

## The knowledge worker (bee)

Should the Person-of-the-Year for 2004 be the Knowledge Worker? The knowledge workforce today is the linchpin to an organization's success, as the world morphs into a knowledge economy. This change represents a significant challenge to managers who are accustomed to managing workers in more traditional roles. Knowledge work represents a very different economic model. The minimum cost of tools and technologies that support these workers,

estimated at \$5,000 to \$10,000 per employee per year, is growing steadily; yet most companies have failed to recognize the changes they must make in order to conduct business and manage their workforce.

Companies need to look for ways in which they can view and manage their human resources as a pool of intellectual capital—raw material for the knowledge economy. Knowledge workers spend 15 percent of their time each day searching for information, and 50 percent of these searches fail—at an annual cost of \$6,000 per worker. In addition, companies have yet to recognize the high cost of their employees' unproductive time—which exists because many organizations continue to provide their knowledge workers with outmoded tools. In aggregate, unproductive time costs the corporate world approximately \$25 billion (in 2004) and will increase by 15 percent in 2005.

In today's business environment, information workers have more options on how and when they work, with access to a wide array of tools to meet their work needs than ever before. It's exciting from business, technology, and innovation perspectives to witness the productivity gains among properly-equipped individuals, teams, and organizations in this new world of work and how the nature of work continues to evolve.

Smarter document management plays a key role in any effort. Companies are focusing their strategies on delivering better ways to work with documents and the information they contain. Today's competitive environment requires the ability to comprehend and manage vast amounts of information from multiple sources and to recognize the critical nature of such a function, and the systems that support it, to the success of the enterprise.

Smart companies are employing technologies that enable their employees to make better decisions faster. Information technology has played a significant role in facilitating this change; the market for knowledge worker tools and applications is \$50 billion. Companies haven't quite figured out how to manage the knowledge workforce, and the average company with 1,000 employees loses over \$12 million annually as a result.

Is the mere accumulation of knowledge, knowledge? The desire to know everything is ancient. The Library of Alexandria was set up by Ptolemy I in the third century B.C. It was meant to hold every book on every subject. To ensure that no title escaped its vast catalog, a royal decree ordered that any book brought into the city was to be confiscated and copied.

The pharaoh's librarians calculated that they required 500,000 scrolls if they were to collect "all the books of all the peoples of the world." By 1988, the Library of Congress alone was receiving that number of printed items each year, and kept only 400,000. But the Alexandrian stock was too much for any reader, and the librarians devised a system of annotated catalogs for which they chose works they deemed especially important and appended a brief description to each title: one of the earliest "recommended reading" lists.

Google has agreements with several leading research libraries, including Harvard, the Bodleian at Oxford, Stanford, the New York Public Library, among others, to make some of their books available online without travel to the libraries and searches through endless stacks of books. Millions of pages will be available to online readers. Imagine if the libraries of the world could now be summoned up. We are approaching that point, but access alone does not provide meaning.

### DID YOU HEAR?

- Forget about the death of mass marketing, the rise of segmentation, and preoccupation with ROI. Super Bowl ad rates had marketers paying \$2.4 million for 30 seconds of fame. That's \$80,000 per second (Ad Age).
- Even with anti-spam measures in place, companies receive more spam e-mails now than in 2004. Businesses spent more on preventing spam last year, yet it still represents almost 80 percent of all e-mail according to a study from Postini, an e-mail security and managing firm.
- "The dissemination of information will increasingly become the dissemination of drivel. As more and more 'data' is posted on the Internet, there will be increasingly less 'information.'" (The Future of the Internet, Pew Internet & American Life Project)
- Time wasted deleting junk e-mail costs American businesses nearly \$22 billion a year, according to the University of Maryland.
- The commercial printing industry has not experienced precipitous declines. While many establishments have left the competitive landscape, average revenue per establishment has exceeded inflation by about 2 points since 1998 (InfoTrends/CAPV).
- The Media Audit says younger age groups were the first to embrace the Internet, but most of today's growth is driven by groups 55 or older. In the markets surveyed, representing more than 130 million adults, 61.2 percent of all adults visit the Internet regularly, up from 54.9 percent in 2000, and most of the growth is coming from those over 55.
- I.T. Strategies estimates that in 2003 a total of 276 billion pages were printed on narrow format ink jet and color EP printers.

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## DOCUMENT MEANING

When it comes to conveying meaning, how a document looks can be as critical as the words it carries, according to Steven J. Harrington, a research fellow in Xerox's Imaging and Services Technology Center in Webster, NY. He is investigating document "intents" and the impact of cross-media design as a document moves between paper and digital displays. Whether a ballot is displayed on a touch-screen monitor or printed on paper, for example, its effectiveness depends on attributes such as design, the user's comfort with the technology, whether it is easy to find necessary information, and feedback about completion—values that are all independent of the content. However, the intent in either format is considered the same—effectively facilitating action.

Harrington worked out the concept of document intents and developed ways to quantify document properties such as aesthetics in collaboration with Rhys Price Jones and J. Fernando Naveda, from Rochester Institute of Technology, Nishant Thakkar, an RIT student now at IBM, and Paul Roetling, a consultant. They presented a paper at the ACM Symposium on Document Engineering entitled "Aesthetic Measures for Automated Document Layout." At the American Association for Artificial Intelligence's symposium on Style and Meaning in Language, Art, Music and Design in Washington, D.C., they presented another paper entitled "On the Structure of Style Space for Documents."

Harrington and his colleagues have identified more than 150 measurable value

functions, including density of the text, colorfulness of images, regularity of positioning of images, and diversity of font and typeface, that a designer can use to convey the intent of a document. Their research explores the idea that style is measured by a large number of value properties and that these properties can be clustered into a small number of intents.

This finding has implications for the field of automatic document conversion. One intent of an advertisement is to capture attention. A printed advertisement might be designed to do that with a large headline; the ad on the Web might express the same intent with animation; or if it is displayed on a cell-phone, it might include voice or sound.

Because today's diversity of presentation methods makes any single fixed output appearance obsolete, Harrington envisions a transformation matrix. It would permit a document prepared for one type of display space to be analyzed so that its intents could be expressed accurately and automatically in the style space of another medium.

With document layout a key means of expressing intent, the scientists considered rules for automating document layouts. They sought objective formulas that could be used to calculate the aesthetics of a document no matter where it appeared. Among the quantifiable factors they found that could produce aesthetically pleasing layouts were alignment, regularity, uniform separation, balance, proportion of white space, height to width proportion, uniformity and "page security"—the positioning of small objects so they don't appear to be falling off a page.

## A-books and VHS and vinyl records, oh my

Seattle's King's County Library System is the first in the nation to allow patrons to download audio books for use on CD or MP3 players. You don't even have to set foot in a library. An audio-book can be downloaded from the library's Web site onto a computer and either burned to a CD or transferred to an MP3 player. Some 200 libraries in the country offer a-books. An a-book can be virtually checked out for a month and, when the due date arrives, the book expires and can no longer be listened to unless it has been burned onto a CD or transferred to an MP3 player. If borrowers don't finish an a-book and have not burned it or downloaded it to another device, they can check it out again, but borrowers may face virtual waiting lists because the libraries are licensed to provide only a few copies of each a-book. There may be 246 people on the average waiting list with a wait time of 11 days. 220 books available when the service was announced; 817 titles are now available. Nearly 1,500 people have checked out a-books.

For more than 25 years, VHS dominated the world home entertainment market after thwarting a challenge from Sony's Betamax in the early 1980s. By the 1990s, a VHS recorder was a common feature in most homes as prices fell and technology improved. To add insult to injury, police admit that house burglars don't even bother to take VHS players.

The 112 employees of Universal Distribution in Gloversville, NY, who press vinyl records will soon be out of a job. A spokesperson for the Universal Music Group said the demand for vinyl records has declined significantly. They are being replaced by CDs and DVDs. And the iPod. And Napster. Technology changes the world and sometimes you see it coming and sometimes you do not. And sometimes, your old technology hangs in there longer than it should.

# EDSF STUDY ON NEWSPAPER TRENDS

As a part of its continuing role to provide leading-edge research and education for the document communications industry, The Electronic Document Systems Foundation (EDSF) funded a study through the Department of Technology and Education at Chicago State University (CSU). With assistance and support from EDSF, the research team designed and implemented this study during the third and fourth quarters of 2004. In an attempt to clarify the direction that companies within the newspaper publishing industry are taking, the study investigated the impact of technological and societal changes on past and future operations in selected newspaper publishing companies.

The team surveyed 11 newspaper publishers with circulations over 500,000. The companies investigated were located in major cities throughout the United States, and they printed and distributed daily, weekly, and Sunday publications. While the total number of respondents was relatively small, some were holding companies that reported for numerous small companies. For example, one respondent responded for 44 different daily newspapers. Because of the size of the companies and the magnitude of their distribution, findings from the eleven respondents provide valuable information from which technological and sociological directions can be ascertained for the newspaper publishing industry. The team found the following:

- Technological changes, primarily in the form of electronic document development and Web-based distribution, are effecting changes in operations, distribution and readership for newspaper publishers.
- Publishers are increasingly using Web-based publishing and promotions to communicate information. Generally, however, most expressed reservations about moving entirely to the Internet to distribute publications.
- Their need and desire to reduce costs associated with publishing is a primary concern among the publishers.
- Technological changes in newspaper publishing are affecting a number of social changes. A recognizable social change that has been inspired by technological changes is an increase in on-line readership.
- Recent changes in newspaper publishing have been designed to meet the demands of a customer base that is increasingly requesting documents that are electronically developed and distributed.
- Many newspaper publishers are experiencing and responding to increased demands for color publications.

- With regard to the future impact of electronic publishing, newspaper publishers are divided in their prediction that electronic publishing will pose a threat to their traditional print-based publishing.
- A large percentage of newspaper publishers are generally optimistic about the survival of traditional print-based publishing. Notwithstanding the potentially erosive threats posed by electronic publishing, they expect traditional paper-and-print-based publications to survive.
- Newspaper publishers generally believe that advertising will be their primary source of revenue during the next five years. They are preparing for a future that is loaded with rising costs and increases in competition for advertising.

Taken together, the findings show that newspaper publishers are at a decision junction. On the one hand, they are aware of the need to change operations to meet the inevitable shift from traditional printing and publishing to electronic production and distribution. On the other hand, they are inclined to maintain the status quo. That is, they continue to produce high levels of traditional paper-

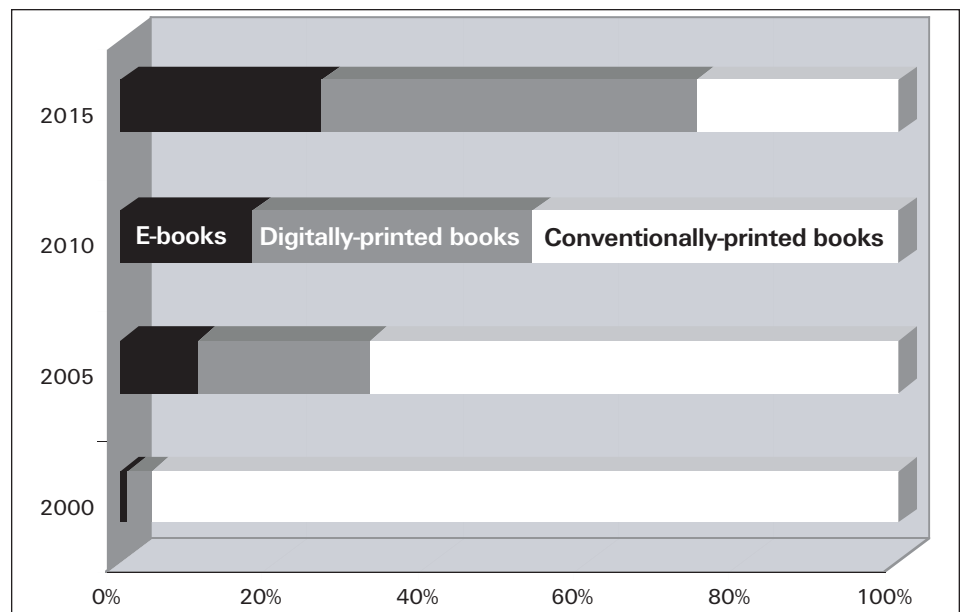
and print-based publishing. A plausible explanation, says the report, is that Web-based and other forms of electronic publishing, coupled with increases in on-line readership, can have far-reaching and potentially devastating effects on their operations as well as those in support industries, such as paper manufacturers and ink producers that supply products such as paper and ink for the printing industry.

The respondents varied in their answers to the question: Considering the impact of the Internet, which types of publications would survive the longest? Four of eleven respondents predicted that all publications would survive. Two predicted weekly publications would survive longest, and one predicted that both daily and Sunday publications would survive. One respondent, Bowater, a newsprint supplier, predicted, perhaps surprisingly, that all publications would expire.

With regard to the future impact of electronic publishing, the survey respondents were divided in their prediction that electronic publishing would pose a threat to traditional publishing. Finally, the majority of the respondents, (9 out of 11) expected increased competition in advertising. See [www.edsf.org](http://www.edsf.org) for the complete newspaper study.

## The future of the book

The book will be with us for a long time, but the question is: In what form? The conventionally-printed book will still be around for long runs, but digitally-printed books will usurp most of the short-run market. In addition, many books will be sold in electronic form. "Electronic form" means dedicated e-books and also PDF files that consumers pay for. The chart below shows projections from 2000 to 2015 based on the number of titles. The data is based on a number of sources and compiled by Frank Romano. Digital printing has had a profound effect on the book market as the number of titles has increased substantially; however, the total number of books produced has not. This reflects the trend to shorter and shorter runs.



## The “popcorn” metaphor

Futurist Glen Hiemstra compares technical and societal revolutions to the popping of popcorn. First, there is a single technological innovation. Then another. Soon the innovations are coming faster. The popcorn metaphor likens this to popcorn popping—first one kernel, then another, then many more. Its point is that inventions and ideas spark the creation of new ideas and inventions. “The process of such a revolution can be compared with the popping of popcorn. The first kernels pop with the initial inventions. Those inventions of significance generate small industries. Older industries begin to flatten out; a few die. The new industries begin to interconnect and reinforce each other. More popcorn begins popping. About 30 years after the initial inventions, the new industries are sufficiently mature to emerge as the dominant ones, generating the most wealth, employing more and more people. All the popcorn now begins popping at once, and everywhere you look it seems that enterprises are changing as the social economy begins to shift. During the final twenty years or so of a period of about fifty years of development, an avalanche of change occurs as all the popcorn pours into the bowl.” (Hiemstra, 2001) There are always hundreds of independent ideas; some of these ideas will explode into an actual creation while others will not. Hiemstra says that at some point all the popcorn is popped and that is where we are about now—he thinks the the digital revolution has matured. His closing statement that “the future is something you do” is right on.

## Flexible foldable e-paper

Flexible display technologies will lead to the commercialization of electronic paper before the end of the decade, scientists say. “E-paper” can be rolled up and folded as a replacement for paper-based newspapers or magazines. Such electronic paper is expected to be on the market in five years. The e-paper sheets will be displays mounted on flexible plastic backings 0.2 millimeters thick. Developers want the technology to develop to the point where an A4 (8.27x11.69 inches) sized sheet, for example, would last a month to several months before wear and tear made it inoperable.

Users could download presentations into the e-paper sheets, which could then be handed out at meetings. The sheets could be combined into binders and read like books. Users would be able to download a page of information in about a second. Downloads could be made using wired and wireless technologies, for example via mobile phones. E-paper will be very light, thin, foldable, and readable. The futuristic vision is to have entire newspapers downloaded electronically. E-paper development takes advantage of several technologies based the ability to print organic thin-film transistors onto flexible substrates. Applications also include electronic tags that can be pasted on and peeled off bottles, or cereal boxes with images that sing and dance. Giant TV panels could even be pasted on walls and used as wall paper with animated images or super-sized computer screens. These panels could combine active matrix OLED (Organic Light Emitting Diode) technology with thin film transistor technology mounted on plastic substrates.

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The knowledge worker

Newspaper trends

Document meaning

The popcorn metaphor