ORGANIZATIONAL ADAPTIVE PATTERNS TO ENVIRONMENT: EXPLORATORY STUDY OF INTEGRATIVE CONTINGENCY MODEL

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The study of the organization-environment relationship has extensively been explored. The technology school originated the study of how to design effective internal organization structures in response to their context. Woodward found that more successful organizations tended to adopt the structures consistent with the requirements of their production technologies (1965).

Although Woodward stressed manufacturing technology, other researchers gradually recognized the importance of external environment. Stinchcomb's study showed that the construction industry had a less stable information-processing apparatus and higher rate of social reconstruction than mass production-oriented industries (1959). Burns and Stalker found that organizations that were profitably coping with uncertain, changing environments had more "organic" rather than more "mechanistic" structures (1961). Lawrence and Lorsch noticed that effective organizational units operating in dynamic environments were more "differentiated," while those in more stable environments were less "differentiated" (1967). They proposed the premise that any kind of organization can be expected to develop internal structures consistent with the requirements of its environment, and introduced the term "contingency theory."

Organizational processes and individual characteristics are also related to the nature of task environment. Leadership style had been found to be contingent on the type of task, decision area and subordinate characteristics, and the effective leader is the one who adjusts influence attempts to the challenges and opportunities of the situation (Fiedler, 1967; Vroom and Yetton, 1973). Hickson *et al.* explored the process of how a department augments power and found that the coping with environmental uncertainty and the nonsubstitutability of that expertise increase departmental power and influence over strategic decisions (1971). Schein emphasized the complexity of human nature (1965), and organizational psychologists noticed that employees can respond differently to their environments, depending on their motives and abilities and the nature of the task.

More recently, some researchers begin to realize that a multiple congruency among environment, structure, processes and individual characteristics is the ultimate goal of effective organizational adaptation. Lorsch and Morse found that a fit among the external environment, the internal environment, and the predispositions of members was related to effective unit performance, and that individuals were rewarded by stronger feeling of com-

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petence (1974). Nightingale and Toulouse (1977) proposed a multilevel congruence theory of organization that linked environment, managerial values, structure, interpersonal processes, and attitudes of members in an open systems framework, and partially tested the theory. In the similar way of thinking, Kotter pulled together many of the major variables of organization theory into a diagnostic model (1978). Mealiea and Lee developed an integrative model that integrated both macro (size, technology, environment↔structure) and micro (structure↔employee behavior) dimensions (1979). Also Osborn *et al.* wrote a book of organization theory that built on a comprehensive contingency or integrated contingency framework (1980). Miller lamented that contingency findings were fragmented and piecemeal, and argued that both organizational adaptive pattern (a configuration among environmental, structural and strategy making behavior variables at a point in time) and adaptive scenario (the process by which structural, environmental and strategy making behavior variables relate over time) should be identified in order to construct a theory of organizational adaptation (1979).

Along with the line of these developments in contingency theory, the purpose of this paper is to propose an integrative contingency model of organization and to find empirically organizational adaptive patterns to the environment.

An Integrative Model

How are the Japanese business organizations adapting to their environments? In order to answer this question, a theoretical model is developed (Nonaka *et al.*, 1978). This model takes an integrative approach to organizational phenomena that an organizational adaptation to the environment will be achieved through the multilevel fit or co-alignment among the organizational structure and processes and the individual attributes of the members (see Fig. 1). It consists of six concepts: environment, context, organizational structure, organizational process, individual attributes, and organizational effectiveness.

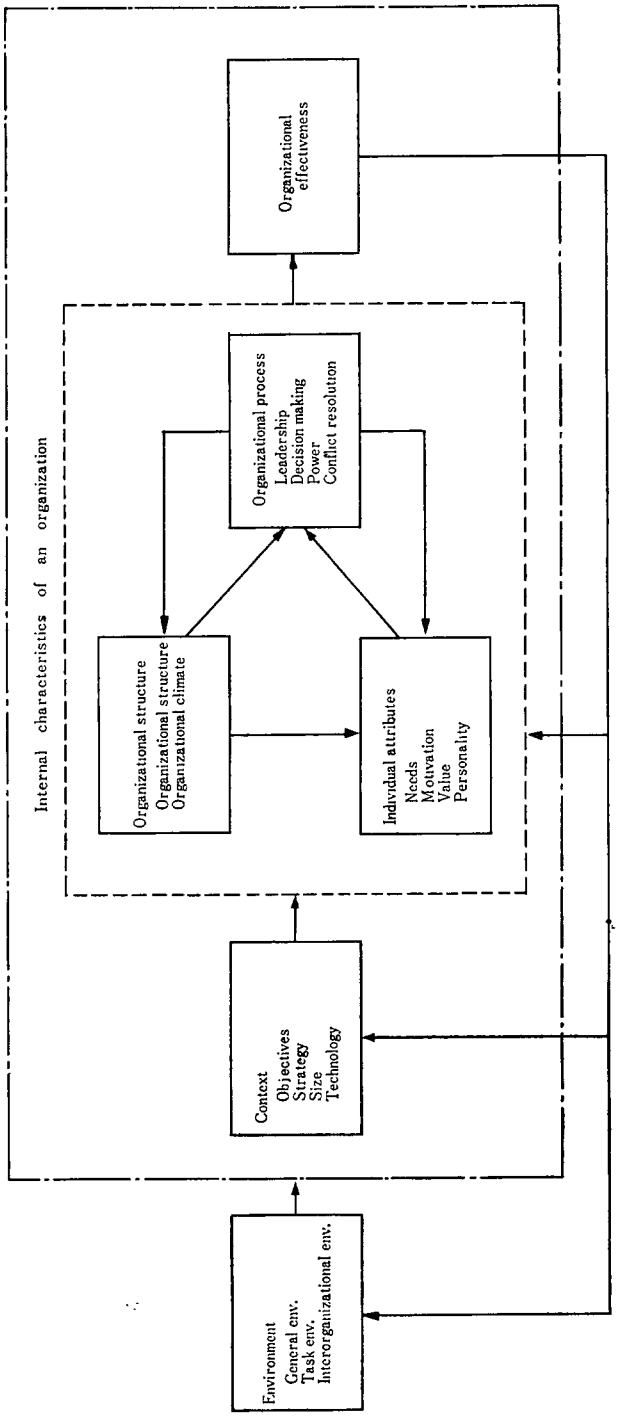
Environment. An organization's environment is the totality of physical and social factors that influence organizations directly or indirectly. It is divided into three segments: the general environment, the task environment, and the interorganizational environment. Among these segments, the most important is the task environment which is directly relevant to organizational decision making activities.

Context. Context is the organizational characteristics that can be clearly defined neither as the external environment nor the internal characteristics of an organization. The context of an organization is its objectives, strategy, size, and technology. They are constant for most managers, but they influence or limit the internal characteristics of the organization.

Organizational Structure. Organizational structure is "the distributions, along various lines, of people among social positions that influence the role relations among these people" (Blau, 1974: 12). It can be observed as a series of patterned interactions among members and as regularities in such activities as task allocation, the excercise of authority, and the coordination of functions.

Organizational Process. By contrast, organizational process is rather dynamic. It is defined as "any continuous sequence of actions contributing to the transition from one set of behavior patterns to another" (Bowey, 1976: 150). Power, conflict resolution, leadership,

FIG. 1. AN INTEGRATIVE CONTINGENCY MODEL



decision making and communications are the typical variables of organizational process. Although they constantly interact with the organizational structure, two concepts are conceptually distinctive. "Structure is inferred from process, but is more enduring than process" (Nightingale and Toulouse, 1977: 265).

Individual Attributes. Individual attributes comprise various microlevel variables such as personality, value, motive, and needs. It is these variables that organizational structure and process are based on.

These three concepts, namely, the organizational structure and process and the individual attributes constitute the internal characteristics of an organization. The interaction among them subject to environmental constraints will lead to a particular level of organizational performance, which in turn be fed back to both the external environment and the organization itself.

This model emphasizes an integrative perspective of contingency theory that the organizational performance is contingent upon a multilevel congruence among the environmental, contextual, and internal characteristics variables. It is not enough, however, to stress only a multiple fit is critical for an organizational success. We have to explain why that balance is critical. In conceptualizing this model, we take a particular frame of reference or a paradigm of organization theory. The background assumptions of the model are based on an information processing paradigm of organizational adaptation. Organizations are essentially decision making systems (Simon, 1957), and decision making is possible only when relevant information is available. Environments generate uncertainty or the information and decision burden. Therefore organizations must adapt to their environments by developing information processing capacities (Nonaka, 1972; Nonaka and Nicosia, 1979; Galbraith, 1973, 1977; Tushman and Nadler, 1978; Kagono, 1980).

Based on this paradigm, we hypothesize five basic assumptions: (1) organizations are open systems and have to develop information processing activities to cope with uncertainty the environment generates, (2) organizational structure can be seen as information processing mechanisms, (3) individuals vary to the extent that they are cognitively complex and capable of processing relevant information, (4) organizations can actively adapt to their environments through the processes such as communications, decision making, conflict resolution, and leadership, and (5) organizational performance ultimately depends upon the information processing capacities of an organization made up by the interaction among the above internal organizational characteristics.

Method

In our study, organizational departments or subunits were selected as a unit of analysis. Each department has one of three functions: manufacturing, sales and marketing, and research and development.

Data were collected on 234 functional departments in 29 Japanese business units. In choosing business units, consideration was given to sample various units that represent a reasonable variety in environmental uncertainty the market generates. They include firms making electrical goods, engineering tools, metal goods, drugs, foods, clothes, and so on. Although not random, this sample is rather large and appears to have a requisite variety in

environmental uncertainty. As shown in Table 1, 234 departments contain 82 manufacturing, 106 sales, and 46 R&D.

The data were collected by means of a questionnaire. We came into contact with a representative officer of each firm (usually a corporate planning manager), and asked him to participate in this research project. The sample departments in each firm were jointly selected by him and our research members. Respondents were department managers.

Table 2 shows a list of variables used in our study. Usually, each variable consists of a number of indicators. They are measured by managers' perceptions on 5-point or 7-point Likert scales. A detailed description of the research methods shall be given by a research monograph to be published later.

TABLE 1. SAMPLE

	Manufacturing	Sales	R & D
'Low performer'	42	51	25
'High performer'	40	55	21
Total	82	106	46

TABLE 2. LIST OF VARIABLES

Task environment=Market:	
	Homogeneous-heterogeneous
	Static-dynamic
Context:	
	Technology (routineness of work)
Organizational structure:	
	Formalization
	Configuration (span of control)
	Decentralization
	Complexity (professionalization)
	Division of labor
	Flexibility
	Institutionalization of performance evaluation
Organizational process:	
	Power
	Decision making
	Communications
	Leadership
	Conflict resolution
Individual attributes:	
	Personality
	Value
Organizational outcomes:	
	Goal attainment

Environmental Uncertainty and Organizational Performance

Environmental uncertainty is defined from the information processing perspective by

two dimensions (Nonaka, 1972): the homogeneous-heterogeneous dimension and the static-dynamic one.

The homogeneous-heterogeneous dimension concerns the quantity of information. Two indicators of this can be constructed. First, quantity of information is directly related to the number of sources (e.g., number of market segments and number of material suppliers) generating information. Second, quantity is also directly related to the amount of information that each source may generate and/or require the department to provide. Thus, heterogeneity occurs when quantity of information is high (i.e., a large number of environmental segments, each generating and requiring a high volume of information), and homogeneity occurs in the opposite case.

The static-dynamic dimension concerns the quality of information. As for indicators of this dimension, we are first interested in assessing the reliability of information for a department manager. For instance, the reliability of information about sales is directly related to the degree of brand loyalty and indirectly related to the degree of competitiveness of other sellers. Second, and independent of its reliability, the time-span applicability of information about events in the environment is also of interest. For instance, this information (a) may have a high or low rate of change over time and (b) may or may not require a fast reaction by a department manager. Accordingly, high uncertainty occurs when information is low in reliability and short in time span; the opposite is true for high certainty.

Lawrence and Lorsch noticed that environmental uncertainty an organization faces varies across its organizational subunits. More specifically, they found that the scientific sector of the environment for R&D department is least certain; market sector for sales, next; and techno-economic sector for manufacturing, most certain (1967: 29). Our data generally confirm their findings (see Table 3). Scores on the homogeneous-heterogeneous dimension and on the static-dynamic dimension have been combined to get a total uncertainty score. Clearly, the differences in the average scores of uncertainty for different parts of the environment are highly significant, and the order is also in the expected direction.

TABLE 3. AVERAGES OF 'PERCEIVED ENVIRONMENTAL UNCERTAINTY' IN THREE FUNCTIONAL DEPARTMENTS—TOTAL SAMPLE

	Averages (7-point scales)			F
	Manufacturing	Sales	R & D	
Homogeneous-heterogeneous	4.74	4.82	4.98	1.48
Static-dynamic	4.16	4.40	4.53	7.72***
Total (Perceived environmental uncertainty)	4.44	4.60	4.75	4.87***

Note: ***Significant at 1 per cent level.

TABLE 4. AVERAGES OF 'PERCEIVED ENVIRONMENTAL UNCERTAINTY' IN THREE FUNCTIONAL DEPARTMENTS—'HIGH PERFORMER' SAMPLE

	Averages (7-point scales)			F
	Manufacturing	Sales	R & D	
Homogeneous-heterogeneous	4.97	4.85	5.26	2.15
Static-dynamic	4.27	4.35	4.56	2.48*
Total (Perceived environmental uncertainty)	4.60	4.60	4.91	2.76*

Note: *Significant at 10 per cent level.

As for the departmental performance, the data about the perceived degree of the attainment of each departmental goal were collected. In each functional department, the sample was divided by the median into 'high performer' and 'low performer.' Table 4 shows high performers' average score of environmental uncertainty in each functional department, the equivalent data to Table 3. In terms of the total uncertainty score, this result is similar to that of Table 3 except that the uncertainty scores of market sector and techno-economic sector have the same values. It should be noted that market sector is more dynamic than techno-economic sector, though the latter is more heterogeneous than the former. It seems to us that the impacts of environmental uncertainty upon the organizational variables are less in techno-economic sector than in market sector, because the static-dynamic dimension is likely to be a more important contributor to uncertainty than the homogeneous-heterogeneous dimension (Duncan, 1972; Nonaka, 1972).

In the following sections, the result of the comparative analysis of context, organizational structure and process, and individual attributes among three functional departments will be presented. In this study, we were most concerned with the adaptive patterns of successful organizations. Consequently the following analysis is limited to the comparative study in the 116 high performing organizational units.

Context: Technology

Contextual variables are objectives, strategy, size, and technology. In this paper, we are concerned with technology. Technology means "the actions that an individual performs upon an object, with or without the aid of tools or mechanical devices, in order to make some change in that object" (Perrow, 1967: 195). While this concept has many dimensions, from the viewpoint of the information processing paradigm, we selected only one dimension, the routineness of work. This variable is measured by the three indicators with 5-point scales: (1) the repetitiveness of work, (2) the number of exceptional cases encountered in the work, and (3) the variety of the work. Scores on these indicators are combined to get a total routineness score.

As shown in Table 5, the average score of the routineness in each functional department is the highest in manufacturing; next in sales; the lowest in R&D. Namely, the work of manufacturing departments is most routine, and that of R&D departments is least routine.

TABLE 5. AVERAGES OF 'ROUTINENESS OF WORK' IN THREE FUNCTIONAL DEPARTMENTS—'HIGH PERFORMER' SAMPLE

	Averages (5-point scales)			*F*
	Manufacturing	Sales	R & D	
Repetitiveness of work	2.31	2.54	1.75	5.46***
Number of exceptional cases (R)†	2.83	2.76	2.05	6.98***
Variety of work (R)†	2.03	1.84	1.55	4.59**
Total (Routineness of work)	2.39	2.38	1.79	9.70***

Notes: †R in parentheses stands for 'reverse.'
***Significant at 1 per cent level.
**Significant at 5 per cent level.

This finding suggests that the organizational adaptive patterns to the environments are different among these functional departments. For instance, manufacturing departments may seek to eliminate environmental uncertainty and to attain the highest internal efficiency, but R&D departments may seek for rather innovative adaptations (Sakakibara, 1980). If so, the interdependence among the internal characteristics of an organization should reflect this difference in the adaptive patterns.

Organizational Structure

Organizational structure is defined as the distributions, along various lines, of people among social positions that influence the role relations among these people. It constrains largely the interaction patterning among members, and controls their exercise of authority. Many authors have suggested various dimensions of organizational structure. For instance, Pugh *et al.* (1968) have been concerned with specialization, standardization, formalization, centralization, configuration, and traditionalism. Blau and his associates have dealt with the hierarchical patterns such as span of control and the number of levels of hierarchy (Blau, 1968; Blau *et al.*, 1966). From the structural viewpoint of information processing, the following six dimensions are chosen here: (1) formalization, (2) span of control, (3) decentralization, (4) complexity or professionalization, (5) division of labor, and (6) flexibility. In addition, institutionalization of performance evaluation (namely, the degree of institutionalizing feedback mechanism) is also selected.

Table 6 shows the indicators of each dimension and the result of interdepartmental comparison. In general, the organizational structures of R&D departments are characterized by low formalization, low centralization, high professionalization, low division of labor, high flexibility, and high institutionalization of performance evaluation. By contrast, the structural characteristics of manufacturing departments are high formalization, high centralization, low professionalization, and high division of labor. As for sales departments, their organizational structures have generally in-between characteristics. On an average, R&D departments which face the most heterogeneous and dynamic environments have flexible or organic structures except for a few indicators, and manufacturing departments which face the most certain environments have rigid or mechanistic structures.

Although almost all our findings support the relationships suggested by Burns and Stalker, there are some exceptions. That is, even in such organic units as R&D departments, certain aspects of formalization, namely, a documentation of communications, and an institutionalization of performance evaluation are highly developed. This symbiotic characteristic suggests to us the need to reconsider the simple traditional conceptualization of the mechanistic-organic dichotomy of organizational structure since Burns and Stalker.

It is also generally argued that there is a negative relationship between formalization and innovativeness. The reason is that the emphasis on rigid rules and procedures prohibits organizational decision makers from seeking new sources of information, and consequently there is less opportunity for them to become more aware of potential innovations (Burns and Stalker, 1961; Hage and Aiken, 1967). Our findings, however, do not conform to this argument. The high performers in R&D departments in Table 6 clearly develop high degrees of formalization in some indicators and institutionalization of performance evaluation.

These findings may bring a new insight for studying the structural characteristics for innovative organizations.

TABLE 6. AVERAGES OF 'ORGANIZATIONAL STRUCTURE' VARIABLES IN THREE FUNCTIONAL DEPARTMENTS—'HIGH PERFORMER' SAMPLE

	Averages (7-point scales)			*F*
	Manufacturing	Sales	R & D	
Formalization:				
Strict devotion to regulations	5.36	5.27	4.90	0.96
Extent of standardized procedures	5.30	4.85	4.65	2.61*
Documentation of communications	4.20	3.87	4.35	1.74
Total (Overall formalization)	4.90	4.66	4.63	1.26
Configuration:				
Span of control	4.31	2.59	3.75	11.94***
Decentralization:				
Delegation of authority to subordinates	4.23	3.92	3.95	1.04
Participation in planning	3.00	3.43	4.30	3.60**
Total (Overall decentralization)	3.61	3.70	4.12	1.42
Complexity (professionalization):				
Expertise required	5.05	5.54	6.31	9.31***
Length of training required	5.78	6.36	6.47	4.52**
Total (Overall professionalization)	5.42	5.95	6.39	10.42***
Division of labor:				
Specialization of roles	4.94	4.76	4.11	2.29*
Flexibility:				
Undertaking of other subunits' duties	4.25	3.96	4.52	1.56
Institutionalization of performance evaluation:				
Institutionalization of evaluation system	4.00	3.61	4.14	2.55*
Specification of evaluation criteria	3.63	3.34	3.66	1.47
Application of evaluation system	3.57	3.27	3.76	2.82*
Total (Overall institutionalization of performance evaluation)	3.75	3.41	3.85	2.85*

Notes: ***Significant at 1 per cent level.
**Significant at 5 per cent level.
*Significant at 10 per cent level.

Organizational Process

By organizational process is meant any continuous sequence of actions contributing to the transition from one set of behavior patterns to another. Power, conflict resolution, leadership, decision making, and communications are the typical variables of process.

Power

Although power has many dimensions, we are concerned with (1) power base and (2) the hierarchical distribution of power.

Power Base. Following French and Raven (1959), five bases of power were measured,

TABLE 7. AVERAGES AND STANDARD DEVIATIONS OF 'POWER BASE' VARIABLES—TOTAL SAMPLE

	Averages†	Standard deviations
Reward power	3.98	0.74
Coercive power	4.60	0.73
Legitimate power	2.37	1.01
Referent power	2.38	0.96
Expert power	1.62	0.85

Note: †Averages of ranks, ranged from 1-most important to 5-least important.

TABLE 8. AVERAGES OF 'POWER' AND 'DECISION MAKING' VARIABLES IN THREE FUNCTIONAL DEPARTMENTS—'HIGH PERFORMER' SAMPLE

	Averages			*F*
	Manufacturing	Sales	R & D	
Power base:				
Reward power	4.00	4.07	3.85	0.81
Coercive power	4.82	4.72	4.30	5.83***
Legitimate power	2.45	2.21	2.42	0.76
Referent power	2.05	2.34	2.52	1.89
Expert power	1.62	1.63	1.90	0.91
Decision making:				
Group decision†	3.36	3.46	3.45	0.32

Notes: ***Significant at 1 per cent level.

†Weighted scores calculated by using the following formula (with regard to the variable codes, see Table 9):

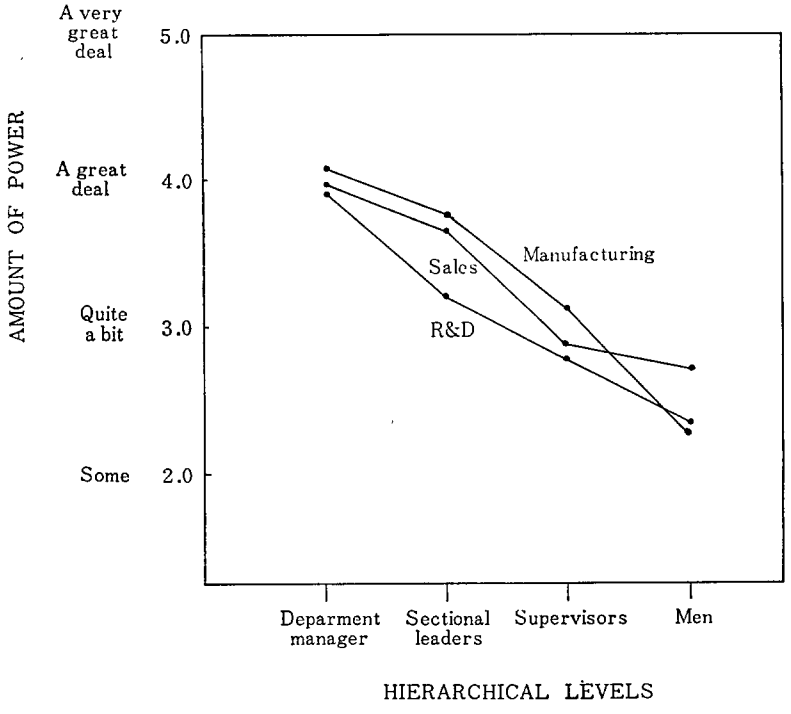
Group decision=(1×DSTY01+2×DSTY02+3×DSTY03+4×DSTY04+5×DSTY05)/15.

namely, reward power, coercive power, legitimate power, referent power, and expert power. We asked each respondent to rank these power bases in order of importance in everyday operations in his or her department. Table 7 shows averages and standard deviations of the ranks. Clearly, it shows that the expert power is most important and then follows legitimate power, referent power, reward power, and coercive power. Generally in Japanese business organizations, the expertise based upon information and knowledge held by managers is the most important power base in everyday operations.

Table 8 shows the average ranks in each functional department. These ranks do not differ significantly between three functional departments. In every department the information and knowledge held by a manager are more important than his formal authority to exercise sanction. But, the referent power is ranked higher in manufacturing departments than both in sales and in R&D departments (the average ranks are 2.05, 2.34, 2.52 respectively), and so, in manufacturing departments only, the ranks of referent power and legitimate power are reversed: the former is ranked higher than the latter (the average ranks are 2.05, 2.45 respectively). Because the referent power is based on a shared value and information among members, this finding may be a reflex of active small group activities at the Japanese workshops, known as "quality control circles."

Hierarchical distribution of power. The hierarchical distribution of power was measured by method of 'control graph' developed by Tannenbaum and his associates (Smith and Tannenbaum, 1963; Tannenbaum *et al.*, 1974). The result of interdepartmental comparison

FIG. 2. CONTROL GRAPH IN THREE FUNCTIONAL DEPARTMENTS —'HIGH PERFORMER'SAMPLE



of control graph is shown in Figure 2. The horizontal axis of the graph represents the hierarchical levels of an organization and the vertical axis represents the amount of power or influence which is exercised by each level in the organization. It is found that the slope of the curve is the steepest in manufacturing departments. This finding indicates that manufacturing departments have the most centralized distribution of power. It is consistent with that of Lawrence and Lorsch (1967) and with our finding on organizational structure of manufacturing departments, i.e., high centralization.

Decision making

It might be possible to infer the actual decision making mode within an organization from its structure, but the organizational structure is not enough to understand the actual decision making mode. Organizational structure constrains available decision making modes but does not determine a decision making mode used by each manager. A taxonomy of decision making modes was developed that defines managers' behaviors in five modes (see Table 9), based upon Vroom and Yetton (1973). This taxonomy has a underlying dimension, i.e., the amount of participation each process affords the managers' subordinates.

TABLE 9. AVERAGES AND STANDARD DEVIATIONS OF 'DECISION MAKING' VARIABLES—TOTAL SAMPLE

Codes	Decision Methods	Averages	Standard Deviations
DSTY01	You solve the problem or make the decision yourself, using information available to you at the time.	3.63	0.83
DSTY02	You obtain the necessary information from your subordinates, then decide the solution to the problem yourself.	3.60	0.81
DSTY03	You share the problem with the relevant subordinates individually. Then *you* make the decision.	3.69	0.82
DSTY04	You share the problem with your subordinates as a group. Then *you* make the decision.	3.29	0.92
DSTY05	You share the problem with your subordinates as a group. Together you generate and evaluate alternatives and attempt to reach agreement (consensus) on a solution.	3.33	1.06

Each respondent was asked with a 5-point scale to evaluate to what extent each decision mode is utilized in his or her department.

The data of decision making mode by the total sample (Table 9) show that the consultative and autocratic decision modes (DSTY03, DSTY01) are more frequent than the group-oriented mode in Japanese business organizations.

It is possible to construct a measure of subordinates' participation into decision making by a weighted average of five frequencies (see *Note* in Table 8). The average degree of participation was calculated for each functional department (Table 8). It is found that the frequency of the utilization of the 'group decision' is higher both in sales and in R&D departments than in manufacturing departments. This finding is consistent with our findings on the organizational structure and of the distribution of power.

Communications

Past research has discussed a variety of dimensions of communications such as the directionality of the information flow, the frequency of the contacts, and the modalities used in transmitting information. It is one of our premises that the organizational adaptation to the environment depends upon the effective communications. Most of the literature on communications, however, were based on the behavioral observations, and few attemps have been made to develop a systematic device to measure communication variables in organizations. Following Roberts and O'Reilly (1974), we developed 12 indicators concerning the two dimensions: directionality and modalities. The data by the total sample (Table 10) show that the frequencies of the on-the-job contacts are generally higher than that of the off-the-job contacts. This is a common sense result, but two points should be made: (1) all the frequencies of the off-the-job contacts are substantial (more than 3.0 out of 5-point scale), and (2) especially, the frequency of the off-the-job contacts with subordinates is rather high (the average is 3.51). This can be seen as the result of managers' intentional efforts. As for modalities, 'face to face' is most frequent and 'written,' least.

These findings indicate very interesting decision making styles of managers peculiar to

TABLE 10. AVERAGES AND STANDARD DEVIATIONS OF 'COMMUNICATIONS' VARIABLES—TOTAL SAMPLE

	Averages	Standard Deviations
Frequencies of the *on-the-job* contacts with		
Superiors	4.01	0.72
Subordinates	4.40	0.61
Peers at your own department	3.71	0.78
Other departments' members	3.57	0.66
Frequencies of the *off-the-job* contacts with		
Superiors	3.05	0.79
Subordinates	3.51	0.71
Peers at your own department	3.26	0.71
Other departments' members	3.11	0.76
Modalities:		
Written	3.51	0.75
Face-to-face	4.07	0.56
Telephone	3.93	0.71
Meeting	3.61	0.69

TABLE 11. AVERAGES OF 'COMMUNICATIONS' VARIABLES IN THREE FUNCTIONAL DEPARTMENTS—'HIGH PERFORMER' SAMPLE

	Averages (5-point scales)			*F*
	Manufacturing	Sales	R & D	
Frequencies of the *on-the-job* contacts with				
Superiors	4.00	4.20	4.15	1.28
Subordinates	4.40	4.57	4.28	2.24*
Peers at your own department	3.69	3.70	3.80	0.16
Other departments' members	3.45	3.69	3.85	3.01*
Frequencies of the *off-the-job* contacts with				
Superiors	2.87	3.41	3.09	5.84***
Subordinates	3.35	3.77	3.52	4.31**
Peers at your own department	3.20	3.41	3.42	1.14
Other departments' members	2.92	3.25	3.52	4.71**
Modalities:				
Written	3.55	3.52	3.85	1.92
Face-to-face	4.02	4.27	4.09	2.26*
Telephone	3.72	4.09	4.33	6.95***
Meeting	3.65	3.41	3.66	1.80

Notes: ***Significant at 1 per cent level.
**Significant at 5 per cent level.
*Significant at 10 per cent level.

the Japanese business organizations. On the job Japanese managers seem rather authoritarian in decision making, but they encourage participation through keeping close social relationships with their subordinates outside of work. Through this processes both managers and subordinates can share a considerable amount of information, and as a result the decision making processes are participative as a total process. Also high degree of 'face to face' interactions seems to improve the quality of participation since visibility is one of the

essential elements to enhance value and information sharing.

In the result of the comparative analysis between three functional departments (Table 11), we can find a certain pattern in communications common to on-the-job and off-the-job: that is, among three functional departments (1) the frequency of the vertical contacts, both upward and downward, is the highest in sales departments and (2) the frequency of the lateral contacts is the highest in R&D departments. By contrast, in manufacturing departments the frequency of the contacts is generally low. As for modality, 'face to face' is most common in sales departments, and 'telephone' and 'written' are most common in R&D departments.

The fact that there is a specific pattern in communications common to on-the-job and off-the-job may be a distinctive feature of decision making processes in Japanese business organizations.

Leadership

Here leadership means the managerial process of influencing followers' orientations and behaviors toward the achievement of departmental goals. Following the Ohio States Leader Behavior Description Questionnaire, we developed 21 indicators to describe the behavior of department managers, then the factor analysis was applied. As a result, seven factors which account for 63.2 per cent of the variance after rotation were extracted. The seven factors were further combined to three conceptual dimensions: information gathering, production-centered, and human relations-centered (see Table 12). Among them, the dimension of information gathering seems the most significant dimension of leadership behavior of Japanese managers. This dimension has not been explored in the past studies of leadership especially of firstline supervisors. We think that *managerial* leadership is different, and the information processing paradigm is the most promising framework to explain managers' leadership styles.

As shown in Table 12, the average scores of two factors for the information gathering dimension are the highest in R&D departments; second in sales departments; and the lowest

TABLE 12. AVERAGES OF 'LEADERSHIP' VARIABLES IN THREE FUNCTIONAL DEPARTMENTS—'HIGH PERFORMER' SAMPLE

	Averages (5-point scales)			F
	Manufacturing	Sales	R & D	
Information gathering:				
Through the line hierarchy	3.46	3.66	3.68	1.82
Through the various channels	3.46	3.76	3.91	5.38***
Production-centered:				
Strict devotion to regulations	3.21	3.08	3.19	0.45
Task oriented	2.97	2.76	3.35	7.07***
Human relations-centered:				
Democratic leadership	3.76	3.51	3.88	3.03*
Egalitarianism	3.01	3.04	3.23	0.73
Consideration for the subordinates	4.02	4.10	4.35	3.34**

Notes: ***Significant at 1 per cent level.
**Significant at 5 per cent level.
*Significant at 10 per cent level.

in manufacturing departments. In R&D departments which face the highest uncertainty, information gathering activities are most emphasized as the leader behavior. In addition, human relations-centered activities are also stressed there. Such leadership styles as in R&D managers with high scores on the information gathering as well as the human relations-centered dimensions seem to promote the high degrees of information sharing between managers and followers, and to motivate followers.

Conflict resolution

When faced with a conflict, managers can respond in several ways. The effective mode of conflict resolution can contribute to organizational integration, depending upon the environmental uncertainty (Lawrence and Lorsch, 1967). We were concerned with five modes of conflict resolution: withdrawing, smoothing, compromising, forcing, and confrontation (Blake and Mouton, 1964). In addition to the five modes, we added 'nemawashi' (*spading*) that is common problem solving styles among Japanese managers. It means exchanges of information and resource in advance of a formal meeting so that differences in opinions are not formally brought up at the meeting.

TABLE 13. AVERAGES AND STANDARD DEVIATIONS OF 'CONFLICT RESOLUTION' VARIABLES—TOTAL SAMPLE

	Averages	Standard Deviations
Withdrawing	2.32	0.68
Smoothing	2.18	0.81
Compromising	2.73	0.83
Forcing	2.97	0.84
Confrontation	3.26	0.77
'Nemawashi'	3.24	0.83

TABLE 14. AVERAGES OF 'CONFLICT RESOLUTION' VARIABLES IN THREE FUNCTIONAL DEPARTMENTS—'HIGH PERFORMER SAMPLE'

	Averages (5-point scales)			*F*
	Manufacturing	Sales	R & D	
Withdrawing	2.25	2.20	2.14	0.18
Smoothing	2.02	2.30	2.25	1.15
Compromising	2.87	2.52	2.80	2.11
Forcing	2.94	2.92	3.00	0.04
Confrontation	3.23	3.32	3.66	2.09
'Nemawashi'	3.15	3.27	3.70	2.56*

Note: *Significant at 10 per cent level.

Then, we made such a short statement representing the characteristics of each mode as, 'The conflict is promptly resolved based upon superiors' authority' (forcing). The respondents were asked with a 5-point scale to evaluate to what extent each statement properly describes the way they resolve conflicts on the job. Table 13 shows that in Japanese business organizations confrontation and 'nemawashi' occur most often.

From the comparative analysis among three functional departments (Table 14), it can be seen that 'nemawashi' and confrontation occur more often in R&D departments than in

sales and manufacturing departments. In R&D departments again the information mixing and sharing processes seems to be emphasized. These two modes of conflict resolution are most frequent in R&D; next in sales; least frequent in manufacturing. This relationship corresponds to the difference of the environmental uncertainty among three functional departments.

Individual Attributes

Although there are many variables of individual attributes, we focused on two characteristics: personality and value.

Lorsch and Morse have identified four personality dimensions (1974: 48–50): (1) *integrative complexity*—the extent to which individuals are able to take in differentiated bits of information from the environment and then to integrate the differentiated bits, (2) *tolerance for ambiguity*—preferences for less-defined, unstable, and relatively changing conditions, (3) *attitude toward authority*—preferences for autonomy and freedom in the job, and (4) *attitude toward individualism*—preferences for being and working alone. These four dimensions were also examined in our study. As for value, we selected one dimension after O'Reilly (1977): the instrumental-expressive orientation toward work. Those who perceive work as a means to another end have the instrumental orientation, and those who rank high in their needs for achievement and self-actualization through on the job activities have the expressive orientation.

TABLE 15. AVERAGES OF 'INDIVIDUAL ATTRIBUTES' VARIABLES IN THREE FUNCTIONAL DEPARTMENTS—'HIGH PERFORMER' SAMPLE

	Averages (5-point scales)			*F*
	Manufacturing	Sales	R & D	
Personality:				
Integrative complexity	3.45	3.83	3.81	3.05**
Tolerance for ambiguity	2.85	2.78	3.07	1.00
Attitude toward authority	2.81	2.58	2.55	1.25
Attitude toward individualism	2.52	2.64	2.42	0.66
Value:				
Expressive orientation	4.20	4.42	4.38	2.22

Note: **Significant at 5 per cent level.

Table 15 gives the final result of the comparative analysis using the averages calculated in terms of 5-point scales. It can be seen that the integrative complexity of managers is higher both in sales and in R&D departments than in manufacturing departments, and that the tolerance for ambiguity is the highest in R&D departments. Thus, the individuals which face the uncertain environment, such as those typical of R&D departments, would need a greater capacity for information processing. As for the instrumental-expressive dimension, both sales and R&D managers' orientations toward work are highly expressive. This may be due not only to the nature of the job (e.g., challenging *vs.* nonchallenging) but also to the mode of organizational adaptation to the environment. That is, the adaptation modes in sales and R&D departments can be expected to be more innovative than that in manufacturing departments.

Summary of the Findings

In the previous sections we have discussed the various relationships between environment and organization. We will now summarize the findings discussed above in terms of pattern of adaptation of each functional department.

Following the findings in contingency theories, we predicted that R&D departments would face the most uncertain environment and thus need organic structures and processes (Burns and Stalker, 1961). This prediction is generally supported by our data. In fact, we saw that the environmental uncertainty was the highest in scientific sector, and that the structural characteristics of R&D departments represented organic types (low formalization, low centralization, high professionalization, low division of labor, and high flexibility).

The characteristics of the organizational processes in R&D departments also seem to fit their heterogeneous and dynamic environments. They are characterized by more democratic decision making, more active communications (mainly lateral, both on-the-job and off-the-job), leadership with strong orientation to the information gathering and human relations, and more frequent confrontation as the mode of conflict resolution.

Furthermore, the individual attributes in R&D departments are consistent with our prediction. Namely, they indicate higher integrative complexity, higher tolerance for ambiguity, and more expressive orientation.

TABLE 16. SUMMARY OF THE FINDINGS ON VARIOUS VARIABLES FOR TWO CONTRASTING FUNCTIONAL DEPARTMENTS

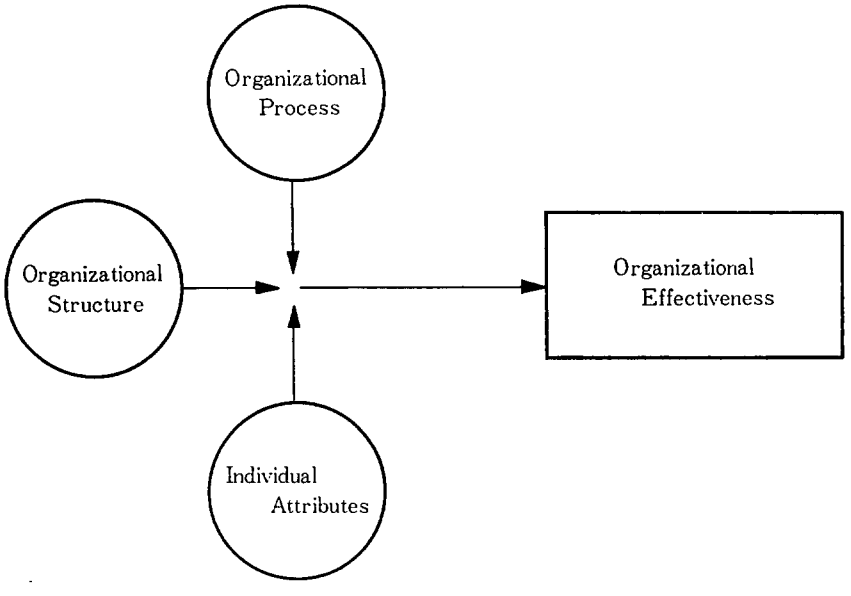
	Perceived environmental uncertainty	
	(Manufacturing) Low	(R & D) High
Context:		
Routineness of work	High	Low
Organizational structure:		
Formalization	High	Low
Decentralization	Low	High
Complexity	Low	High
Division of labor	High	Low
Flexibility	Low	High
Institutionalization of performance evaluation	Low	High
Organizational process:		
Decision making	Autocratic	Democratic
Communications	Inactive	Active (mainly lateral)
Leadership		
-Information gathering	Low	High
-HR centered	Low	High
Conflict resolution		
-Confrontation	Unusual	Usual
Individual attributes:		
Personality		
-Integrative complexity	Low	High
Value		
-Expressive orientation	Low	High

On the other hand, we expected that manufacturing departments would have mechanistic systems to deal efficiently with less complex problems in relatively certain environments. The following characteristics found in manufacturing departments support our expectation: (1) organizational structure with high formalization, high centralization, low professionalization, and high division of labor, (2) centralized distribution of power, (3) relatively autocratic decision making, (4) inactive communications, (5) leadership style low in the information gathering and high in the strict adherence to regulations, and (6) less frequent confrontation as the mode of conflict resolution. This pattern clearly indicates that manufacturing departments are typical bureaucratic organizations.

Finally, the information processing structure and processes in sales departments have generally in-between characteristics. But it should be noted that the frequency of the vertical contacts, both upward and downward, is the highest and 'face to face' interactions in communications are most frequent in sales departments. In these organizations the key is a fast reaction to a change in market conditions, and therefore the vertical information system seems to play an important role in the organizational adaptation to the environment.

Table 16 gives us the summary of the findings in the two contrasting functional departments. The overall pattern of the adaptive relationships seems to be explained by the information processing paradigm of organization. It should be noted here that our comparative analyses between three functional departments are all concerned with the 116 high performing organizations only, and so these suggest not an *average* way of the organizational adaptation to the environment, but rather a *functional* one. Thus, our findings summarized in Table 16 do show that an effective organizational adaptation to the environment is achieved through multilevel co-alignment among the organizational structure and processes and

FIG. 3. THE MULTILEVEL CO-ALIGNMENT MODEL



the individual attributes of the members (see Figure 3).

Some Conclusions

The purpose of this study has been to try to verify how the Japanese business organizations are adapting to their environments. For this analysis, "Integrative Contingency Model" was adopted in this paper. This model hypothesized that an organizational adaptation to the environment will be attained through multilevel co-alignment among the organizational structure and processes and the individual attributes. The sample were 234 functional departments, data were gathered through a questionnaire answered by each department manager, and then the comparative analysis among three functional departments was performed. The result of this analysis supports to larger extent our hypothesis. In concluding this paper, we point out the implications of this study and the future direction of the research.

First, the fact must be emphasized that there are various patterns in the organizational adaptation to the environment. Although most contingency approaches have been concerned with simple bivariate relationships (Miller, 1979), our analysis has shown that the relationships between the environment and the internal characteristics of an organization develop multilevel and multivariate patterns. In reality, an organization can change any structure, processes, or individual attributes in a variety of adaptive patterns. Furthermore, the relationships among these components of the organization are not mutually exclusive but rather complementary. If structure is not functional to the requirement of the environment, the process and/or the individual attributes may cover this incongruence to some degree. Our integrative contingency framework and its empirical findings can contribute to identify these complex patterns of organizational adaptation.

Secondly, it is true that adaptive patterns vary, but they do have a consistent set of characteristics or "gestalt" (Miller, 1979). Past contingency theorists have identified some of the patterns, but they failed to explain *why* these patterns exist, mainly due to the lack of adequate theories. We have shown that a good deal of findings could be theoretically explained with the information processing paradigm.

Thirdly, although our research is an exploratory study of the organization-environment relationship at one point in time, we plan to conduct an intensive case study of each participant organization to see how it developed its present pattern over time. The concept of equifinality implies the existence of variety of organizational paths to their equilibrium. Miller and Friesen empilically explored this concept and identified nine patterns of organizational transition (1980). The future direction of contingency theorists should aim to study the organization-environment relationship in dynamic as well as static state to construct a theory of organizational adaptation.

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