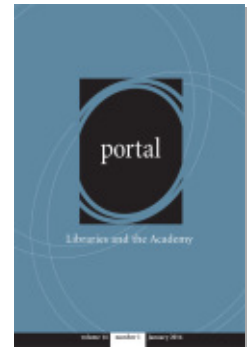# The Entrepreneurial Imperative Advancing from Incremetal to Radical Change in the Academic Library

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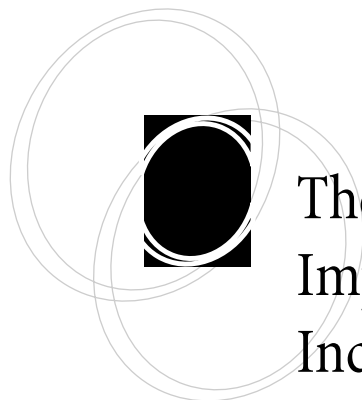
The Entrepreneurial Imperative: Advancing From Incremental To Radical Change In The Academic Library

James G. Neal

Fundamental changes in higher education, information technology, and scholarly communication are provoking a radical revisioning of the future academic library.[1] The library must pursue strategic thinking and action, fiscal agility, and creative approaches to the development of collections and services and to the expansion of markets. Higher education libraries are advancing away from the traditional or industrial age library, a model that is no longer viable. The combined impact of digital and network technologies, the globalization of education and scholarship, and increased competition for resources will produce a very different library in the academy over the next decade.

Academic libraries have behaved fundamentally as anticipatory libraries, selecting and acquiring information resources on a global scale in largely print/analog formats that respond to the current, and anticipate the future needs of faculty and students. These materials are organized, stored, and preserved for dependable access. Library staff provide dissemination, interpretation, and instructional services to enable effective use.

In the transitional or responsive academic library, the processes of information acquisition, synthesis, navigation, and archiving are increasingly focused on networked and interactive access to digital multimedia information at point of need, and on the innovative application of electronic technologies. Academic libraries are now implementing this model, serving as both providers of global publications and portals for users to resources that are increasingly created, stored, and delivered online. The library is both a historical archive and a learning and research collaboratory.

The future academic library will carry forward these network and digital revolutions and also integrate a more market-based, customized, and entrepreneurial approach to the packaging and delivery of information. Academic libraries will become centers for research and development in the application of technology to information creation and use. They will become aggregators and publishers, and not just consumers of scholarly information. They will function as campus hubs for working with faculty on the integration of technology and electronic resources into teaching and research. They will be regional and national centers for lifelong learning opportunities for information professionals, and they will be providers of information services to broader academic, research and business communities. This vision for the academic library predicts a significant moderation in the cost increases for knowledge, acquisition, and access as new models of scholarly publishing are successfully launched. It envisions massive expansion and diversification in new learning communities. The vision includes a redefinition of the library as a virtual resource not limited by time and space, and therefore not dependent on buildings for the housing, use, and servicing of information. The vision sees a repositioning of the academic library as a successful competitor in the information marketplace for new business, and for corporate, foundation, and federal investment.

My objectives in this paper are to acknowledge the revolutionary environment in which academic libraries are developing, to outline the nature of entrepreneurship and innovation, and their relevance to library advancement. I will discuss the impact of changes in global learning and scholarly communication on library entrepreneurial opportunities, and relate recent experiences in the Libraries at Johns Hopkins University as a case study in entrepreneurial activity. I will then define several key elements for successful entrepreneurial development in the academic library.

David Close and Carl Bridge, in their book *Revolution: A History of the Idea*, argue that "the essential feel of revolution derives from its cataclysmic quality . . . it destroys people's security and unsettles their convictions."[2] Thomas Kuhn, in *The Structure of Scientific Revolutions*, observes that "the transition from a paradigm in crisis to a new one from which a new tradition can emerge is far from a cumulative process."[3] Karl Marx, in his theory of knowledge or theory of epistemology, emphasizes that ideas do not exist on their own and are real and have value only when they are translated into action. He points to a pot of water over a flame. We know intellectually that the temperature of the water is rising, but only when it reaches a critical point, the boiling point, when the liquid changes to gas, does a true transformation take place. It is this move from quantitative to qualitative change that Marx defined as revolution. In many ways, today's academic library is a paradigm in crisis, unsettled, insecure, and beginning to bubble.

Revolutionary changes are transforming the environment in which the academy and the library operate.[4] These include significant developments in the technological, social, economic, and service milieu. Particularly noteworthy is an "information as commodity revolution," which is increasingly viewing information as an article of commerce and source of profit rather than property held in common for societal benefit. Also important is a "mutability revolution" that is elevating change and survival into organizational constants and encouraging hybrids or mutations in structures, programs,

and roles. Technology used for replication and acceleration; that is, doing things as they have always been done but much faster, is being supplanted by technology for innovation; that is, doing things that have never been done before. Students and researchers are bringing extraordinary expectations to technology: more and better content, access and convenience, new capabilities, reductions in cost, and expansion in individual and organizational productivity.

It is important for academic libraries to understand and capitalize on the important advantages of the digital medium.[5] These include:

- accessibility, the ability to overcome the limitations of place;
- availability, the ability to overcome the limitations of time;
- searchability, the ability to probe information in new ways;
- currency, the ability to make information available in a more timely way online;
- researchability, the ability to ask new questions that could not be posed with printed information;
- dynamism, the fluidity of the presentation and the ability to reshape the information; and
- interdisciplinarity, the ability to carry out research across multiple fields and to explore new approaches to a topic.

Other noteworthy qualities include:

- collaborative nature, the ability to incorporate conversation and debate among scholars and students into the use of a work;
- multimedia aspects, the ability to integrate text, images, sound and video into the presentation;
- linkability, the ability to use hypertext to connect a work to related materials;
- interactivity, the ability of the user to not only read and view the information, but also to interact with the digital text and images and to use and repurpose them in creative ways;
- procedural qualities, the ability of the computer to carry out tasks over and over again with high accuracy and efficiency, thus allowing the user to focus on the intellectual work;
- spatial capabilities, the ability to view objects in multiple dimensions and relationships, and the ability to navigate easily through files of information; and
- encyclopedic qualities, the almost unlimited capacity of the computer to store and display massive volumes of information without the limitations of the physical format.

Each of these characteristics presents an opportunity for innovation and advancement in library functionality and capability.

At the conceptual core of these developments is the digital library, defined by the Digital Library Federation during its period of formation as, "organizations that provide the resources, including the specialized staff to select, organize, provide intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities."[6] At the operational level, the

institutional digital library program includes several core elements, including scholarly content, instructional support, technology development, access design, and research and evaluation. It embraces a number of key capabilities, including a web-based library management system; the purchase or licensing of textual and multimedia databases; electronic publishing through the conversion of analog materials to digital formats; electronic course reserves; the collection and archiving of software, courseware, simulations, and research data files; the identification and organization of Internet sites of quality and relevance; electronic document delivery; customized literature update services; and online instructional tutorials to support effective use of digital resources. Each of these components embraces creative collection and service development and the potential for entrepreneurial outreach to and beyond the academic community. Advancing the digital library means leveraging the content, reshaping the organizational culture, building the physical and expertise infrastructure, setting the direction, and then just doing it.

The word "entrepreneur" was first applied in France to individuals who "entered (entre) and took charge (preneur)" of royal contracts. The king would grant a noble the right to build a road or a bridge, for example, and to collect the tolls in return for a gift or a favor. The noble would in turn appoint an individual, the entrepreneur, who would arrange the financing, supervise construction, and manage the completed facility. The entrepreneur guaranteed the noble a fixed income, and kept any proceeds left over in compensation for his service and his risk. Howard Stevenson of Harvard defines entrepreneurship as a management style that involves pursuing opportunity without regard to the resources currently controlled.[7] Economist Joseph Schumpeter, writing in 1911, brought the concept of innovation to the definition of entrepreneurship, including process, market, product, factor, and organizational innovation. His work emphasized the role of the entrepreneur in creating and responding to economic discontinuities and as "a person who carries out new combinations."[8]

Organizations and individuals can be viewed as sitting on an entrepreneurial continuum, at one extreme the "promoter" who feels confident of the ability to seize opportunity regardless of the resources under current control, and at the other extreme is the "trustee" who emphasizes the efficient utilization of current resources. Stevenson has identified a series of factors that pull individuals and organizations towards particular types of entrepreneurial behavior.[9] The first factor is strategic orientation; that is, how strategy is formulated—the basis of opportunity or on the basis of resources in hand? It is important to note that the entrepreneur is not always focused on breaking new ground, for according to Stevenson, opportunity can also be found in a new mix of old ideas or in the creative application of traditional approaches. A second factor is commitment to opportunity; that is, a revolutionary action orientation operating in a short time frame versus an evolutionary compromise process acting in an extended time frame. The third factor is commitment of resources; that is, a multistage commitment of resources with minimum investment at each stage or decision point versus careful analysis and large scale commitment of resources after the decision to act. The fourth factor is control of resources; that is, the ability to leverage other people's resources deciding over time what resources need to be brought in-house versus the need to control and own a resource from the outset. A fifth factor is management structure. It is the

awareness of progress through contact with principal players, as opposed to formal relationships in which specific rights and responsibilities are assigned through delegation of authority in a hierarchy. The sixth factor is reward philosophy: compensation based on performance linked to value creation and teamwork in contrast to compensation based on individual responsibility, assets controlled, short-term targets and reward through promotion to more responsibility.

Teresa Amabile has identified environmental stimulants and obstacles to creativity.[10] Stimulants include: the freedom to decide how to accomplish a task, good project management, sufficient resources, an environment free of threatening evaluation, a mechanism for considering new ideas, a collaborative environment, feedback and recognition systems, sufficient time, intriguing problems, and a sense of urgency. Obstacles include: inappropriate reward systems, bureaucratic processes, low levels of cooperation, distrust of innovation, lack of control over own work, organizational disinterest, poor project management, an environment focused on criticism, insufficient resources, insufficient time, overemphasis on status quo, unhealthy competition, and self-defensive attitudes.

With these broad understandings of entrepreneurship and innovation, we can explore several of the key developments in the academy and the opportunities presented for library leadership and advancement. James C. Collins and Jerry I. Porras, in their 1994 work, *Built to Last: Successful Habits of Visionary Companies,* describe the importance of Big Hairy Audacious Goals (BHAGs) to innovate organizations, to stimulate bold progress, to enable the surpassing of competitors, and to create daunting but also energizing and focused direction.[11] The distance learning and e-commerce aspirations of many top American universities and colleges, working independently, in collaboration with other higher education organizations, in partnership with the private sector, or through spin-off structures, have taken the character of a BHAG. This transformation in higher education in response to the perceived expansive markets for network learning challenges the library to rethink its nature and role. The virtual campus demands rampant digital content creation, new strategies for information storage and management, more sophisticated search and query techniques, dependable and secure distribution and access systems, and new approaches to rights management.

There are interesting and important parallels between the push of universities into cyberspace and some key aspects of American economic history. The current rush to stake out web space for educational enterprise is comparable to the nineteenth century land rush experience. The massive economic benefits of the railroad and the transformations it engendered in so many industries align with the impacts of electronic commerce in so many areas. And the extreme fragmentation and later rapid consolidation of utility industries such as electricity and telephone might predict a similar winnowing at some point of the online education industry. We now see many layers developing around educational commerce, including numerous educational destinations for courses, many new education portals or pipelines that aggregate offerings, and new business-to-business sites serving online learning.

American higher education is severely challenged in this competitive market increasingly dominated by new for-profit players. Universities and colleges must be able to support the educational demands created by employment transitions and career

changes and the needs of new majority students who are juggling families, jobs, and education. They must begin to view the undergraduate degree as a step, and not the termination of an educational relationship with a student, and graduate learning as leading to a process of ongoing and global consultation and collaboration. American universities must be able to deliver high quality and flexible learning to the corporation and the factory, and to forge educational partnerships with the K-12 community. Each of these thrusts will demand new thinking about how to support learners and teachers and about the information resources and collaborative tools they will require. How will higher education acquire sufficient infrastructure, quality courseware, willing faculty, comparable student services, enterprise management tools, and new delivery models? How will higher education successfully implement the advantages of online learning such as interactivity, flexibility, functionality, cost of access, and support for diverse learning styles? Are there opportunities for the academic library to be an aggressive partner in these new learning communities, and to export resources, services, and expertise into new markets?

Scholarly activity is the creation of knowledge and the evaluation of its validity, the preservation of knowledge, and the transmission of knowledge to others.[12] The technologies, economics, and institutions that underpin the research journal and the scholarly monograph, the traditional tools of communication, are being rapidly transformed. It is clear, if not trite at this point, that scholarly communication costs too much, it takes too long, the higher education community gives too much away, and the consequent crisis has gone unrecognized as a public policy issue. The library and higher education communities consistently have advocated several core interests: a competitive market, easy distribution and reuse to serve learning and scholarship, innovative applications of technology, quality assurance, and permanent archiving.

The urge to publish must be understood—why are the faculty on our campuses so highly motivated to share their research results with colleagues? Clearly, scholars want to communicate their findings and they are concerned about the long-term availability of their ideas. They have been nurtured in an academic culture that celebrates scholarship and that links prestige, recognition, and rewards to productivity and scholarly output. And for some there is even financial profit from publishing activity. Libraries must recognize these motivations as new models of electronic scholarly publishing are developed and implemented.

Several new strategies or models of scholarly publishing have been advanced, and academic libraries have been actively involved in leadership and supporting roles. The traditional commercial publishing model remains central to scholarly work. The academic server model proposes that universities obtain the newly prepared research papers from their faculties and make them available over the global network, or take responsibility for posting the work of scholars from around the world in selected disciplines. The prestigious publishing model calls upon scholarly societies and university presses to expand their electronic publishing activities, particularly for scholarly journals. The digital library model emphasizes the work of libraries in digitizing usually unique materials in the collection and making them available on the Internet. The electronic book model is leading to expansive databases of book-length materials and to experiments in some disciplines to prepare new works for online use. The

electronic collections model pulls together diverse formats on a common theme into a dynamic and current database. The university publishing cooperative model, including Scholarly Publishing and Academic Resources Coalition (SPARC) for example, seeks to forge partnerships that will launch competitive ventures characterized by reasonable prices and support for the access needs of higher education. The public domain or open archives model is focused on free and open access to the work of scholars, and the North American Electronic Article Repository (NEAR) proposal is an example of an attempt to retain intellectual property ownership in the academic community. The government server model demonstrates the rampant growth in web publishing by departments and agencies at all levels of government. The retrospective model seeks to capture electronically the historical literature in a field, and Journal Storage (JSTOR) is the prime example for scholarly journals. The preprint server model is an attempt by an expanding number of disciplines to enable researchers to post new research papers on a web-accessible database prior to formal publication. And the peer review lite model is a similar effort in disciplines where a level of review is deemed necessary to verify the legitimacy of works submitted. Clearly, the scholarly communication landscape is complex and diverse and is going to be reshaped over the next decade. Are there opportunities for libraries to be key players in these new publishing ventures and to build a new economic framework for organizing, accessing, and archiving the scholarly record?

The framework for academic library participation in the learning and scholarly communication processes must be rethought, and new structures for promoting library partnerships with faculty are essential. The model that has been developed in the Libraries at Johns Hopkins is the Digital Knowledge Center, launched in 1997. It is a hub for research and development in the creation, production, marketing, distribution, and archiving of electronic information, instructional resources, and scholarly works. It is a laboratory for experimenting with and employing new technologies in teaching, learning, and research. It serves as a magnet for a wide range of skills from across the library and for faculty collaboration as it focuses on electronic pedagogy, electronic publishing, emerging technologies, usability/human factors, and knowledge management. Several current examples of projects in the Digital Knowledge Center will illustrate its entrepreneurial potential:

- *Project* MUSE® is a partnership between the library and the university press, which is distributing on the Web on a subscription basis the journals published at Hopkins and a growing number of other university presses. This business initiative, with seed funding from NEH and the Mellon Foundation, combines quality content with sophisticated searching capabilities, favorable licensing terms, and attractive price options to launch a profitable venture and a model for electronic journal publishing.

- The Comprehensive Access to Print Materials (CAPM) project is a partnership among the library, faculty from economics and engineering, and several corporations. It seeks to integrate digital and robotics technologies to expand user access to library collections stored remotely and to restore the browsability of these materials online. With funding from the Mellon Foundation, a rigorous economic analysis has been carried out and prototype technology is being

designed. U.S. and international patents are being secured to protect the future capitalization potential of the product.

- The Levy Sheet Music project involved the digitization of over one hundred twenty thousand pages of popular American music including cover art, now completed and available on the Web. This phase of the project was funded by NEH. The next phase of the project includes a partnership with faculty in the Hopkins music conservatory and with a corporation to develop a digitization workflow process, to create through sophisticated software a digital sound file and to enable searchability by musical notation and sound. Funding has been secured from the National Science Foundation and IMLS.

- A new project in development will seek to create a global research database touching on the multidisciplinary fields of Extreme Wind Events (EWE). Faculty from such academic areas as geography, meteorology, engineering, economics, and public health will be drawn into project planning. Scholarly societies and government agencies dealing with disasters such as hurricanes and tornadoes will be involved. The goal is to enhance worldwide scholarly communication in these areas and to promote the online availability of research data.

- The City in Disciplinary Perspectives project is a partnership between the library and faculty from several disciplines which seeks to take the website and electronic resources for this experimental course and develop it into a multimedia digital kit that can be used in other educational settings. Funding from NEH enabled a series of focus group discussions with representatives from a variety of colleges to evaluate the product and its usability and adaptability.

- The Civility Project is a partnership between the library and faculty from several humanities disciplines to create a web database of global research and electronic texts in the areas of customs, manners, and courtesy in historical and contemporary life. It will also serve as a tool for the posting and discussion of new research and for delivering educational activities into various settings.

- The Medieval Manuscripts Digitization project is a partnership between the library, faculty in literature and history, American and overseas libraries and museums, and corporate partners to digitize the images and texts of a French medieval manuscript. Funding from two foundations enabled the library to convene a colloquium of scholars, librarians, and technologists to discuss the goals, standards, protocols, and academic applications for digitizing such scholarly manuscripts and to bring the group back together to evaluate the usability of the products.

These examples of projects being advanced through the Libraries at Johns Hopkins have several important characteristics: active faculty participation, a research and development focus, innovative applications of technology, academic and corporate partnerships, foundation and federal funding, and a potential for capitalization and marketing. They reflect an entrepreneurial culture and an innovative spirit.

Effective faculty relationships are essential to the success of the academic library and contribute in powerful ways to entrepreneurial opportunities.[13] Faculty, as researchers, are among the primary consumers of library collections and services. They

also produce, as authors and editors, the scholarly literature that is acquired by the library. Their teaching activities and course requirements determine the nature and intensity of library use by students. Faculty occupy positions of administrative and policy leadership which influence the financial and political status of the library in the institution. And faculty are increasingly involved as advocates and partners in the development of the digital library.

Faculty bring diverse but important priorities, interests, and expectations to their work at the university. They seek personal advancement and recognition in their disciplines and, in some cases, academic administrative opportunities. They want to contribute to the literature and prestige of their fields and, therefore, often actively pursue external funding in the form of grants and endowments to support their work and that of their students. They strive to produce high quality instructional content and experiences, and to advance students into successful careers or prestigious graduate and professional programs. They are interested in working on innovative projects and collaborating with interesting and accomplished colleagues. They expect financial recognition of their efforts in the form of compensation and, as appropriate, profit from their publications, inventions, software, or expert consultation. And increasingly, they demand access to the best laboratory, technology, and library capabilities, as well as opportunities to experiment with technology in their teaching and research. It is important that the library understand these motivations as relationships and collaborations with faculty are developed.

A taxonomy of faculty and library relationships can be outlined. The servant relationship places the library in a position of responding to faculty demands without an opportunity to influence expectations and without mutual respect. The stranger relationship is characterized by faculty and library communities that do not work together, but coexist independently in the academy. The parallel relationship describes a situation where faculty and library activities do not intersect, where library collections and services are underutilized, and where faculty's information needs are satisfied from other sources. The friend relationship positions the faculty and library as cooperative and mutually supportive more out of tradition than intense dependence. The partner relationship is built on a mutual dependence and a shared commitment to improving the quality of both the library and the university. The customer relationship places the library and the faculty in a market relationship, with a recognition of the consumer and broker nature of the interaction. The team or knowledge management relationship realizes a fuller integration of interests and activities and high levels of personal investment in collaboration. These descriptions of faculty and library relationships are not complete or mutually exclusive, but they do illustrate the evolution of the quality and impact of the interaction and its centrality to library innovation and participation in the academic life of the institution.

Other relationships are important as well, both within and outside the university. The advancement of a research and development agenda through the library involves intense and ongoing contact with numerous campus offices. This includes the university counsel and technology transfer office for legal and patent questions. Government relations, research grants, foundation relations, alumni relations, and university development can put the library in touch with potential funding sources. Financial

planning and human resources can assist with business development, organizational change, personnel recruitment and retention, and staff development. The information technology and network organizations are central to infrastructure development. And the public relations office can help with getting the word out about accomplishments.

Similarly, broad cooperation locally, regionally, nationally and internationally through consortium relationships and institutional partnerships is essential to a successful entrepreneurial agenda. In addition to faculty partnerships, academic libraries increasingly are seeking out effective working relationships with computing units, with publishers, with corporations and businesses, with museums and other cultural organizations, and with government agencies.

Organizational flexibility and agility are essential, and structural and personnel policy development may be valuable. This might include selective outsourcing of technology support and operations. On the human resources side, strategies such as expanded temporary or fixed term appointments, enhanced organizational fluidity and flattening, frequent staff sharing and consultation, facilitative management and small group training, a salary bonus program, and an incentive compensation program may be needed.

As libraries become more involved in entrepreneurial projects, it is important to also focus on critical information policy issues. These include intellectual property/copyright, Internet development and availability, telecommunications, privacy, intellectual freedom, information technology research funding, and information technology workforce development, for example. These policy arenas will influence the ability of the academic community to advance the education and research agenda.

Copyright developments are particularly noteworthy. As the globalization of copyright through World Intellectual Property Organization (WIPO) treaty agreements strives to harmonize national policies, sometimes unfriendly to American market traditions and economic values, this has spawned a series of significant legislative initiatives. In the U.S., this includes copyright term extension, the Digital Millennium Copyright Act, the database bills, and now the Uniform Computer Information Transactions Act (UCITA). Pressures to create copyright use guidelines for electronic information have been resisted successfully by the library and education communities. Licensing has expanded rapidly as the tool for libraries to negotiate the terms of access and use for digital resources, and sometimes at the expense of fair use capabilities. Technological controls are being implemented by publishers of electronic information, and are advancing from passive "password or IP domain" models to more active "encryption or self-help" strategies. And challenges on copyright ownership are numerous. Writers and scholars are questioning the right of publishers to recycle their works in new electronic publications, researchers are asserting co-ownership of their own journal articles, and college faculty are debating ownership of new academic publications such a courseware and software. These developments have created extraordinary conflicts in the information marketplace between the interests of the community of production and the community of consumption.

Perhaps the fullest expression of the entrepreneurial development in the academic library is the expanding interest in the organization of business operations to create new income streams for the organization. In the Libraries at Johns Hopkins, this has

been mandated by the long-range campus financial plan and involves the library generating new resources from nondevelopment sources, largely through e-commerce initiatives. The Hopkins Libraries had already been leveraging assets to produce new income. This strategy includes leveraging attractive space by leasing a special collections library for social events, leveraging traffic by outsourcing a coffee cart in the central library, leveraging space by making the storage facility available to other libraries, leveraging technology by bringing other local libraries onto the library management system, leveraging content by implementing the sale of products that feature images from the collections, leveraging preservation and instructional services to external customers, and leveraging expertise to launch publishing projects. It also will include instructional technology services, a usability lab, software and technology product development—all designed to serve the Hopkins community but also seeking to build new revenue for the Libraries.

The objectives of these entrepreneurial business initiatives are to produce new income to benefit library collections and services, to learn through these activities, and to apply these lessons to library programs. The objectives also aim to secure expanded visibility in the national library and information technology communities, and to increase credibility in the University, where the tradition for such activities in the academic divisions is established.

The focus is now on e-commerce development, and a series of programs has been organized including: virtual electronic library for distance learning universities, corporate electronic library service, school (7-12) electronic library service, personal research librarian, and personal electronic library. A contract has been signed with a well-established and large distance learning university that has a global student body. Negotiations are underway with several commercial and university-based organizations that provide educational and tutoring services to junior and senior high school students. Discussions are proceeding with a major consumer health portal on the provision of the personal research librarian service. Plans are underway to launch a comprehensive information service for Hopkins alumni and for several corporate clusters in the Baltimore region. Across these various activities, a tiered suite of library services has been designed and is being offered, including a customized information website or portal, electronic reference service, electronic reference and full-text databases, document delivery, personal librarian research, customized information profiling, and strategic information analysis and intelligence.

These entrepreneurial activities present some significant challenges for the Libraries, and include: creating a firewall between these business developments and the support being provided to Hopkins students and faculty, finding risk and development capital, and developing and recruiting staff skills for business ventures. Other challenges include creating the technology infrastructure, managing intellectual property and legal concerns, moving from cost recovery to profit models, moving from staff to software mediation to handle expanding volume of transactions, and forging effective business partnerships within the University and with outside organizations to help grow the business program.

In the process, we ask ourselves fundamental questions.[14] Can we offer additional information or transaction services to our existing customer base? Can we address the needs of new customer segments by repackaging our current information assets or by

creating new business capabilities through the Internet? Can we use our ability to attract customers to generate new sources of revenue? Will our business be significantly harmed by other companies providing some of the same value we currently offer? How do we become a customer magnet through electronic commerce? How do we build direct links to new customers? How do we take away bits of value digitally from other companies? Can we use the Internet as both a tool for global learning and scholarly communication and for technology transfer and entrepreneurial activities?

Two recent *Harvard Business Review* articles powerfully capture the opportunities and challenges of the new economy and present some important direction for the academy and the academic library. Philip B. Evans and Thomas S. Wurster, in "Strategy and the New Economics of Information," note that "incumbents could easily become victims of their obsolete physical infrastructures and their own psychology," and "existing value chains will fragment into multiple businesses, each of which will have its own sources of competitive advantage."[15] And Gary Hamel, in "Bringing the Silicon Valley Inside," emphasizes that "in industry after industry, unorthodox start-ups are challenging complacent incumbents," and "if you want to free the entrepreneurial spirit in your organization, you must create and sustain dynamic internal markets for ideas, capital and talent."[16]

Entrepreneurial initiatives that build on e-commerce capabilities must be sensitive to new measures that are very different than what has governed our thinking in the academic library, for example:

QUALITY = CONTENT + FUNCTIONALITY

VALUE = CONTENT + TRAFFIC

PRICE does not equal COST OF INPUTS
PRICE = PERCEIVED QUALITY + VALUE

SUCCESS does not equal RESOURCE ALLOCATION
SUCCESS = RESOURCE ATTRACTION

Successful entrepreneurial activities in the academic library will require a redefinition of the physical, expertise, and intellectual infrastructure, and a new understanding of the geography, psychology, and economics of innovation. That is the where, who, how, and why of productive change. Advancing the entrepreneurial imperative will demand a commitment to the tools of the trade, and these include business plans, competitive strategies, and venture capital. And it will mean advancing from incremental to radical change.

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Notes

1. This paper was originally presented as the Schwing Library Lecture at Louisiana State University on October 28, 1999.
2. David Close and Carl Bridge, *The Meaning of Revolution* (London: Croom Helm, 1985), 3.

3. Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962), 84.
4. These ideas on revolutionary change were originally presented in a lecture at the University of Georgia on April 7, 1997 and later published in a reduced version *in Collection Development in a Digital Environment* (Binghamton, NY: Haworth Information Press, 1999), 3-17.
5. These ideas on the advantages of the digital medium were originally presented in a lecture at the China-USA Conference on Global Information Access in Beijing, China on August 26, 1996.
6. Available:< http://www.clir.org/diglib/dlf.homepage.htm>.
7. Howard H. Stevenson, "A Perspective on Entrepreneurship," in *The Entrepreneurial Venture,* eds. Michael J. Roberts and Amar V. Bhide (Boston: Harvard Business School Press, 1999), 10.
8. William Taylor, "The Business of Innovation," in *The Entrepreneurial Venture*, 537.
9. Stevenson, 10.
10. Theresa M. Amabile, "Managing for Creativity," in *The Entrepreneurial Venture*, 525-26.
11. James C. Collins and Jerry I. Porras, *Built To Last: Successful Habits of Visionary Companies* (New York: Harper Collins, 1997), 94-95. These ideas on the role of the academic library in distance learning were also presented in a lecture at the International Association of Technological University Libraries in Brisbane, Australia on July 3, 2000.
12. These ideas on scholarly communication were also presented in a lecture at the University of Oklahoma on March 5, 1998.
13. These ideas on library and faculty collaboration were originally presented at the Kanazawa Institute of Technology Roundtable for Library and Information Science in Japan on July 15, 1999.
14. Shikhar Ghosh, "Making Business Sense of the Internet," in *The Entrepreneurial Venture*, 109.
15. Philip B. Evans and Thomas S. Wurster, "Strategy and the New Economics of Information," *Harvard Business Review* (September/October 1997): 79, 82.
16. Gary Hamel, "Bringing Silicon Valley Inside," *Harvard Business Review* (September/October 1999): 71, 73.