

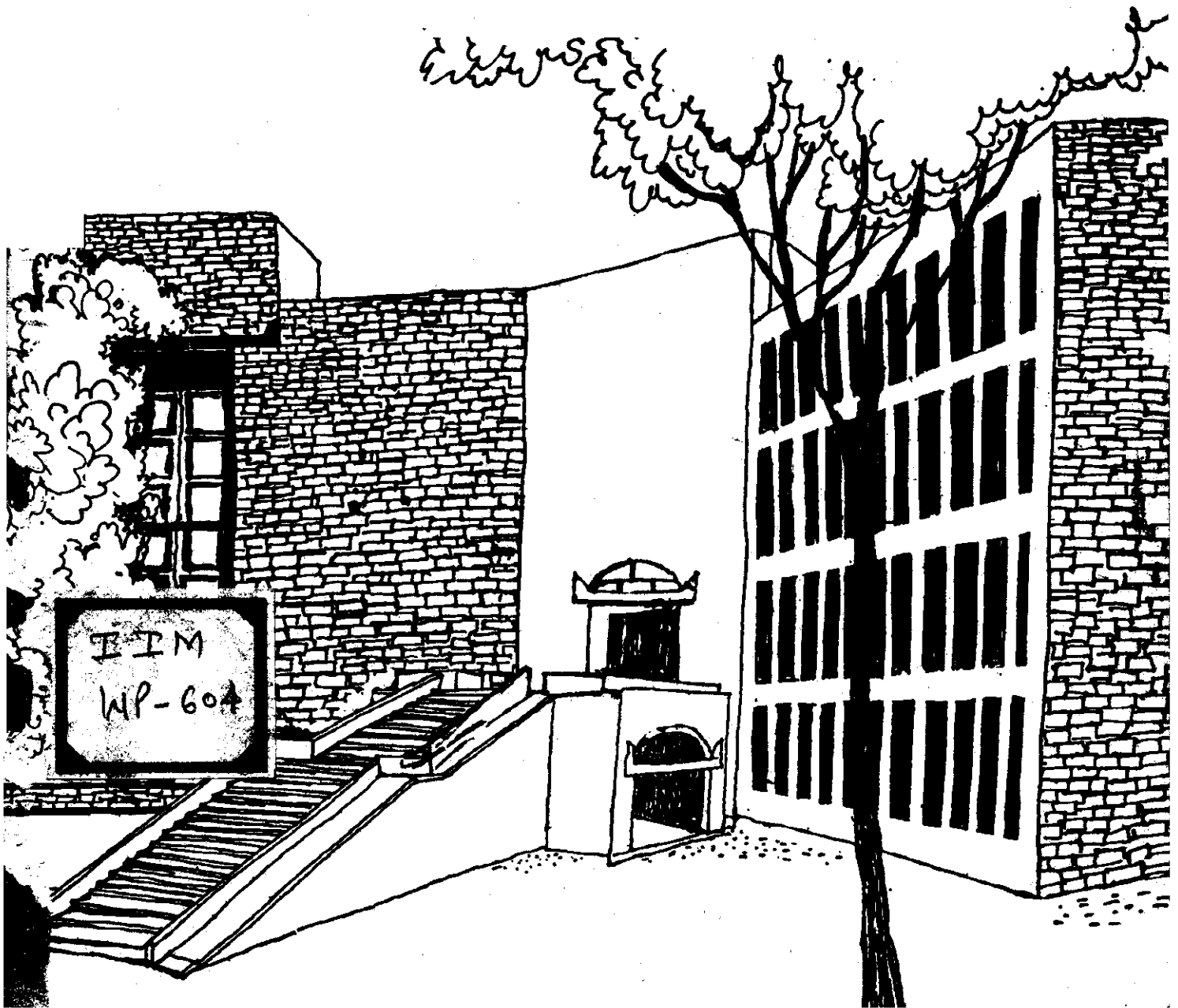


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Working Paper



CAUSAL LINKAGES AMONG DIMENSIONS OF
PERCEIVED ORGANIZATIONAL ENVIRONMENT

By.

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Abstract

The paper highlights the importance of environmental perceptions of management for a strategic contingency theory of organizational functioning. Based on data from 75 Indian organizations, the paper examines the temporal stability of environmental perceptions and the potential causal linkages between perceptions of ten dimensions of the organization's operating environment. Based on identified causal linkages, the environmental dimensions are classified into strategic, transmitter, instrumental, and isolated. A causal network is constructed. Distinction is drawn between the direct and network organizational effects of changes in environmental perceptions. Implications are drawn for a dynamic organization theory. The paper concludes with some emergent hypotheses.

Many organization theorists have considered the operating environment to be a significant shaper of organizational structure and processes (Emery and Trist, 1965; Thompson, 1967; Khandwalla, 1972; Child, 1972; Miles, Snow, and Pfeffer, 1974; Aldrich, 1979). Since the organization is an "open system" that can survive only through exchange relationships with its environment (Katz and Kahn, 1966; Pfeffer and Salancik, 1978), it stands to reason that properties of the operating environment would affect the design and functioning of the organization. Thus, Lawrence and Lorsch (1967) argued that the uncertainty and complexity in the environment would tend to get reflected in complex forms of organizational differentiation and integration. Similarly, Thompson (1967) argued that organizational structure would be rather different depending upon whether the environment is stable or shifting, homogenous or heterogeneous, and Khandwalla, too, advanced several hypotheses on the organizational effects of environmental uncertainty, hostility, diversity, restrictiveness, complexity, etc. (Khandwalla, 1972; 1977 : ch.9). Attempts have also been made to predict how configurations of environmental dimensions may affect the organization (Shortell, 1977). Despite a fair amount of empirical work, questions still remain about just how significant is the operating environment in explaining inter-organizational differences in structures and processes (Pennings, 1975; Child, 1977).

There has been some controversy about whether the "objective" environment affects the organization or the perceived or subjectively experienced environment affects the organization (Duncan, Downey and Ireland, 1979). It would seem that if the theoretical perspective is of studying what happens to organizational forms in alternative ecologies (Hannan and Freeman, 1977), or in contrasting environments (Burns

and Stalker, 1961; Emery and Trist, 1965), then the objective environments may be the more appropriate ones to study. If, instead, the interest is in how particular organizations respond to their environments, then the environment perceived or interpreted by their decision makers may be more closely linked to the strategic behaviour and structural adaptations of these organizations (Child, 1972; Downey, Hellriegel, and Slocum, 1975; Anderson and Paine, 1975; Leifer and Huber, 1977). Thus, environmental perceptions may be critical ingredients of a strategic contingency theory of organizations that fuses the contingency theory perspective with the strategic choice perspective (Child, 1972; Hofer, 1975; Khandwalla, 1965).

In much of the literature the operating environment is assumed to be given. But like any other ambiguous phenomenon, it is interpreted by organizational decision makers and these interpretations tend to be updated in the light of what happens as the organization tries to act on the environment through its strategic or tactical choices (Cyert and March, 1963; Weick, 1969; Aldrich, 1979). In other words, the environment is not given; it is to be discovered sequentially through social information processing by the organizational decision makers (Salancik and Pfeffer, 1978). In the process, not only may a facet of the environment undergo change in perception, new facets may become salient. Thus, the cognitive map of the operating environment may undergo significant changes over a period of time, even when the "objective" conditions have not changed, through social learning and sense making processes within the organization. An environment seen initially as opportunity - rich may, over a period of time, come to be seen as far tougher to operate in, and one seen as simple may later be seen as far more complex and multi-dimensional.

These perceptual changes may have significant implications for organizational redesigning. A new organization in an established industry initially may well see the environment as hostile and may develop a centralised decision structure (Khandwalla, 1972). Familiarity, however, may lessen perceived hostility, and may, therefore, lead to some decentralization. An organization discovering that its environment is far more turbulent than what it thought it to be may move towards an organic structure and operating culture (Burns and Stalber, 1961). In a number of turnaround cases, a more optimistic assessment of the environment by a new chief executive seemed to play a decisive role in the vigorous strategic, structural, and operating changes initiated by the organization after a period of stupour (Bibeault, 1982; Khandwalla, 1983-84; Slatter, 1984). Thus, how the cognitive map of the environment is built up may have considerable bearing on organizational changes and transformations. A theory of environmental sensing may become a useful building block for a theory of organizational change.

This exploratory paper seeks to identify some potentially causal linkages between ten dimensions of the perceived operating environment of organizations. It seeks to do so through an examination of the correlations between prior period facets of organizational environment as perceived by the top managements of these organizations with later period perceptions of these facets. The data were secured from 75 Indian organizations. An analysis of the data indicates interesting differences in the stability of perceptions of the ten dimensions, differences in the inter se influencing capability and influentiability of these dimensions, and some possible paths by which cognitive maps of the operating environment get built up.

Method, Variables, and Sample

The data reported in this paper were gathered as part of a study of indigenous management practices in India. The details of the method and the sample have already been published (Khandwalla, 1985). The data on ten dimensions of the perceived environment of organizations were gathered from top management respondents of 75 organizations. The data from multiple respondents from the same organization were averaged to secure scores for the organization's perceived environment. In the questionnaire, ratings were sought on ten 5-point scales. They were sought both for the "current" period and for the situation 3 years back. Thus, two sets of environmental scores were available for each organization, one relating to the current period and the other relating to an earlier period. Correlations between earlier period variables and later period variables may be more indicative, on grounds of antecedence, of causal linkages between variables than correlations between same period variables. A wide range of organizations operating in a variety of Indian industries participated in the study. While the bulk were private sector corporations, there were also significant numbers of government - owned corporations and a few government non-commercial organizations. There was considerable variation in size, technology, type of output, etc. (Khandwalla, 1985).

While Western conceptualisation^s of the operating environment (Thompson, 1967; Jurkovich, 1974; Khandwalla, 1972, 1977 : ch.9) were drawn on, those dimensions of the operating environment that prior interviews with Indian executives indicated were of particular relevance in Indian conditions were finally selected. These were environmental change and dynamism, riskiness, buoyancy, technological sophistication, diversity, favourableness, restrictiveness, competition, new

product profusion, and amplitude of cyclical change. The question used for measuring the environmental dimensions is reproduced below (minor changes were made while administering the questionnaire to the managements of non-commercial organizations):

How would you rate the company's overall market or business environment?

Please indicate the current situation as well as situation 3 years back.

i) The business environment is

Very <u>dynamic</u> , changing rapidly in technical, economic and social matters	1	2	3	4	5	Very <u>stable</u> ; virtually no change
--	---	---	---	---	---	--

Your rating of situation 3 years back -----

ii) Conditions in the company's lines of business are

Very <u>safe</u> : there is little or no threat to the survival and well being of the company	1	2	3	4	5	Conditions in the business are very <u>risky</u> : a false step can have disastrous consequences
---	---	---	---	---	---	--

Rating of situation 3 years back -----

iii) There is considerable recession and <u>stagnation</u> in the business	1	2	3	4	5	There is great <u>buoyancy</u> in the company's business, rapid growth, and the emergence of new markets
--	---	---	---	---	---	--

Rating of situation 3 years back -----

iv) The company's business is mostly in what is called " <u>high technology</u> " industries - very highly skilled labour and much technological sophistication is needed for anyone to be able to operate in this business	1	2	3	4	5	Very <u>little</u> skilled labour is needed in <u>operations</u> and very <u>little technological sophistication</u> is needed for anyone to be able to operate in this business
---	---	---	---	---	---	--

Rating of situation 3 years back -----

- v) The markets or market segments in the company's lines of business differ very sharply in terms of needed marketing strategies 1 2 3 4 5 The markets or market segments differ very little from one another in terms of needed marketing strategies

Rating of situation 3 years back -----

- vi) The company's business environment is one in which the company cannot take any initiatives, so overwhelming are the forces ranged against the company and so unfavourable are its business circumstances 1 2 3 4 5 The company has absolutely no difficulty in taking various initiatives, so favourable are the circumstances for the company.

Rating of situation 3 years back -----

- vii) There are very few external constraints on the company's expansion or diversification 1 2 3 4 5 Company's expansion or diversification is totally subject to governmental or other external constraints

Rating of situation 3 years back -----

- viii) In marketing its major product(s), the company faces very stiff competition in matters such as product promotion and distribution, pricing, and product quality 1 2 3 4 5 In marketing its major product(s), the company faces little competition in matters such as product promotion and distribution, pricing and product quality.

Rating of situation 3 years back -----

- ix) The rate of introduction of new products in the company's lines of business is virtually zero 1 2 3 4 5 The company and/or the competitors have been introducing a very large number of new products (e.g. the petrochemicals industry, drug industry, etc.)

Rating of situation 3 years back -----

- x) The cyclical fluctuation in the company's lines of business is very large 1 2 3 4 5 There is virtually no cyclical fluctuation in the company's lines of business

Rating of situation 3 years back -----

For data analysis, items i), iv), v), viii), and x) were reversed.

Stability of Environmental Perceptions

The stability of environmental perceptions may well be an important but neglected area of contingency theory. The more stable the management's perception of a feature of an environment, presumably the more time the organization gets to adapt to it, and therefore the more effective may be the adaptation. On the other hand, frequent changes in management perceptions of the environment could lead either to many "quick fix", half-baked adaptations and poor organizational learning, or to postponement of organizational change, so that over time a wide hiatus gets built up between the organization in use and the organization needed to cope effectively with the environment. Also, contingency theory predictions of linkages between environment and organization may be weakened for those dimensions whose management perceptions are unstable.

Table 1 shows the product moment correlation of each prior period environmental dimension with its later period measure. The variation in correlations is striking, ranging from only .28 for perceived buoyancy and .49 for perceived dynamism of environment to .90, .89, .88, and .84 for respectively perceived environmental restrictiveness, cyclical oscillation, technological sophistication, and competition. One reason could be that industry growth prospects, upon which perceptions of environmental buoyancy generally rest, may be notoriously fickle, and cues to perception of environment change and dynamism notoriously ambiguous, and this makes perceptions of environmental buoyancy and dynamism so unstable. In contrast, governmental restraints, price and other forms of competition, technological sophistication, and cyclical ups and downs are perhaps more concrete and palpable, and also possibly more permanent features of the organization's environment.

As far as organizational adaptations are concerned, the differential stability of perceptions of facets of the environment suggests weaker or more superficial organizational adaptation to perceptions of environmental buoyancy and turbulence, compared to organizational adaptations to the perceptions of environmental restrictiveness, technological sophistication, competition, and cyclical oscillation. In other words, measured contingency theory linkages between environment and organization may be generally weaker for environmental turbulence or buoyancy than for the other dimensions of the environment.

(Table 1 about here)

A Typology of Environmental Dimensions

In terms of potential for influencing management perceptions of the operating environment, there could be several types of environmental dimensions. Some perceived dimensions of the environment may affect the perceptions of other dimensions of the environment, but not be affected by them. These may be called strategic dimensions. Some others may be affected by other dimensions, but not affect them. These may be called instrumental dimensions. Some others, still, may be influenced by others and in turn influence others. These may be termed transmitter dimensions. Finally, there may be dimensions of perceived environment that are isolates - they are neither influenced much by the other dimensions nor influence others to any significant extent.

The data in Table 2 may be useful in identifying some of these types. It shows the correlations of each prior period perceived environmental dimension with the other nine later period perceived dimensions. The last column of Table 2 shows the number of significant correlations (at 1% level, 2 tails) of each prior period environmental

dimension with the remaining nine later period dimensions. It thus provides an estimate of the causal power of each dimension vis-a-vis other environmental perceptions. The last row of Table 2 shows the number of significant correlations of each later period dimension with the nine prior period dimensions, and provides an estimate of the causal sensitivity of the dimension to other environmental perception changes.

(Table 2 about here)

Table 2 discloses one possible "strategic" dimension, one that affects the perceptions of other dimensions without being affected by them. Prior period perceived restrictiveness has two significant correlations with later period environmental perceptions while later period restrictiveness has no significant correlations with earlier period environmental perceptions. There may be at least one instrumental dimension, that is, one causally affected by others but causally affecting others much less, namely perceived favourableness. While prior period favourableness has only two significant correlations, later period favourableness has four. There may be several transmitter dimensions, that is, dimensions that significantly affect others and are affected equally in turn. Perceived riskiness, competition, and cyclical oscillation appear to be transmitter dimensions, with "scores" respectively of 3-4, 3-2, and 2-2. Finally, there may be several isolates, not affected much by others nor affecting others much, namely, perceived dynamism (0-0), technological sophistication (0-0), diversity (0-1), and new product profusion (1-1). Buoyancy (2-1) is difficult to classify. Diagram 1 shows these dimensions classified into the four categories.

(Diagram 1 about here)

As Diagram 1 shows, environmental perceptions that may generate alarm in decision makers by threatening the organization's viability - riskiness of the environment, competition, cyclical ups and downs - tend to be transmitters. The implication seems to be that alarming environmental cues play a major role in restructuring the decision makers' cognitive map of the environment. Dimensions of the environment that may make decision making more complex through diversity of the organization's domains of activity (diversity), technological sophistication, profusion of new products, and multi-sided and rapid change (dynamism), without necessarily threatening the organization's viability, tend to be isolates. Thus, changes in perceived environmental complexity may have only a minor role in any reorganization of environment-related perceptions. One possible explanation may be that alarming situations tend to evoke the concentrated attention of the top management to the environment and intense social information processing among members of the top management may lead to dramatic shifts in the perception of the environment. On the other hand, when faced with interpretive complexity, the typical response of the top management may be to delegate sense making to lower level specialists, whose later recommendations to top management would, in turn, tend to be local rather than global, analytical rather than visionary, and technical rather than strategic. While both alarm raising and complex cues from the environment may elicit "problemistic search" (Cyert and March, 1963), the process may well be quite different, and the implications for cognitively remapping the environment may also be different.

Causal Networks of Environmental Perceptions

To the extent that a significant correlation between a prior period perceived environmental dimension and another later period dimension is

indicative of at least potential causal influence on grounds of antecedence, the data presented in Table 2 can yield potential causal networks. Only statistically significant correlations (at the 1% level) were utilised to construct causal networks. The method followed was as follows:

1. The correlations of each prior period dimension with the other later period dimensions were examined.
2. If a prior period dimension was significantly correlated with a later period dimension, the relationship was shown by an arrow going from the former to the latter. The sign of the correlation was indicated above the arrow ("+" meaning positive covariation and "-" meaning inverse covariation).
3. If the earlier period measure of the "caused" dimension was, in turn, significantly correlated with other later period dimensions, arrows from the former going to the latter were added. This was repeated until no fresh linkages were revealed.

Diagram 2 illustratively shows the causal networks of perceived riskiness and perceived restrictiveness of environment.

(Diagram 2 about here)

The causal networks of the ten perceived dimensions could be integrated into one master causal network, as shown in Diagram 3. For simplicity, a single line with two arrows is shown where the relationship is symmetrical.

(Diagram 3 about here)

With the exception of two isolates, dynamism and technological sophistication, all the other eight dimensions are integrated into the causal network shown in Diagram 3. The diagram is useful in as much as it suggests that a major change in the perception of a strategic dimension or a transmitter can, over a period of time, significantly alter the top management's map of the environment, and thus possibly initiate far-ranging changes in organizational design and functioning. As an implication, the longer (within reason) the efflux of time after a change in the perception of a strategic or transmitter dimension, the greater and more multi-sided may be the changes in organizational design and functioning. This is because over a period of time a chain reaction of changed perceptions of other environmental dimensions may take place, building up pressure for significant and multi-dimensional organizational change. For instance, if the top management perceives a significant increase in the environment's restrictiveness, it can be predicted (by observing the arrows and signs of relationships) that over time the management will also tend to perceive the environment as less favourable, riskier, more stagnant, more competitive, more prone to large cyclical fluctuations, and more diverse. Accordingly, there may be pressure to centralise strategic decision making, tighten controls, pare the "fat", diversify, engage in more vigorous marketing, perform greater market segmentation, set up more profit centers etc., a prediction that may not be easy to make simply by considering the increase in perceived restrictiveness alone. Similarly, greater perceived buoyancy or new product profusion (as during the growth phase of an industry, or boom, or just after major technological break-throughs, or in controlled economies, following "liberalisation") may lead to opposite predictions of organizational changes because of greater perceived favourableness, and lesser perceived risk, competition, market instability, and diversity. An implication is that

cross-sectional measurements of environment and organizational structure and functioning (e.g. Pennings, 1975; Khandwalla, 1976-77) will tend to under-estimate the effect of the environment on the organization.

Summary and Discussion

The paper presents and analyses relationships between ten prior period and later period perceived dimensions of the organization's operating environment. These data were gathered from the top managements of 75 Indian private corporate and governmental organizations. One significant finding was that these dimensions varied widely in their temporal stability, with perceptions of environmental dynamism and buoyancy apparently being far less stable than those of such dimensions as competition, restrictiveness, cyclicity, and technological sophistication. A possible implication is that organizational adaptations to less stable environmental dimensions may be less permanent and more superficial than to the more stable dimensions.

An analysis of the "causal" linkages between the ten perceived environmental dimensions indicated that some of them were far more richly linked than others. Based on their linkages, the dimensions were classified into four types : strategic dimensions, such as environmental restrictiveness, causally more influencing than influenced; transmitter dimensions, such as environmental riskiness, competitiveness, and cyclicity, equally influencing and influenced; instrumental dimensions, such as environmental favourableness, more influenced than influencing; and isolates, such as environmental dynamism, technological sophistication, diversity, and new product profusion. Alarm-rich dimensions, potentially threatening the viability of the organization, tended to be transmitters, while decision-making complexity-rich dimensions tended to be isolates. It is possible that alarm-rich dimensions tend to have

rich linkages with other dimensions because they stimulate top management to focus on the operating environment, and through social information processing processes, lead to relatively far-reaching changes in the cognitive map of the organization's management. On the other, complexity - laden cues from the environment may be delegated downwards by top management to specialists for interpretive analysis and technical solutions, and so may have relatively little impact on the restructuring of the environment's cognitive map.

By taking into account statistically significant correlations and their signs, it was possible to construct a tentative causal network of relations between eight of the ten environmental dimensions. The network suggested that changes in the perceptions of some of the environmental features may trigger widespread changes in the management's perception of others, thus leading (a) to a substantial restructuring of the entire cognitive map of the operating environment; and (b) as a consequence, to far wider organizational changes than may be anticipated simply by taking into consideration the original change in the perception of an environmental dimension. In other words, the network effects of a perceptual change may be far larger than its direct effects. If so, one implication seems to be that contingency theory cross-sectional studies seeking to relate a dimension of the environment with organizational structure may often seriously under-estimate the strength and variety of the linkages. This may be one reason why empirical cross-sectional studies of the effects of features of the environment on organizational structure, style of management, etc., have shown rather modest relationships (Pennings, 1975; Khandwalla, 1976-77).

Much of the work in the contingency theory tradition has tended to view the environment of the organization as given, to which the organization more or less passively adapts. In this paper the view is taken

that whether the objective properties of the environment change or not, the perceived environment may be in a constant flux, in part because perceptions of different facets of the environment influence one another. The view is that the perceived environment resembles more closely a turbulent, shifting ocean than a stately, fixed landscape. Since the perceived environment may strongly affect strategic choices of the management, the paradigm of strategy formulation suggested is not one of a static, once-for-a-while rational end-means analysis but of somewhat turbulent, continuous strategic reappraisal in which decisions do not cluster around just expansion, diversification, and competitive elements, but rather, embrace a number of organizational elements as well, with the mix of elements considered by management varying with the number and type of environmental dimensions currently evoked.

The paper highlights the possible role of changes in management's perceptions of the environment in the process of organizational designing. It makes a modest contribution to the evolution of a dynamic theory of organizations in which time, lag effects, network effects, and so forth could be vital variables. It also indicates a method for measuring the past situation and the current situation, even though both the measurements may be made at the same point in time.

Finally the following hypotheses are advanced as a spur to further research:

1. During any reasonable span of time, management perceptions of environmental turbulence will tend to have a lesser impact on organizational structure than management perceptions of environmental complexity, riskiness, restrictiveness, etc.

2. New perceptions of environmental risk will tend to alter the management's cognitive map of the environment far more than new perceptions of environmental complexity.
3. The long term effects of management perceptions of the environment on organizational structure, strategy, and management style will tend to be far greater and more variegated than the short term effects.
4. The more restrictive the environment as perceived by management, the more will the management eventually differentiate between different segments of the environment, while the more buoyant or munificent the environment, the less will it eventually differentiate between the various segments of the environment.
5. There will be striking contrasts in the organizational effects of greater perceived restrictiveness of the environment and greater perceived buoyancy of the environment.

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DIAGRAM 1A CLASSIFICATION OF TEN PERCEIVED DIMENSIONS OF ENVIRONMENTSensitivity to Other Dimensions

		<u>High</u>	<u>Low</u>
<u>Causal</u> <u>Power</u>	<u>High</u>	<u>Transmitters</u> Perceived riskiness Perceived competition Perceived cyclicity	<u>Strategic Dimensions</u> Perceived restrictiveness Buoyancy (?)
	<u>Low</u>	<u>Instrumentals</u> Perceived favourableness	<u>Isolates</u> Perceived dynamism Perceived technological sophistication Perceived diversity Perceived new product profusion

DIAGRAM 2

CAUSAL NETWORKS OF PERCEIVED RISKINESS AND RESTRICTIVENESS OF THE ENVIRONMENT

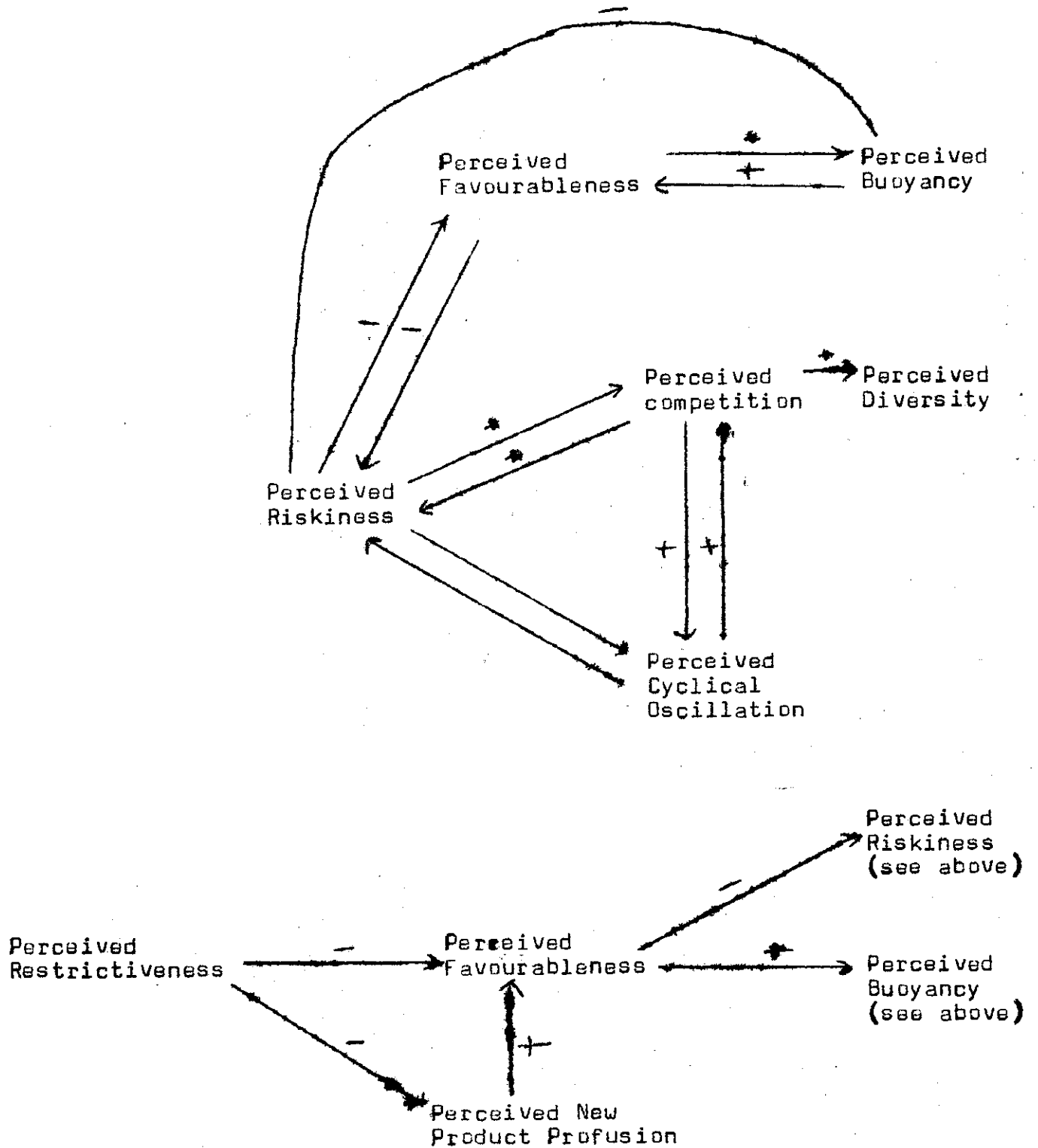


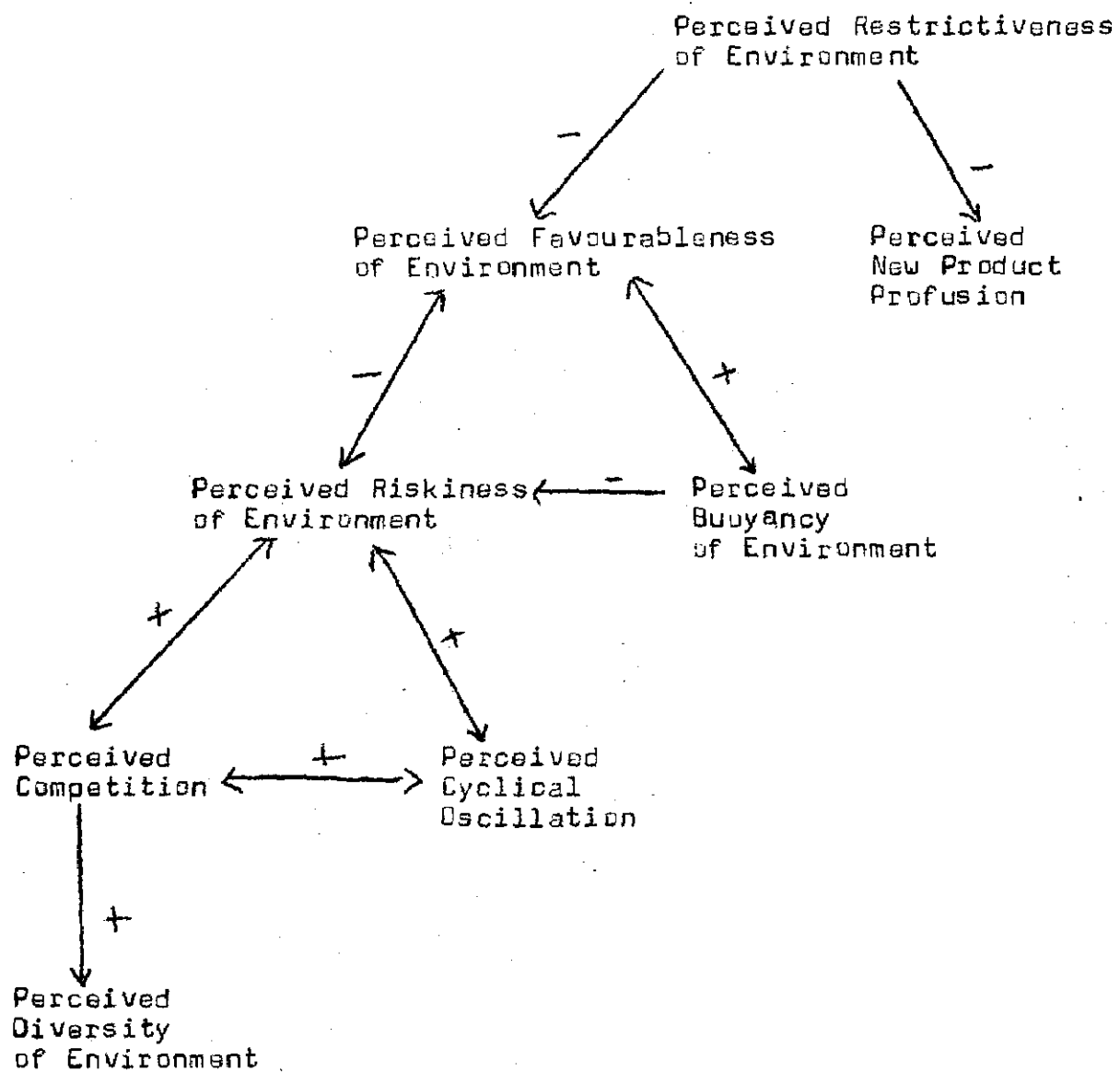
DIAGRAM 3POSSIBLE CAUSAL NETWORK OF TEN PERCEIVED DIMENSIONS OF ENVIRONMENT

TABLE 1

CORRELATIONS OF PRIOR PERIOD ENVIRONMENTAL PERCEPTIONS
WITH THEIR LATER PERIOD PERCEPTIONS

	<u>Product Moment</u> <u>Correlation</u>
Environmental dynamism and change	.49
Environmental riskiness	.71
Environmental buoyancy	.28
Technological sophistication of environment	.88
Diversity of environment	.71
Favourableness of environment	.68
Restrictiveness of environment	.90
Competitiveness of environment	.84
New product profusion	.75
Cyclical oscillation	.89

TABLE 2

INTER-CORRELATIONS OF PRIOR AND LATER PERIOD ENVIRONMENTAL PERCEPTIONS

<u>Prior Period Perceptions</u>	<u>Later Period Perceptions</u>										No. of significant correlations
	1 Dynamism	2 Riskiness	3 Buoyancy	4 Tech. soph.	5 Diversity	6 Favourable	7 Restrictive	8 Competitive	9 Profus.	10 Cyc. Osci.	
1. Dynamism		.05	.14	-.12	.17	.01	.20	-.12	-.15	-.14	0
2. Riskiness	.05		-.14	-.03	.05	-.31*	-.10	.36*	-.12	.39*	3
3. Buoyancy	.01	-.26*		-.09	-.08	.331*	.04	-.12	.10	-.11	2
4. Technological sophistication	.18	.00	.02		.11	-.12	.09	.11	-.16	-.20	0
5. Diversity	.05	.01	.06	.21		-.04	.00	-.15	-.08	-.06	0
6. Favourableness	.18	-.33*	.45*	-.13	-.22		.14	-.16	-.21	-.06	2
7. Restrictiveness	-.06	.69	-.16	.08	.08	-.28*		-.03	-.28*	-.23	2
8. Competition	-.12	.49*	-.10	.06	.31*	-.14	-.10		-.06	.49*	3
9. New product profusion	-.08	-.06	.02	-.21	.00	.53*	-.24	-.19		.11	1
0. Cyclical oscillation	-.07	.43*	-.10	-.13	.16	-.02	-.22	.53*	.13		2
1. No. of significant correlations	0	4	1	0	1	4	0	2	1	2	

* Significant at P C 1% level (2 tails)