Department Level Information Resource Management: A Theoretical Argument for a Decentralized Approach

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This article asks, "Why would the responsibility for information integration be located in an academic department instead of the centralized information utilities?" It proposes that the costs of locating information resource management tasks in academic departments may be overshadowed by the benefits of reducing agency costs.

Department level information resource management (IRM)—the location of information technology or information professionals in academic departments instead of the centralized information utilities—is a rapidly growing phenomenon in organizations today. The resulting dispersion of responsibility for the management of information is viewed by many as dangerous and inefficient. They predict that the functional departments will have to "learn about back-up and security the hard way," and that information professionals will be called upon to supply the inevitably missing skills and expertise. However, department level users of information technologies claim that moving information closer to the work it supports results in "improved quality," "better control," and "lower costs" (Business Week, 1987). The purpose of this article is to explore this dispute and to propose a framework in which it can be understood.

We begin our examination of departmental level IRM by defining what we mean by information resources and IRM. Next, we propose a framework for understanding different allocations of responsibility for information resource management within and outside a firm. The framework describes four conceptual levels at which information resource management tasks might be carried out: individual (or task), department, institution, and market. Our discussion proposes that the allocation of information resource management tasks is a matter of trading off economies of scale and economies of control. Departments, we believe, take on responsibility for information resource management tasks when the agency costs involved in dealing with a centralized service providers become prohibitive. They also offer information resource management services to the individuals in their departments where there are economies of scale to be obtained at the department level.

Information Resource Management

People in today's organizations use a great deal of information in their work, both to support decision making (Galbraith, 1977) and also to coordinate work (Arrow, 1974). In this article we use the term "information resources" to refer to aggregations or elements of information used in performing work, including, for example, research data, works in progress, books, reports, tapes, messages, and conversations with colleagues.

By "information resource management" we refer to activities that bring the right information, at the right time, to a decision-making or coordination task. The management of information resources can be seen as a life cycle (e.g., Ives & Learmonth, 1984) or value chain of activities (e.g., Porter, 1985), including identifying, accessing, and acquiring the information; assuring the quality, timeliness, and relevance of the information or otherwise adding value to it; storing the information for future use; making it available or transferring it to others; and disposing of it. The responsibility for any of these various IRM activities, we argue here, can be taken up by the user of information or can be delegated to some other organizational entity.

If IRM were free and effortless, we might expect that all IRM would be carried out at the information

use point. It is not, however, and so IRM tasks are allocated such that they will be carried out at an acceptable level of quality at minimum cost. The question of how best to allocate IRM tasks is a recurring one with Information Systems and Library Science researchers (see, for example, King, 1983; Watts et al., 1983).

For purposes of this article we identify four conceptual information resource managing entities which might carry out IRM tasks: individuals, departments, institutions, and markets, as shown in Figure 1. *Individual IRM* includes IRM tasks carried out by the party responsible for a decision making or coordination task. *Market level IRM* includes IRM tasks carried out outside the boundaries of the firm, for example by private information service companies such as Dow Jones or Nielsen, by public institutions such as governing bodies or public libraries, or by customers or suppliers of the firm. *Institutional IRM* includes IRM tasks carried out by one part of the firm in service to other parts of the organization. The Library and Information Systems departments, for example, provide IRM services to other departments, as do, too, the Accounting and Human Resources departments. Finally, *department level IRM* includes those IRM tasks carried out by a functional department for its members, using resources such as a local area network, a department-based technical services staff, or a department library. Our term "department" is not meant to refer to any particular size group. A department may include only a few members, such as a single work group, or tens of members, in several work groups.

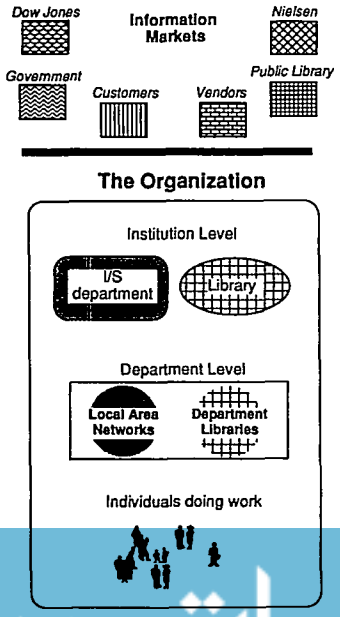

FIG. 1. The information resource management system

The key element in our definition of department level IRM is simply that it is distinct from individual level and institution level IRM. With individual IRM, the management and utilization of the information resources are done by the same person. With departmental IRM, however, management and utilization of information resources are done by different people. Department level IRM is distinguished from institutional level IRM in that department-level IRM tasks support individuals within its department but not individuals in other parts of the firm; lateral IRM support is considered an institutional IRM task. That is, departments do not perform information resource utilizing tasks, individuals do; and departments do not support individuals outside their boundaries, institutions do.

An Agency Argument for Department Level IRM

In terms of the framework shown in Figure 1, the question that this article addresses is, "Why is any IRM carried out by departments, as opposed to the other potential IRM providers—individuals, institutions, and markets?" The literature cites an increasing need for information, lower absolute costs for the technology itself, and less need for special skills when using the technology (Mendelson, 1987). But, if decentralizing IRM is a good idea, why stop at the department level? It is increasingly possible to manage information resources at the individual level, where decisions are made or coordination is effected, on the desktop, at the individual task point. Moreover, some changes in the economics of IRM point to the centralization of IRM tasks, moving them up to the institution and market levels. For example, reductions in the costs of storage and communication costs permit data to be stored and managed centrally while accessed locally. In the same vein, increased demand for professional information services has stimulated the establishment of markets for IRM services, such as training, off-site data storage, data entry services, and other services such as those provided by Dow Jones or West Publishing.

In summary, "affordability" arguments do not lead unequivocally to department level IRM. Furthermore, little room is left in these arguments for department IRM motivated by a "better sense of control," "more flexibility," or "better responsiveness." Are these simply political arguments (Pfeffer, 1981)? We think not. While it is undoubtedly true that some departments undertake IRM activities for only affordability or only political reasons, we think that some do so to reduce agency costs, or the costs of control.

Agency theory examines the relationships between two units, one of which is "acting for" the other. An agency relationship exists when one unit, called the "principal" engages another unit, the "agent," to perform some service on the principal's behalf. Jensen and Meckling (1976) provide a broad interpretation of

agency, arguing that any cooperative action constitutes an agency relationship. We adopt this point of view in this article. In agency relationships the principal cannot completely ensure that the agent acts in the interests of the principal. Agents are assumed to be inclined to shirk, or at least to be disinclined, to pursue the principal's objectives, to consume perquisites out of the principal's resources, and to make suboptimal choices (Perrow, 1986). Thus, there is always some residual efficiency loss due to agency that is the difference in value between the agent's decision and the decision that would maximize the principal's utility.

Principals, therefore, expend funds to monitor or train agents, to ensure that the agent's decisions maximize the principal's welfare. Monitoring costs include costs of specifying desired actions, policing and enforcing compliance with auditing or other formal control systems, and litigating for compensation. In addition, the principal is assumed to discount the fee given to the agent in an amount equal to the principal's expectation of efficiency losses and monitoring costs. Hence, it is proposed that the agent is motivated to incur bonding costs, or guarantees to the principal that the agent will not shirk, consume perquisites, or make suboptimal choices.

These three types of costs—monitoring, bonding, and the residual loss due to incongruence in objectives—are called agency costs (Fama & Jensen, 1983; Jensen & Meckling, 1976) and are incurred in any cooperative activity. Agency costs result from separation of task execution and task control, and thus they are eliminated only by colocating task execution and task control. Uncertain, complex, and infrequent decisions usually imply higher agency costs (Barney & Ouchi, 1986; Williamson, 1985), as they make the agent's behavior more difficult to specify and monitor. The need for transaction-specific investments—investments which have value only in the particular task being supported—also make it difficult to motivate and control the quality of an agent's decision (Alchian & Demsetz, 1972; Klein, Crawford, & Alchian, 1978), due to the goal incongruence that specific investments impose.

We argue here that many IRM activities involve agency relationships. For example, a researcher implicitly engages "agents"—the department, the institution, the market—to help obtain and manage the information resources needed to do the work. Those agents are likely to have objectives and incentive structures that differ from the researcher's. For example, the researcher probably pursues personal career objectives, whereas the department has as its principal mission the conservation of resources, the Library "builds a collection," the Information Systems department keeps abreast of new technology, and market level IRM providers seek profits.

While it might be hard to argue across the board that these "agents" are inclined to shirk or consume perquisites, it is not hard to argue that they will sometimes take actions while providing IRM services which are not congruent with the researcher's objectives. Thus the IRM services provided to the researcher may be of lower quality than desired leading to some residual loss in efficiency, one component of agency costs. The researcher, furthermore, engages in monitoring activities in dealing with the agents: the agents, in turn, engage in bonding activities. When dealing with the Information Systems department, the agent incurs specification and monitoring costs, attempting to articulate the IRM support needed and checking to see that it is delivered. Information Systems for its part, incurs bonding costs, sending the researcher reports which permit monitoring of the quality of services rendered.

We believe that the department can be argued to perform as an agent for individuals in the department with respect to some IRM tasks, and as a principal in relationships with IRM service providers for other IRM tasks. Figure 2 illustrates our view which might be summarized in two propositions: (1) departments undertake IRM tasks for individuals which cannot be carried out economically at the institution or market level due to excessive agency costs, and (2) departments undertake IRM tasks which show economies of scale or specialization relative to the individual level, if agency costs are minimal or acceptable. The department level, in other words, competes with the individual level, the institution level and the market level in providing efficient information resources and services to individuals engaged in decision making or coordination.

Certain limitations to the model in Figure 2 deserve comment. First, ownership, through patents or other property rights, will restrict the location of some IRM activities. For example, Dow Jones can control access to the information which they own. Second, if agency

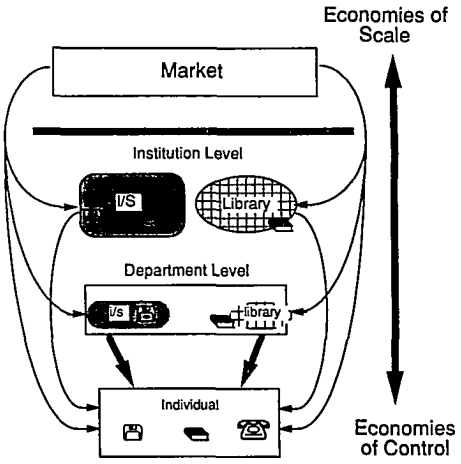

FIG. 2. Department level IRM economic trade-offs

costs are not recognized, they will not always be accounted for properly. In particular, if agency considerations such as lack of goal congruence are labeled "political," including them as decision variables may not be viewed as legitimate. Finally, as mentioned earlier, organizational forms are sometimes politically motivated or politically protected and sometimes persist beyond their period of economic justification (Zucker, 1977). In the short run, therefore, "uneconomic" organization forms may be observed.

Overall, the allocation of IRM activities to various entities as suggested by Figure 2 is more or less in agreement with proposals made by others. Williamson (1985) notes that organizations make trade-offs between production and transaction costs (transaction costs include agency costs); Galbraith (1977) considers trade-offs between investments in technology and learning against coordination costs. Researchers and observers of the Information Systems scene (Buchanan & Linowes, 1980; Malone et al., 1987) similarly discuss the trade-offs involved in the allocation of information-related activities to departments or end-users. We believe, however, that by including considerations of agency costs, our view offers a more complete explanation for this allocation.

Our view is not expected to account for all IRM allocation decisions. Rather, it is expected to account for IRM allocations more completely than considerations of economies of scale and specialization alone. To the extent that agency theory rationalizes the consequences of goal incongruence, it may also explain some IRM allocations which might otherwise be considered to be "political." Agency theory shows that loss of control can be costly, and especially costly where goals are widely divergent.

Summary

This article contrasts the role of department level information resource management with information resource management at the individual, institutional, and market levels. It argues that the allocation of information management tasks to the department level involves trade-offs between economies of scale or specialization and economies of control. At the department level, agency and control costs, incurred as a result of attempting to manage information resources too far away from the task, are all too visible. These costs lead to interest in gaining control over the management of those information resources, not just for the sake of a sense of personal power, but for the sake of overall cost minimization. Without proper attention to agency costs, it is all too easy for allocations of function to be made in consideration only of economies of scale or specialization. Thus, for example, the dispute between an information utility and a department over whether to install a departmental minicomputer to support some information resource becomes one in which Information Systems focuses on the squandering of economies of specialization and the department focuses on gains from the reduction of agency costs, but is unable to articulate their concern. The model proposed here is a small step toward clarifying that disagreement.

References

Alchian, A. & Demsetz, H. (1972). Production, information costs, and economic organization. *American Economic Review, 62,* 777–795.

Arrow, K. J. (1974). *The limits of organization,* New York: Norton.

Barney, J. B. & Ouchi, W. G. (1986). *Organizational economics,* San Francisco: Jossey-Bass.

Buchanan, J. R. & Linowes, R. G. (1980). Making distributed data processing work. *Harvard Business Review,* Sept-Oct, 143–161.

Business Week, (1987). Computers: The new look. *Business Week,* November 30, 112–123.

Fama, E. F. & Jensen, M. C. (1983). Separation of ownership and control. *Journal of Law and Economics, 26,* 301–325.

Galbraith, J. R. (1977). *Organization design,* Addison-Wesley, Reading, MA: Addison-Wesley.

Ives, B. & Learmonth, G. P. (1984). The information system as a competitive weapon. *Communications of the ACM, 27,* 1193–1201.

Jensen, M. C. & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics, 3,* 305–360.

King, J. L. (1983). Centralized versus decentralized computing: Organizational considerations and management options. *Computing Surveys, 15,* 319–349.

Klein, B., Crawford, R. G., & Alchian, A. A. (1978). Vertical integration, appropriable rents and the competitive contracting process. *Journal of Law and Economics, 21,* 297–326.

Malone, T. W., Yates, J. & Benjamin, R. I. (1987). Electronic markets and electronic hierarchies. *Communications of the ACM, 30,* 484–497.

Mendelson, H. (1987). Economies of scale in computing: Grosch's law revisited. *Communications of the ACM, 30,* 1066–1072.

Perrow, C. (1986). *Complex organizations: A critical essay,* New York: Random House.

Pfeffer, J. (1981). *Power in organizations,* Marshfield, MA: Pitman.

Porter, M. E. (1985). Competitive advantage, New York: Free Press.

Watts, T. D., Woodsworth, A., Hibbard, M., Atkinson, H., & Holley, E. (1983). Centralization or decentralization of library collections: A symposium. *Journal of Academic Librarianship, 9,* 196–202.

Williamson, O. E. (1985). *The economic institutions of capitalism: Firms, markets, relational contracting.* New York: Free Press.

Zucker, L. (1977). The role of institutionalization in cultural persistence. *American Sociological Review, 42,* 726–743.