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Colorado, suggests "It isn't that we're faced with problems. It's that our problem-solving machinery has gone away."

In a "Hard Choices" course that he is teaching, Lamm focuses on social and cultural issues. In librarianship, while the issues are less dramatic, the choices are relatively hard.

Almost weekly I read about some new and exciting development in the online industry. A whole range of potential library applications shines forth. Likewise, the possibility of reaching beyond the walls of the library to users in situ (i.e., in their own place) seems to become more and more feasible. As our system increase in complexity, the value and absolute need for strong library instruction programs also increased.

In a "Hard Choices" course that he is teaching, Lamm focuses on social and cultural issues. In librarianship, while the issues are less dramatic, the choices are relatively hard.
Academic Library Services: The Literature of Innovation

Judy Reynolds and Jo Bell Whitlatch

Innovation has the potential for increasing the effectiveness of information service. As a result of this interest in innovation, organizational theorists have begun to explore the effect of organizational design upon flexibility, creativity, and productivity of organizations. A review of existing literature, however, provides no comprehensive theory of organizational innovation. Research on organizational design and innovation in libraries could contribute to the systemic study of the impact of organizational structure. Studies by Howard and Lawrence indicate that traditional library organizations may inhibit change as well as the reexamination of values and services. Further study is needed to determine how libraries can most effectively manage innovation in the rapidly changing environment ahead.

Concern over the future role of libraries is a constant theme in the library literature. The loss of a stable environment, such as declining budgetary support and rapidly changing information technology, has resulted in substantial interest in the planning and evaluation of library services. Libraries have borrowed from business theory and practice in designing, planning, and evaluating programs, but an area in business theory that has received relatively little attention is innovation in organizational design and its influence upon organizational adaptation and survival. Innovation has come into fashion within the last decade. As with all fashionable trends, it is advisable to ask, "Is innovation necessary?" and "Is it innovation good?" While it is foolish to argue that all innovation is beneficial, or that continual change for its own sake is desirable, attempts in the business literature provide evidence that innovation is often essential for survival. Librarians must read and use the literature of innovation as well as that of planning and evaluation if libraries are to survive in increasingly turbulent times. The literature on innovation and organizational design has the potential for assisting libraries in providing effective information services in the rapidly changing environment ahead.

Several interesting studies on organizational innovation have been completed in the past two decades. Although few findings have improved our understanding of innovation, there is not yet a comprehensive theory of innovation. Innovation has been difficult to define. Gerald Zaltman's definition is commonly used in studies: "any idea, practice, or material artifact perceived to be new by the relevant unit of adoption." The three principal interrelated working definitions found in the literature are (1) first use, (2) adoption or nonadoption, and (3) extent of implementation. Much indicates that studies of the adoption of innovation in organizations have suffered from inadequate definition and from failure to distinguish among types of innovations. Little research has been designed to study differential adoption patterns for various types of organizations. The inconsistent findings that research has produced may be attributed to a failure to take into account the type of innovation and to differences in defining and measuring contextualization. Centralization is the "bringing together of operations or functions of similar types into a common grouping." The resulting administrative design is "a system in which authority for directions, control, and management has become concentrated in the hands of a few persons or offices." Clint Argyris notes five common types of innovation: (1) products, (2) processes, (3) ideas, (4) persons, and (5) environmental variables. Zaltman has a slightly different list: (1) product or service, (2) production process, (3) organizational structure, (4) people innovations, and (5) policy innovations. Richard Daft divides innovations into those occurring in the operations area, where the basic production of services or products takes place, and those in the administrative area. Organizational and environmental variables may be associated with activity in one area but not the other.

This paper focuses on the effects of organizational structure upon innovations in both the technical operations and the administrative areas of the organization. Zaltman suggests that the essential variable determining how organizations react to their external environment is organizational structure. Daniel Katz and Robert Kahn indicate that the direct manipulation of the various components of organizational structure is a powerful means of producing systematic change. Jerry Hage and Michael Aiken indicate that the structure of an organization may be more crucial for the successful implementation of change than the particular blend of personality types in the work place. An organization can be defined as an adaptive system that must continually improve its performance to stay alive in modern society. Even the cumulative effects of minor change can be important in ensuring organizational survival. More relevant to the study of innovation in libraries is Mohr's definition of innovation—the successful introduction into an applied situation of means or ends that are new to that situation.

THEORIES OF INNOVATION

The theories of innovation presented in this section are based upon data gathered from the study of organizations. A summary of the major studies is provided in table 1; details of the selected experimental studies are also provided in the references cited in this paper. There is also an extensive literature that deals with innovation and organizational climate but does not focus primarily on organizational design. This aspect of innovation is outside the scope of this paper.

One of the earliest theories of innovation was proposed by James March and Herbert Simon. Innovations occur when an individual or group of individuals has a new idea that is more attractive than the current ideas. It is important to distinguish between invention (creating something new) and innovation (using or applying something new into being) and innovation involves major realignments of human, financial, and physical resources of the organization. This is similar to Jeffrey Hage's definition of "radical" innovations, which involve high risk and major alterations for the organization and are discontinuous relative to the existing technology. Such radical innovations occur infrequently. Consequently the focus in this paper will be on low-risk innovation, which is more common in libraries and hence of more concern.

Hage has observed that words such as change, innovation, and creativity are easy to use but not so easy to define or actually observe and measure. The three principal interrelated working definitions found in the literature are (1) first use, (2) adoption or nonadoption, and (3) extent of implementation. Much indicates that studies of the adoption of innovation in organizations have suffered from inadequate definition and from failure to distinguish among types of innovations. Little research has been designed to study differential adoption patterns for various types of organizations. The inconsistent findings that research has produced may be attributed to a failure to take into account the type of innovation and to differences in defining and measuring contextualization. Centralization is the "bringing together of operations or functions of similar types into a common grouping." The resulting administrative design is "a system in which authority for directions, control, and management has become concentrated in the hands of a few persons or offices." Clint Argyris notes five common types of innovation: (1) products, (2) processes, (3) ideas, (4) persons, and (5) environmental variables. Zaltman has a slightly different list: (1) product or service, (2) production process, (3) organizational structure, (4) people innovations, and (5) policy innovations. Richard Daft divides innovations into those occurring in the operations area, where the basic production of services or products takes place, and those in the administrative area. Organizational and environmental variables may be associated with activity in one area but not the other.
firms adopt more organic management techniques. A moderate gap between the organization’s propensity for adopting new techniques and their potential performance may be observed. While there are no surefire models for organizational adoption, a mechanistic structure is more suitable when the environment is stable and predictable. Organic forms have higher complexity and flexibility, allowing them to adapt to changes more effectively. However, organic forms may be less efficient in stable environments.

In the theory developed by Tom Burns and G. M. Stalker, the environment heavily influences organizational adoption of mechanistic or organic management techniques. The environment is characterized by loose, informal relationships and a low degree of standardization. The organization’s ability to adapt to changes is limited. In contrast, a mechanistic structure is characterized by a high degree of formalization and centralization. This facilitates the adoption of techniques when the environment is stable and predictable. However, when the environment is unstable, organic forms have an advantage. The diversity and fragmentation of the units create intense competition for scarce resources.

Bums and Stalker note that when organizational outputs are services rather than manufactured products, the organization is more likely to show more adaptiveness because there is a reduced ability to standardize tasks. Aiken and Hage have found empirical support for the notion that the organic organization has characteristics that facilitate innovation. Aiken and Hage have developed a major theory regarding organizational adoption of new techniques. They have identified several organizational characteristics—such as complexity, centralization, formalization, and stratification—that affect the rate of innovation in organizations. They hypothesize that the higher the formalization, stratification, volume of production, centralization, and emphasis on efficiency, the lower the rate of innovation. Innovative organizations also have more elaborate committee structures than noninnovative organizations. Central to their theory are propositions drawn from the concept of the “professional second wave” of the 1980s.

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bureaucracy." The organization allows for both standardization and decentralization. Coordination is provided by employees sharing a standard set of skills and knowledge that transcends organizational boundaries. The professionals use their skills in response to predetermined service categories. Clients are categorized in terms of the functional specialties the library offers. Change in the professional bureaucracy occurs through altering of the type of people who enter the profession, their norms, skills, and knowledge acquired in professional schools and in subsequent continuing education.

Other researchers have also found professional contacts to be important. Daft reported positive associations between professionalism and innovation in the technical area. Professionalism can also have some negative effects upon innovation. Mayer Zald and Patricia Denton identify predictors of innovation as the breadth of organizational goals and the absence of a single dominating professional ideology. Aiken and Hage found that it is the current degree of involvement of staff members in extraorganizational professional activities, not the initial level of professional training, that most highly relates to successful implementation of innovation. In confirmation of this research, Katz found that isolation from sources providing evaluation, information, and new ideas is the most critical factor resulting in ineffective project performance. James Utterback's work also indicates that the primary limitation on an organization's effectiveness in innovation is neither costs nor technical knowledge, but the ability to recognize the needs and demands in its external environment.

For Zaltman, the organization is an open system in continued interaction with its environment. The organization must determine which products or services will be most readily received by the end users and focus innovative efforts in these areas. The organization must also adapt its technology to produce these new products or services and monitor the environment for feedback to determine if the innovation is effective in meeting the demands of the environment.

Hage and other theorists have concluded that innovation and efficiency are negatively related and appear to require opposing types of organizational structures. Efficiency is usually positively associated with centralization and formalization, and may be either positively or negatively associated with complexity. Yet organizations must be both efficient and innovative to survive in a changing world. Jon Pierce and Andre Dale come suggest that the solution to this paradox probably lies in capital venture systems, matrix structures for initiating and varying the organizational design using project groups in the initiation stages and structured decision bodies in the implementation stages. The matrix system provides a dual focus when more than one orientation is critical for managing the organization.

An organizational structure, which Mintzberg terms the "adhocracy," uses the functional and market bases for grouping in a matrix structure. The experts are grouped into functional units for normal purposes, but are deployed into project teams for the purpose of encouraging innovation. Mintzberg observes that even hospitals and universities, which are closest to the "professional bureaucracy" for their routine clerical and teaching work, are drawn to the "adhocracy" when they attempt truly innovative work. Specialists must join together in multidisciplinary teams to create new knowledge and skills. Figures 1, 2, and 3 illustrate the theoretical difference between typical hierarchical and less traditional structures in libraries.

**ORGANIZATIONAL STRUCTURE AND INNOVATION IN LIBRARIES**

Certainly innovation in itself is intrinsically neither good nor bad. Multiple views have been expressed on the value of recent innovation in librarianship, the adoption of AACR2. Another innovation in library services, networking or resource sharing, also has both positive and negative attributes. Networking can increase access to resources but may result in the loss of local library autonomy in setting
budgets, service priorities, and collection development policies. Bibliographic instruction and online database searching have also extended library services and enriched the interaction between the library and its environment. Some argue that provision of these new services reduces the resources available for the more traditional library services. Nonetheless, change is inevitable and the library that plans and encourages creativity is most likely to cope effectively.

Much of the literature on innovation in libraries is a call for exercise and/or listings of possible areas of need or application. Connie Dunlap suggests that collegial or participatory staff organizations will increase staff interest in library-wide concerns resulting in greater productivity and adaptability. The more prevalent bureaucratic organizations tend to produce conformity and generally stifle creativity. Victor Thompson states that a "well managed" organization "tends to define jobs and jurisdictions which lack variety and richness of cognitive inputs usually associated with creativity. The creative process is characterized by slowness of commitment, by suspended judgement, by refusal to grasp the opportunity and make quick decisions." He surmises that this is "very difficult for the person cataloging all day to be creative."

As a public service organization, the library must openly review its goals as an "open system" that is responsive to the public. Peter Drucker defines the public as: (1) "the people who depend on you," (2) the users, and (3) "any group that can in effect stymie you." In the latter case he suggests that modifying services to satisfy the patron will be difficult because staff may not wish to abandon established services in favor of new ones. He says, "that you really effective resources, both human and money, will be invested in defense of yesterday." Harvey Kolodny cautions against the apparent closed system that libraries have provided to the public. Management "must stop functioning like librarians that are waiting for people to come to them because they control the source of a particular skill or knowledge or discipline."

FIGURE 3
A Schematic of Matrix Organization for the Reader Services Division of San Francisco State University

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DISCUSSIONS OF INNOVATION IN LIBRARY LITERATURE

Automation, budget crises, increasingly sophisticated patron needs, complex copyright regulations, resource sharing, and demands for professional autonomy are factors leading to a flurry of demands in library literature for change, creativity, and innovation in libraries. Mary Lee Bundy advocates the release of "powerful growth forces" to counteract tendencies toward conformity and restriction of service modifications. She proposes restructuring the organization into two areas: one would operate collegially in discipline units providing selection, indexing, and reference; the second area would be auxiliary services, governed by committees of professionals who would set policy for the purchasing, processing, and inventory units composed of support staff. This arrangement is similar to the innovative structure successfully implemented at Sangamon State University. Howard Dillon has described this experimental new organizational structure that freed librarians from administrative responsibilities. Patricia Brewik later expanded upon the design. Bundy's structure could provide responsible units and individuals with increased decentralization of decision making. It would also decrease formalization of professional activities while maintaining the high degree of formalization already present in auxiliary services and increasing the stratification of rewards between support staff and librarians.

Bundy proposes that support staff be compensated equitably for their work. The positive effects of collegiality and decentralized decision making upon the rate of innovation, which are predicted in the Hagel and Aiken model, might be negated by excessive formalization, rigidity, and stratification in auxiliary services. Robert Moran accuses academic libraries of maintaining an organizational design that "addresses only internal matters," hindering their response to the environment. He proposes an "outside surveillance" unit, specifically collection development, which would be decentral-
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ized and informal. An advisory group of librarians would be formed to provide the director with insights gained from participation in external professional associations. The director would assume responsibility for attending to external matters as well as internal needs. Moran states that this modified bureaucratic model would offer a more responsive, open system. The organizational changes proposed by Moran are supported by Hage and Aiken’s theory, which predicts that decentralization and informalization will increase the rate of innovation.

Karl Musmann observes that libraries have the same problems with structure and innovation that Mintzberg outlined. As agencies that are externally controlled for the most part, their structure is highly formalized, bureaucratic, and centralized. Musmann says this is “not conducive to successful survival in a dynamic environment nor is it especially suited to encourage innovative behavior.”

The Booz, Allen, and Hamilton study of Columbia University in 1970-71 advocated restructuring the organizational design so that the library would be better able to function as an open system and effectively respond to the changing needs of the academic community. Lowell Martin believes that consideration of Peter Drucker’s basis of organization. Drucker states that organizational structure should flow from purpose and that the proper structure cannot be determined until the organization’s objectives are clarified. According to Martin, applying Drucker’s organizational ideas to a university library structure could result in two primary divisions: the instructional division and the graduate or research division. This structure would shift the organizational emphasis from the traditional functions, such as acquisitions, cataloging, reference, and circulation, to a focus on the library’s purpose and users. Academic library structures based upon undergraduate libraries and graduate research branches appear to incorporate the basic concepts embodied in Martin’s two-divisional design.

Another redesign suggestion comes from Gardner Hanks and James Schmidt, who feel that the professional model is deficient because it discourages change. They argue that it encourages members to defend a stereotype of acceptable client needs and professional responsibilities. In effect, a closed system. They recommend the replacement of the traditional functional organization with one based on the types of clients served. They do not consider the possibility of a matrix structure with attention given to both special services to clients and the need to maintain efficiency in the delivery of standard library services. Their recommendation is supported by Mintzberg’s model of the professional bureaucracy and Hage and Aiken’s predictions that formalization reduces the search for better methods of doing work. Hanks and Schmidt note that more emphasis in library schools on theoretical and applied sciences would help solve the problem by introducing librarians an understanding of open systems. Librarians might then demand less formal, more responsive libraries. Joseph McDonald also observes that professionalism is a problem. He notes that organizational design, i.e., the division into functions such as reference librarian, archivist, and bibliographer, “dictates how the user must approach the organization for service and how the service is to be provided.” In the professional bureaucracy, the division of work into narrow specialization would result in routine matters requiring communication and cooperation between people.

This structure may also be more conducive to innovation. In observing excellent companies, Peters and Waterman note that these companies are “better listeners.” They pay attention to their lead users, and most of their innovations come from the market-place. Peters and Waterman also question the value of the matrix structure and note that it almost always ceases to be innovative after a short time. They suggest that the product division is probably still the best form around for providing the simple structural form and lean staffing so necessary for organizational flexibility at the corporate level. They state that this simple structural form can be reorganized around the edges, e.g., by creating experimental units. There is evidence that large library organizations do not facilitate the adoption of new technology. Musmann found evidence that the large size, complexity, and decentralization of power within the California State University and Colleges System contributed to an environment of slow decision making.

Thomas Shaughnessy was correct that decentralization can deteriorate into an overemphasis on specialization at the expense of overall organizational needs. Organizational redesign can be used to maintain the balance between specialization and attention of overall goals. “Coordination by plan” is a mechanistic response, effective in stable situations where units have standard tasks, policies, and interactions. “Coordination by feedback” is an organic response to dynamic, changing situations. Shaughnessy sees the latter as becoming more prevalent through the employment of such devices as coordinator positions. Citing Alan Dyson’s study of library instruction programs, Shaughnessy recommends increased support for coordinator positions in order to maintain the library a more open system. Theoretical support for such a structure is provided by the Hage and Aiken model, which would predict an increase in innovation by decreasing centralization, formalization, and stratification.

Textbooks on library management usually have not addressed the design of an organization and the functions associated with such a design. In his book, A Theory of Library Organization, M. L. Wolstenholme makes no attempt to review the literature of library management. Instead, Rizzo reviews the larger world of management theory and research for librarians, who are expected to make their own judgments on applicability. While the work devotes most of its attention to group dynamics and techniques, it does touch lightly upon aspects of organizational design as characteristics to be manipulated rather than accepted as permanent fixtures. Division of labor, task design, job enrichment, formality, centralization, organizational development, project teams, matrices and committees, the need to tolerate ambiguity, and equita-
ble representation are mentioned. The works of Hage and Aiken's come into question. Their data show that organizations that cling to the formalized hierarchy when their environment becomes dynamic do poorly in the marketplace. Those that shift to a more organic form tend to prosper. Rizzo recommends further reading in this area.

**RESEARCH IN LIBRARIES**

Helen Howard has done the most extensive research on the effects of organizational structure in libraries. She tested Hage and Aiken's hypothesis in four academic libraries. Unfortunately, the study results may not be generalizable beyond these four libraries. Nonetheless, Hage and Aiken's model was successfully applied, and Howard encourages other researchers to replicate the study to verify her findings. She defined innovation broadly as the "generation, acceptance and implementation of new ideas, processes or products in a library for the first time within an organization." Howard found that the data largely supported Hage and Aiken's hypothesis that innovation would be negatively related to the degree of formalization, centralization, and structure complexity.

In systems of higher education, Clark observes that change promoted by external influence comes about in largely unnoticed ways through boundary roles at the bottom level of the academic system. Professors engage in activities characteristic of boundary roles, such as information gatekeeping, coordinating with other groups, and linking and coordinating with the inside and outside. Charles Burgoon reports that two-thirds of the reference librarians in thirty-five libraries he surveyed relied on conferences and workshops to update their knowledge and skills.

Howard's study raises an important question: Are professional associations the potential as catalysts for innovation? Participation in decision-making was another strong indicator of boundary-role activities. Howard's findings support McDonald's and Hanks and Schmidt's belief that professional training serves as an obstacle to innovation.

Specialization and professional activities were only weakly associated with innovation. Howard suggests this may be because librarians have been conditioned to think of themselves as generalists. While librarians may possess such specific titles as "selector," "head of map room," or "East Asian bibliographer," they may not reflect much more than vague organizational structures and fuzzy roles. A librarian's job title may not signify the clear distinction between occupational specialties found in another industry employing a wide diversity of personnel with various professional degrees.

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library will be effective, she suggests, (1) the employees affirm its goals; (2) it responds to environmental changes; (3) it provides timely, relevant and accessible services; and (4) it monitors user needs.

What has been investigated so far and what do we know? Additional research based on organizational behavior theories and models would permit us to judge whether the results of innovation theories and studies of business firms can be generalized to libraries. More study needs to be done to determine the effects of centralization, complexity, formalization, and stratification upon innovation. These studies need to compare libraries of various types, sizes, and levels of wealth, private and public institutions, and those with common and divergent goals. These organizational variables must be measured against the different types of innovation characteristics: cost, time required, impact on work group, administration, and studies of business firms can be generalized.

There is no comprehensive theory of organizational innovation to provide significant insight beyond the boundaries of our own field. Library research could contribute to the systematic study of organizations and provide information on innovation and organizational design. It is imperative that libraries take the initiative in times of limited funding. Richard Dougherty warns, "If innovation activities are sacrificed in order to preserve existing activities, librarians will eventually force their organizations into operational straightjackets." The operational straightjackets provide a closed system for libraries which could be devastating to their survival as organizations. Hage recounts an instance when Burgess at Columbia attempted to get the library to order new books for his courses and to be open for more than two hours a day. When the librarian refused to support his attempts to introduce innovative new courses, Burgess went to the Board of Regents and obtained permission to start an entirely new library.

Recognition of the need for innovation is becoming more widespread. Charles Caudle provides an excellent summary of the need for librarians to understand and investigate how library organizations can encourage innovation:

It is in no way necessary or inevitable that libraries shift the balance of their holdings and services to include microforms, digital information, videotapes, holograms and other trappings of advanced technology. It is not necessary that libraries adopt the concept of operations from circulation to outright distribution. It is not necessary that libraries invest in computers and other paraphernalia to provide users with a higher order of access to reference material if the library does not bring them about, some other type of agency will. That agency will then occupy the central role in the information business—the role that was once occupied by the library.

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