

# Angst and anticipation: how will traditional information services fit in the new information age?

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Information, long the domain of scholars, small publishing houses, government agencies, associations, and not-for-profit organizations, has become big business. The US government speaks of building information highways and infrastructures to support a shift from an agricultural and manufacturing society to a culture based on information flow. Publishing companies increasingly are owned by a few large media conglomerates. Information services are becoming one with consumer electronics appliances, cable TV, and telephone service. 'Online' is a household word. Though the members of the National Federation of Abstracting and Information Services (NFAIS) played a prominent role in launching the modern information era more than 20 years ago, it is by no means clear how they will fit into the information economy that is emerging now. This paper examines the factors that will influence and determine the roles that NFAIS members will play in the coming Information Age.

My remarks today are in the nature of recollection, reflection, and rumination rather than an attempt to provide any sort of dramatic new insight. In considering how the member organizations of NFAIS will fit in the Information Age of the future, I'm going to try to weave together a number of themes and issues that I've spent the last twenty-odd years thinking about, such as: What is the true nature of the markets NFAIS members serve? What role should the US government play in developing, supporting, and providing information services? What lessons can we learn from consumer-oriented information services? Whatever became of those elusive end-users? How can we innovate intelligently to prepare for the future? How long can our current businesses hope to survive?

## *How NFAIS began*

The year was 1958 when Miles Conrad championed the founding of NFAIS. The Soviets had just launched Sputnik; and in Washington there was growing concern that the United States was slipping behind in science and technology. In those days, much to the chagrin of the US publishing community, VINITI, the All-Union Institute for Scientific and Technical Information in Moscow, could credibly argue that it was superior to Western A & I services like Biological Abstracts (BA), Engineering Index (Ei), and Chemical Abstracts (CA). There was even talk of creating a cen-

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tralized US scientific and technical information service within the federal government to meet the Soviet threat. That could have meant the end of the A & I business as we know it.

Miles Conrad and others founded NFAIS to avert this threat, but also to seize an opportunity. The US government's initiatives in the area of scientific and technical information were not only the catalyst that brought us together, but also the spur we needed to modernize, automate, catch up, and forge ahead in what was emerging as an international information industry.

In many cases, government agencies—like the National Science Foundation and National Aeronautics and Space Administration (NASA)—were also the initial funding sources that helped us pioneer electronic publishing, develop databases, launch online retrieval services, and lay the foundation for the information industry we have built over the last 30 years.

I am continually hearing about the information infrastructure of the 'information highway', the term used for the much-heralded, long-awaited, and still unrealized merger of television, telecommunications, and computer technologies. I am troubled by the very popularity of the notion that we are living in a revolutionary new 'Information Age'. This sweeping concept has strong emotional appeal, but I'm not at all sure what it actually means in practical terms. For 5,000 years or more the civilized world has been operating on information, which is the basis of all technology, be it bronze working, pyramid building, farming, manufacturing, or providing services. The fact that information underlies our modern society is not

unique to this day and age. There certainly is a lot more information than there used to be, and it's harder to find exactly what you want to know, but as for an economy actually being able to subsist on the creation and distribution of information—as opposed to subsisting on farming and the manufacturing of steel and other similar tangible goods—I have my doubts.

### *Stranger than fiction*

In a recent essay in the *New York Times*, columnist William Safire observed: 'Five thousand years ago, ancient man invented writing. Five hundred years ago, Renaissance man invented the printing press. Fifty years ago, modern man invented the computer. Five years ago, postmodern man, or person, put the world of information at our beck and call.'

Have I missed something? Has it suddenly become easy to go out on the networks and find a specific fact, locate a particular document, or answer a question without sorting through reams of electronic junk? Has it become simple to conduct an online search? Do our databases no longer produce false drops? Is it possible to get a copy quickly of one of the obscure original documents we cite? Is everything standardized? Did all that electronic mail moving around the world suddenly become urgent and important? Is information at our beck and call?

I feel obliged to run the risk of being accused of lacking vision, when I say that, as far as I can tell, there is not much of a revolution going on. There's a lot of change in our operating environments, and we do face a lot of challenges, but that's been true for the past two decades. I'm convinced that the information highway we hear so much about is neither going to transport us quickly to a brave new world nor leave us hopelessly behind if we fail to jump on board immediately.

### *The more things change . . .*

I observe that for all the time we have spent for more than a decade talking to each other about new technologies and their potential threats and opportunities . . . and for all the money we have invested in experiments and new ventures, our organizations are all still here and doing fundamentally the same things we did when I first came upon the NFAIS scene in 1982.

All the time we have spent worrying about our future, the future has been coming and going like a wave that we rode, only to find ourselves at approximately the same spot we started from. The truth is: We are who we are. We do what we do. And what we do is important and has lasting value.

As an appendix to his 1977 Miles Conrad lecture, William Baker included the text from a 1958 report on scientific and technical information delivered to President Eisenhower. In reviewing the status of the

information systems of that day, the report noted these kinds of information services in existence: primary journals and monographs; abstracting journals; data; Government research reports; PhD theses. None of this has changed, and I see no convincing evidence to suggest that it will change soon. The medium is *not* the message.

I have been making this point for a long time. At the NFAIS Annual Conference in March 1986, when I was speaking as Director of Marketing for Chemical Abstracts Service (CAS)—which was, at the time, devoting tremendous energy and a great deal of money to the development of an international network for electronic distribution of scientific and technical information—I had this to say: 'CAS is, first and foremost, a database producer. The production of useful databases of very high quality is the heart and soul of CAS's business.'

My view has not changed. If CAS and the other publishers in the NFAIS membership ever start thinking that the form of delivery is more important than the substance being delivered, they're headed for trouble. The database production and publishing sides of the businesses may not have much 'sizzle', but they make everything else possible and, to a very large extent, they still pay the bills. The medium is *not* the message, not even with consumer-oriented information services.

### *The medium is not the message*

If consumer-oriented electronic publishing could be successful anywhere, one would suspect it would be in Silicon Valley. But the *New York Times* reported in February 1994, experiments by the *San Jose Mercury News* in online, fax, and phone delivery of newspaper stories have met with substantial consumer resistance. According to staff of the newspaper in San Jose, the services are costing millions of dollars but there are few takers, even at a low price. The reason apparently is that people are having a hard time understanding what electronic news is, why they need it, and most importantly, why they should pay for it.

The same newspaper article reports that Knight-Ridder spent about \$50 million on its Viewtron electronic news service before giving up and shutting it down in 1986. And IBM and Sears have spent over a billion dollars developing and promoting the Prodigy service—which after a decade is still not breaking even.

Wave after wave of multimedia machines have tried to make their way into our households over the past few years. But despite the best efforts of the likes of Philips, Kodak, and Tandy, very few of us have made room in our homes for these devices. It's little wonder, when you consider that a recent survey of VCR owners in America found that 16 per cent of people who own VCRs have never even been able to set the clock.

No one in the NFAIS community has yet cracked the direct end-user searching market in a financially significant and profitable way. In fact, it remains to be demonstrated that commercially important end-user markets exist for our kinds of businesses at all.

### *Survival of the fittest*

When I first entered this industry I was advised that the print publishing business was threatened by a competing new technology. The new medium was cheaper to produce than a printed book, much easier to copy, and sure to be pirated by zealous librarians, copyright-defiant scholars, and unscrupulous foreigners. The medium that threatened our existence in those days was . . . microfilm. Then came worries about high-powered photocopiers, fears about pirated magnetic tapes, then videotex, downloading . . . CD-ROM . . . more recently, the Internet . . . and now the information super-highway. So far, we've managed to cope with all the major technological changes that have come our way. But, the future, if nothing else, is always uncertain.

So, what do we have to fear now from the Internet, NREN, or Data Highway 95?

There are some scenarios that cause unrest among primary publishers today:

1. Universities will take back the lead they once had in publishing scientific and technical papers by producing peer-reviewed electronic journals without any involvement by today's publishers.
2. Images of journal articles will move uncontrollably across the networks, escaping all attempts to enforce copyright controls and collect appropriate royalties.
3. Document delivery services will reach their ultimate extreme and, as a result, only one copy of each printed journal will be sold.

Now for some concerns of secondary publishers today:

1. Printed information services will die out entirely, making it difficult if not impossible to keep up the coverage and pay for the 'first copy'.
2. The substantial online revenues that we've grown accustomed to over the last 15 years or so will dry up as all usage turns to CD-ROM and its electronic relatives.
3. When the full text of journal articles is available electronically, there will be no need for abstracts and indexes.

My belief is that, ominous as some of our worries seem, there is no reason to assume that any of them will actually happen, at least not to such extremes. Electronic publishing developments are more likely to create opportunities for us to tap new revenue streams than they are to make our existing products and services obsolete in the near term.

### *Threat or promise*

There are experiments with electronic journals going on, as they have been for more than a decade. There are people—mainly at colleges and universities—who see publishers as unnecessary middle-men, if not outright enemies of the most desirable form of communication: person-to-person among members of the invisible college. There are those who believe the world would be a better place if publishers could be short-circuited by the authors themselves self-publishing research results over the Internet.

All this overlooks the fact that publishers truly add value in the process of making information public. Publishers select the *right* material to begin with; they edit it; they ensure appropriate expert reviews and quality checks; and they package it effectively—all of which adds value to the material long before they distribute it. Perhaps most important of all, publishers lend their reputations to the work they publish under their names and imprints.

Those who say they can get along without publishers are underestimating the staying power of their own institutions, social traditions, and reward systems, which encourage print publication . . . not to mention the egos of the authors—who still want very much to be 'published' in print.

As for widespread copyright violation in an electronic environment, that's what we hire lawyers for. The courts have been supportive, most notably in the Kinko's case, where a limit was put on the notion of educational usage being entirely exempt from copyright . . . and in the Texaco case, where the concept of 'fair use' in a corporate setting was significantly limited. Copyright is something we'll have to keep watching and managing, but copyright abuse is unlikely to wreck our businesses. Long before we find ourselves reduced to producing only one printed copy of each journal, we—or more likely our descendants—will have come to terms with how to make a profit in a new kind of publishing environment.

Nothing in the real world today suggests that full-text electronic journals will replace the need for abstracting and indexing services. The state-of-the-art in information retrieval is a long way from being able to perform the intellectual analysis of a trained abstractor and indexer. Anyone who has tried to perform a full-text search in a large database on a higher-level concept—rather than a specific word appearing in the text—knows that it is still an unpredictable and unreliable proposition.

Furthermore, there are tremendous logistical barriers to putting the full text of the world's scientific and technical literature online (let alone on compact discs). The A & I services cover tens of thousands of journals, which publish millions and millions of documents a year, not to mention staggering numbers of books,

conference proceedings, and other kinds of documents which originate in more than a hundred countries all over the world and are published originally in dozens of languages. The scope and corpus of the material covered by A & I services simply defies full-text searching as we know it. Even if, as some claim, most scientists could get by with a few core journals the few experiments in offering full-text journals online or on disk have been marginally successful at best. Though, without a doubt, researchers would like to have the full text of certain key documents delivered to their computers, the demand is not nearly as great as one would expect, based on the success of the services that have attempted to do this to date. I firmly believe that abstracting and indexing journals in both print and electronic forms are going to be here for the rest of our lifetimes and beyond.

As for online replacing print, CD-ROM replacing online, and Internet and the information highway replacing both, I remain a skeptic. The world of information services is very much a mixed bag in which various media serve specific market segments and satisfy different customer expectations and requirements.

What about the threat of government information policy?

### *Fact or fiction*

Vice President Al Gore, speaking at the White House, gave an encouraging assessment of the proper role of the government in the information infrastructure: 'The public sector role is to create the wholesale database. The private sector can supply the retail market.'<sup>2</sup>

The risk of the government's emerging as a direct competitor to our commercial information services is not new. The current initiatives of the US Patent and Trademark Office and the Library of Congress, which both seem intent on providing commercial information services while keeping themselves wrapped carefully in the mantle of the public interest, are merely the latest incarnations of a recurring problem. But we have mostly been able to convince decision makers in Washington that they are better off working with the private sector than against it. Yet the threat is always there. No US publisher is bigger than the federal government, and no data are more likely to fuel NREN and the information super-highway than this vast collection of low-priced information. Are publishers and online vendors at risk? To the extent that they depend on inexpensive access to government data, perhaps. But it's useful to remember that the MEDLINE database has long been offered by virtually every important online host in the world—at various pricing levels—despite the availability of NLM's own low-cost alternative. So even when the government decides to compete with us directly, it doesn't mean that we can't find ways to hold our own.

### *The more things change . . .*

We hold our own in part because what we do is inherently durable. Most of the organizations involved in NFAIS specialize in providing scientific and technical information to professional markets. When we look at the basic forces that drive these businesses, it's hard to identify anything that seems likely to threaten our livelihoods seriously. As the scientific literature has grown rapidly over the past five decades, so has the number of practicing scientists. According to the National Science Foundation, there are more than twice as many physical scientists, life scientists, and environmental scientists in the United States now as there were 20 years ago. There are three times as many psychologists and engineers, and four times as many social scientists. These people all need access to information, and they drive the demand for our services. Scientists are not going to quit doing research, or to stop recording their results. They are not going to quit publishing these results in printed technical journals. They *are* going to continue to need help sorting through the vast output of information that the scientific community generates.

In fact, in a world increasingly cluttered with electronic mail, countless drafts of collaborative papers, unevaluated results, and amateur research that flood the computer networks daily, it seems to me that A & I services are more necessary than ever. I don't personally plan to trust Gobots, Robots, or Knowbots—to go out on the inter-galactic network, sort through all of the garbage, and bring back what I really need.

### *Angst and anticipation*

Last year, Art Elias observed, 'The evolution of . . . information services, has followed a Darwinian survival of the fittest model.'<sup>3</sup>

So, should we approach the future with anxiety or hope? In some respects it was more comfortable to be in the information industry in the days when it was the quiet domain of scholarly researchers and serious database producers, not a household phenomenon hyped out of all proportion. But times change, and we have no choice but to keep moving forward. I will offer just a few words of advice. Remember who you are and what your customers expect of you. Let the Baby Bells develop dial-in weather reports, sports updates, and horoscopes. Let the cable companies develop movies on request, video news clips, and home shopping services. Let the entertainment industry bring virtual reality to those who aren't satisfied with the real thing. All of this has very little to do with secondary-publisher information services.

The average American is never going to sit down on a Sunday afternoon and search *Chemical Abstracts* for kicks. They're not going to be overcome by urges to browse MEDLINE, NTIS, or other databases that we

produce. We need to fit what we do to the needs of our customers, not to the technological visionaries' views of the world.

We need to stay focused on the right issues. In a book called *Marketing high technology* the authors distinguish between supply-side markets and demand-side markets for high-tech products.<sup>4</sup> In a supply-side market, dramatic technological advances literally create markets and demand. Marketing programs usually follow the lead of R & D developments. High-tech advances of this kind are found on a *presumption* of a market need, rather than on a careful analytical identification of customers' desires and problems. Demand-side markets are less chaotic and driven more by market considerations than by technology. In such markets, R & D's role is to extend and improve products and technologies in response to specific customer needs identified by marketing.

I believe that those engaged in providing scientific and technical information services are operating in demand-side markets. Our markets are mainly vertical, highly specialized, relatively mature, and relatively small. However, much of the advice we hear comes from people operating at the other end of the spectrum—on the supply side. They advocate bold, risky technological innovation as the path to success, and often downplay the role of careful market research and planning in innovation. Not all of us live on the cutting edge, and some of us can succeed and grow only through steady, long-term progress rather than quantum leaps of innovation. Some of us should ignore the siren's song of the high technologists.

### *Future outlook*

Please don't conclude that I believe our only option is to throw in the towel and resign ourselves to a dull and tedious future. The future is in our own hands. There will be ongoing and continuing demand for the services we provide by the people we have historically provided them to. We're going to have to continue to make media choices and pricing decisions, to seek ways constantly to improve the quality of our databases, and to develop useful new products based on our customers' needs. We will have to do everything possible to modernize our operations and contain or reduce our costs—because to a very large extent, we are managing mature businesses at this point.

The coming information super-highway and information infrastructure will bring new opportunities. We may be able to return to the type of cottage abstracting and indexing industry that made our production processes so cost-effective in the early days. Our intellectual workers may be able to work at home by telecommuting over the data highway. We all may be able to travel a little less. Just as the fax machine and cellular phone have made it possible for us to do things faster, we may see productivity increase from

more networking, as long as we don't get distracted by the influx of unnecessary communication that these convenient technologies tend to encourage.

As the electronic future unfolds, I expect that we also will discover new, incremental revenue streams as opportunities develop to repackage our content and create innovative value-added services tailored to the new forms of delivery media that will undoubtedly appear. But those opportunities will materialize only if we do the basic job right: only if we continue to build relevant databases of excellent quality.

I would like to conclude by recalling comments from two presentations I delivered in 1982. First, at the 6th International Online Meeting in December 1982, in London, on the subject of 'Why Secondary Services Will Survive and Thrive,' I said: 'Certainly secondary services should not blithely go about their traditional businesses, oblivious to the changes going on around them. Even the strongest must change to survive. But the changes will be gradual, not catastrophic. The essential function of secondary services will be needed as much in the foreseeable future as it is today. That function is filtering unmanageable amounts of information down to a smaller number of items that are of interest to a user. The precise way in which we accomplish this filtering process undoubtedly will change. The successful secondary services of the future will be those that are adept at sensing market needs and users' preferences, and adapting their services accordingly.'

I concluded my first NFAIS presentation, at the annual conference in 1982, by saying: 'One comforting thought is that no one in the information business, including your competitors, is blessed with sure knowledge of the future. We're all scrambling, and each of us has the opportunity to create our own special advantage. I hope all of you will.'

It's time for all of us to go forth boldly into the new Information Age.

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