AN OVERVIEW OF THE INFORMATION INDUSTRY-1993

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INTRODUCTION

Three years ago, I had an idea for a book. I hoped to enrich myself by allowing people to **avoid** reading.

The NFAIS Yearbook of the Information Industry* does this by digesting and interpreting the literature of the industry. I read all of it (and some of it is BAD.) I attempt to place it in a useful form by weaving related materials into broader context.

The 1993 Yearbook is labelled with the year in which it is published. It **covers** the literature of 1992.

For this presentation, I have used that data and added work in progress for the 1994 edition.

There are nine topic areas in the Yearbook (Figure 1).

YEARBOOK OF THE INFORMATION INDUSTRY

GOVERNMENTAL IMPACTS
TECHNOLOGIES
MARKETPLACES
PUBLISHERS, PRODUCERS AND DISTRIBUTORS
DATABASES
RESEARCH
COMMUNICATIONS
LEGAL ACTIONS
WORLDVIEW

The **good** news is that I am **not** going to read it to you.

The mass of the literature requires that I summarize and keep to the most important issues.

* NFAIS Yearbook of the Information Industry

Learned Information Inc. 143 Old Marlton Pike
Medford, NJ $ 50.00 ISBN 0-938734-74-1

The information industry is a daunting, dynamic and challenging environment. Technology, sociology, and business forces interact in wild and erratic combinations.

o There are more than seven thousand electronic databases.
o The explosive growth of the industry has been facilitated by communications technology. Transmission speeds were ten characters per second. They have now reached almost ten thousand characters per second.
o Information "superhighways" have linked research communities in unprecedented intimacy.

This ferment has impacted international business, economic, social, legal and governmental structures. It is a resource of vital importance to your activities.
I need to apologize in advance for my ignorance of just what these activities are like. I scanned the proceedings of last years' meeting and was filled with doubt.

My sector of the information industry and yours look at the world very differently.(Figure 2)

You like superscripts (I^{3}) and we like subscripts(H_2O).
We both like SDI, but we use it differently(Selective Dissemination of Information).
Lastly, we like different animals.
In last years Proceedings, I found a paper from the Ferret Corporation. One of my favorite software company's has a product called Puffin.
The information industry reacts to external *environments and technology.* My remarks today will be based on these topics.(Figure 3)

The **environments** of the industry include economic conditions, the impacts of governments, trade policy and legal actions.

Economic and Market Conditions
1992 and 1993 were years of economic friction. Users were reluctant to spend and budgets came under pressure. The period was one of consolidation. There were combinations and integrations of media, technologies and managements. Information companies dealt with flat revenues and adopted cost conserving tactics. Downsizing and deferred R & D investment characterized the major players. They became bigger in size and fewer in number.
Governmental Impacts
Information issues grew in scope and importance. They became worthy of governmental attention. In some cases they became national priorities.
United States
The United States kept its dominating position in the database and distribution sectors and scared many information companies to death. The Internet and the planned National Research and Education Network presented opportunities and perceived threats.

Europe and the EEC

Europe, moving toward the Single Market, focussed on the diminution of national market barriers. The European Community introduced Directives aimed at assuring privacy and the protection of databases. They accomplished neither objective.

The EEC was presented with philosophical and practical challenges as Central and Eastern European nations sought membership.

"USSR"

The transition from the USSR to the Commonwealth of Independent States produced an auction market. The former Soviet information infrastructure and database content came up for bids. Western entrepreneurs exploited these resources.

Japan

Japan concentrated on database development with the support of the Ministry of Trade and Industry (MITI.) Increasingly, Japanese information resources are being made available in the English language.

International Trade

The General Agreement on Tariff and Trade (GATT) aimed at removing barriers to free trade. These included intellectual property elements. The information industry was probably as happy as the French farmers at the outcome of the talks.

Legal Actions

Intellectual Property

Legal actions affecting the information industry remained focussed on intellectual property issues. Emphasis was placed on patents, copyrights and trademarks as corporations valued forms of ownership as assets.

Copyright

Electronic information is volatile and easily reproduced. Respect for the work and personal expression of others is especially critical in computer environments. Violations of author rights, invasion of privacy, unauthorized access, and trade secret and copyright violations persisted as inhibiting factors for the industry.

In the United States new precedents were introduced. There were continuing impacts from the Kinko and Feist decisions. Kinko dealt with photocopying and Feist eliminated "sweat of the brow" as a basis for copyright.

The Texaco case which denied this "fair use" to corporate America, caused some very exaggerated reactions.

Resolution of these issues was difficult because of the international nature of the industry. The range of jurisdictions required the industry to operate within a patchwork of varied and often contradictory national laws.

Public Interest

There has been a change from a perspective of information *users* to one of *consumers*. In turn, this has led to a healthy emphasis on information consumer protection.

In conclusion, the information industry is both flattered and worried at the increasing level of attention it receives from government.
It is *flattering* to consider these impacts as evidence that the industry has "come of age."
It is *worrying* when these national and international bodies begin to intrude on industry activities raising issues of regulation and other constricting policies.

SUMMARY

Despite all of the ferment about an information society incorporating information malls (the Internet), boutiques (Prodigy and CompuServe) and superhighways, the industry remains sensitive to economic pressures.
Economic factors are at the heart of industry responses to governmental and legal actions. The industry is hampered by a lack of definition, a weird mix of price structures that confuse the market, and some hormonal rushes characteristic of adolescence.

TECHNOLOGIES(Figure 4)

The information industry incorporates technology and is technology **driven**. The distinctions that existed between technology and content are being blurred. When organizations launch devices, they are being forced to supply the content **used** by those devices.
The technology category is oriented to information *functions*.(Figure 4a)
Information Origination includes authors, users, publishers, and database producers. These traditional operators are losing definition as technology makes it possible for any of them to assume the role of another.
I have retained conventional labels within this area for easier recognition and because statistics are grouped in that way.

Authors and Users

He who writes-reads (uses.) Modern technology has returned authors to their roles as *correspondents*. The exchange of letters to communicate knowledge emerged in the eighteenth century and was only converted to the publication process in that century. Now the Internet and other electronic pathways make it possible to publish, distribute and access information *without* middlemen.

Primary Publishers

Primary publishers see the creation of electronic journals on the Internet as a long term threat. Their problem is not with technology but with its form and effect. Intellectual property is important to them as is security and control. Basically they worry about changes to economic models produced by technology.

Secondary Publishers

The secondary publishers add value by abstracting and indexing primary materials. The simple conversion role of producing electronic versions of citations and abstracts was affected by adverse copyright decisions on "sweat of the brow" applications.
The archival and access benefits on which these products are based are threatened by the new technologies. The very large services in the sciences are protected by their very mass, but the smaller niche-focussed have cause for concern.

Database Producers

Worldwide database availability reached more than 8,000. The total industry was valued at ten billion.

Ninety-six percent of sales are from the business information sector. Real-time services for the financial community make up half of this amount.

Sci-tech databases yield $ 690 million for the library market segment. Fewer than fifty of the thousands of sci-tech files dominate the market. Many are created and controlled by not-for-profit professional societies.

Compact Disc Database Publishing

Compact disc database publishing was 2,000 titles in 1991 up from 1,025 in 1990. This growth will yield more than 8,000 titles this year.

Subject matter distribution was reported as 43% social sciences, 35% sci-tech, 13% general, and 8% in the arts and humanities. Much of the material is full-text.

The future of compact disc publishing will lie in research and development work aimed at improving functional aspects of the technology. This would include images, software interfaces, networking improvements and multimedia versions.

Network Publishing

There was an increased move toward the use of networks to deliver original source material, a role traditionally filled by the printed journal.

Industry wisdom suggests that online journals may replace print. Favorable economics support the transition with production, printing and mailing activities being eliminated.

A directory devoted to these applications reports 36 electronic journals, and 80 electronic newsletters.

MEDIA(4b)

Compact Discs

This media was growth focussed during 1992. No big innovations in storage capacity were reported but data compression was actively pursued. "Shelf-life" was addressed when 3M noted that discs have a potential lifetime of 100 to 300 years if stored at room temperature.

Unit shipments of these products grew forty-three percent in 1992. The installed base should reach 1.9 million by 1997.

Multimedia

The world market for multimedia products and services will grow from $6.4 billion in 1990 to $24.1 billion in 1994. Innovative, dynamic and entertaining products are emerging and the links to compact disc publishing are obvious.

Audiotex/Videotex

With the exception of voice mail, audiotex and videotex markets have not made major impacts. The French successes with Minitel remained regionalized although extensions were made into Ireland and Switzerland.

Fax continued its remarkable developments, but little of this technology was integrated into information product development.

PROCESSING(4c)

Computer Hardware

Mainframe technologies continued to diminish in importance for the information industry. The shift to personal computer technologies was apparent and realistic. This was demonstrated as sales of this equipment added department store outlets. Client -server architectures were increasingly favored.

Software

Software technology was heavily focussed on Windows architecture. This was very pronounced in compact disc applications.

As networking took on increasing focus in corporate areas, Lotus Notes began to occupy more importance. This reflected corporate tendencies to apply internal and external sources for overall information strategies using local and wide area networks.

Imaging and Scanning

The image processing market was reported to amount to $2 billion annually and was growing at 12% a year.

Scanning technology grew in application to production processes.

Pictorial images presented special needs. In more demanding forms, e.g., chemical structures, the current technology requires "vectorization." Tags are added to the images as the result of an editorial process.

INTELLECTUAL PROCESSING

After twenty years of domination by Boolean retrieval, there has been some movement toward innovative access methods, but these have been focussed on "front-ends." While there is continuing research, we did not find reports on *applied* artificial intelligence and neural networks in the sources we examined.

Machine Translation

Machine translation has been around for more than forty years. As we note the global nature of the industry, the needs in this area are as great as they were when the uses were focussed on defence and intelligence. Possibly commercial needs will improve the research climate.

Expert Systems

Expert systems have the United States in a leading position. The market amounted to $352 million in 1991 and is expected to exceed $ 1 billion soon.

Wide Area Information Servers (WAIS) may make important contributions. WAIS aims at a capacity for searching a variety of databases through one interface.

Virtual Reality

While the technology is at a very early developmental stage, it may become the ultimate multimedia computing experience. It may provide a key to integrating and experiencing the complex information stored in databases.

Summary

Work on improving the intellectual analysis capabilities of our systems is still disappointing. Possibly, we have too high a sense of urgency in this area because of the high costs of these processes.

DISTRIBUTION(4d)

Online

Online distributors had to deal with the worst recession since the formative years of the industry. Questions of pricing and heightened competition from other media were poorly dealt with.

Online distribution generated revenues of twelve billion dollars in 1992. This was an increase of seven percent over the prior year. These values do not take account of price increases and exchange rate effects.

Marketing and financial information services accounted for nearly fifty-two percent of the total.

Scientific and technical services had four and one-half percent.

Online searching is still popular. 52% of users subscribe to between one and five hosts. 33% subscribe to between six and ten online services.

Public Access Hosts

The public access hosts (Prodigy and CompuServe) showed interesting market penetration. The potential for this product format was supported by reduced prices for personal computers and the development of a consumer market base.

Document Delivery

Document delivery systems proliferated and were modernized. Researchers had expectations that the networks would provide original material as electronic publications but this is yet to come. Electronic document delivery and full text electronic journals *are* key items for the networks in the future. Until that happy day, the modernized print on paper systems will play a useful and expensive role.

Networking

Networking made significant advances. Consider the employment of online public access catalogs. The penetration of these facilities into the public library sector testifies to the changes underway in information access as a consumer product. While the most important network developments lay in the United States with the Internet and NREN, on-campus networking is growing here and in the UK.

COMMUNICATIONS (4e)

Basic Factors

The general trend in the Communications area was for an ultimately more "friendly" environment.

United States

In the United States, the legislative agenda has set things up for the future. Broadband networking and open network architecture initiatives should lead to enhanced capacity and use.

Europe

A European Community Directive aimed at Open Networking to open the telecommunications services market. The Directive supports transparency and non-discrimination and moves away from domination by the PTT's.

The entry of value-added telecommunications services will be eased. Simplified and reduced licensing costs are expected.

Applications

Wireless Transmission

Wireless local area network applications (LAN) offer advantages over conventional wired installations. Although higher in cost and slower, wireless facilitates short term networking needs and can be adapted to leased facilities. As a result, expenditures on wired services will decrease as more wireless technology is deployed.

Cellular

This industry grew more than forty-three percent in 1991. It added a record 2.3 million subscribers to a total of 7.6 million. The average monthly bill was $72.74 and the average call was 2.38 minutes.

Testing has begun that will allow cellular telephone users to access centralized databases. The product applications are potentially very large.

Cable developments were front page news and showed (with cellular) the directions taken by the Regional Bell Operating Companies with the Greene decision exemptions and the failure of regulatory moves suggested by Congress. The industry still awaits applications of substance in other information services.

Internet

Frankly, I am troubled by the Internet. There is a polarizing quality to the interactions of the research and commercial communities. From an information industry point of view, the lack of organization, administration and security built into the Internet is a barrier to its active employment.

An Internet guru noted that the Internet was designed for chaos. It has been achieved.

Consider the beast. Connected hosts grew to more than 375,000 in 1991 and were reported at 727,000 in 1992. Thirty-eight countries can be reached with interactive services and more than fifty can be reached with electronic mail. E-mail provides a high proportion of use as does electronic file transfer.

The value of the Internet to the worldwide research community is validated by its growth. The market potential including extensions into the K-12 education segment is monumental.

Lets look at some of the problems.

NSFnet, the so-called backbone of the Internet has restrictions.

Services are provided to research and education institutions. Research arms of for-profit firms may use the services when engaged in open scholarly communication and research. Among other things it may be used for *announcements* of new products and services for use in research and instruction.

Unacceptable uses include for-profit activities e.g., consulting for pay, sale of tickets, and extensive use for private or personal business.

Internet Access and Use

The doctrine of user-friendliness espoused by all sectors of the industry is not operational in the Internet world.

How does one connect to the Internet? "For now the simple answer is there is no simple answer or single phone number." "To connect a site to the Internet can

involve everything from provider evaluation to hardware and software installation." A thriving business has developed in providing e-mail and a variety of other Internet functions on a fee basis.

I will not dwell on other issues of data security, privacy, and the proprietary atmosphere of the Internet in-group, but I must address a fundamental problem for network commercialization. There is no simple way for Internet users to pay for services. While access to commercial hosts is available, the user must employ a double access procedure to use them.

The longer term solution to these issues lies in the National Research and Education Network (NREN). While the progress of this legislation has been slow and its components complex, NREN will be a major factor for the future and the creation of the network opens opportunities to correct some of the problems I have mentioned.

CONCLUSION

Where do your interests fit in this multi-dimensional puzzle? I suspect that the intelligence community has skills that can be applied to the technical problems that are hampering information product development. We need those skills.

I **know** that the wide array of products and information resources can be exploited by other skills and technologies that you possess. Information is being increasingly considered as a corporate asset. In addition to proprietary interests, corporate planners are implementing global intelligence strategies as part of commerce. There are two things you bring to the information world.(Figure 5)

Applying technological know-how to commercial and societal problems can result in badly needed analysis and interpretation based on information resources. The result can be truly intelligent.

I have just returned from a major information industry meeting in Europe. I have been going to this meeting for almost twenty years and there is <u>always</u> a paper from some professor who tells us more than we wanted to know about alligators. I hope that I have not filled his shoes today.

Figure 1 THE NFAIS YEARBOOK OF THE INFORMATION INDUSTRY
VOLUME 2 1993

GOVERNMENTAL IMPACTS
TECHNOLOGIES
MARKETPLACES
PUBLISHERS, PRODUCERS AND DISTRIBUTORS
DATABASES
RESEARCH
COMMUNICATIONS
LEGAL ACTIONS
WORLDVIEW

Figure 2 VIEWS OF THE WORLD

OSS FORMULA C^4I
OUR FORMULA H_2O
OSS SDI STRATEGIC DEFENSE INITIATIVE
OUR SDI SELECTIVE DISSEMINATION OF INFORMATION
OSS ANIMAL: FERRET
OUR ANIMAL: PUFFIN

Figure 3 ENVIRONMENTS

ECONOMIC AND MARKET CONDITIONS
GOVERNMENTAL IMPACTS
UNITED STATES
EUROPE AND THE EEC
CENTRAL AND EASTERN EUROPE
"USSR"
JAPAN
INTERNATIONAL TRADE
LEGAL ACTIONS
INTELLECTUAL PROPERTY

Figure 3(Cont)COPYRIGHT
PUBLIC INTEREST

Figure 4 TECHNOLOGIES

INFORMATION ORIGINATION
MEDIA
PROCESSSING
DISTRIBUTION
COMMUNICATIONS

Figure 4a

INFORMATION ORIGINATION
AUTHORS AND USERS
PRIMARY PUBLISHERS
SECONDARY PUBLISHERS
DATABASE PRODUCERS
COMPACT DISC DATABASE PUBLISHERS
NETWORK PUBLISHING

Figure 4b MEDIA

COMPACT DISCS
MULTIMEDIA
AUDIOTEX AND VIDEOTEX
FAX
CABLE

Figure 4c PROCESSING

COMPUTER HARDWARE
SOFTWARE

IMAGING AND SCANNING
INTELLECTUAL PROCESSING
MACHINE TRANSLATION
EXPERT SYSTEMS
WAIS
VIRTUAL REALITY

Figure 4d DISTRIBUTION
ONLINE
PUBLIC ACCESS HOSTS
DOCUMENT DELIVERY
NETWORKING

Figure 4e COMMUNICATIONS
BASIC FACTORS
UNITED STATES
EUROPE
APPLIED FACTORS
WIRELESS TRANSMISSION
CELLULAR
CABLE
INTERNET
RESTRICTIONS
ACCESS
NREN

Figure 5 ANALYSIS

INTERPRETATION

SECOND INTERNATIONAL SYMPOSIUM: NATIONAL SECURITY & NATIONAL COMPETITIVENESS: OPEN SOURCE SOLUTIONS Proceedings, 1993 Volume II - Link Page

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