Encyclopaedia Britannica and the New Technologies

Confidential

Encyclopaedia Britannica in recent years has been closely following developments in new technologies as, of course, have many other publishers and businesses. This report to the Board of Directors identifies and describes the most current segments of the new technologies that appear to have present or future interest for Britannica, and describes Britannica's activities to date. This report was prepared jointly by Messrs. Jim Sloan and Charles Van Doren, who are responsible for the major effort in this area.

Introduction

During the past decade, especially the past two to three years, major technical advances have been made in all forms of telecommunications. The most dramatic changes have occurred in the fields of transmission of televised media, and in the use of computers. As in the past, initial usage of end products of new technologies has been relatively limited, generally because of early high cost of production; or slowness in the changing of public mores towards acceptance of a given new technology as a part of normal day-to-day life. One needs only to remember that television was developed and demonstrated publicly as early as the 1939 New York World's Fair, but it was not until the early mid-fifties that the entire country swung from radio to Milton Berle and I Love Lucy. Early primitive black and white sets cost more in 1952 than they do now, and similarly color sets in the early sixties cost more than now.

The public acceptance of television was based in large part on the fact that it allowed the consumer to enlarge his own entertainment horizons. In most cases that early public had access to but a few TV channels, but with the recent growth of new television distribution systems -- cable, satellite transmission, subscription via UHF (STV), multipoint microwave (MDS) -- the present viewing audience has access to a virtually unlimited number of program choices. There are 80.8 million homes in the United States that have one or more television sets. As of July 1981, 32.2 million of those homes (40%) were subscribing to one or more additional cable services, and 51.6% could subscribe to existing cable systems that have already passed their locations. The cable television industry has been the most dramatic in terms of the volume of public acceptance, but it has also broadened the scope of types of programming that are needed and can meet the special interests of audiences. The greater the number of channels, the greater the need for programs to fill the hours of these multiple channels. A general audience's need for mass entertainment can always be met, but especially now with cable, audience interests and needs can be economically accommodated, be it public information, cultural presentations, information, education or training.

Computer technological advances historically have occurred with much greater rapidity and until recently have not been associated with the mass market of home consumers. As recently as 1977 there were only 43,000 computers identified as being used in homes, and of those it is thought that the majority were in some way utilized in a

home-based business situation. In 1981 with the cost of home computers comparable with many home stereo systems and TV sets, averaging around $1,000, there are now 1.2 million home computers in use. With even lower projected computer hardware costs, it is expected that the home computer will also show the type of public acceptance and usage that can be seen with cable television, as well as other ancillary television products such as video cassettes and video discs.

The home computer market does not have much shape at this point in time, and is still largely limited to home business use or as a hobby item. However, over 95% of all U.S. homes already have two of the three key components of a home information system -- a television set and a telephone. Forecasts for home computers vary, but there is a general consensus that home/school use of mini computers should pass 6 million by 1985. A contributing factor to the expected public acceptance of home computers is that the majority of the buying age public (ages 21-45) will have had more sustained exposure to computers in their education and work than older persons. In addition, the computer is versatile in meeting specific information and service needs, as well as learning and leisure interests such as games and education/ training.

Television systems provide satisfaction through visual and auditory senses; computer systems provide instant mental interplay with some end form of the recorded printed word. The reality that the two systems can now be meshed or married, and that now even oral response interaction is feasible, provides the consumer with a far greater capability

to design and control his own system for satisfying needs and interests.

In observing the phenomenal advances made so far in the new technologies, and in considering the future implications relevant to mass acceptance and usage, it is of primary importance to remember that each of these technologies requires something for the user to see or to hear, or something with which he interacts or to which he has access. The device is the hardware; what makes the device of interest or value is the software.

Encyclopaedia Britannica and the new technologies

Because of EB's unique position as the world's leading and most respected publisher of reference materials, the recent technological advances in multiple forms of information dissemination have been given high priority by the Planning & Development Department, as well as all other sectors of the corporation. EB has been monitoring these technical developments and the many companies directly or indirectly associated with these evolutionary changes. In investigating all of the technologies several strategic considerations were constant factors:

a. Which, if any, of the many technologies would have short and/or long-term synergism with EB's existing basic product line either as new ancillary products/services, or as improvements upon existing products?

b. To what extent would such technologies directly compete with or detract from our established sales and sales organization?

c. Which of the technologies would lead to entirely new business opportunities?

d. Which of the technologies appear to have the greatest potential for wide market acceptance, especially within the mass consumer sector?

e. What resources, including EB's own data bank, could be viable new products if converted to one or more of the new technologies?

f. What are the strategies of our present and future competitors?

Investigative efforts have been made by the Planning & Development Department commencing with Frank Gibney and continued by his successor, Jim Sloan. These efforts have included thus far close monitoring of the industries via appropriate newsletters and other printed information sources. Sloan and others have attended many technology industry seminars and conferences, as well as met with many experts within the fields, and made numerous site visits. Outlined below are the EB activities to date in each of the major technology sectors:

A. Computer Technology

No attempt in this report will be made to speak to the scope of the computer industry from a context of manufacturing or distributing computer hardware. Emphasis instead will be on what would appear to be a more appropriate area of interest to Britannica, namely direct and indirect ancillary computer services. This segment of the computer business has grown from $1 billion in 1969 to $10 billion in 1980. As outlined here, therefore, computer service industry is defined as consisting of three types of services:

a. Processing Services: Including time-sharing, batch services, payroll and other specialty services which in some way involve the sale of computer time.

b. Software Products: i.e., computer programs packaged and sold on a reel of tape or disc, and including full documentation. Special interest area data base accessible as needed for specific prescribed needs.

c. Professional Services: Including consulting, programming, systems analysis.

Projections of Growth Computer Services

	1979-80 Revenue-billion	1979-80 Pretax Profits % of sales	1985 Revenue Projections
Processing Services	$ 6.7	10%	$ 17
Software Prod.	1.3	7	8
Professional Services	1.5	7	5
Total Computer Services Industry	9.5	9.1	41

Not surprisingly, the majority of the earliest revenue of this segment of the industry has been tied to meeting specific data needs of interested business, government, education and research organizations. As mentioned above, interest in accessing information by the general mass consumer market is just beginning to surface. It should be pointed out that the on-line information industry serving all sectors of customers in 1975 in the United States represented only an embryo of 177 complete data bases, 33 million records on-line, 1 million bibliographic data base searches and under 5,000 customers. Between 1975 and 1981 there has been an average growth of 180% based on number of customers, with no indication as yet to the impact of the individual home computer user. In this short span of five years the number of records on-line has grown from 33 million to 200 million; bibliographic data base searches

have almost septupled to 6.9 million; and the number of data base customers has risen to over 130,000.

As indicated previously the computer service industry in 1981 is still fragmented, though nothing like the diverse complexities of 1975-79. In the last two years there has been a massive acquisition of small, even marginal companies that control or have access to isolated data bases, or ones which can offer specialized information services. Notwithstanding the growth in the overall computer services industry, best conservative industry estimates presently indicate that 1981 revenues of data based companies, including those of McGraw-Hill, Mead, OCLC, Lockheed-Dialogue will not exceed $300 million. This lower than popularly publicized revenue expectation - expectations which have been hyped to the point of disbelief - can in large part be explained by the fact that the market is growing and changing on almost a daily basis, and it is a new market without any precedent. As mentioned separately, Britannica in its first controlled experiment with the use of its library data base with Mead Data could not, and still does not know the degree of the current market's interest and willingness to pay for instant on-line access to Britannica's specific data bank.

The potential for growth in on-line data base revenues, however, clearly would appear to exist. With hardware costs declining, falling data storage costs and satellite communications, all of the on-line information industry's major expense categories are decreasing on a per unit basis and every time the prices fall, the potential market improves. Bibliographic Retrieval Services, Inc. (BRS) one of the more notable successes in this field, and one to which Britannica gave serious acquisition consideration, has been a prime example of a company that started in the mid-70's with a -0- revenue base and

became a major distributor of specialized information, originally only in the medical field. Part of BRS's success picture was its strategy of low cost to customer, and intensive creative expansion into a wide variety of data bases.

Disregarding the conflicting wide range of computer industry projections, it would appear that a reasonable annual growth of 15% will occur through 1985, with computer terminal deliveries expected even to be greater as the home consumer market opens. This growth is based on the growing use of computer terminals and word processing equipment which allows more and more businesses and individuals to retrieve information electronically. The Department of Commerce reports that it expects 1981 to show delivery of 1.4 million terminals, bringing the total projected to 6.4 million by end of year 1985. These estimates do not include probable home computer terminals.

HISTORICAL DATA BASE INDICATORS
(From U.S. Dept. of Commerce)

	1975	1977	1979	1981 est.
Items abstracted & indexed annually	2,336,406	2,126,927	2,217,142	2,428,880
No. of data bases				
Total	301	362	528	700
U.S.	177	208	259	
Total current no. of records	52,000,000	71,000,000	148,000,000	250,000,000
Total current no. of on-line records	33,000,000	50,000,000	116,000,000	200,000,000
Searches (bibliographic data bases)	1,000,000	2,670,000	5,000,000	6,900,000
Computer terminals shipped	280,171	661,604	991,528	1,415,901
Computer terminals installed	1,350,000			6,370,000
No. of data base customers	under 5,000			130,000 plu

In 1978 over 100 information related companies were evaluated by Ross Sackett in his capacity as a consultant to the Planning & Development Department. The objective was to identify companies which met the basic criteria for an EB acquisition and entree into the industry. The criteria for consideration included that a company be in one segment of the information industry which would lead to synergism with other segments; that it already be established enough to offer $5 million in revenues, or be in a position to obtain that level within a short period. Ideally it was hoped that an appropriate acquisition candidate would be obtained that could direct the potential growth of EB's own data resources.

Concurrent with the above described effort, the Planning & Development group also investigated the possibility of creating an internal Information-On-Demand (IOD) service in conjunction with a possible acquisition of a small local IOD firm, Edetec. It was ultimately concluded that the IOD sector of the information industry was too small in scope to offer EB the type of entree that it desired.

Direct personal contact was established with the New York Times Information Bank, Lockheed-DIALOG, Bibliographic Research Services, Inc. (BRS), Measurement Research Corp--Westinghouse, Hudson Research, Ltd., and Mead Data. In making the investigation several factors immediately became evident, not the least being that EB was certainly not alone among publishers and other businesses in actively pursuing new business opportunities within the area of the new technologies.

The majority of the information firms tended to provide special or limited services. The fragmented industry in the late 70's was

one of many small service providers, along with a few giants such as Dun & Bradstreet. Acquisition patterns, therefore, developed where several information companies would have to be purchased or clustered if one were to achieve a business of reasonable size and influence. The computer based information industry started in most cases by entrepreneurial younger management found itself in the enviable position of being in a strong sellers market when it came to the question of acquisition. It was not uncommon for small, but vital companies to be purchased at extremely high ratios of earnings.

Britannica did identify one growth candidate which it felt met the criteria set for joining this industry. Bibliographic Research Services, Inc. (BRS) was a small firm with excellent management which had been able within three years to grow from -0- revenues to revenues of $3 million with 20% pretax profits. Excellent rapport was established between its management and EB's, and after an extended period of several months of mutual investigation and discussions, BRS indicated that it would be agreeable to a merger with Britannica. It was thought at the time that BRS would prove an excellent core for full expansion of EB's information resources, as well as the core for expansion into other computer related businesses. The minimum price that BRS would accept for its company was $5 million. EB, Inc. management was prepared to consider an offer of $3 million, approximately 10 times earnings. Because of the high cost of money at that time (approximately 19%) and the uncertainty whether this company could grow to a large and profitable operation, we did not reach a point of recommending the purchase. BRS in early 1981 was purchased by another company for a price reported to be in excess of $8 million.

The competition for good acquisitions is very intense as many organizations are willing to pay high multiples of earnings.

Investigation of the computer industry continued with the greatest emphasis being placed not on acquisition, but on selecting an appropriate distribution channel for the existing EB data base. Exploratory meetings were conducted with the New York Times Information Bank, Lockheed-DIALOG, and with Mead Data. It was ultimately determined that the Mead Data association was by far the best chance for EB to conduct a limited test of its product in this medium, and at no investment cost to EB.

B. Mead Data Central - Lexis/Nexis

In the Fall of 1979 Mead Data Central (MDC) and EB held preliminary discussions. Mr. Jerry Rubin, President of Mead Data, told us about the success of Lexis, an on-line service for lawyers that permits partners and associates of firms subscribing to the service to perform very extensive searches in legal files. The access tools are characterized by great power and ease of use; for example, an attorney can sit down at a Lexis terminal and type in questions in ordinary language and receive immediate answers -- no programming is necessary. Apparently Lexis is now used by almost all of the larger law firms in the United States and by many in the United Kingdom as well; the service will be extended to France later this year. Many medium-sized and smaller law firms are also subscribers to Lexis, which, all-in-all, is apparently one of the larger financial successes in the new field of on-line data bank technologies.

Mr. Rubin informed us that he was a long-time user and admirer of Britannica and that he wanted to add the encyclopaedia not only to the material available to Lexis subscribers but also to that available to subscribers to a new service MDC was planning, Nexis. Nexis is a current events file. Subscribers are able to access, using the same powerful tools available to Lexis subscribers, such publications as the Washington Post, Newsweek, The Economist, and others. Nexis became operational at the beginning of 1980 but as yet is not as successful as Lexis.

We negotiated a contract with Mead Data Central that was signed in June 1980. The main provisions of the contract are that MDC's right to offer Britannica on-line to its subscribers is (1) non-exclusive; (2) limited in time (to four years with options to renew if both sides agree); (3) limited to law and business firms, thus excluding libraries and private homes; (4) on a royalty basis (EB to receive approximately 20 percent of use fees); and (5) involving no up-front expenditure by EB. Work began to put Britannica on-line as soon as the contract was signed, but it was not until last July -- a long year later -- that the system finally became operational. EB3 is now available to nearly all subscribers to both Lexis and Nexis, but as yet we do not have much information about the level of use, and therefore about the volume of royalties that we may expect from MDC.

The system works like this. A machine-readable version of the entire Britannica, on tape, was provided to MDC, which ran the tape through its computers in Dayton, Ohio. The MDC computer "read" the set and concurrently constructed an alphabetical "thesaurus" of all the words used in EB3, apart from "noise words" -- that is, words

like "the", "a", "is", "become", "after", "before", "when", "then", etc. In constructing this thesaurus the computer also appended an "address" to every non-noise word -- that is, a citation of where the word appeared, and if it appeared in more than one place, then a list of all the places it appeared, in volume and page order, in both the Micropaedia and the Macropaedia.

A subscriber is therefore able to "ask" the computer about the whereabout of any word in Britannica, and will always receive an answer, even if the answer is "that word does not appear". In practice, however, it is usually more efficient to make searches not on a single word but on a set of words, two or three or even more, that are required to appear within a certain number of words of one another. Thus, for example, if you asked the computer whether Britannica had anything on "yachts", you might get the answer that there are more than 100 places in which it does. However, if you asked it whether Britannica has anything on the two words "yacht" and "Newport" within 10 words of one another the field would be greatly reduced and you would be sent direct to the small number of places in the set where the America's Cup races in Newport are discussed.

The user must follow rather simple rules in asking questions and has several options when it comes to receiving the answers. He may read on the terminal a list of citations to articles and parts of articles where his words are covered; or he may read on the terminal a "window" of text including his words, at a length that can be controlled by him; or he may read the full text of an article or part of an article dealing with his subject. Alternatively, he may ask the terminal to print out either the citations or the window of text;

he may not print out the full text owing to a certain nervousness on the part of EBUSA about making a hard-copy version of Encyclopaedia Britannica available to persons who had not bought it (in fact, such a hard-copy version of the set, in print-out form, would be much more expensive than buying the set in the ordinary way, and would also fail to provide the illustrations, which cannot be displayed on the terminal).

As yet no one is certain how useful the system will be to subscribers to Lexis and Nexis. "Reading" Britannica on a Lexis/Nexis terminal is not a cheap way to read it, since subscribers pay time and search charges that can be as high as $500 an hour or even more, although the typical charge is more like $150 an hour. Will subscribers want to pay that kind of money for access to the kind of information they find in Britannica? We just don't know, nor does MDC. However, we are going to find out soon, at relatively little cost to ourselves, and this information should be extremely valuable to us in our planning for the years ahead.

The cost to ourselves just mentioned is not an up-front cost, but the cost -- already recognized by us as not insubstantial -- of using our own Lexis/Nexis terminal to make searches in Britannica. In effect, the MDC access tools are a super word-index (but not a so-called concept index) to Britannica, providing us with an insight into the set never possible before. We can check our indexing to see whether we have noted every important instance of the appearance of a term; we can check in the course of revision to see whether we have caught every appearance of any term or concept that we want to change or update; we

can generally find out if we are contradicting ourselves on any subject; and we can discover other examples of mistakes and embarrassments findable in no other way (unless a reader were to find them, which would mean they really were embarrassing). It is not unreasonable to suppose that the Editorial Department will come to depend more and more on MDC's powerful electronic access to the text of Britannica as the years pass. In the near future it will be of crucial importance to us in the final months of the R program.

Our contract with Mead Data Central expires in 1984, although, practically speaking, it will probably be desirable to extend it until 1985, when the first stage of the revised Britannica appears. Our relations with MDC may extend beyond that date, although the decision does not have to be made now. No one in the industry appears to have a more powerful and flexible system of access to on-line data than MDC; they are an imaginative and forward-looking company. At the present time MDC is limited in its right to make Britannica available to law and business firms; by contract it may not enter the Home Field. In fact, at this time it is not offering anything to the Home Field. But, like all such companies, it is obviously interested in the Home Field: in what kind of information ordinary people will want to buy, how much they will want of it, and what they will be willing to pay. These questions interest us, as well. Perhaps EB and MDC can continue indefinitely a relationship that is so far of mutual benefit.

C. Video Disc

A video disc is a grooved or grooveless disc similar in appearance to a record, which is less expensive than a video cassette and is played

on a video disc player which, in turn, is less costly than a VCR. There are three main types of video disc systems, all incompatible with one another. One is the capacitance system, which has a grooved disc played by a phonograph-like stylus. The RCA SelectaVision or CED system is based on the capacitance system, which is also used by Zenith and CBS. A second major system involves optical or laser technology, and utilizes a reflective disc which is scanned with a low intensity laser beam. Companies committed to this format are DiscoVision Associations (IBM/MCA), N. A. Philips, Pioneer, Magnavox, and 3M. The third segment of the market is the VHD (video high density) disc system, also a laser system, espoused by Matsushita, Victor Company of Japan, General Electric, and Thorn EMI Ltd.

Late in coming onto the television market, and plagued by early distribution and disc quality control, video discs have not, as yet, reached the potential claimed by their developers. The laser system now available is especially versatile in its capacity for freeze-framing, and its stereo audio capacity. Since the two systems presently being sold in the U.S. are not compatible the consumer is limited to purchasing software that has been developed or obtained by each manufacturer. A major factor well publicized by the VCR competition is that none of the present video disc systems has the capacity to record.

In the U.S. fewer than 50,000 units were sold in the first full year, 1980. Even with the highly promoted introduction of the RCA system in March, 1981, total industry sales for disc players for the first six months in 1981 was approximately 30,000 units. It is generally concluded that the laser system being sold primarily so far

by Pioneer and Magnavox will ultimately become the predominant choice of the consumer market. The latter system is also likely to be the better bet for major use in schools and industry.

EB became interested in the possibilities of video disc as a conveyor and purveyor of encyclopedic information in 1979-80. T. White arranged for J. Sloan to visit RCA to learn about their new program. Our enthusiasm was whetted last May when two young practitioners in the field were brought to Chicago and made a presentation for several EB executives. Their names are Bob Stein and Rod Daynes: Stein is an independent producer in Los Angeles, with many contacts and ideas in this new field (brought to our attention by John Frank); Daynes is the director of the video disc production lab at the University of Nebraska, one of the premier facilities in the field. After the presentation in May, Stein and Daynes were engaged as consultants, and they are now preparing a report and proposal for our future activities in this field that is due at the end of October.

Video disc technology is available now from large international consortia of companies involving such names as Dutch Phillips, GE, IBM, Matsushita, MCA, and others. Basically, although there are minor differences, these alternatives all use an electronic pickup instead of a magnetic one, a laser beam that "plays" the disc and transmits the signals to a TV set and associated other equipment, such as a stereo amplifier and a home computer. The result is a system having great flexibility and significant entertainment, as well as educational, possibilities.

The current front-runner among laser-system video disc players is marketed by Pioneer, but not very many have as yet been sold, nor are there many discs available to play on those that have been sold. The market is therefore extremely limited at the present time. Estimates of its future expansion vary widely. It is fair to say that the majority of knowledgeable observers think it will become very large in five or ten years, but what directions it will take, and what particular laser-system technology will become dominant, is not known.

Basic video disc technology goes back a number of years, but only recently has it "gone public" with the decision of RCA to invest millions in the promotion of what it calls SelectaVision. SelectaVision is the 45 rpm of this so-far rather confused industry; the SelectaVision disc is "played" by a needle with a magnetic pickup and the system provides only limited random access to the material on the disc. That material is and will remain mostly movies, which may be played through a TV set with extremely high fidelity and with reasonably good sound. The best thing about SelectaVision is that it is relatively cheap. The worst thing is that it seriously underexploits the possibilities of the technology.

Estimates also vary regarding the practicality of providing encyclopedic information on video disc. The possibilities are enormous but no one is sure how to do it so that the customer will use the software. (However, Academic American has produced a demonstration video disc from its encyclopedia). It appears that the character of the encyclopedic information itself is likely to change in the new medium, just as the invention of movable type in the middle of the 15th century changed not only the character of books but also the character of thought.

Nevertheless, as a leading information company it behooves us to know as much as we can about this new technology. We therefore asked Messrs. Stein and Daynes to develop a proposal for us, covering the following main subject:

1. Descriptions of the range of viable video disc projects that Britannica might undertake, including but not necessarily limited to:

- "Supplements" to the existing EB3, perhaps based on the subject divisions of the Circle of Knowledge in the Propaedia
- Single topic "programs" on the order of "EB Presents The Encyclopaedia of Space Exploration" or "EB Presents A Visit to the World's Most Significant Archaelogical Excavations"
- Preparation of a fully electronic, complete encyclopaedia at the level of Compton's or Britannica Junior.

This section will also address some of the thorny conceptual problems related to program design that are generated by subject matters, the interactive capabilities of the video disc (and related media), and by the combination of the two.

2. Delivery Systems. An analysis of the various media available for these projects, including a discussion of the technology as it exists today and as it is likely to develop over the next 5 to 10 years.

- Video disc (by itself and as peripheral to a microcomputer)
- Video disc plus video text and teletext
- Videotape, cable and broadcast TV
- Print, book tie-ins, etc.

Special attention will be paid to the possibility of maximizing distribution by issuing the same program in different formats.

3. Production Considerations. What gets done, when and by whom. Recommendations as to who should handle various aspects of the work: "in house" or not, and if not, what should be the organizational relationship between EB and other entities.

Cost factors will also be discussed, in all stages from program design through mastering and replication of discs, etc.

4. Sources of Photo Images (still and motion pictures). An analysis of the suitability of EBEC materials. How useful will they be, and what percentage of illustrations will have to be obtained from other sources? What sources?

5. Joint Ventures. An examination of the possibility of EB's joining forces with other companies on various projects. For example, the discovision consortium, comprising MCA, Pioneer, Magnavox, and others; the Thorn-EMI-GE consortium; or perhaps a PBS station or even another publisher.

D. Video Cassette

A video cassette is a non-film video format that allows video programming to be used at an individual's convenience. Hardware utilized with a video cassette is a video cassette recorder, or VCR. Video cassettes and VCRs are now established software/hardware combinations in both consumer and business markets, with consumer video cassettes largely concentrated on Hollywood movies and business cassettes often used for training. The two most common formats are 3/4 inch (U-Matic) and 1/2 inch (Betamax and VHS). A major advantage of VCR is its capability to record.

Present higher costs for both hardware and software have undoubtedly slowed the growth of this versatile system. Industry estimates, however, are that the tape cost will be reduced substantially in the next year, and it is generally conceded that VCR will continue its steady growth that has been shown over the past years even with the advent of the less expensive video disc. The first six months of 1981 reflected a 40% increase in sales over 1980 entirely.

VCR Market 1980

Hardware unit sales cum.	0.8 million
Viewer population	1.9 million
Prerecorded cassette unit sales	3.0 million
Prerecorded cassette retail sales	$165 million

EB has not seriously considered utilizing this medium for its reference publications due to the lack of instant indexing. To locate information would involve long searches through the tape. In addition, this medium can be readily reproduced by others and pirating could be a major problem.

E. Cable Television

Cable television is a means of delivering television to the home via cables laid underground. Originally, cable TV was devised to deliver better reception; however, basic subscribers now also elect to have cable for the additional channels of programming it offers as well as the ability to access Pay TV. Current cable TV subscribers number over 21 million.

In 1980 the Cable TV market was:

Basic subscriber revenues	$ 1.7 billion
Cable revenues from Pay TV	$ 470 million
Advertising revenues	$ 35 million

Pay cable television is a subscription to an additional programming service, usually entertainment oriented, for which an extra fee is charged by the company which supplies the cable service. Pay cable program services include Home Box Office and Showtime, and Warner Amex's Movie Channel. Over 8 million U.S. homes subscribe to one or more pay cable services.

While local franchises vary in requirements, the majority of them do require fixed channel time for public services. As indicated above, cable advertising is minimal at this point in time, the greatest share of it presently being derived from local advertisers.

There are several major cable companies which operate multiple systems (MSO), as opposed to a single cable operation. Teleprompter, which operates 110 systems, is the largest MSO in the U.S., closely followed by American Television and Communications (ATC). In addition a recent cable phenomena is the so-called superstation. This is a local independent TV station whose programs are carried via satellite to cable systems in distant markets. Those cable systems then pay a fee to the common carrier for this signal. WTBS, Atlanta (Turner Broadcasting System) is one of the largest and best known superstations in the U.S. Recent announcements have been made by ABC and NBC for forthcoming allegedly culturally oriented cable systems.

Multipoint Distribution Service (MDS) involves transmission of a super high frequency microwave signal over an unused VHF band or channel. Homes receiving the signal need a receiving antenna with a converter set-up that feeds the signal into their regular TV set. Like subscription TV, subscriber rolls presently are small, about 500,000 subscribers with 1980 revenues of $119 million.

Over-the-Air Subscription Television (STV) is the broadcast version of Pay TV, distributed as an over-the-air broadcast signal rather than as a cable service. The siganl is scrambled and can only be rectified by a special decoding device attached to a TV set for a fee. The STV market is small, between 600,000 and 700,000 subscribers. 1980 revenues -- $208 million.

Interactive Television is a two-way cable system, as exemplified by Warner's Qube, which allows interaction between the TV viewer and whatever is on the screen. The interactive capability allows viewers to vote on matters set before them and to order products advertised over the air, among other things. Still relatively in its infancy, it is thought that some form of interactive capability will be standard in future cable systems.

Many years ago EB, Inc. looked into the possibility of entering the cable TV business, but the high front-end investment required was an impossible hurdle for EB to overcome at that time. EB has considered development of software to be exchanged for home field lead advertising testing.

E. Electronic Publishing

A natural offshoot development of the quickening advances in computer and telecommunication technologies has been the capability to provide via computer, television, or a combination of both, full textual access to anything printed and put on-line. The reality of being able to provide any customer with complete, absolutely updated information normally printed, but now in video or computer print-out form is now technically possible, and is, indeed, being tested throughout the world. Again, the technology is ahead of its potential market. One has no way, as yet, of knowing how many people will want to read a novel on a television screen anymore than one can project how many times a student may want to seek instant televised/computerized information from an encyclopedia for use in a student's term paper. Depending upon the sophistication of a user, and that user's interests and needs, technology presently exists that would enable full and total visual re-creation of anything printed in a most speedy and easy manner.

As described earlier in this report the Britannica experiment with Mead Data offers a user full access in a most amazingly quick way to anything one might want to find. One also reads that the entire Encyclopaedia Britannica could be on one video disc. At this point it is not pertinent to argue whether anyone would want to read the entire encyclopedia on a disc, but the fact remains that a demonstration program has already been initiated by a new competitor, Academic American for both on-line through Source and the New York Times Information Bank, and also on video disc.

The major inherent advantages of an electronic publishing effort, especially for an information product such as Encyclopaedia Britannica, is the easy ability to take advantage of more sophisticated indexing and data retrieval on a most timely basis.

The future home-consumer market for electronic publishing is a most appealing one, and one which has drawn the attention of the giants of American industry. The prime current example is the effort of AT&T and CBS to develop a home product which utilizes AT&T's vast distribution network via its telephones and CBS's equally respected capacity for software materials suitable for public interest. Again, the true contingency is not knowing at this time exactly what an American home television and/or computer user will want to access.

Electronic publishing presently is going through a flux of conflicting non-compatible systems growing pains, not too unlike what can be seen in the VCR and video disc industries. As briefly outlined below each of the existing systems is dependent upon utilization of displayed information upon some form of television screen or monitor.

a. Teletext: This is a system which piggybacks data on the regular TV broadcast signal, employing the unused vertical blanking lines. Using a decoder, the viewer chooses from a continual stream of pages that are limited in number. Examples are Ceefax and Oracle in Great Britain and Antiope in France.

b. Videotext: This is a system that provides for retrieval of text and graphic information via the properly modified home television set. Data for this marriage of video and the computer may be transmitted via TV or FM radio broadcast or phone lines, or any combination of the three.

c. Videotex/Viewdata: At the present time the apparent preferred candidate, Videotex/Viewdata, provides for interaction of the user with unlimited data bases, personal services such as banking and shopping, as well as a wide variety of learning/leisure activities. These systems utilize standard telephone lines to estbalish a two-way or interactive link from the viewer to the data bank. The British Post Office's Prestel was the original system; the Canadian Telidon system offers additional features including more realistic graphic presentations, and can be relayed through telephone, cable, and standard television lines. AT&T has selected Telidon as its model for entrance into this new industry.

Summary of U.S. Teletext/Videotex Trials and Operations

Participants	Project Name	Location	Media	Format	Users	Start Date
A. Data Base Suppliers						
CompuServe	MicroNet	Columbus, OH	Telephone	Computer	10,000	Nov. 1979
Dow Jones	News/Retrieval	National	Telephone	Computer	18,000	1980 (consumer market)
	a. Park Cities	Dallas, TX	Cable TV	Computer	200	1980
	b.	Danbury, CT	Cable TV	Antiope	--	1981
Source Telecomputing	The Source	McLean, VA	Telephone	Computer	10,000	June 1979
B. Cable TV Operators						
Warner-Amex	QUBE	Columbus, OH	Cable TV	TV set	10,000	1977
Cox Cable	INDAX	San Diego, CA	Cable TV	TV Set	--	1981
C. Newspapers and Magazine Publishers						
Knight-Ridder	Viewtron	C.Gables, FL	TV+teleph.	Viewdata	160+84	July'80 & Jan'81
Time	a.	Albany, NY	Satellite+ Cable	Telidon	100	Late 1981
	b.	Orlando, FL	Cable	Telidon	200	Late 1981
Times-Mirror	a.	Los Angeles	Cable+ Telephone	TV set	--	1981
	b.	LA&Orange Co.	Cable+ Telephone	Telidon	200	1981
A.H.Belo	Park Cities	Dallas	Cable	Computer	200	1980
WFLD-TV/ Field Enterprises		Wash. D.C.	Broadcast TV	Ceefax	100	1981
D. Over-the-air- TV Broadcasters						
ABC/NBC/PBS	Captioning For The Deaf	National	Broadcast TV	TV,VBI, line 21	30,000+	1971
CBS/PBS	KNXT/KCET	Los Angeles	Broadcast TV	Antiope	100	1981
KSL-TV		Salt Lake C.	Broadcast TV	Ceefax	?	June 1978
Alternate Media Center and PBS	WETA-TV	Wash. D.C.	Broadcast TV	Telidon	64	Mid-1981
E. AT & T						
	a. Electronic Yellow Pages	Albany NY	Phone	--	75	Fall 1979
	b. Viewtron	C.Gables FL	Cable&phone	Viewdata	100+84	July'80 & Jan'81
	c. Electronic Info. Services (EIS)	Austin TX	Phone	--	740	Pending PUC hearing
F. Others						
OCLC	Project 2000	Columbus OH	TV+phone	--	200	October 1, 1980
Univ./Kentucky	Proj. Green Thumb	Kentucky	CRT+phone	--	200	1980
ProFarmers of America	Instant Update	Cedar Falls IA	Computer + phone	--	--	1980

In addition to the above activities, Planning & Development has been accumulating information on what leading educational publishers are doing in the various new technologies. Following is a summary of this information, indicating in a general manner what others are doing, as far as we are able to determine. At the present time it appears that other U.S. reference book publishers are doing little or nothing in this area. World Book is likely to be the only U.S. competitor to undertake a developmental program in a new technology.

LEADING EDUCATIONAL PUBLISHERS' INVOLVEMENT IN ELECTRONIC PUBLISHING

Rank Based on 1979 Revenues	Publisher	1979 Educational Revenues (in millions)	Electronic Publishing Activities
1	Scott, Foresman	$221	Microcomputer software agreement with Texas Instruments
2	Harcourt, Brace, Jovanovich	191	No plans at present.
3	McGraw-Hill	182	Various types of courseware, including microcomputer software and telecourses; films of video tape; manuals for computer training.
4	Houghton Mifflin	142	Time Share Corp. computer software, used to enhance text materials. National marketing began in 1980.
5	CBS Educational Publishing	130	Prototype programs, continuous monitoring of activities relating to microcomputers in education for classroom management and instruction.
6	Prentice-Hall	125-130	Acquired Deltak, Inc., which has over 2000 video-based training courses, in 1979.
7	Scholastic	110	Scholastic Productions unit formed to seek non-print publishing opportunities for print product.
8	Macmillan	105	Macmillan Electronic Media, is developing markets in cable and commercial TV and exploring opportunities for creating and marketing

Summary - Present Strategy

1. Computer

Mead Data has EB3 on-line and a terminal has been installed in the EB editorial department. We plan to spend the next six months to a year learning what advantages this system offers to our editorial revision programs and seeing what use businesses make of EB3 on-line. We plan to study the possibilities of how the Mead Data on-line system can further improve the editorial revision work to be done on ATEX. Depending on usage of the on-line EB3 we might consider extending this service to libraries and schools, as a next step.

2. Videotex - Telidon

Planning and Development has recommended to EB management that we make a direct contact with Telidon Videotex Systems Inc. to hold exploratory discussions. The objective being to determine whether an association, a joint venture, or a test might be mutually beneficial. This matter will be discussed at the next EB New Business Strategy meeting. Assuming support for the recommendation and no apparent negatives, we would proceed to explore this possibility, which might become the most accepted new technology for in-home users.

3. Video Disc

The study and recommendations from the consultants will be available for discussion by the EB New Business Strategy Committee at the November 10, 1981 meeting. Based on early conversation with the consultants it appears that they will have an interesting and promising suggestion for a video disc, as a supplement for sale with EB3 and on its own. A developmental budget was set up in the fiscal '82 operating plan for this purpose, assuming that the marketing divisions will be

interested in such a new product and the return on investment will be rewarding. Depending on other findings and recommendations in this outside study, we may well wish to formulate plans for other new products in this new technology.

We have had an initial discussion with the management at VNU (a Dutch publisher) about the possibility of EB taking over the distribution of Academic American. They have indicated an interest in selling and we should have their proposal during October. They have taken a small portion of this new encyclopedia and put in on a demonstration video disc. Their demonstration video disc is rather rudimentary and fails to utilize the full potential of the video disc, but it is a start. The examples selected from their encyclopedia for this demonstration video disc raise some questions whether this will become an appropriate medium for a general encyclopedia. In addition, the present market is very limited with so few players sold to date.

Recommendations

The high level of awareness and understanding of the new technologies described in this report reflect a team effort by all members of management to gather important information, to undertake special studies, and to consider the implications for our present business as well as new business opportunities. We have attempted to hold down expenditures in this area and have tried to avoid undertaking high risk projects, recognizing that EB has had many other problems and great pressure to improve profits. As the results from the tests and studies described above become available and management recommends

undertaking additional new projects, we expect to seek approval of additional budgets. However, for fiscal '82 we believe the present efforts and budget, while certainly limited, are sufficient to keep EB abreast of all new developments, without wasting funds. We will continue our close monitoring of all these technologies.