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A BEHAVIORAL APPROACH
TO OPTIMIZING END-USE
COMPUTING

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ABSTRACT: Organizational effectiveness requires the integration of MIS strategy within the larger corporate strategy. The technological and environmental imperatives resulting in the increasing movement towards end-user computing has resulted in the increasing decentralization and dispersion of MIS operating system responsibility throughout the organization. This situation has increased the potential for a sub-optimal allocation of resources to the MIS function and made its integration into the overall strategy of the firm more difficult. The potential for a misallocation of resources occurs when end users do not reveal their true preferences for a given MIS configuration. An alternative to the conventional approach of using easily defeated external controls may lie in the development of behavioral approaches to end-user decision-making that are guided by organizational norms and values that promote the common goal of global optimality.

1. Introduction

The importance of strategic planning to organizational effectiveness is a widely recognized paradigm in management [21, 27, 29, 31]. It has also been recognized that MIS can play a strategic role that transcends merely servicing the information needs of the organization and becomes an element of strategy in its own right [3, 16]. The tremendous potential of recent advances in information systems technology for reducing product costs, improving product quality, reducing logistical expenses, and enhancing the product itself may make the successful integration of MIS and business strategies the critical strategic issue of the 1990s for many organizations.
Attempts to integrate information system issues and capabilities into overall organizational strategy have encountered numerous difficulties [4, 24, 28]. Recent research [20] suggests that the coordination of IS issues with strategic plans is generally not under the control of IS executives, but top management.

The severity of this problem has been compounded by the increasing shift to end user computing [2]. Falling computing costs, powerful commercial software, and the use of fourth generation languages now make the complete decentralization of the MIS function possible [17]. While some researchers feel that this is a desirable (if not inevitable) occurrence [9], other see a variety of dangers in this possibility [1, 8].

The driving force behind the use of the new information systems technology comes from an array of line managers, professionals, and technicians scattered throughout the organization who are primarily focused on the implications of this technology for their job responsibilities. Consequently, their concern is with the immediate imperatives of their jobs. Issues of system compatibility,
data transfer, data consistency, and security are not their immediate concern.

These changes strike at the heart of the historic role of a centralized MIS function. Attempting to control the use and direction of information systems technology from the top through the use of formal policies, rules, and supervision often appears to degenerate into an inflexible, bureaucratic system that stymies, rather than facilitates, innovation. End-users will continue to be impatient with any force that appears to interfere with their ability to do their job as well as possible. Janson [17, p. 30] argues that the future will bring an IS Department increasingly structured around "... the task of providing the user with a technological infrastructure that ensures the greatest possible user discretion in the deployment of information resources."

Current industry practices suggest that only the largest allocation decisions receive serious top management consideration [13, 34, 35]. The bulk of the allocative decisions are relatively small and typically delegated to operating levels in the organization. Top management control is then exerted through rules and policies in the form of a the budget mechanism. This reality of
organizational life gives information system end-users the opportunity to make MIS decisions independently of the centralized MIS Department.

In a decentralized end-user computing environment, MIS resource allocation will be determined through the budget process. The general problem with this approach is that individual decision-makers in the organizational may have an incentive to ignore positive or negative externalities affecting the remainder of the organization in making their decision. This problem is particular acute in the MIS area. Here externalities may take the form of failure to capture economies of scale, incompatibilities with other elements of the MIS system, networking problems, inconsistency in the shared data base, lack of knowledge with respect to currently available hardware and software, failure to anticipate future technological trends, and security issues.

2. The Budget as an External Control Mechanism

Most organizations encounter problems in implementing their strategy through the budget process. A number of researchers [11, 21, 22, 36] have focused on the difficulties of implementing corporate strategy through the
budget mechanism. Ishikawa [15, Ch. 2] argues forcefully that the separation of the planning function from the budgeting function is one of the most serious obstacles to organizational effectiveness. Pick and Whinston [26] argue that the budget can be made an effective force for promoting the optimal allocation of resources to end-users throughout the organization.

The task of allocating resources optimally through the budget process is difficult because operating managers are often more interested in optimizing resources for their area of responsibility than for the organization as a whole. This problem is particularly acute in the MIS area because of the rapidity of technological change.

Existing usage patterns are an inadequate guide for allocation because the current system may be distorted by past allocation practices. Even if the present system reflects an optimal allocation of resources to end-users, changes in MIS technology or in the organization's environment may cause that pattern to be sub-optimal.

Left to their own devices, computing end-users may overstate their need for resources in the budget because extra resources increase their flexibility, enhance their
chances of accomplishing sub-unit goals, and can be used politically to justify even larger resources in future budgeting periods. If administrators attempt to correct this situation through the imposition of a cost to the sub-unit, an under allocation of resources to the MIS function may occur. End-users will choose or not choose to pay this cost depending on the relationship between their marginal benefits and marginal costs. The average costs of most MIS components fall as size increases with marginal cost consequently below average cost. Where the cost assessed to the sub-unit is the average cost (a common budgetary practice), a sub-unit may choose to forego participation in the system where the marginal benefits exceed the marginal costs, but not the assessed (average) cost of participation. Thus a sub-optimal allocation of resources to end-use computing in the organization occurs.

Pick and Whinston have correctly identified this problem and developed an ingenious solution for it [26]. The solution involves the application of a budget rule called a Clarke-Groves tax. This concept was initially developed by Groves [12] and Clarke [6] and later extended [32] to develop a charging mechanism arising out of a demand revealing process to which sub-units may be subjected in order to determine an optimal allocation of resources.
The use of this rule would require end-users to indicate their preference for difference resource configurations in dollar terms. The configuration with the largest dollar preference is then selected with end users being charged in the following manner: (1) a user whose stated preference is not chosen is charged zero; (2) a user whose stated preference is the option selected is charged zero if the option would have been selected even if he had abstained; (3) a user whose preferred option is selected is charged the dollar amount at which the foregone option would have been preferred had he abstained.

In effect then, a user is charged the amount by which his choice impacts the remaining users.

Pick and Whinston [26] are able to demonstrate the power and versatility of this tool, and readily acknowledge a number of its weaknesses. While their defense that no charging mechanism of this sort will ever be free of criticism [26, p. 99], the real question is whether or not this is the best approach that can be taken to the developing problem of sub-optimal allocation of resources in a rapidly proliferating end-user environment.
The Clarke-Groves approach appears simply to complex for use in a budget process across a broad spectrum of organizational sub-units. Even if the sub-units had the necessary knowledge to correctly evaluate alternative resource configurations, the process of specifying alternative resource configurations given the complexity of MIS technology is mind-boggling. It might even be preferable to try to charge end-users the marginal cost of selected resource configurations, obviating the most obvious part of this problem!

In addition, the whole process can readily be suborned by collaboration of the interested parties. Indeed, the political realities of the organization practically mandate that coalitions be formed. The essence of organizational life is interdependence and cooperation. Clarke-Groves requires independence and isolation.

3. A Behavioral Approach to Allocation Optimality

It is clear that organizational effectiveness requires the integration of MIS capabilities into the strategic planning process and that this in turn requires control of end-user computing activities. Direct coordination of end-user activities through the external controls associated
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with a centralized MIS Department or indirectly, through the budget mechanism, appear unlikely to be effective.

Modern (contingent) management theory is rich with insights into this type of problem. The assumption of the type of myopic "rationality" postulated by Pick and Whinston [26] reflects a series of assumptions about organizational structure and values that are not necessarily appropriate.

Brown and Bostrom [5] have developed a model of end-user management effectiveness that suggests the importance of strategy and organizational structure. There is no reason why this fundamental notion can't be extended into practical approaches to addressing the problem of sub-optimal allocation among computing end-users.

A widely recognized alternative to approaching the control issue through formal external control mechanisms (e.g., the budget) would involve altering the behavior of people in the organization through the creation of internal control mechanisms [10, 19]. Harnessing the tremendous centripetal forces unleashed by the movement towards end-user computing through the classical methods of control is likely to dampen innovative behavior, generate increased end-user hostility, and lead to the widespread evasion of
such controls. Perhaps a more effective approach would involve co-opting the end-users into making MIS decisions that are globally optimal by sharing the power for such decisions with them on a formal basis.

A powerful mechanism for implementing this approach would be to encourage end-users to form a group within the organization with the specific charge of optimizing the use of MIS resources across the organization. The intent would be to empower information system end-users and make them ultimately responsible for the use of MIS to enhance organizational effectiveness.

Such a group should be responsible for its own internal organization and agenda. Individual participation would be voluntary, but encouraged by the appropriate use of financial and non-financial incentives [18]. Control of the end-user group would be achieved through the establishment of an internal system of norms and values [25, 33]. Real power should be accorded to the group in terms of control over resources and access to top management. This will encourage the commitment of end-users to the group and increase group cohesiveness. In addition, it is likely that this group will acquire considerable political power because
of its ability to reduce uncertainty on behalf of different functions or operating groups [14].

The task of the group would be formidable, requiring numerous tradeoffs among their individual needs and interests [7, 30]. Their willingness to sacrifice sub-unit needs to the larger interests of the organization will receive support from peer pressure within the group. This commitment will be facilitated by an ongoing process of information transmission and allegiance to larger organizational values. The effect of the operation of the group will be to internalize the externalities associated with end-user computing and thus make allocation decisions within the MIS function globally optimal.

The development of a cohesive group of end users would have a number of advantages that would tend to promote a more optimal allocation of resources among end-users.

(1) There would be a tendency to modify sub-unit goals in the light of end-user group goals. This tendency would mitigate the possibility of under allocation of resources to functions with relatively low, but still positive, marginal net benefits.

(2) The increased association and exchange of knowledge among end-users will create an enormous pool of information concerning MIS product development and application. The creation of such a storehouse of information would tend to eliminate negative externalities associated with erroneous or obsolete knowledge.
(3) The increased association and exchange of information among-end users would tend to capture positive externalities that would otherwise be lost, e.g., the use of shared data.

(4) The ability to develop and distribute knowledge of emerging software products, hardware products and technological innovations.

(5) A group voice to top management independent of normal communication channels (i.e., the MIS Department). This would help to ensure the appropriate use of MIS potential in the larger corporate strategy and strengthen MIS input into the organization's process of strategy formulation.

4. Conclusion:

Organizational effectiveness requires the integration of information system considerations in the strategic planning process. Coordinating information system development and implementation in the context of rapid technological innovation that has put increasing power in the hands of end-users is a task not well suited to a reliance on external controls by a centralized MIS Department. An alternative organizational approach to this problem is suggested by empowering end-users through a formal group to take responsibility for the integration of MIS into organizational strategy and enhancing organizational effectiveness.
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Bibliography


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