HOKKAIDO UNIVERSITY

Title	The Relationship between Environment and Budgeting Systems in Japanese Corporations
Author(s)	KOJIMA, Hiromitsu
Citation	HOKUDAI ECONOMIC PAPERS, 17, 39-48
Issue Date	1987
Doc URL	https://hdl.handle.net/2115/30735
Type	departmental bulletin paper
File Information	17_P39-48.pdf



Hokkaido University Collection of Scholarly and Academic Papers : HUSCAP

The Relationship between Environment and Budgeting Systems in Japanese Corporations

Hiromitsu KOJIMA
Associate Professor
Faculty of Economics
Hokkaido University

I. Introduction

Today, the environment surrounding corporations is increasingly mobile and unstable. Corporations are required to be able to adapt quickly to changing conditions. They set up various kinds of management systems in their effort to be responsive to the environment. Budgeting systems, among other management systems, are especially important because they determine and implement plans regarding how management resources should be utilized in relation to the environmental setting.

It has often been pointed out that budgeting systems of many corporations have the following problems: (1) authority does not lie where the responsibilities do; (2) rational and scientific budgeting is difficult; (3) there is not enough participation and cooperation in budgeting by top management and the work–site segment; and (4) inflexible budgets have been implemented.

Consequently, there have been many suggestions made for overcoming these problems: contingency planning, zero–base budgeting, and PPBS, to name a few. But these suggestions have remained suggestions only and have not actually been implemented by corporations. It is because there has not been enough recognition of the fact that a rationalized and improved, more desirable budgeting system must match the environmental setting and organizational characteristics of an individual corporation.

In order to make effective suggestions for the rationalization and improvement of budgeting systems, it is necessary to determine how budgeting systems are implemented by their corporations. It is especially important to analyze implementation closely in relation to the environmental setting and organizational characteristics of individual corporations.

It must be admitted that there have not been sufficient empirical analyses of budgeting systems from such a standpoint. Most studies in the past were either general surveys on the mechanics of budget preparation, or case studies of individual budgeting systems. Few studies have dealt with a systematic and empirical analysis of budgeting systems in relation to their environmental settings (Swieringa and Moncur, 1972; Bruns and Waterhouse, 1975; Hayes, 1977).

This study attempts a systematic and empirical analysis of budgeting systems interrelated with their environmental settings in order to fill the gap between general surveys and case studies.

II. Hypothesis and Method of Analysis

1. Theoretical Framework and Hypothesis

The conventional contingency theory concentrated on typification of the relation-

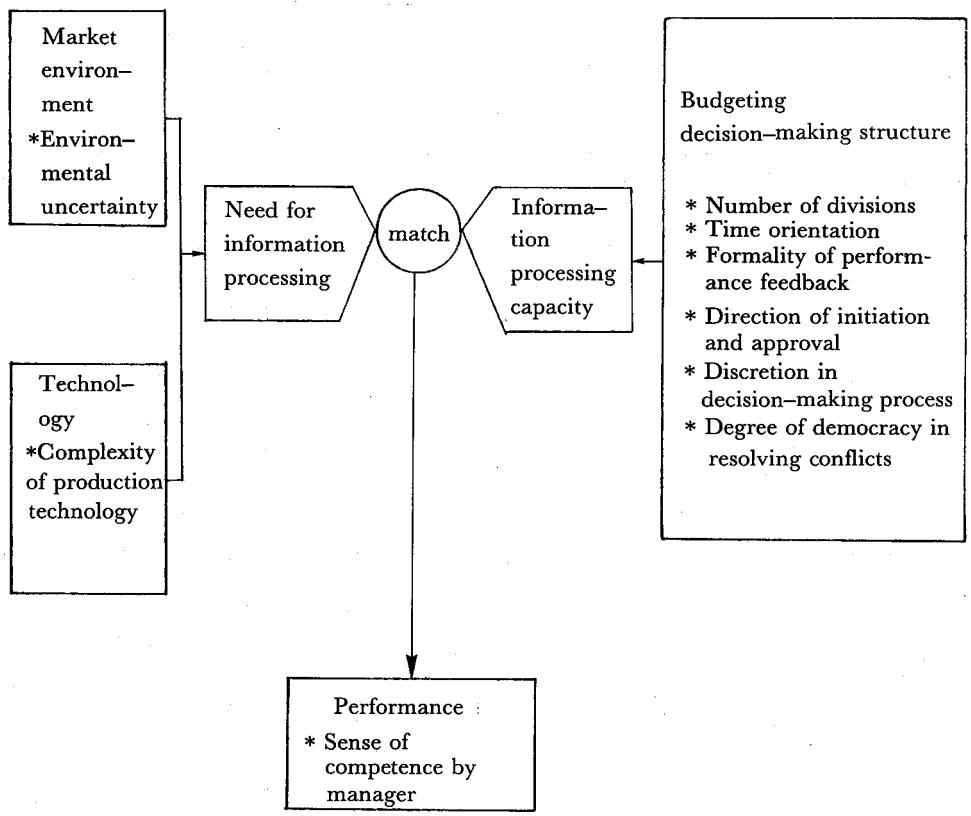
ship between task environment and organizational characteristics. It gives only fragmentary answers to the question of why the effectiveness of the organization increases when there is a certain relationship between task environment and organizational characteristics. The information processing model first presented a clear explanation principle in answer to this question. The explanation was: "As uncertainty in the immediate task environment increases, so does the need for increased amounts of information, and thus the need for increased information processing capacity; organization will be more effective when there is a match between information processing requirements and information processing capacity of the organization."

The validity of the information processing model has recently been recognized by a number of studies, and is receiving a great deal of attention as promising (Lawrence and Lorsch, 1967; Nonaka, 1972; Duncan, 1972; Lorsch and Morse, 1974; Galbraith, 1977; Tushman and Nadler, 1978; Nadler et al., 1979). In this study, the relationship between the environmental setting and the budgeting system was analyzed according to the information processing model.

Fig. 1 shows the theoretical framework for analysis of the relationship between environmental setting and the budgeting system. The following is a brief explanation of the theoretical framework.

In this analysis, market environment and technology were taken up as task en-

Fig.1.Theoretical Framework



Prepared with reference to Nadler et al.(1979), p.195.

vironment. In order to cope with the need for information processing associated with increased environmental uncertainty, organizations exercise budgeting decision–making structures (structure and behavior of the budgeting system). The information processing capacity of the organization is determined by the budgeting decision–making structure. Performance is realized as a result of the match between the need for information processing and the information processing capacity.

Next, operationalization was attempted on the concepts composing the theoretical framework: market environment, technology, budgeting decision–making structure, and performance. The process of operationalization of a concept consists of choice of dimension(s), choice of indicator(s) for each dimension chosen, and choice of the measuring instrument(s) for each indicator chosen (cf. Table 1). I would like to elaborate on the operationalization of the concept of performance.

A budgeting system is a system for management. Therefore, evaluation of any budgeting system must be given in relation to the overall management performance. The overall management performance is affected not only by the budgeting decision–making structure but also by various other factors. Therefore, it is impossible to separate the contribution of the budgeting decision–making structure to overall management performance, and measure and analyze it alone. In this study, therefore, "strong or weak sense of competence by manager in budgeting system ?" has been employed as the indicator for performance. "Sense of competence" is the degree of confidence felt by a manager in the budgeting system; this means the extent to which individuals gain phychological gratification from successfully mastering the world around them (Lorsch and Morse, 1974).

Based on the above considerations, the following hypothesis was presented.

Hypothesis:

"An effective budgeting system comes to show the following five characteristics concerning its structure and behavior as variety of environment (uncertainty of market environment and complexity of production technology) increases.

(1)Plans are set from the viewpoint of shorter terms.

(2)Performance feedback becomes more flexible.

(3)Direction of initiation and approval is likely to be bottom–up in a greater number of cases.

(4)There is greater discretion in decision–making.

(5)Conflicts are resolved through a more democratic method."

2. Method of Analysis

Ten manufacturing companies were chosen as subjects for this study, and the survey took place in 1975. (cf. Table 2)

The data were collected by means of questionnaires and interviews with budget managers and division managers. Answers to the questionnaires were converted to numerical values, using a five–point bipolar scale.

III. Analysis and Discussion of Results

The extent of environmental variety was measured by the method described below, using the ranking of environmental uncertainty and the ranking of complexity of production technology (cf. Fig. 2). That is, the extent of environmental variety

Table 1.Summary of Operationalization of Concepts

Concept	Dimension	Indicators for dimension	Measuring instruments for indicator
Market environment	Environmental uncertainty	Level of environmental uncertainty	Stability and potential of demand Market share and influencing power of corporation Intensity of competition in product market Predictability about competitor's actions
Technology	Complexity of porduction technology	Complexity of production system	Woodward's six step scale
		Number of products	Standard merchandise classification list
Budgeting decision-making structure	Number of divisions	Number of autonomous divisions	Number of autonomous divisions/annual sales (in 10 billion yen)
	Time orientation	Long or short term planning?	Degree of organization of long-range planning Integrity of contents of long-range plans
	Formality of performance feedback	Formal or flexible performance feedback concerning budget?	Degree of formality in performance feedback for budget
	Direction of initiation and approval	Bottom-up or top-down preparation of budget guidelines?	Direction of flow of budget guideline preparation Degree of specificity of budget guidelines
		Level of budget initiation in organizational hierarcy	Where decision-making items concerning budget are initiated
	Discretion in decision-marking process	Personal or mechanical budget review?	Degree of participation by budget department in sales budget review
	Degree of democracy in resolving conflicts	Democratic or despotic resolution of conflicts in budget committee?	Degree of cooperation between budget department and divisions Degree of democracy in resolving conflicts in budget committee
Performance	Sense of competence by manager	Strong or weak sense of competence by manager in budgeting system?	Confidence of members of division about achieving budget target Confidence of division manager about achieving budget target Level of mental pressure on division manager in budgeting system

was expressed as the square root of the sum of the squares of the ranks following; the rank of environmental uncertainty and the rank of complexity of production technology, i.e., distance from the origin (radius of concentric circle). The bigger the radius of the circle on which the organization is located, the more its environmental variety; the smaller the radius, the less the variety.

As shown in Fig. 2, the shoe company was discovered to have the greatest variety of environment, followed by the newspaper, vehicle, chemical, ceramics, special steel, electric appliance, bakery, and food companies, in this order. The power company was discovered to have the least variety of environment.

The ten subject companies were divided into two groups according to the level of the sense of competence; the top–five in one group, and the bottom–five in another. The top–five were the shoe, power, newspaper, bakery, and food. The bottom–five were the vehicle, electric appliance, ceramics, chemical, and special steel. In each group, seven rank correlation coefficients were obtained between the variable of environmental variety (one variable) and the variables of budgeting decision–making

Table 2.Summary of Subject Organizations

	Power company	Bakery	Food company	Shoe company	Chemical company
Yr. established	1951	1919	1957	1921	1912
Capital (¥ bil.)	217	.63	1.4	.018	2.13
Sales (¥ bil.)	63.6	28.5	33.2	3.7	21.3
# of employees	17,900	3,402	1,800	500	1,540
Main products	Electric power (rates)	Bread, Pastries, Ice cream	Tomato ketchup, Sauces, Natural juices	Men's shoes	Building materials, Chemicals, Electronic circuits

	Special steel company	Electric appliance company	Vehicle company	Newspaper company	Ceramics company
Yr. established	1950	1949	1896	1942	1904
Capital (¥ bil.)	12.5	7.3	4.1	.3	4.16
Sales (¥ bil.)	160	200	53.2	37.3	30.2
# of employees	9,200	19,500	4,300	4,015	4,000
Main products	Special steel materials, Steel goods, Industrial furnaces, Cast steel	Electric equipment for automobiles	Trains, Iron structures, Industrial machine, Plants	Daily newspapers, Monthly magazines, Irregular publications	Ceramics, Whetstones, Electronic parts, Environ–mental tools

structure (seven variables).

As shown in the results presented in Tables 3 and 4, six rank correlation coefficients of the top–five group were larger than the corresponding correlation coefficients of the bottom–five group. This indicates that the degree of match between environmental variety and budgeting decision–making structure is related to performance. The hypothesis of this study, therefore, has been generally supported.

Now, let us examine the results of the top–five group shown in Table 3.

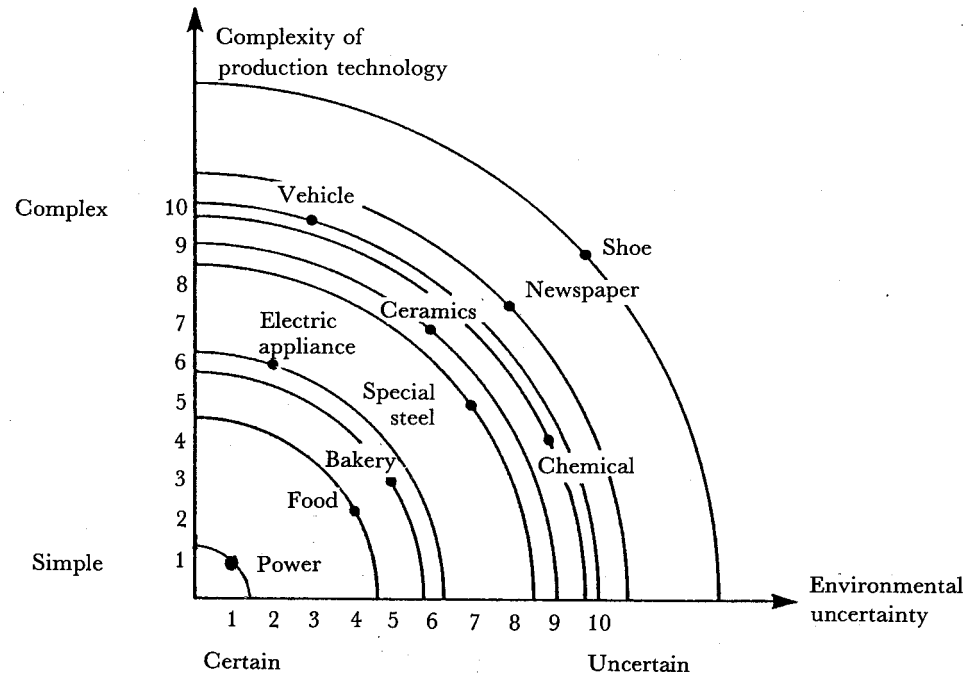
The ranking in the first column, "Environmental variety," completely coincides with the ranking in the second column, "Number of divisions," and the rank correlation coefficient is 1. This means that "the greater the environmental variety, the greater the number of divisions."

The rank correlation coefficient between the third column, "Time orientation," and "Environmental variety" is 0.65. This means that the organization with a more unstable environment cannot have a long–range viewpoint, and sets long–range plans of a shorter term. On the other hand, the organization with a more stable environment is setting long–range plans from a viewpoint covering several years and using projects allocated in the first year of its long–range plan for budgeting. This supports the hypothesis: "Under an effective budgeting system, plans are set from the viewpoint of shorter terms as variety of environment increases."

The rank correlation coefficient between the fourth column, "Formality of performance feedback," and "Environmental variety" is as high as 0.90. This result supports the hypothesis: "Under an effective budgeting system, performance feedback becomes more flexible as variety of environment increases."

Through analysis of the overall organizational structure, Lorsch (1965) has presented a theory that "less structurized organizations are more effective when their

Fig.2.Environmental Variety of Subject Organizations



tasks have a higher level of uncertainty and changeability; more structurized organizations are more effective when the certainty of the task is high." The aforementioned results of this study support Lorsch's theory.

The rank correlation coefficient between the fifth column, "Direction of initiation and approval (I)," and "Environmental variety" is a moderate 0.50. This result indicates that the preparation process of budget guidelines may be determined by factors other than environmental variety.

The rank correlation coefficient between the sixth column, "Direction of initiation and approval (II)," and "Environmental variety" is as high as 0.90. This result supports the hypothesis: "Under an effective budgeting system, direction of initiation and approval is likely to be bottom–up in a greater number of cases as variety of environment increases."

The rank correlation coefficient between the seventh column, "Discretion," and "Environmental variety" is as high as 0.70. This result can be interpreted as indicating that more discretion is given to divisions directly related to sales in organizations with a more unstable market environment among other environmental factors. In other words, the more stable the corporation's market environment, the more structurized the planning procedures and the higher the reliance on objective data in decision–making.

Ranking in the eighth column, "Degree of democracy in resolving conflicts", completely coincides with the ranking of "Environmental variety." This result indicates that, in organizations with a complex technological environment, top management does not exercise its authority to coordinate units at the lower level, but coordination among lower–level units is made democratically. Such democratic coordination among lower–level units is likely to give a stronger sense of competence to managers.

IV. Conclusion

The results of this empirical study concerning relationships among market environment, technology, budgeting decision–making structure, and sense of competence by the manager, have proven that the degree of match between environmental variety and the budgeting decision–making structure is related to a sense of competence. These resutls provide the following useful guideline for designing a budgeting system that is optimum for adaptation to the environment. That is, when the degree of match between the environment and budgeting decision–making structure decreases as a result of changes in the environment, performance can be improved by increasing the degree of match with changes in the budgeting decision–making structure.

Table 3. Match between Environmental Variety and Budgeting Decision-making Structure
— Top-five group of stronger sense of competence —

Organization	Environmental variety	Number of divisions	Time orientation	Formality of performance feedback	Direction of initiation & approval (I)**	Direction of initiation & approval (II)***	Discretion in decision-making process	Degree of democracy in resolving conflicts
Shoe	$\sqrt{181}$ (1)*	2.70 (1)*	4.0 (1)*	7.0 (1)*	4.5 (1)*	5.3 (1)*	8.00 (1)*	8.50 (1)*
Newspaper	$\sqrt{128}$ (2)	0.80 (2)	7.0 (3)	6.0 (2)	2.5 (4)	4.7 (2)	5.35 (4)	7.97 (2)
Bakery	$\sqrt{34}$ (3)	0.32 (3)	6.0 (2)	6.0 (2)	3.5 (2)	3.8 (3)	7.17 (2)	7.10 (3)
Food	$\sqrt{20}$ (4)	0.22 (4)	7.0 (3)	4.0 (4)	1.5 (5)	3.0 (5)	6.39 (3)	6.75 (4)
Power	$\sqrt{2}$ (5)	0.16 (5)	7.0 (3)	4.0 (4)	3.0 (3)	3.1 (4)	5.30 (5)	5.80 (5)
Spearman rank correlation coefficient		1.00	0.65	0.90	0.50	0.90	0.70	1.00

* Parenthesized figures indicate ranking of each indicator within the group.

** Indicator: Bottom-up or top-down preparation of budget guidelines?

*** Indicator: Level of budget initiation in organizational hierarchy.

(Notes apply also to Table 4.)

Table 4. Match between Environmental Variety and Budgeting Decision-making Structure
— Bottom-five group of weaker sense of competence —

Organization	Environmental variety	Number of divisions	Time orientation	Formality of performance feedback	Direction of initiation & approval (I)**	Direction of initiation & approval (II)***	Discretion in decision-making process	Degree of democracy in resolving conflicts
Vehicle	$\sqrt{109}$ (1)	1.04 (3)	4.0 (1)	6.0 (3)	3.0 (3)	3.9 (5)	4.75 (5)	8.03 (2)
Chemical	$\sqrt{97}$ (2)	1.07 (2)	6.0 (2)	6.0 (3)	4.0 (1)	4.0 (4)	5.89 (3)	6.78 (5)
Ceramics	$\sqrt{85}$ (3)	1.72 (1)	8.0 (4)	8.0 (1)	2.0 (4)	5.7 (2)	6.06 (2)	8.11 (1)
Special steel	$\sqrt{74}$ (4)	0.25 (5)	6.0 (2)	7.0 (2)	4.0 (1)	4.4 (3)	6.46 (1)	6.86 (4)
Elect. Appl.	$\sqrt{40}$ (5)	0.58 (4)	8.0 (4)	6.0 (3)	2.0 (4)	6.0 (1)	4.80 (4)	7.77 (3)
Spearman rank correlation coefficient		0.50	0.70	−0.20	0.30	−0.90	−0.30	0.10

References

[1] Bruns, W.J., and J.H. Waterhouse, 1975. "Budgetary Control and Organizational Structure," *Journal of Accounting Research*, 13: 177–203.

[2] Duncan, R.B., 1972. "Characteristics of Organizational Environments and Perceived Environmental Uncertainty," *Administrative Science Quarterly*, 17: 313–327.

[3] Galbraith, J., 1977. *Organization Design*, Reading, Mass.: Addison–Wesley.

[4] Hayes, D.C., 1977. "The Contingency Theory of Managerial Accounting," *The Accounting Review*, 52: 22–39.

[5] Kojima, H., 1982. *Kigyokankyo to Kanrishisutemu* (Environment and Management Systems). Written in Japanese, Tokyo: Chuokeizaisha.

[6] Lawrence, P.R., and J.W. Lorsch, 1967. *Organization and Environment*, Boston: Division of Research, Harvard Business School.

[7] Lorsch, J.W., 1965. *Product Innovation and Organization*, London: Macmillan.

[8] Lorsch, J.W., and J.J. Morse, 1974. *Organizations and Their Members*, New York: Harper & Row.

[9] Nadler, D.A., J.R. Hackman, and E.E. Lawler III, 1979. *Managing Organizational Behavior*, Boston: Little, Brown.

[10] Nonaka, I., 1972. *Organization and Market: Exploratory Study of Centralization vs. Decentralization*, Ph.D. dissertation, Graduate School of Business Administration, University of California, Berkeley.

[11] Swieringa, R.J., and R.H. Moncur, 1972. "The Relationship between Managers' Budget–Oriented Behavior and Selected Attitude, Position, Size, and Performance Measures," *Empirical Research in Accounting: Selected Studies*: 194–205.

[12] Thompson, J.D., 1967. *Organizations in Action*, New York: McGraw–Hill.

[13] Tushman, M., and D.A. Nadler, 1978. "Information Processing as an Integrating Concept in Organizational Design," *Academy of Management Review*, 3: 613–624.

[14] Woodward, J., 1965. *Industrial Organization: Theory and Practice*, London: Oxford University Press.