

MANAGEMENT CONTROL SYSTEMS:

A CONCEPTUAL FRAMEWORK

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Introduction

This paper has two purposes, the first is to synthesize the current state-of-the-art with respect to Management Control Systems, pulling together what we perceive to be some of the existing concepts into a framework which we suggest is useful in identifying gaps in our current understanding. The second is to use the framework to suggest directions in which control systems might be modified to increase their effectiveness. The process of control and the application of control system concepts to Management Control has been talked about and discussed at great length in the literature over the previous twenty years. In its practical form control in organizations today is synonymous with financial control and in particular budgets and the budgeting process. This will continue to be extremely important for all organizations. However, it is apparent from the recent increase in pressure from outside the organization that ones view of control systems will have to be modified if organizations are to continue to run effectively. There is already ample evidence of this shift in the control practices of many organizations and we think we discern three major areas in which these changes are taking place.

- The need for control systems to be modified to reflect the increasing complexity of the organization's structure because of the evolution of more traditional organizational patterns, such as divisionalized organizations, into say multidimensional structures.

- The use of non-dollar variables as a regular part of the formal control system.
- The linkage between planning and control, and between control and operations.

Our discussion will be normative. Although our article does not base itself on a specific research project, we shall be drawing on pertinent research findings by others, as well as our recent general field experience with planning and control systems in actual organizations. Thus, all statements to be given are hypotheses and require testing.

I. Management Control: Purposes and Steps in Process

A number of reasonable definitions of management control systems have been suggested over the years.¹ Admittedly, some of these tend to be so general that they yield less than desirable guidance for the researcher, or the practitioner. Other definitions tend to be too partial by essentially focusing on narrower aspects of what seems to be a broader management control process. Nevertheless, a number of useful definitions of management control exist. We shall propose that the fundamental purpose for management control

¹See, for instance, Anthony, Robert N., Planning and Control Systems: A Framework for Analysis, Division of Research, Harvard Business School, 1965; Jerome, William Travers III, Executive Control -- The Catalyst, Wiley, 1961; Anthony, Robert N., John Dearden, and Richard F. Vancil, Management Control Systems, Irwin, 1972; Horngren, Charles, Accounting for Management Control, Prentice-Hall, 1974; Horngren, Charles, Cost Accounting: A Managerial Emphasis, Prentice-Hall, 1972; Welsch, Glen, Budgeting: Profit Planning and Control, Prentice-Hall, 1971; Emery, James C., Organizational Planning and Control Systems, MacMillan, 1969; Dearden, John, Cost Accounting and Financial Control Systems, Addison-Wesley, 1973, and others.

systems will be to help management accomplish an organization's objectives by providing a formalized framework for the identification of pertinent control variables, the development of good short-term plans, the recording of the degree of actual fulfillment of short-term plans along the set of control variables and the diagnosis of such deviations. We shall adopt this as our working definition of management control systems.

An overall illustration of the management control process model is given in Exhibit I. The exhibit indicates the interrelationship between management control and the long-range planning process as well.

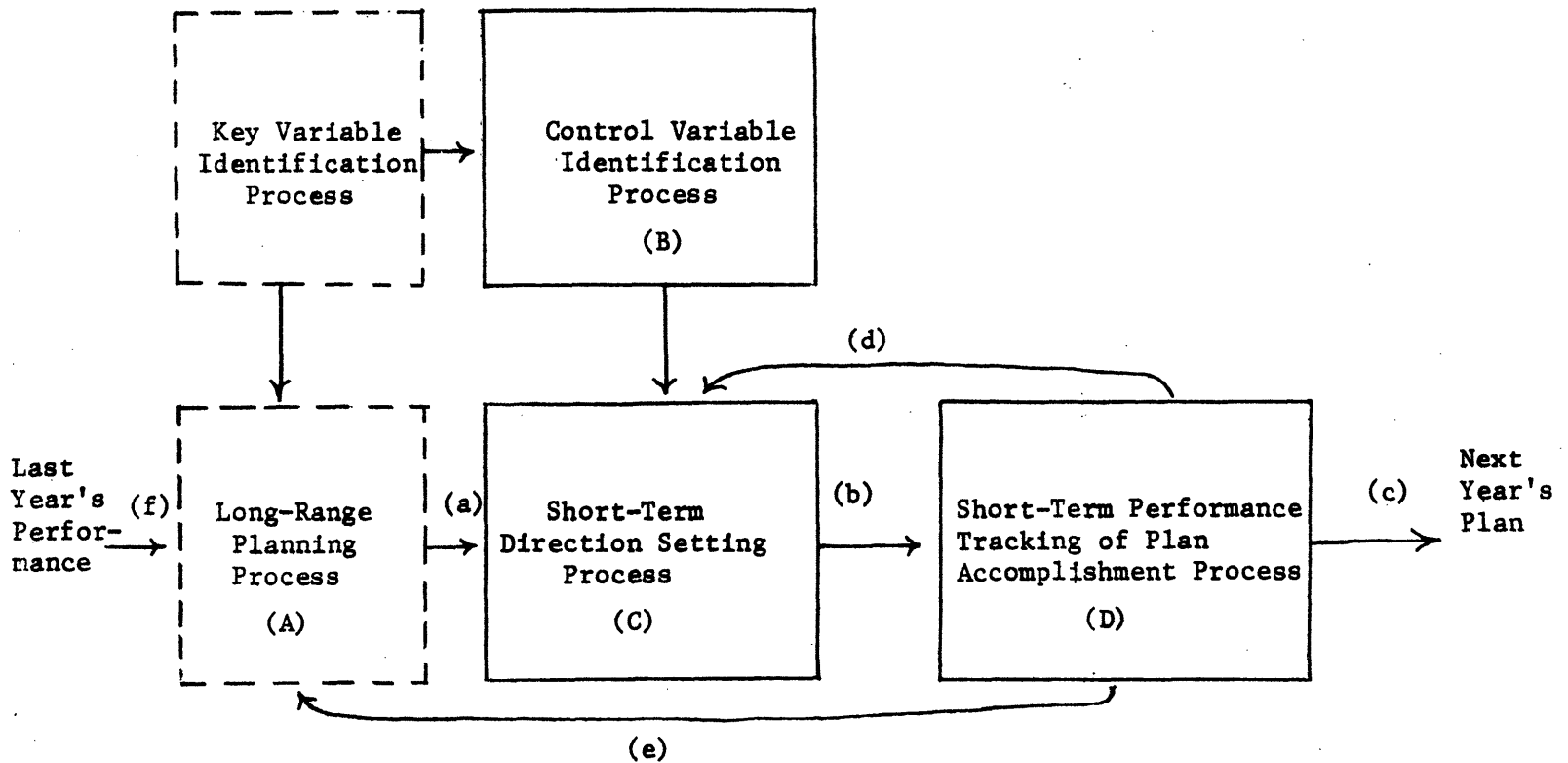
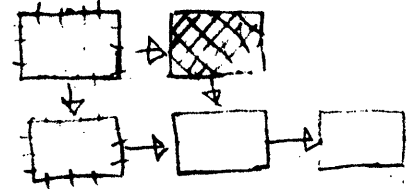


EXHIBIT I

Interrelationship Between the Components of the Long-Range Planning and Management Control Processes

The long-range planning process is illustrated by box (A). The management control process is split into the control variable identification process (B), the short-term direction setting process (C), and the short-term plan accomplishment tracking process (D). The linkage between planning and control is illustrated by arrow (a). The relationship between the two control subprocesses is illustrated by arrows (b) and (d). The tracking of deviations between actual performance and budget may lead to a number of actions, arrows (c), (d), and (e).



A. Identification of Control Variables

Control variables form the content of the short-term plan -- they are the items that represent the goals of the organization and they determine what is to be tracked. One of the central activities of management control is to identify what these control variables should be. In the discussion to follow we shall show these to come from two major sources:

- (1) The goals and objectives.
- (2) The situational setting, particularly:
 - (a) the organization structure
 - (b) the people in the organization
 - (c) the technology available
 - (d) the external environment

The choice of control variables is partially dependent on the choice of key variables in the long-range plans as indicated on Exhibit I with the arrow linking the key variable identification and the control variable identification

processes. Key variables are operational measures that reflect the goals of the organization. For example change in market share might be a key variable used to reflect the organization's goal of growth. Some key variables cannot be used as control variables because they are virtually uninfluenced by the organization. For example new product innovations by competitors could be a key variable but not a control variable. Nevertheless, the goals and objectives of the corporation, as represented by the key variables, is a major source for the control variables determination.

The actual choice of control variables will also, of course, depend critically on each given corporate setting. We shall indicate aspects of a situational setting that seem relevant to consider in order to come up with a situationally "tailored" set of control variables, by drawing on Leavitt's work where he discusses managers and their various tasks in an organizational context.² When looking at a particular task, in our case the management control process, he argues that task interacts strongly with three other sets of variables. The first of these is the organizational structure in which the task is taking place, the second is the people that are in the organization and the third is the technology that is available to support the task in question. Leavitt argues cogently that these four sets of factors have to be in a state of dynamic equilibrium if an organization is to remain healthy. For our purposes here we will add the external environment as a fourth major independent variable. We shall expand on each of these forces to get some flavor for the impact they have on the choice

Leavitt, Harold, Managerial Psychology, University of Chicago Press, 3rd edition, Chicago, 1972.

of control variables:

(1) Organization Structure

The type of control system to be used is partially dependent on the kind of organization structure that exists in the company. The now generally accepted contingency theory of organizational design depends on the company's situational setting, and that since virtually all companies differ in their situational settings, there will be no one best way of designing the organization.³ Thus the choice of organizational structure is dependent on many other variables.

The most important of these is the basic organizational archetype that is involved. Every corporation consists of a number of more or less autonomous decision-making units. Such responsibility centers, or the "building blocks" of the organization, may have labels such as cost centers, investment centers, departments, divisions, areas, as well as others. Although there are many different types of responsibility center units we shall claim that there will be several common features of the management control process of any such center. However, the control variables to be

³For a review of empirical studies on contingency theory, see Galbraith, Jay, "Organizational Design: An Information Processing Point of View", Sloan School Working Paper No. 425-69, M.I.T., Cambridge, Massachusetts, 1969, pp. 2-5; see also Lorsch, Jay W. and Stephen A. Allen III, Managing Diversity and Interdependence: An Organizational Study of Multidivisional Firms, Division of Research, Harvard Business School, Cambridge, Massachusetts, 1973; for some viewpoints critical to the contingency theory school of thought, see Christenson, Charles, "The Contingency Theory of Organization: A Methodological Analysis", Harvard Business School Working Paper, Harvard University, Cambridge, Massachusetts, 1973.

tracked through plans and budgets will differ, depending on what type of responsibility center we are dealing with. Further, an analysis of the common elements of management control with the responsibility center helps the exploration of management control for various combinations of centers, such as functional, divisional or matrix organizations. We are thus encountering a management control problem at two levels, for a responsibility center and for combinations of centers.

(2) People

We would argue that the type of control variables and the nature of the control process will be significantly affected by several sets of variables that characterize people in organizations. The first of these might be labelled "style". The style of the managers and the style of the organization with respect to conflict resolution, their attitudes toward risk, and the way they tend to make decisions, often vary between organizations. Some organizations have a more bureaucratic approach with a well documented and careful trail of paper behind each decision. Others tend to be more informal with largely verbal conversations and little or no documentation. The control system will obviously be different in these two organizations. The control system is also affected by the educational levels and the degree of professionalism of the managers and by the history built up over time. These factors of style, education, and history are augmented by that of the "political science" of the organization. The importance of the informal power structure and the informal

communication network of organizations have been well-documented elsewhere.⁴ Although the control systems design cannot take all these factors into account explicitly, it is crucial for the designer to recognize that the people in the organization will determine in large measure what kind of control system is possible.

There is a particularly important reverse effect of the control system on the people in the organization. In other words, not only do the people affect the kind of control systems possible, there is often a strong effect of the control system on the individuals in the organization. Questions of the motivational impact of tight versus loose budgets is merely one example of this effect. The early work by Stedry and others attempted to show some of the impact that the behavioral implications of the budgeting process can cause.⁵ Although this research had tended to focus largely on dollar budgets, or single dimensional budgets, the fact that it had an impact is quite clear.

(3) Technology

There are at least three important aspects of technology with respect to control systems. The first and most prevalent of these is

⁴See for instance, Lorange, Peter, Behavioral Factors in Capital Budgeting, Universitetsforlaget, Bergen, Norway, 1972, and Bower, Joseph, The Resource Allocation Process, Division of Research, Harvard Business School, Harvard University, Cambridge, Massachusetts, 1970.

⁵See Stedry, Andrew C., Budget Control and Cost Behavior, Prentice-Hall, 1960, Becker, Selwyn and David Green, Jr., "Budgeting and Employee Behavior", Journal of Business, October 1962, pp. 392-402, as well as the discussion between the above authors, Journal of Business, April 1964, pp. 195-205.

the Management Information System necessary to support the control system. A simple example of this is obviously the computer-based information system which allows a very much more elaborate and detailed budgeting system to be maintained than would be possible manually.

A second kind of impact of "technology" is the measurement question. There is a real technology of measurement, the developments in cost measurement systems being an example. In addition, there is also the technology involved in tracking non-dollar key variables such as employee morale, market share, productivity, product quality and the like. If the measurement technology is not adequate to track these kinds of variables it clearly becomes impossible to have them form a robust part of the control system.

The third component of technology is the mathematical techniques that allow us to make trade-offs between different objectives, based on multiattribute preference theory.⁶ If, for instance, the control system calls for tracking a series of control variables and each of these variables are measured on a different scale then it becomes necessary to find some way of assessing the status with respect to the combination of these objectives. An example is how one assesses the status of a division that is ahead on market share, behind in quality, and above inventory target levels. Further, a given course of action may have differing effects on the various attributes and it may become hard, or even impossible, to assess which action strategy would give "the best" results.

⁶ See, for instance, Keeney, Ralph L., "An Illustrated Procedure for Assessing Multiattributed Utility Functions", Sloan Management Review, Fall 1972, or Keeney, Ralph L., "A Decision Analysis with Multiple Objectives: The Mexico City Airport", Bell Journal of Economics and Management Science, Spring 1973.

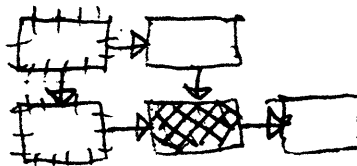
The reverse effect of the impact of the control system on technology may have its biggest significance in the Information Systems area. The information systems in many instances ought to be designed to support the control system, and not be built as ends in themselves. This view of subordinating information systems to the purposes of the control system is not one that seems to be widely shared by information systems professionals in actual practice in many organizations.⁷

(4) Environmental Forces

The fourth set of forces that help determine the control system are those external to the organization. It might be more accurate to show a planning function between the environment and the control system since it is the purpose of the planning activity to assess the environment and its implications for the organization. As we argued at the beginning of the paper, it is primarily the change in the external environment of the organization that makes us suggest that a shift in emphasis in the control system may well be appropriate. For example, the environment is exerting pressure for product quality or product safety, it is sharply raising some of the costs of production due to energy shortages, it causes shifts in raw material supplies and their costs; it is placing requirements on the organization from governmental authorities; and there are a host of competitive pressures due to shifting technology. It seems reasonable in light of these pressures that

⁷ See Gorry, Anthony, and Michael Scott Morton, "A Framework for MIS", Sloan Management Review, Fall 1971.

the control system should change to include an expanded set of control variables that can be used to manage the organization in response to these pressures.



B. Setting Short-Term Direction

From Exhibit I it follows that the next step in the control process is that of setting short-term goals. A major objective of management control is to provide a vehicle for systematically narrowing down the wide number of business opportunities immediately facing the corporation into one set of attempted business actions. Initially, top management will be primarily involved, but, as the control process proceeds, a larger and larger share of the organization's managers do get involved. Consequently, the control system provides a logical sequence of steps for gradually narrowing down the near-term business opportunities, during which agreement will be reached on a given direction setting among a gradually increasing set of managers, thus culminating with the agreement on a near-term plan for all responsibility centers that the entire management should be committed to. Thus, we claim that one purpose of management control is to arrive at a "smart" set of short-term goals. These short-term goals may be specified in dollar numbers, as most typically exemplified by the budget, or they may, increasingly, be specified in non-monetary terms. Each responsibility center will attempt to develop their "good" short-term goals. At the outset there will be a number of inputs from the preceding planning, such as the responsibility center's charter, objectives, goals, and strategy. Also, a relatively broad

and tentative resource allocation to the unit's overall progress will typically exist. Thus the span of immediate opportunities will have been narrowed down considerably through preceding planning. The task to be achieved through the short-term planning process will be to complete this narrowing down so that a good short-term plan will result. In case of little or no preceding long-range planning or in case of loose linkage between the long-range and short-term planning parts of the process, much less narrowing down of strategic options will have taken place. Thus, at the short-term planning stage, one will have to undertake a much more dramatic narrowing down in order to arrive at the near term plan. In practice, this may jeopardize the quality of the short-term plan, as typically there is a shortage of time in which to do the same systematic narrowing down as before.

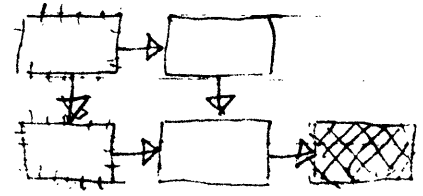
For a functionally organized combination of responsibility centers the steps in the short-range strategic goal-setting process may be that the corporate president's office states the overall corporate goals, based on a summary of the inputs from the preceding planning cycle, for then to call on each department for short-term plans. The departments then develop and submit for corporate approval their short-range plans, which then will be coordinated, reviewed and approved by the corporate headquarters. Approval implies the allocation of funds to the short-range plans.

For a divisionalized organizational structure each division will proceed in a way essentially analogous to the steps of the functionalized corporation. The most significant difference seems to be related to corporate headquarters role. The corporate headquarters requests each division to initiate

the developments of their short-term goals, operationalized by their short-term plans. Based on planning at earlier stages (involving all three hierarchical levels in the divisionalized organization; corporate, divisional, and departmental), corporate headquarters has reached an agreement within the division level responsibility centers on long-range goals, both corporate and divisional. Corporate headquarters has then tentatively allocated the resources available to the program "packages" of each division, i.e., indicated how much is to be allocated to each business element in the company's "portfolio" of businesses so that overall profits, growth and risk properties of the entire corporate portfolio balance become as desired.⁸ Within the constraints imposed by this specification of linkage to long-range plans, the divisions are asked to come up with their short-term plans.

A number of characteristics of this process should be pointed out. First, close coordination will most often be required between the functional departments; they are not developing their short-term plans in isolation. Secondly, the process is interactive. Typically, the short-term planning cycle will go through a number of "spins" before the budget gets finalized. Finally, the budgeting process is hierarchical. This implies that the higher organizational level will review the plans of the level underneath as a portfolio. Thus, each responsibility center plan at the lower level will be reviewed in terms of its effect on the totality of all the other responsibility center plans at that level.

⁸ See Vancil, Richard F. and Peter Lorange, "Steps in the Long-Range Planning Process", Sloan School Working Paper, Cambridge, Massachusetts, 1974, and Carter, E. Eugene and Cohen, Kalman J., "Portfolio Aspects of Strategic Planning", Journal of Business Policy, Summer, 1972.



C. The Performance Tracking and Diagnosis Steps

A distinctive benefit from formal planning and control is as a vehicle for systematically learning about how to adjust better to one's business environment, by attempting post facto to understand why one's plans and budgets did not get fulfilled. By making use of plans and budgets as benchmarks for reference in systematic follow-up analyses of why the company did not get where it planned, important understanding about future direction-setting can be gained. This third purpose of management control, consequently, deals with the measurement of the extent to which the short-term goals are being achieved and the diagnosis to find reasons why these goals are not being reached. It thus serves as a "tracking function" for measuring performance as well as a basis for diagnosis of performance deviations. Consequently, it provides a vehicle for learning from experience how to make better adjustments to business opportunities in the future. In fact, since most of the monitoring of both long-range as well as short-range plans takes place as part of the management control process, an effective extension of the tracking part of the management control process will be essential both for effective long-range and short-range planning.

The ability of one organizational unit to fulfill short-term plans does not depend on its own abilities alone, but also on other organizational units' performance. For instance, a division's ability to fulfill its short-term plan depends considerably on how well its departments are proceeding

in attaining their planned short-term goals. Consequently, the tracking function must provide for the signaling of performance deviations to those other organizational units for which such information is relevant. At the outset, however, let us discuss the tracking process where we have one responsibility center only. The tracking functions (C) in Exhibit I may be divided into two parts, the recording of deviations from short-term plans for the set of control variables identified during the short-term plan determination stage, and the diagnosis of deviations hopefully leading to a determination of the causes of deviation.⁹

The first of the two subfunctions of the tracking task, the recording function, can in turn be separated into three components, the measurement of each control variable, the identification of what extent the source of deviation was due to a controllable factor, as well as whose responsibility it is,¹⁰ and the identification of what extent the source of deviation was due to uncontrollable events for then to initiate the adjusting accordingly.

The control variable measurement function consists of measuring the progress over time of the short-term goal attainment. Given that not all

⁹Zannetos, Zenon S., "On the Theory of Divisional Structures: Some Aspects of Centralization and Decentralization of Control and Decision-Making", Management Science, Vol. 12, No. 4, 1965.

¹⁰See Kaplan, Robert S., "Optimal Investigation Strategies with Imperfect Information", Journal of Accounting Research, 1969; Dyckman, Thomas R., "The Investigation of Cost Variances", Journal of Accounting Research, 1969; and Demski, Joel, "Optimal Performance Measurement", Journal of Accounting Research, 1971.

the goals may be quantified in dollars, we must be able to measure control variables expressed in non-dollar terms as well as in qualitative terms, too. A number of criteria have been proposed for judging the goodness of control measures, many of them originating from financial accounting.¹¹ The measures may have to satisfy criteria such as objectivity, reliability, verifiability, although most important for our purpose is the criterion of usefulness in decision-making, i.e., that the data being monitored are useful for management control.

Let us now turn to the second subtask of the tracking function, namely, the diagnosis of deviations. The diagnosis consists of applying analytical tools to understand the cause-effects of the phenomenon that resulted in the deviation. Given that we may be analyzing variations of various kinds and for a variety of control variables, we may, of course, have to resort to a wide variety of analytical tools.

The diagnosis of a variance may lead to three different actions:

- (1) The performance deviation may trigger some sort of corrective action, which, in turn, implies that the resource allocation exemplified by the short-term goals will have to be altered to some extent. This is illustrated by arrow (d) in Exhibit I.

¹¹See in particular, American Accounting Association, A Statement of Basic Accounting Theory, Chapter 4, 1966, and American Institute of Certified Public Accountants, Objectives of Financial Statements (Trueblood Committee Report), 1973.

- (2) In cases of serious deviations, corrective measures may be taken regarding the overall resource allocation pattern, which will be evidenced by the revision of the long-range planning process, followed by revision of the short-term goals. This relatively rare effect is illustrated by arrow (e).

- (3) In some cases no immediate corrective actions are being taken, but the "learning process" of deviating from plans will lead the deviation to have an impact on next year's plan, as evidenced by arrow (c). (Of course, deviations in last year's performance similarly led to impacts on this year's plan, as illustrated by arrow (f).)

Let us indicate some of the complicating issues of tracking when we have hierarchical combinations of responsibility centers. In the case of a functionally organized company we will typically be dealing with performance measurements for cost centers and/or discretionary expense centers. Diagnosis will also focus heavily around costs and expenses. We shall not explore these problems in detail, but refer to a relatively well developed body of literature.¹² For the divisionalized corporation the performance tracking will not only be focused around cost and expense centers, but also around profit and investment center performance. Many difficult measurements problems arise, not only when attempting to determine

¹² See, for instance, Horngren, Charles, Cost Accounting: A Managerial Emphasis, Prentice-Hall, 1972; Gordon, Myron S. and Gordon Shillinglaw, Accounting: A Managerial Approach, Irwin, 1964; or Dearden, John, Cost Accounting and Financial Control Systems, Addison-Wesley, 1973.

profits but even more so when attempting to estimate an asset base. Once more, we shall not repeat the various arguments within this relatively heavily researched field, but again refer to the literature. ¹³

There is a possible danger that the performance tracking process might lead to decision-making behavior within an organization which violates the overall organizational goal consequence requirement. Partly this is due to the "technical" measurement problems just referred to, which often stem from a desire to attempt to capture complex and multi-faceted underlying phenomena by means of a few variables, usually expressed in dollar terms. Oversimplification, leading to impossible measurement tasks, will easily be the result. Partly, however, lack of goal consequence may arise due to lack of consistency between the time span used for control purposes for a unit at a given organizational level and the time span that seems to be appropriate for the given type of business undertaken by the unit. For instance, a research laboratory organization would experience severe problems with a one-year time horizon for its control system -- five years might for instance be more appropriate.

The preceding discussion has attempted to synthesize the current view of management control systems. The literature contains a variety of views but most if not all of these can be summarized by Exhibit I. The literature,

¹³ See, for instance, Solomons, David, Divisional Performance, Financial Executives Institute, 1965; and Dearden, John, "The Case Against ROI Control", Harvard Business Review, September-October, 1966.

however, does not provide an emphasis on three emerging areas of control-- it is in these, namely linkage to planning, use of non-dollar control variables, and the added complexity of multidimensional organizational structures that we now turn.

II. Emerging Issues

A. Multidimensional Organizational Structures - Control Implications

One of the results of the increasing complexity of much of today's technology is a higher degree of interdependency between many intermediate production processes, which may lead to a considerable penalty in terms of diseconomies of scales on corporations that are divisionalized. A lot of duplication of effort may be taking place. Similarly, a company expanding multinationally may be too small to set up separate production facilities in each geographical area. In both instances, a matrix-type organizational structure may be adopted to achieve both production economics as well as business/area effectiveness. Given the trends towards increased complexity of technical processes as well as towards increased internationalization, multidimensional organizational structures will probably become more common.

For a company with a matrix structure key decision-making activities will be carried out in committees by managers representing diverse task backgrounds. Consequently, within parts of such organizations, unidimensional hierarchical responsibility center patterns no longer exist. The managers

on the matrix boards will represent one of the following three task types:¹⁴

- Business Units: These will have performance responsibility for a business family, analogously to divisional organization along business areas, and will typically be profit centers.

- Geographical Units: These will have performance responsibility for a geographical area, say a country, and will also typically be profit centers.

- Functional Units, such as manufacturing, marketing, R & D, etc.: These will have responsibility for the functional services they render to each business and/or area unit, and will typically be cost centers.

Not all matrix organizations will be three-dimensional, i.e., have all the above three task types represented on the group decision-making matrix boards. For instance, a company operating only on the domestic market may be matrix-organized along the business and functional dimensions only. Or a company which is essentially manufacturing one class of products world-wide may adopt a two-dimensional matrix with geographical and functional elements. Thus, only multinational, multiproduct corporations will typically adopt the

¹⁴See Galbraith, Jay R., "Organization Design: An Information Processing View", Sloan School of Management Working Paper N. 425-69, M.I.T., Cambridge, Massachusetts, pp. 27-32; Galbraith, Jay R., "Matrix Organization Design", Business Horizons, February, 1971; and Goggin, William C., "How the Multi-dimensional Structure Works at Dow Corning", Harvard Business Review, January-February, 1974.

more complex three dimensional structure.

It should be stressed that only a relatively small part of any company's decision-makers will directly be part of committee decision-making. The functional organizational hierarchies such as marketing or production, will, of course, still be in existence. Unidimensional responsibility patterns will exist within these hierarchies, although at one level fairly high up in the organization each function as well as the business or/and the area dimensions. A given corporation may consist of from only a few to a fairly large number of matrix units.

Three distinctive types of control tasks emerge from such a matrix structure:

- Control within each of the three task dimensions (i.e., the business, geographical and functional tasks). Particularly for the functional responsibility centers elaborate control similar to what we find in unidimensional structures will typically be instituted.
- Control of each matrix committee effort, the multidimensional responsibility and reporting patterns being a distinctive feature.
- Control of the overall corporation, the major task being to control the overall portfolio of matrix team efforts.

For a matrix structure the steps in the short-term planning process will be much more complicated. It will be necessary with a high interaction among a large number of executives and substantial interrelationships between sub-plans, sub-tasks, etc. The need for a formal system for management control becomes

higher than ever in such a setting, ensuring proper timing, formats and coordination of many diverse control activities.

One might speculate that in order to get the planning and control process going one of the three task dimensions might be given a more dominating role than the others. For instance, when developing the long-term plans, the business and/or geographic task units may be more heavily involved than the functional dimensions. On the other hand, when options have been narrowed down considerably and short-term budgeting is to take place, the functional units might be playing a more dominant part.

As a further illustration of complexity due to cubic structure one can look at the measurement and diagnostic step. For the multidimensional organization this can become complicated by the added dimensions of multiple responsibility among decision-makers for tasks. One implication is that costs and incomes must be tracked in such a way that they will be assignable to matrix responsibility units as well as to functional and/or area and/or business responsibility centers. A given income figure may at the same time also be credited to one of the functional responsibility centers and another part may be credited to other functional and/or area entities. Hence, income and cost figures will normally have to be split and accounted for at more than one entity of the organization. To measure costs and incomes in such ways that they lend themselves reasonably well to other arbitrary subsequent splitting becomes a major task in performance tracking in matrix organizations.

A second implication is the substantial increase in the actual volume of internal reporting needed and the increased minimum time requirement that follows. This is not only due to the increased number of plans, reports, etc.

needed in a matrix. Because of more complex patterns of interdependencies in a matrix the plan updating and revision task however also becomes tremendous. A computer-based Management Information System seems potentially very cost-benefit advantageous for organizations of this type.

A third implication is the necessity to ensure consistency of formats for short-term plans, for procedures of calculating and reporting deviations for definitions employed to spell out underlying terms, cost allocation, formulas, etc. Given the types of interdependencies that are evident in a matrix organization much higher consistency requirements on common format for the management control process will result.

In total the internal information handling tasks become significantly more complex in a matrix organization. The choice of formal structure for the management control system consequently becomes even more crucial and the potentials for utilization of advanced information-handling techniques increase.

B. Non-Dollar Variables

An emerging issue from our discussion of the identification of control variables was that many of these will be of types not measured in the traditional dollar terms. The addition of these control variables directly reflects the added importance of environmental pressures and suggests a fundamental shift from the kind of control systems that we have been used to in the past. The first implication from this is that the control systems design

process should be adapted to reflect the need to do an environmental diagnosis and arrive at what the control variables should be in the first place. The shifting environment does not suggest that the fundamental nature of the control process should change. What it does suggest is that the kind of variables that are in the control system, the way these are derived, and the people, structure and technology that are employed may have to change. In particular if the external environment is shifting as we have suggested, then the control system will have to have new kinds of control variables.

There are many examples of these, for instance the move by a furnace manufacturer to track dealer inventory levels to cut down on the amount of hoarding by the dealers as they tried to protect themselves from stockouts. These were occurring because of severe parts shortages at the factory, which in turn were caused by the energy shortage. Similar examples are easy to find. There does not exist, however, a good statement of what such control variables should be, or a well understood methodology by which they can be derived.

We are suggesting that analysis of the five forces reflected in the list at the outset of our discussion of the identification of control variables is an effective first step which can be done readily by any organization. There then remains the time consuming, but straightforward task of setting up an information system to track these on a regular basis.

C. Linkage of Control System

Our discussion laying out the steps in the management control process placed considerable emphasis on the linkage to planning. In addition, there are linkages between control and the action programs designed to correct the operations of the organization as a result of the diagnosis stage. A third linkage is caused by the need to connect control across the hierarchical levels of an organization. We shall discuss each linkage phenomenon, and indicate why they should deserve increased attention.

(1) The Linkage Between Management Control and Planning

We have indicated that the linkage between the long-range planning phase and the control phase is critical for the characterization of the control process because the way and extent to which business opportunities have been narrowed down before the control phase will largely dictate the activities of the latter. We shall explore two aspects of this linkage, with respect to content, and timing.¹⁵ It has been suggested that content linkage between the long-range plan and the budget can be judged by comparing the two in terms of comparability of the level of financial detail, equality of numbers in plan and budget at time t, equality of numbers for this year's budget with plans for this year developed last year, the year before last, etc., and the extent to which difference at time t and over time are being reconciled. Given the different purposes of planning and control, we shall suggest an

¹⁵ See Shank, John K., Edward G. Niblock and William T. Sandalls, Jr. "Formal Planning Systems: Getting Creativity and an Action Orientation", Harvard Business Review, November-December, 1972, and Camillus, John C., "Formal Planning Systems: The Control Considerations in Design", Unpublished D.B.A. Thesis, Harvard Business School, Harvard University, Cambridge, Massachusetts, 1972.

alternative way of looking at these linkages, namely to what extent the key variables of the long-range plan and of the budget are reconcilable. Although the key variables may be entirely compatible, this does not mean that the number of the plan and budget need to coincide. Thus, we may have situations with tight content linkage despite this.

In cases with loose content linkage, little "narrowing down" of options will have been undertaken at the planning stage. This implies that most of the narrowing down of options will have to be done at the short-term planning/budgeting stage. Consequently, heavier requirements will be placed on this process stage in order to arrive at a "smart" plan. It is important to realize that loose content linkage implies a shifting of the narrowing down commitment from planning to control.

There may be several reasons for a rational choice of a specific degree of tightness/looseness of content linkage. During some stages of an organization's evolution, however, the linkage may be loose by default rather than by design. Typically, most companies have had much longer experience with budgeting than with long-range planning. When planning is initiated, it will often be difficult to integrate it with the mature control process. In effect, this means loose linkage, with the accompanying implications just pointed out.

The time schedule for the completion of the planning and budgeting task also becomes important. If relatively little time elapses between the execution of the long-range planning tasks and the short-range planning (budgeting) tasks, this is an indication of tighter de facto substance linking. This, however, also probably implies that the outputs of this year's control process will have a looser impact on next year's plan, due to the longer elapsed time between

the completion of the budget preparation and the beginning of next year's planning. The timing linkage question may be less significant than perceived by many, however, due to the continuous nature of the processes and the necessity to perform these more or less on an on-going basis year round.

(2) Linkage to Action Plans

The signals from the control system generate a diagnostic activity as part of the management control process. This diagnosis is used by the responsibility center manager as part of his process in creating an action plan to solve, or mitigate, the variances that exist. Such action plans may be more or less successful in curing the fundamental cause. An important input to the redesign of the control is the effectiveness of the existing control signals in helping the manager arrive at good solutions to his problems. This linkage between action and control has severe implementation problems and, judging from the existing literature, seems almost nonexistent. Measurement of cause and effect in such situations is hard to do. Despite the practical difficulties such as linkage is most desirable in the control system is to be usefully modified over time.

(3) Organizational Linkage

We are dealing with up to three types of organizational levels in the organization. At the corporate level we face a linkage problem between the corporate long-range plan and the corporate short-term plan; at the division

level we face a linkage problem between the division's business plan and its business budget, while at the departmental level we deal with the linkage between the functional plan program and the functional budget. Further, we are faced with the linking of each level's plans and budgets with the plans and budgets of the levels above and underneath. The fact that we thus are dealing with a three-level interdependent linkage phenomenon raises a number of issues:

- (a) Should the degree of content linkage be the same or different at the three levels?
- (b) If corrective actions are taken as a consequence of diagnosis of budget deviations at one organizational level; how does that affect the long-range plans and/or the short-range plans/budgets at the other levels? Under a pattern of tight linkage? Under a pattern of loose linkage?

This suggests that the model of the planning/budgeting process, portrayed in Exhibit I needs to be expanded into a multi-level model in order to cope with the organizational linkage problems just raised.

III. Implications

This view of control systems has been designed to emphasize the implication of three emerging evolutionary trends for management control.

These are:

- (a) The increasingly unstable external environment which results in a need for a tighter linkage of the management control system to the formal planning system.
- (b) The lack of stability in the external environment which causes a need for a more robust set of control variables than exists with the current dollar based budget.
- (c) The increasing diversification of large corporations which often will be creating more complex organizational forms (at the extreme, the matrix structure) operating in widely differing environments (the multi-dimensional corporation) and in very different businesses (the conglomerate).

Even for small or medium-sized organizations these three factors are changing, and much the same kind of changes can be identified for public sector organizations.

As a result there is a need to have a clear view of what a control system and its basic purpose is -- without such a view it is hard to build or run one effectively in an organization.

The framework suggested here is a first step in trying to build a structure which is useful for diagnosing existing control systems. Is there a match

between this normative view and the descriptive model of the organization's existing control system? In particular, we would argue that the framework presented here is useful for making changes in the management control system to reflect the continuing changes in the external environment, changes which exert considerable pressure on the corporation.