53986	.43471
Population			.79086		-.43005	.70388	-.34063
Population Density	-.42988	-.58787	-.34356	-.45873			-.24872
Income per capita	-.30619	-.27154	.13462		.62502	.99567	.46156

DEPARTMENT'S ENVIRONMENT SPACE

WHITTIER

PARTIAL CORRELATIONS

Environment Factors	Police	Fire	City Manager	Public Works	Parks & Recreation	Library	Building & Safety
Labor Force		.60947	.39001				.28805
Unemployment	.47189		-.45289	.54932	.38726		
Mfg. Avg. Salary	.45737		-.17938	-.41045	-.50502		-.44992
Gross Value Property	-.38833			.42614			.98396
Net Property Value		-.55474	-.39742	-.42743			-.33955
Mfg. Capital Expend.		-.34276	-.26604	-.36585	-.42886	.32739	
Land Value	.75092	.94361	-.21953			.98720	
Land Improvement			.91128	.48989	.38925		.22719
Miles Road per 1,000 inhabit.	.61628				.31806	.40370	
Climate Variation	-.34320	-.49038		.49395	.30152	-.30865	
Water Area per 1,000 inhabit.		-.30623		-.35204			
Taxable Sales	-.32061	-.68145	.47333	.94746	-.32333		.57979
Mfg. Value Added		.43189		.39925	-.57902	.72643	
Agric., Forestry & Fishing		-.46562	-.27262	.53027	-.50616	.49102	-.22542
Population		.52203	.20293	-.50510	.73790	.42337	.42092
Population Density			-.32961		-.53047		
Income per capita	.98125	.68391	.21469	.41359	.99166	.35702	-.50356

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