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Environmental scanning: an essential tool for twenty-first century librarianship

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Abstract: Purpose - This article aims to highlight important aspects of environmental scanning (ES). As a managerial tool of high utility, ES may assist library professionals - at all levels - proactively assess and respond to change in the technological, demographic, economic and social environments that may have a future impact on the library profession and stakeholder services. Design/methodology/approach - This article deepens the library literature related to the methodology of ES with concepts and ideas derived from the relevant management literature. Findings - Based on an in-depth review of the library literature, the evidence suggests that librarians have not the used ES techniques consistently or systematically to manage change. Research limitations/implications - While the results of this literature review imply that ES is underutilized as a tool to manage change in the library environment, it is entirely possible that practicing librarians actually utilize ES far more frequently than a review of the library literature suggests. Additional survey-studies addressing this concern will be required to resolve this important question. Originality/value - This article provides useful information related to the importance of ES and the related methodology required to build a comprehensive ES initiative. In addition, the paper introduces the reader to the innovative goal of coordinating ES initiatives on a global scale. This is presented with a view toward developing cooperative programs and approaches that may increase the viability of our profession and strengthen our collective ability to increase stakeholder satisfaction.

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Today, libraries face enormous challenges related to the development and implementation of "value-added" services for their stakeholders. Libraries of every type and size are facing similar resource constraints and competitive pressures from corporate entities - external to the library - that are vying to provide services directly to the stakeholders that librarians have traditionally served. In order to maintain a competitive edge, every element of the library profession including: librarians; administrators; schools of library and information science; and our professional associations need to understand and monitor - on a global basis - the shifting competitive landscape.

Environmental Scanning (ES) is an important managerial tool used extensively in business and industry to assess and respond to external environmental change that may have a decisive impact on strategic business decisions, organizational performance and viability ([7] Hambrick, 1981). The basic concepts of ES, originally enunciated in a seminal work by [3] Aguilar (1967) describes important concepts and practical tools - that if systematically used by library professionals - may result in a more precise alignment of library resources and services with the rapidly changing information service requirements of our stakeholders.

The importance of ES

Each library is ensconced in an economic, social, political, regulatory and technological matrix that is constantly evolving. Applying fixed managerial techniques, concepts or ideas in environments that are experiencing rapid external-change may place any organization or profession at a competitive disadvantage. For example, Andrew Grove, former chairman of the Intel Corporation has suggested that fundamental change in any organization's business environment may represent a "strategic-inflection-point". Grove defines a "strategic-inflection-point" as a time in the life of a business when important fundamentals are about to change ([5] Grove, 1996). According to Grove, change is often the basis for the development of...
inflection-points that usher in new competitors, products or services by a process of innovation and substitution. Inflection-points may mark the beginning of a new cycle of innovation and market success for individual careers, corporations or industries, or they may be the beginning of a long decline for those engaged in inflexible business and management practices” ([4] Castiglione, 2006, p. 290).

For example, external information about economic change, demographics or advances in computer and communication technology can be conceived of as “inflection-points” that may have a distinct impact on the way libraries serve their stakeholders. Library administrators who remain unaware of external-change, or minimize the importance that such change may have on library operations may lose significant opportunities to respond - in a timely fashion - and develop services that are valued by the stakeholder.

As a managerial tool of considerable importance, ES may be conceived of as an ongoing activity designed to identify important external developments that may guide and inform the business activities of library administrators.

Library administrators who attempt to evaluate and understand "leading-edge" trends and developments are often capable of identifying: emerging problems; competitive weaknesses; organizational strengths; and new service opportunities at an early stage. With this information, it may be possible to adjust the library services offered to the stakeholder in a highly adaptable and proactive manner.

Libraries, both individually and collectively, will either succeed or fail to efficiently deliver valued stakeholder services. Success of failure will be based on the degree to which strategic-planning efforts are guided by an accurate assessment of the external-factors that may affect library operations and service delivery. Increasing levels of environmental uncertainty requires that members of our profession, at every level, coordinate and intensify their ES initiatives in an effort to: monitor; understand; and adapt to the external-factors driving change in the library environment.

While little practical guidance exists in the library literature, it is possible to present a logically derived list of target-factors that library professional should monitor on a continuous basis. The following external-factors may be of considerable importance in any comprehensives ES initiative including:
- the service deliver implications of new technology;
- changes in the law of intellectual property and copyright;
- changes in the amount of tax-payer financing available for library operations;
- the entry of new competitors;
- the availability of trained library personnel;
- regulatory changes that impact employment practices; and
- the general health of the local and global economy.

With the external-factors or forces impacting library operations, under continuous observation, evaluation and analysis, it may be possible for library administrators to accurately determine and implement a highly adaptive and strategic organizational response.

**Developing a comprehensive ES initiative in the library environment**

High impact ES is not a "one-shot" process. Effective ES is conducted continuously in an effort to identify emerging changes and trends that may have a significant impact on library operations and stakeholder satisfaction.

**Competitors**

While librarians have tended not to view the services they offer to stakeholders as marketable commodities, highly profitable and cash-rich corporate-competitors continue to emerge who hold precisely this view. Creating a comprehensive list of the leading corporations operating in the information services environment - with the goal of monitoring their business activities and information product development plans - may provide library administrators with the "lead-time" necessary to consider the service implications that new information products will have on the information needs and research activities of all library stakeholders. The result of this activity
may facilitate a more effective allocation of scarce library resources, by providing library administrators with the information required to: acquire, adapt and utilize only those services and information systems that have the potential to increase stakeholder satisfaction.

Technology
The development of new computer, communication and information technologies continues unabated. For example, the impact of the internet (Zhao and Resh, 2001) on the library profession has had wide ranging implications; from the way we serve our stakeholders, to the education and preparation that librarians will require for successful professional service. In an interesting historical note highlighting the problems that may be associated with a lack of ES, "[10] McMullen (1955), then an associate professor of library science at Indiana University, suggested that librarians in 2005 would be managing libraries using the same mechanical devises already in existence.

However, within one year of Professor McMullen's prediction, "William Shockley, John Bardeen and Walter Brattain shared the Nobel Prize ([8] Lee, 1995) for their discovery of the transistor-effect at the (AT&T) Bell Laboratories" "While Professor McMullen incorrectly assessed the impact of technology on library operations in the 21st century, he correctly suggested that libraries may be affected by external change that remains obscure for a long period-of-time ([10] McMullen, 1955). Implicit in McMullen's comments is the idea that librarians need to look outside their professional boundaries for insight that will help them anticipate and manage change. His view finds support in the general systems theory (GST) of [12] Parsons (1951) and [16] von Bertalanffy (1968) and on the theory's contemporary emphasis on "open-systems" (see [15] Taylor and Felten, 1993) and (Senge, 1990)".

Clearly, the use of an appropriate ES strategy is the first step required to change managerial perceptions and assumptions and facilitate adaptive decision making [7] Hambrick (1981). Therefore the use of ES by library administrators may: reduce complacency; inform the progressive adaptation of our profession; enhance the importance of our professional activities; and facilitate the development of appropriate stakeholder services.

Sourcing competitive intelligence
A number of resources are available that may empower library associations, library administrators and librarians to conduct ES activities. These sources, according to [2] Albright (2004, p. 44), are divided into external and internal information sources and include:

(1)] External information sources
- professional conferences;
- radio, television and the internet;
- books, newspapers, journals; and
- commercial databases.

(2)] Internal information sources
- other employees;
- personal contacts;
- committees/meetings; and
- internal reports.

In addition, many leading corporations that are pioneering "cutting-edge" advances in computer and communications technology, software applications and the internet, have developed attractive internet-portals and web-sites that provide considerable information in the form of "white-papers" news releases and direct access to on-line USA, Securities and Exchange Commission filings ([17] Wood, 1997). In addition, other interesting information about future product developments, services and research interests may provide our profession with a "window-of-opportunity" to strategically respond to proposed or planned changes in technology.

Economic, social and demographic concerns
Naturally, libraries need funding. Many are taxpayer-financed; as is the case with public, school and college libraries - others are funded by endowments, internal corporate or organizational transfers, and student tuition-receipts. Irrespective of the funding-route, a library's ability to provide services is, in many cases, related to the health of the local economy and the stage of the business-cycle that a country, region or local economy is experiencing.

### The importance of monitoring interest and exchange rates

For example, in times of economic expansion and high economic activity, government treasuries generally run surpluses. In times of economic stagnation or decline, government treasuries generally run deficits. Often, in lean-times, governments tend to fully-fund "essential" services, usually at the expense of libraries, educational and other "cultural" institutions.

In all market economies, interest-rates, exchange-rates and the price of oil for example, have a profound impact on economic activity. For example, high interests-rates tend to slow economic activity, decrease corporate profits, and increase unemployment. This in-turn, decreases government tax-receipts and tends to have a depressing effect on government spending. Conversely, declining or low interest-rates stimulates investment, increases corporate profits and reduces unemployment, resulting in an increase in tax-revenues and increased government spending.

A knowledge of the business-cycle and the probable direction of interest-rates will help library managers anticipate any positive or negative change in the flow-of-funds available for library operations. Important sources of economic and business-cycle information are often web-accessible and are freely available from a countries' central banking system. A comprehensive list of central bank websites is available from the Bank of International Settlement at: www.bis.org/cbanks.htm

### The importance of monitoring demographic shifts

A change in the demographic profile of a libraries's stakeholders - along age, education, ethnic and other characteristics, often requires a shift in programs or services to reflect this change. Library administrators who understand and monitor stakeholder-profiles possess the required information to efficiently provide - within resource constraints - the appropriate level and type of service required.

### An example of ES related to technological change

The value of ES activity is presented in the following example. The author visited the Courant Institute of Mathematical Sciences Library, an affiliated library of New York University; this library specializes in mathematics and computer science literature.

The goal was to engage in "boundary-spanning" - a component of appropriate ES activity - in an effort to review the literature and find an example of an emerging technology that may have a significant impact on library operations.

After perusing a number of different journals, an article was found (Pons, 2006) describing the use of fingerprint-identification-technology (FIT). While the article was not specifically written for librarians - the article was clearly intended for corporate marketing executives who have an interest in developing more precise customer profiles - the article nevertheless contained information that may have an important - future - impact on the way libraries manage their e-collections, allocate scarce resources and learn from the Internet and library research activities of their patrons.

Understanding the information service requirements of the library patron is a critical concern of library administrators. Accurate patron-profiles are absolutely essential to facilitate the efficient allocation of scarce financial, technical and human resources. While library administrators have the ability to know, for example, the number of times a licensed electronic resource has been accessed, the profile of the person accessing the resource remains obscure. This is particularly true of "walk-up" public access computers available in the library. The use of FIT has the potential to change this completely. For example, once suitable "privacy" and patron-security arrangements have been made, a FIT database can be constructed that identifies - without
compromising actual identity - any library stakeholder on the basis of age, gender, academic or faculty status. Public access computers, located in the library, and other library computers equipped with FIT technology will automatically create a record of activity within the selected attribute fields. Also, the web-site or "click-stream" activity of patrons visiting the library and using the library's computers may provide information that library administrators may use to adjust the content of bibliographic instruction, monitor electronic-resource utilization and learn from the user activity of patrons who are identified in the database by age, gender, or other criteria that will not compromise a patrons actual identity. According to Pons (2006), some universities are already using biometric technologies for student authentication and to monitor resource usage patterns. For example, the Buffalo and Erie County Public Library has employed a biometric system developed by the Ultra-Scan™ Corporation that identifies each library patron by looking at the unique characteristics of a patron's finger (see Ultra-Scan, 2006). Though currently expensive, biometric technology will, over time, become less costly and easier to use. Therefore, the use of biometric technologies may provide library administrators with an additional tool to accurately understand the information resource needs of the library patron. While the potential for biometrics in collection-development and resource allocation in the library environment is clear, an in-depth review of the library literature indicates that biometrics is currently a neglected, but important emerging technology for both library practitioners and researchers to consider. While conducting a test-scan of the computer science literature available at the Courant Institute, the author was completely unaware of the fact that this technology was already in-use in the library environment. Undoubtedly, a coordinated and systematic ES initiative may uncover additional "emerging-technologies" that may have an important-future-impact on library services.

Implementing a comprehensive ES program

A comprehensive ES program should combine scanning on two levels. Scanning of the economy, patron demographics and service requirements are probably most efficiently performed by librarians and support-staff within especially designated project-teams; composed of individuals with the appropriate functional-expertise and skills ([1] Aaker, 1983). Scanning on the second-level should attempt to identify - in addition to economic, political and demographic change - changes in technology that may have a profound effect on the evolution of our profession; both in terms of the way we provide services to stakeholders and in the way we educate future library professionals.

Typically, library personnel do not have the time to monitor the emerging technological environment. However, professional library associations - operating in different countries - may have the resources to develop specific units tasked with the responsibility of monitoring change in the technological landscape. Global coordination of ES activities conducted by various library associations finds support in the literature.

In an important attempt to provide the library profession with actionable insights concerning future developments effecting the library profession, the Online Computer Library Center, OCLC (2003), should be highly commended for publishing an in-depth and comprehensive ES that identifies and evaluates the emerging library services environment on multiple levels. Their involvement with ES is based on the idea that "any person or organization is unlikely to be able to make meaningful predictions that are helpful for charting directions for an indefinable future" ([11] Online Computer Library Center, 2003, p. vii). In addition, coordinated ES is supported by the work of ([6] Cyert and March, 1963) indicating that individuals attempting to comprehensively understand their environments will experience a form of "bounded rationality" - that may ultimately preclude them from gaining a complete grasp of the important external developments and trends taking place in their operational environment. Library associations performing ES activities independently of one another may also experience limitations in their ability to comprehensively understand their collective operational environments. This notion is further supported by ([9] Madge and Plutchak, 2005, p 20) who suggest that library associations provide a useful organizational infrastructure for developing co-operative programs and approaches. Co-operative scanning
programs may foster wider and more frequent ES; enabling according to ([18] Yasai-Ardekani and Nystrom, 1996) a timely and far more comprehensive assessment of environmental change.

Considering the aforementioned possibilities, library associations from around the world, supporting and coordinating their ES activities through - hypothetically - the IFLA (International Federation of Library Associations and Institutions), as an official and sanctioned expansion of IFLA's core activities, may avoid duplication of effort and increase the accuracy and value of ES derived information.

The potential benefits that may accompany coordinated ES adds further support for the innovation championed in this paper, namely: that professional library associations need to coordinate their efforts in an attempt to proactively identify emerging technological, demographic, political and economic changes - developing on a global scale - that may have an important impact on library operations.

In an effort to expedite a wide and deep dissemination of actionable insights, the assembled information: coordinated, analyzed and presented in concise reports, should be frequently published on an "official website".

Ideally this information should be made available at minimal cost to all library researchers, librarians and administrators who are tasked with identifying, understanding and responding to: technical, demographic, political and economic change.

In addition, a consortium of library associations equipped with an understanding of the impact that emerging technologies will have on our professional activities, may, as a unified "global-voice", enter into a dialog with the companies that are spearheading technological change. This may allow our profession to influence the development of technologies that simultaneously advance the interests of our profession and our stakeholders.

Structural considerations
ES conducted at both the first and second level will require the institutional support of library administrators and the support of individuals who guide our library associations. Without this support, it is unlikely that the ES initiatives proposed in this paper will succeed. Assuming that the appropriate level of support exists to proceed with first level and second level ES activities, the scanning activities envisioned- on both levels - may proceed along the following path:
- develop a list of critical variables that require continuous evaluation;
- develop a list of information sources that provide the required coverage of all critical variables;
- gather and analyze the information; and
- present this information along with useful conclusions and insights in the form of concise reports to the appropriate stakeholders.

With timely reports on a range of business, technology and service issues, library managers will be in a better position to align our libraries and our profession with emerging patron needs and new technologies. In cases where library associations engage in accreditation activities, their ES initiatives may form the basis for altering the library curriculum to reflect the likely impact that new technologies may have on stakeholder information needs and the competencies required for librarians to remain viable and important participants in the evolving information services world.

For those in our profession who feel that ES is an important activity, some words of caution are in order. To begin with, guarding against information overload is an extremely important aspect of any successful ES initiative. That is why all ES activities must begin with a careful specification of the information required, the variables to be monitored and the sources of information to be consulted.

Conclusion
Today, a new type of collaboration and sharing is required that transcends distinct library associations, schools of library and information science, libraries and librarians. A new relational-matrix must emerge where "competitive-intelligence" gathered by any one member of the matrix is shared with the others.

Based on a review of the most recent quarterly financial statements of Google, IBM, Microsoft and Yahoo -
companies that have undeniably influenced the practice of our profession - we are faced with global corporations that possess cash assets of roughly 25 billion dollars. A portion of this money will undoubtedly be used to develop, hardware, software and other information appliances that will have an additional future impact on our professional activities.

Compare this with the amount of money roughly allocated every year on education and library spending in the following countries ([11] Online Computer Library Center, 2003):

- USA, $12 billion;
- Japan, $3.2 billion;
- UK, 3.2 billion;
- France, 1.6 billion; and
- Italy, 1.6 billion.

The overwhelming and combined financial power of the corporations that are spearheading major technological change, affecting both education and library services, are essentially global corporations possessing enormous cash-flows and highly funded and productive product-research-laboratories. The corporations thus described, are engaged in creating economic value for a small subset of the worlds inhabitants; their shareholders.

Therefore, the combined and coordinated efforts of our library associations are absolutely essential in order to facilitate the best interests of our profession and our stakeholders.

While the operative questions are straightforward, the answers will undoubtedly be complex. For example, will the new information-appliances spearheaded by the techno-giants enhance education, innovation and democratic processes? Or will these important issues be sacrificed on-the-altar of corporate-profits and market-share? In support of the democratic principles we champion and hold sacred, our profession has an obligation to ask these question on behalf of our global community of stakeholders.

Individual library professionals, library schools and our professional associations must become part of an interconnected system of learning, adaptation and renewal; based on collective ES and the sharing of intelligence. This process will be facilitated - not hindered - by the evolution of our library associations into a more global, interconnected and coordinated group of concerned library professionals operating on behalf of our stakeholders.

References


Appendix

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