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# Videotex and Electronic Publishing : A Legal, Regulatory, and Economic Analysis

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# A LEGAL, REGULATORY, AND ECONOMIC ANALYSIS

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# INTRODUCTION

The United States is an information society, supported by technological advances in the electronics and telecommunications industries. In North America, the information revolution is about to hit home by the introduction of systems for transmitting large amounts of data to and from homes as well as offices. This will result in one of the most significant technological and social developments of this decade.

The North American family of the near future will have the morning news, banking statements, supermarket ads, product information and the Yellow Pages delivered electronically to its living room. The information will arrive in the form of electronically transmitted words, numbers, and graphics displayed on the screen of the family's television set or other terminal device.

The jargon describing the various forms of computer-to-home (or office) data transmission has been muddled even by the industry. For clarity's sake, a few definitions thus are necessary.

As used in this book—albeit not by some other observers[1]—"videotex" means transmission of words, numbers, graphics and the like by telephone lines, coaxial cables, or television broadcast signals to a television set or other terminal device in the home or office. The amount of data transmitted may vary from a few hundred to a few hundred thousand pages per hour.

Transmission of data on a one-way basis is known as "teletext." Transmission of similar data on a two-way or "interactive" basis is called "viewdata"; this offers communication with a central data base to call up particular data. Depending upon their configurations, different media can offer either teletext or viewdata; the distinction depends not upon the technology, but rather upon the way in which a technology is applied.

With these definitions in mind, it is possible to examine the economic, legal, and regulatory implications of videotex. The book opens with an outline of components—data bases, transmission networks and receiving equipment—which are common to all systems.[2] Subsequent chapters review the capabilities of present videotex systems and discuss technological, economic and legal considerations. This analysis includes an examination of antitrust problems,[3] the Federal Communications Commission's jurisdiction[4] and the role, if any, of other federal administrative agencies.[5]

## CHAPTER I

## THE TECHNOLOGY OF VIDEOTEX

Videotex systems use a variety of transmission and reception techniques to provide users with a large amount of data. As discussed later,[6] data may be transmitted through broadcast signals, cable channels, or satellites for display on modified television sets or other forms of cathode ray tubes. The basic technological requirement for videotex is just a means for a central data bank to present data to a user.

### A. *Data Input and Storage*

A videotex service requires a large amount of data. This information may originate from a wide variety of "information providers." Since a videotex system can transmit almost any type of textual matter—basically anything that can be put into a print or graphic layout—potential information providers in the United States are diverse and numerous. Realistically, the first major U.S. videotex operators probably will be the country's principal information gatherers —the major television networks, newspaper chains, wire services, computer software providers, and governments. For example, a news service—such as Associated Press, United Press International, or Reuters—could feed its stories directly into the memory of a videotex system's central computer. Indeed, the most popular information provider in the British "Prestel" service is a provincial newspaper, the *Birmingham Post and Mail.*[7]

In a videotex system, the product is information and the delivery package is computers and transmission facilities. The amount of data storage and the ease of user access to that data are important elements in this technology. A data base may be operated by a local broadcaster, newspaper, or cable franchisee. A data base's capacity and content will reflect the size and interests of a videotex operator's clientele.

A data base operator controls the memory in which information is placed. An operator may lease its space to information providers or it may generate its own data. An operator also may handle administrative matters, such as billing and marketing. One of the most important issues concerning development of videotex in this country is the extent of content control, if any, to be retained by data base operators.[8]

A broadcaster or cable operator might have a small data base, into which it could feed local news, advertising and community messages. The development of low-priced computers and peripheral memory devices could allow a small broadcast station or a cable system to offer its own videotex service. Indeed, a number of comparatively small newspapers already have begun to offer electronic editions over cable systems.[9] A national data base naturally would require more memory and a wider selection of subject matter. For example, a national computer might provide national train schedules, whereas a local data base might have a listing of trains stopping in the viewing area.

Development of data bases in the United States has encountered a type of "Catch 22" situation. On the one hand, there presently are insufficient home terminals to warrant development of very many extensive data bases. On the other hand, the lack of data bases makes home terminals less attractive to consumers.

### B. *Transmission of Data*

Data are sent to subscribers by one of two general methods—the electromagnetic spectrum or wire. Teletext usually involves data delivery to a terminal via a broadcast signal, microwave service, or cable channel. In "broadcast teletext," a limited amount of information is inserted into an otherwise unused portion—i.e., the "vertical blanking interval" or "VBI"—of a broadcast television signal.[10] This is probably the most highly developed form of videotex today. Yet broadcast teletext is handicapped by inherent technical limitations. The small amount of bandwidth available for teletext on a conventional broadcast signal necessarily limits the amount of data that can be transmitted by broadcast teletext. And aside from its limited transmission capability, broadcast teletext is a one-way, non-interactive service. A subscriber thus cannot call up information on demand, but rather must wait for information to be displayed. Delivery of teletext by cable or microwave services on a full broadcast channel, however, allows transmission of up to two hundred thousand pages of text per hour—thus giving an ability to choose information which offers a perception of interactivity to a user.

A teletext service thus must balance the number of pages in its data offering and the time between each cycle—i.e., repetition—of pages. Although a broadcast teletext system may be able to transmit several hundred pages of text per hour, its consumers would have to wait at least several minutes for the desired information to recycle and appear.

An alternate means of videotex transmission is on an interactive basis through telephone lines, coaxial cable, microwave signals or a combination of them. This transmission mode—i.e., viewdata—allows a subscriber to order a particular piece of information from a data base. Instead of waiting for the desired information to be recycled, a viewdata user can summon pages of data at will. In addition, telephone lines can provide a "return link" on a cable or

microwave system to allow a subscriber to request particular pages of text, thus converting a one-way teletext system into a two-way viewdata system.

Teletext and viewdata face similar technological limitations in displaying data on a cathode ray screen, such as a television set. In a broadcast teletext service, data are transmitted during the "vertical blanking interval" (VBI) of a conventional broadcast television signal. This transmission causes no interference with the regular television programming. A television picture is composed of hundreds of horizontal lines—which a programming signal retraces 60 times per second—moving from the top to the bottom of the screen. When a programming signal reaches the bottom of the picture, there is a microsecond interruption while the signal returns to the top of the screen. During this fraction of a second, the screen actually is blank. But this is undetectable by the human eye—thus creating the VBI. Since the blankness is not part of the television picture, videotext transmissions do not disturb normal programming.[11]

The VBI contains 21 lines, only some of which are available to deliver videotex in the United States. The remaining VBI lines are either designated for other uses or unusable without causing interference with regular programming.[12]

Broadcast teletext delivery is not limited to VHF stations (channels 2-13); the service also has been successfully tested on the UHF (channels 14-84) band.[13] Moreover proposed low-power television (LPTV) stations would be able to deliver a full channel of text service.

### C. *Videotex Receivers and Decoders*

Videotex systems deliver the requested information through a "decoder" or other terminal device, which is attached to a user's television set or other cathode ray tube. A decoder enables a text message to be displayed on a television set's screen. The basic function of a videotex terminal or decoder is to display information on a screen. Terminal configurations vary in their levels of sophistication, but the potential for compatibility between systems does exist.[14] For example, a LEXIS terminal for doing legal research in a viewdata mode is incompatible with most other types of terminals.

Using a viewdata decoder for teletext is relatively simple, since by definition a viewdata terminal must contain decoding, memory, signal processing, and display equipment. But the reverse is far more complicated. Decoders can be attached to television sets in one of three ways—i.e., internal modification of existing sets; use of external adaptors; or incorporation of decoders into new sets.

Internal modification of a television set presents many potential problems, including invalidation of a set's warranty, voiding of a homeowner's fire insurance, and violation of fire ordinances. Because of these problems and the large number of television sets already in homes and offices, use of an external adaptor may be an attractive option. An adaptor needs a separate housing, power supply and antenna. To be sure, built-in adaptors or decoders provide better quality

images than external adaptors; but they require special modifications and impose higher expense as well as inconvenience. The alternative to modifying television sets is to build decoders into new sets. Under this option, however, users must buy new and more expensive sets in order to receive videotex.

Currently available decoders differ greatly in their levels of sophistication. They vary as to the type of keypad, keyboard, controller or memory. All of these factors affect the perceived degree of interaction by the user.

A British viewdata system, "Prestel," includes a keypad with normal controls for picture contrast, brightness, channel selection, as well as twelve buttons similar to those on a push-button telephone. These buttons allow a user to call up on the screen the pages of information desired by entering the number of the page desired. A keypad can order a database to deliver data, but it cannot interact with a data base to any great extent, because of the limited amount of information which it can transmit back to a data base.[15] Such a system thus is not highly interactive. But with a full alphanumeric—i.e., typewriter-like—keyboard, a user of a telephone line or two-way cable viewdata system can send complex messages to a data base. This type of keyboard is part of the French "Antiope" service. Antiope employs a full alphanumeric keyboard, a complex decoder and a sizable memory within the terminal. Of course, these features increase the terminal's cost.

The waiting time gap for teletext data may be closed by use of memories built into terminals—particularly with the development of inexpensive disc and tape memory units. These memories can store hundreds of pages of information. A user can call up frequently desired pages for display by merely triggering the terminal. This approach is promising, but manufacturers are not likely to conduct research unless there is a market for the product.

With terminals utilizing personal computers—e.g., the Apple, TRS-80 and IBM systems—a full keyboard combines a terminal and a personal computer. These terminals allow substantial interaction, since they permit users to manipulate the data they receive on the system as well as to send complex messages back to a data base.

Videotex systems can be compatible with each other by using the same terminal circuitry. Basic issues affecting terminal standards include "character set" and "display format." Character set is a range of characters (letters, numbers, symbols, and graphics) which can be displayed in one character position. Current videotex systems use several modifications of the American Standard Code for Information Interchange (ASCII). This consists of 128 binary codes for specific upper or lower case letters, numbers, punctuation marks, and special communications control characters. It also permits the selection of formats, graphics and colors.[16]

Another area of primary importance for videotex standardization is display format. Display format depends on the number of character positions in a row and the number of rows on each page. The basic problem is that putting more characters on a page allows more information to be presented at one time, but

uses characters which are smaller and thus more difficult to read.

General U.S. technical specifications for terminals differ from those in other nations. For example, the resolution of European television pictures is somewhat better than that of U.S. television pictures, since European television frames contain more lines. A unique set of specifications thus must be developed for U.S. terminals.

Since disc or tape recorders increase the "read only memory" (ROM) capacity of a system, the amount of "random access memory" (RAM) in a terminal could be reduced or used for alternative purposes through expansion of ROM capacity. Videocassette recorders and videodiscs also can provide inexpensive local storage for pre-recorded material, although there is no apparent trend toward their use. For the near future, audio cassettes or discs probably will be the least expensive form of ROM.

Another important peripheral device for videotex systems is a printer to provide hard copy. For many purposes—such as financial projections—a hard-copy record is essential. Printers can produce hard copy in three ways: directly off-line from a data base; from a memory in a terminal; or from a pre-recorded source such as a cassette or disc.

Present printers use either electro-sensitive paper or plain paper. Electro-sensitive paper printers produce slightly blurred images, but cost only a few hundred dollars; the paper itself, however, is fairly expensive. Plain paper printers are easy to read, but cost from $700 for mediocre results to $3,000 for "letter-quality" products. Prices also differ depending on printing speed and the amount of circuitry shared with the terminal device. Units currently offered in England range from $400 for electro-sensitive paper printers to $1,400 for simple plain paper printers. With mass production, the price of these units may drop to several hundred dollars for plain paper printers.