ELECTRONIC PUBLISHING:
THE NEW FRONTIER
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ABSTRACT: At the intersection of
microprocessors, graphic display technology,
communications networks, laser non-impact
imaging and the traditional print-oriented
publishing industry, a new phenomena known as
electronic publishing is emerging. Over the last
few years, significant strategic moves have been
made by the top 100 media companies. Groups
like Dow Jones and the New York Times have moved
firmly into position to benefit from the
distribution of information in non-print
formats. At present there are few who claim
profits from their activities in this area, but
a great deal of work is underway in structuring
this new industry segment.

Electronic publishing becomes a reality because
of progress in digitization of both text and
images over the last decade. The availability
of new media for delivery of soft material
intensifies the potential for non-print
publishing. This presentation will explain the
basic concept of publishing in videotext or
teletext formats, discuss videodisk and image
archiving technologies, review the state of the
art of the online database industry and discuss

systems and equipment now evolving to supply the needs of the electronic publisher. Case studies from the newspaper, magazine, catalog and other sectors will be reviewed. The evolution of an information industry which will encompass sectors of the traditional graphic arts market over the time frame 1985-1990 is discussed.

I BACKGROUND & OVERVIEW

At the intersection of microprocessors, graphic display technology, communications networks, laser non-impact imaging and the traditional print-oriented publishing industry, a new phenomena known as electronic publishing is emerging. Over the last few years, significant strategic moves have been made by the top 100 media companies. Groups like Dow Jones, Grolier, Time Incorporated, CBS and the New York Times have moved firmly into position to benefit from the distribution of their information in non-print formats. At present there few who claim profits from their activities in this area, but a great deal of work is underway in developing this new industry segment.

Electronic publishing becomes a reality partly because of progress in digitization of both text and images over the last decade. The availability of new media for delivery of soft material intensifies the potential for non-print publishing. These include home delivery channels like cable or direct broadcast satellite (DBS) and retail distribution media like videodisks. Crucial to the economical production of new information packages is the ability to manipulate images and type in totally digital formats. This has been available only expensively and experimentally until the last 12 months. Moreover, software and engineering expertise for type and image processing systems, most commonly referred to as pagination or image assembly devices, are maturing at a rapid rate. This is occurring just as the new generation of high-powered microprocessors of both 16 and 32 bit varieties are becoming realistic components for lower cost systems.

FIGURE 1. MIGRATION OF IMAGE MASTERS

Organizations who presently have a need and
justification for completely integrated
pagination to automate production of print
products may find themselves in the most
favorable position to exploit new market
opportunities. Once master images have been
composed for high resolution print , it will be
a simple matter to reprocess these for the
electronic publishing market which normally uses
the standard home television set for delivery.

Inter/Consult characterizes electronic
publishing as being in a PHASE II state of
evolution and its supporting pagination
technology as being in the early part of a PHASE
III state. These are described in SLIDE 2.

FIGURE 2. TECHNOLOGY/MARKET EVOLUTION PHASES

II DEFINITIONS OF ELECTRONIC PUBLISHING

Electronic publishing is actually a catchall
phrase covering a wide variety of activities.
Their most important common feature is that they
contain or convey information with an intensely
editorial and high value-added content in a form
other than print. Included in the list of
presently practiced EP activities are:

        On-line databases
        Videotext
        Teletext
        Video tape cassettes
        Videodisks
        Cable TV programming (with DBS
delivery optional)
        Electronic Mail and Messaging

FIGURE 3. OVERVIEW OF ELECTRONIC PUBLISHING

We may for convenience and ease of understanding
classify these as classifiable according to the
amount of interactivity the user is allowed.
One-way systems are those which deliver
information in a continuous manner and allow the
user only passive viewing and crude control over
sequence or position. All television and
sequential access image archiving media like
videotape are one-way. What we may term one way
plus systems are those which are continuous but
offer some option for sequencing and selective
access, with teletext being the best example.
Two-way systems are those which access
information randomly under direct user control.

Slide 3 shows a matrix of the characteristics of
various electronic publishing technologies.
[REVIEW IN PRESENTATION]

III STATE OF THE ARTS AND MARKETS

ON-LINE DATABASES
Most mature of the EP activities is that of on-
line database publishing. There are presently
more than 500 producers offering more than 1400
individual products on an pay-per- use or
subscription basis according to the Eusidic
Database Guide for 1981. On-line databases
utilize standard magnetic media and are composed
of text characters stored in ASCII. OLDBs are
accessed remotely using standard data terminals,
via existing public telecommunications
facilities at low to moderate speed with most
hardcopy output being done on lineprinters at
central facilities. Direct output of full-text
data from electronic text-processing systems to
OLDBs is already a reality in highly automated
newspaper or magazine publishing environments.

This segment has been active since 1975.
Estimated total reciepts in the sector for 1980
were an astounding $900 million. Growth has held
steady at 30% per annum since 1975. This growth

trend is expected to continue at 25-40% annual growth for the next few years.

Bibliographic databases accounted for only 10% of revenues, disproportionate to the percentage of products in this category. These databases are published predominantly by government, quasi-government and not-for-profit suppliers.

Source databases (or factual packages) are better revenue generators. However, they are more expensive to market than bibliographic databases which rely on well-trained librarians who understand and use them as professional tools. Source databases like Value Line or Standard and Poor's with usage costs of over $100 per hour require knowledgable sales people and considerable customer training. They also demand some preplanning to obtain most effective results, eliminating casual usage.

From a producer standpoint, factual packages also require a high degree of currency, accuracy and powerful indexing. These all are expensive in time and human judgement. However, factual DBs focus more on current data, and can be less expensive in on-line storage requirements than bibliographic varieties.

Inability to incorporate graphic material has been a major limitation and block to greater acceptance of OLDBs. This year has witnessed the first attempt to use videodisk, attached locally to the access terminal, as a way of integrating image material into the OLDB presentation. This is exciting theoretically but may be difficult in practice, since each disk contains only 54,000 or 108,000 images, necessitating multiple disks for storage of a complete archive. This becomes critically inconvenient when disk volumes must be changed during a single search sequence. Pergammon's Patsearch, which utilizes this technique, has had limited acceptance partly due to this. However, there is still much excitement over Patsearch compared to all previous methods of researching patent information.

A major impediment to industry growth and DB proliferation is lack of standardization in the user access protocol, the group of directives for specifying what operations are to be performed and which variable data are to be used. Non-standard command codes to perform the same operations on different DBs create a Tower of Babel situation in which it can take as much as 6 months to train a fully qualified searcher and each new DB has its own specialized commands which must be learned.

FIGURE 4. ACCESS PROTOCOL STANDARDIZATION FOR OLDBs

Availability of a new generation of self-contained database processors like that introduced this year by General Electric will make entrance to this profitable field easier for publishers. A multi-protocol processor and batch search techniques using intelligent microprocessor terminals and store-and-forward to reduce communications charges will improve the user's lot and decrease costs when they appear within the next 24-36 months.

FIGURE 5. AN OVERVIEW OF THE DATABASE INDUSTRY

VIDEOTEX AND TELETEX

The enormous potential of videotext services has as yet been unrealized in any activity above the level of experiment, despite the avalanche of publicity which is heralding the arrival of a new era in home information delivery. Many fundamental problems exist in making the concept truly useful and commercially viable. Most of these focus on either production capabilities, which requires competent digital type/image manipulation, cheap hard copy, delivery systems which need adaquate bandwidth to deal with pictures or productization of present information resources into videotext databases. Videotext is presently underrated as an

equipment suppliers' market, in our opinion. Recent estimates indicate that by 1990 a total of 7% of US homes (and a much larger percentage of businesses) would be utilizing videotext in a significant way. Cumulative expenditures through the dacade were estimated at $19B for equipment and $16B for services and usage fees.

Unfortunately the strategic and regulatory environment around videotext services has become the battleground for both national telecommunications policy and national technology prestige. This has overshadowed deficiencies in present product and production technology. Lack of acceptance by information providers and users has been unheard beneath the din of congressional arguments between the newspaper industry and AT&T over rights to revenues from home-accessed information bases. Economics of the new medium are wildly overestimated with claims based on subsidized probes which rarely approach real-life market conditions.

Even for those systems which are actually operational, capital cost is high on both the publishers' and users' sides. A new generation of database and computing machinery will help the industry, as will new terminals designed for use by graphic designers and visual artists. These have been prototyped by units like the AVA from Ampex, an electronic sketchpad which allows artists a primitive but well-intentioned interface which emulating traditional painting and drawing activity. AVA outputs encoded analog television signals directly into the broadcast pattern at CBS where the prototype has been operational for some time. Several companies, including a spinoff from the research program at New York Institute of Technology are approaching this market. Improved terminals for image creation will simplify the publisher's burden and improve the product.

VIDEODISK

Laser videodisk is one of the most exciting of the new media (see my paper in TAGA Proceedings

for 1981). It has rich potential since it is a random-access technique and stores either analog FM-encoded TV signals in its consumer format or enormous quantities of digital data in its binary form.

Unfortunately,   the   videodisk   business   has evolved   into a state where its one solution   is looking   for   a problem and its big   problem   is waiting for a solution. The consumer disk   with its   low   cost   and   limited   on-line   storage capability   has   been   percieved as   a   suitable medium for several publishing products including catalogs,   training   programs,   archive documentation and as a source for locally-stored graphics   as   in   Patsearch.   All   these applications accept the idea of a content-static package   with a long production lead time   being acceptable.   An   interesting   prototype   for industrial, research or training applications of analog   disks   has   been   introduced   by Vision Machine   Research of Cambridge, Massachusetts. This   consists   of   two   color display   screens controlled   by a third data   terminal   accessing from   4 to 10 laser disk players simultaneously. Multiple   microprocessors   offer   database management   for search and retrieval of   desired images.   Full   audio output for   sound   tracks, data communications and a $20,000 price tag make this   appear to be a   powerful tool for a medium where access has been the problem.

Most   applications   where   image   archiving   is desired   in   fact need an dynamically   updatable and   expandable   storage   requirement.   Picture morgues for newspapers or magazines, electronic document-on-demand systems and electronic   color systems all share this requirement. Direct Read After Write (DRAW) digital data   record   and playback   systems   would   answer   this   need. Unfortunately,   the   promised 1982   availability date seems hopelessly optimistic. Even when the problems   of   recordability,   erasability,   data reliability   and archival durability are solved, an   enormous amount of research and   development on   packaging   of such large databases   will   be required.

IV CASE STUDIES IN ELECTRONIC PUBLISHING

CompuServe is a model for the electronic information utility of the future. Starting in August 1979, it has grown until it now serves over 24,000 users on a regular basis. Access is made by a local telephine call in over 300 US cities. Presently usage is concentrated in the northeastern seaboard, Silicon Valley, L.A. and Chicago. CompuServe presently offers users 301 categories of information from African weather to used car purchase procedures. News is available from 11 traditional print news publishers and the Associated and Canadian Press wire services.

Users have access to classified ads; entertainment, arts and lesiure articles; movie and book reviews; world, sport and business news; columnists; and both local and national events calendars. Financial data from market wires and private publishers like S & P are also available. Computer games continue to be among the best revenue generators.

FIGURE 6. THE COMPUSERVE INFORMATION UTILITY

TELECABLE, A TELETEXT NEWSPAPER EXPERIMENT

"If you're out to make a quick buck, the alpha/numeric presentation of news on cable television is not necessarily the way to do it" according to Roger Galstad, Sales Manager for the Eau Claire (WI) Leader-Telegram. TELECABLE is a teletext operation recycling the print operation's news over a channel leased from Wisconsin CATV. The service is presently available to 70% of the cable subscribers in Eau Claire.

On TELECABLE, brief news stories are displayed on the screen for 25 seconds with 25-second advertising slots between stories. On important stories, the viewer is encouraged to become a

reader by referring him to the print product for more in-depth coverage.

In 1981, $90,000 in revenues were generated. This year, $200,000 income is projected. This will unfortunately not be enough to cover the expenses of a staff of 4 salesmen and 3 editors. Poor understanding of how to use the teletext medium for advertising seems to be the major problem. For this reason, TELECABLE recently introduced a regular hourly five-minute live anchored newscast on which it sells traditional 30-second advertising spots.

Surveys show frequency of use rising, with 73% of cable subscribers presently viewing TELECABLE 1.5 times daily, a 57% increase over the first year of operation. Advertisers report sales results approximately equal to those traditionally generated by radio advertising. But prestige seems to be the biggest payoff to date. Eau Claire has acquired a national reputation for technology leadership and been visited by over 200 representatives of individual newspapers and industry associations.

THE SEARS VIDEODISK CATALOG

The first attempt to replace or augment full color merchanside catalogs with videodisk was undertaken by Sears Roebuck in their Summer 1981 video edition. The catalog contained not only traditional text and graphic information frames, but TV-like action sequences and user-originated search/query capability.

Action sequences included fashion modelling and operation of mechanical equipment like lawn mowers. Production values were extremely high, with TV advertising standards prevailing throughout. There was also a heavy mix of computer-generated graphic effects.

The catalog was made available to the public for home use or at public access facilities in Sears retail locations. Reactions were extremely favorable although specific sales data or comparisons with traditional catalog

merchandising remained proprietary in nature.
Sears did publically state, however, that the
per copy cost was substantially lower than that
customary for their traditional printed product.
Unfortunately, slow acceptance by consumers of
videodisk as a component in home entertainment
systems will be a gating factor in use of the
disk for catalog purposes.

ELECTRONIC MAGAZINES

Non-print formats for magazines are an appealing
and seemingly successful application of
electronic publishing. Magazines are presently
being published in videotape format with moves
into videodisk immanent. Several magazines are
using their print product as the basis for a
cable or broadcast television program. Videotex
seems very suitable for certain kinds of
magazines, especially how-to oriented books.

AMERICAN BABY magazine has now piloted a series
of programs for cable distribution in major
markets making use of their name recognition and
in some cases offering video versions of
articles which originally appeared in print.
Classic TV ad spots are used and heavy cross-
promotion of the print product is done as well.

Time Incorporated will launch a series of
videotext news and feature magazines later this
year. Formats or target audiences are not yet
announced. Popular Science has already started
making the last six month's content available
through CompuServe. Some material is specially
edited for the on-line format. This includes
the "Science News Front" and "New Products:
What's New in Electronics", both
headline/capsule oriented features. Automobile
road tests and car repair articles are also
offered. PS encourages its readers to offer
suggestions or pass on requests for mor
information via CompuServe's electronic
messaging services. This is a forerunner of the
kind of transactional services in responding to
advertisers which will make video magazines an
extremely attractive and powerful medium.

As pagination of the traditional print product matures, electronic recycling of material will give publishers with such high-functionality equipment strong incentives for content recycling in other forms.

V   OPPORTUNITIES AND OBSTACLES

It appears that a new Electronic Publishing industry is at the beginning stages of its evolution. Many of the larger participants in the traditional sectors like R.R. Donnelley, Time and Dow Jones have already made strategic moves to position themselves strongly in the new sector. Activity by traditional equipment suppliers has been less enthusiastic. Most capital-intensive product development for new equipment needed to supply this sector is being undertaken by data processing suppliers.

Is electronic publishing a threat to traditional printed information distribution? For the next five years, the answer is probably 'no'. As mentioned in last year's paper, production of printed matter will probably increase short-term as a result of the need for packaging and collateral materials needed to deliver, sell or use electronic information.

In a ten-year timeframe, however, color magazine and catalog printers may begin to experience a shift in their revenue base. Certainly vendors of Graphic Arts equipment and supplies, especially plates, films and inks will be strongly impacted by 1990. This may seem remote until one considers the payback period on a film coating alley or a large rotogravure printing facility.Inter/Consult is presently at work on new tools for strategic planners in the Graphic Arts industry which we hope to report on soon. These, if successful, will help track the development of electronic publishing as it grows into a single major industry, by the year 2000 perhaps representing the largest single sector of the US industrial economy.