

Varun Grover is currently a candidate for a Ph.D. degree in management information systems at the University of Pittsburgh. He holds a bachelor's degree in electrical engineering from the Indian Institute of Technology, New Delhi, India, and an MBA from Southern Illinois University.

Rajiv Sabherwal is also a doctoral candidate in management information systems at the University of Pittsburgh. He has a bachelor's in engineering from Bhopal University, India, and a post-graduate diploma in management from Indian Institute of Management, Calcutta.

# Poor Performance Of Videotex Systems

BY VARUN GROVER AND RAJIV SABHERWAL

■ It all seemed so promising a decade ago. The "information revolution" had arrived and a new technology — videotex — would bring the power of remote computers into the living rooms and offices of millions. With simple to use, low-cost terminals and local phone lines, videotex customers could call up thousands of pages of news, sports, travel schedules and other colorfully illustrated information, as well as on-line shopping and home banking. Business users could dial up such systems to get up-to-date information on anything ranging from new products, regulations and policies to dispersed sales forces and customers. Published articles emphasizing the benefits of the new technology proliferated.<sup>2,8,9</sup>

It was therefore no major surprise when in the late 1970s, dozens of companies rushed to design videotex systems and vied for a place in bringing the easy-to-use, menu-driven technology into American homes. But consumers, it seemed, were not particularly interested in buying these videotex offerings. Some ventures failed. In fact, the actual number of videotex subscribers at the beginning of 1985 was less than 10,000 as opposed to the "expert" predictions for this period, which ran into millions!<sup>6</sup> Clearly something is wrong!

An interesting fact is that despite the overwhelmingly negative consumer response to videotex, its advocates continue their enthusiasm. Articles that emphasize only the positive aspects of the technology still appear frequently. The difference as pointed out by Noll<sup>6</sup> in a recent article in *Information & Management* is that now some cynical and downright negative articles are also being published.<sup>4,10,11</sup>

This must be confusing to the reader with inadequate knowledge of the facts that document the failure of videotex in England, Canada, the United States and elsewhere.<sup>6</sup> Further, one can only wonder with amazement why large corporations continue to make substantial investments in the area. Is it because of the fear of being left behind? Is it because of an overfascination with the technology? Or is it because of well-founded belief that the videotex technology will prove beneficial? Clearly, there is a need to take a step back from the chaos and carefully assess the situation.

This article attempts to do just that. It is based on a nominal group session conducted using five experts working in the videotex field. The participants were asked to identify and prioritize the reasons behind the poor performance of videotex. The results obtained have direct implications for all of those involved in the field. This article thus provides a structured assessment of what now seems to be a confusing situation.

## What Is Videotex?

Videotex was originally conceived from the term "viewdata," referring to a two-way service, distributed by telephone or cable networks, for access to textual information that could be displayed on a television set modified by a modem. The universally accepted pioneering effort of videotex was the British GPO system called PRESTEL, which was installed with the idea of increasing usage of rate-time in the GPO's telephone network. Users purchased

the adapted television terminal and were charged for connect-time to a variety of databases.<sup>7</sup>

With the "information revolution" and the changes in technology, however, current systems belie the postulation that videotex is nothing more than a friendly, inexpensive on-line service for the home. While there is still no generally accepted definition of videotex, many current writers have extended the traditional notion in two major directions:

1. Videotex systems are not restricted to television receivers any more, but also include intelligent receivers (personal computers). Along with this, color and graphics enhancements make the systems significantly different from the originally conceived textual systems.<sup>3,6</sup>
2. The proliferation of specialized databases targeted to the needs of specific business segments has caused a shift of emphasis from the consumer to the business user.<sup>1,3</sup>

In lieu of these changes, the following modified version of a widely accepted definition of videotex proposed by Tyler<sup>7</sup> seems appropriate:

"Systems for the widespread dissemination of textual and graphic information by wholly electronic means, for display on terminals (often suitably equipped television receivers), under the selective control of the recipient, and using control procedures easily understood by users."

Clearly, as the idea advances, the term "videotex" may grow to refer to so much that it may lose its meaning altogether. The transition from the original British system has made it clear that videotex is now not so much a specific technology as it is a way of giving the user easy access to remote computers.<sup>3</sup>

### Applications

Videotex has been promoted primarily as an information-retrieval service. More recently, usage of the service for conducting transactions has gained importance. It is unfortunate that many proponents of videotex have extended the notion to such an extent so as to include interpersonal communication between terminals. They argue that even such electronic mail systems involve visual telecommunications and are, therefore, videotex

systems.<sup>4,6,7</sup> We, however, strongly feel that electronic messaging systems should be discussed within the context of office automation and that the issues relevant to these systems are different from those in videotex. In this article we restrict ourselves to applications concerned with the widespread dissemination of information. As mentioned earlier, these can be of two general types:

1. Retrieval (news, sports, weather, travel schedules, stock market reports, new products, regulations, etc.)
2. Transactional (telebanking, teleshopping, etc.)

### The System

Figure 1 depicts the roles of the main participants in a videotex system. The participants include information service providers, information managers, system operators, network providers and the users. The user operates a videotex system either by punching a hand-held keypad or a full alphanumeric keyboard. The information accessible to the user could range from large databases of general information to customized information designed for an individual subscriber (retrieval). The user could also interact with the system to order goods and services, play games, etc. (transactional).

**The Participants And Their Roles In A Videotex System**

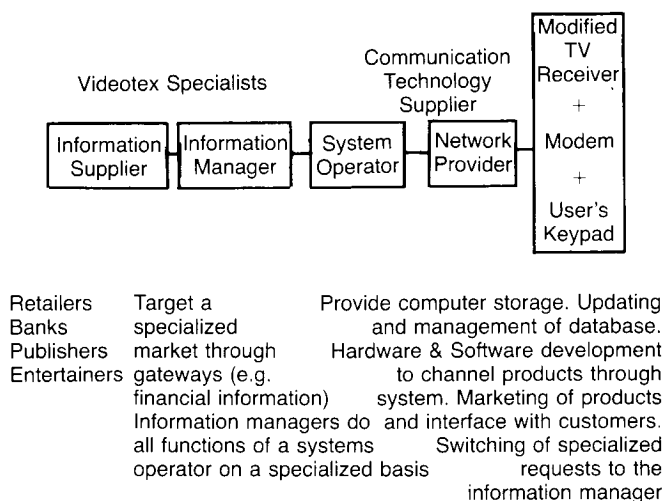


Figure 1

---

## The Question

Videotex is perhaps one of the most heavily test-marketed products and services in history. Many advocates of the technology use test marketing scenarios to quote isolated figures to depict a positive user response. The relative success or failure of a venture can only be gauged relative to some a priori expectations. Using such criteria it appears obvious that videotex has not met its potential. The following examples illustrate this:

1. The most widely quoted "success story" of videotex is perhaps the British Post Office's PRESTEL system. In 1978, British Telecom had predicted that one million users would be subscribing to the service in 1981.<sup>12</sup> There were only 13,000 Prestel terminals in 1981.<sup>6,10</sup> The situation improved slightly by mid-1985 when it was reported that Prestel had 55,000 users.<sup>3</sup> Even this number falls far short of predictions, and given the large capital investment in Prestel, it would be facetious to call the system a success.
2. In 1983, Knight-Ridder's Viewdata Corporation launched a market test of Viewtron, a videotex service, in southeastern Florida. The home terminal was manufactured by AT&T Consumer Products. Forty million dollars was invested in the service, which was targeted to reach 4,500 subscribers in the first year.<sup>13</sup> By the end of February 1984, however, less than 1,700 homes had subscribed to Viewtron — and this after the company had cut subscription costs by 40%, subsidized terminal costs and given away free software to the owners of personal computers in southern Florida.<sup>3</sup>
3. In 1983, Times Mirror Co. ran a free market test of videotex in 350 homes in southern California. Half the homes dropped out as soon as they had to pay for the service.<sup>3</sup>
4. Keycom Electronic Publishing Co. in Schaumburg, IL, initially a joint venture of Centel Corp., Honeywell Inc. and Field Enterprises Corp., planned to offer a videotex service to 700,000 resi-

dents of the Chicago area starting in late 1984.<sup>3</sup> Keycom launched a seven-figure advertising campaign to point out the capabilities of the service. By June 1985, the company had attracted only a few hundred customers. Both Honeywell and Field Enterprises sold out of the venture, and by late 1985 Keycom was forced to back out of the residential videotex business.<sup>1,3</sup>

These are only some of the examples that illustrate the inability of videotex services to even come close to their expectations. The question is why? While few would debate the potential of the concept, many would acknowledge its failure. Clearly something has been done wrong, and there is a need to identify the areas of concern.

The lack of previous research formally identifying the reasons for the poor performance of videotex and the likelihood that such reasons are not easily identifiable or quantifiable, suggested the need to adopt a qualitative methodology. In addition, an interactive approach to data gathering seemed appropriate. Accordingly, the nominal group technique (NGT)<sup>14</sup> was adopted for the project.

### The Nominal Group Technique (NGT)

The carefully worded NGT question was provided to the participants two weeks in advance. The exact question for this project was: "What are the reasons due to which the actual impact of videotex has fallen short of its promised potential?" During the introduction, the participants were advised to answer the question at a level of generality that transcends specific application areas. An overview of the NGT process was also provided. Step 1 allowed 20 minutes for the silent generation of ideas on the sheets provided. During Step 2, each participant provided ideas on a round-robin basis, which were recorded on a flip chart without discussion. After all the ideas had been recorded, the participants discussed and clarified the ideas; the ideas were then combined as desired by the group (Step 3). In Step 4, the participants were asked to silently and independently rank the final set of ideas (categorized reasons) on 3' X 5' cards, one idea per card. They then assigned the most important idea a rank of 6 and the least important a rank of 1. They were also asked to rate each idea

on a five-point scale ranging from 5 (high importance) to 1 (low importance). This ranking system highlights the least and most important ideas and the relative importance of each idea. The cards were then collected, shuffled and the rankings were displayed and totalled for each idea. The two-hour session concluded with a brief discussion of the results.

### Sample Selection

Since participants would have to assemble for a two-hour session, they would need to come from the local business community. Therefore, senior business attendees of an AT&T Telecommunications lecture series, held in the University of Pittsburgh, were informed of the project by letter. Given the generality of this research, the objective was to gather senior management personnel of large corporations who were involved in some way with investigation of the potential of videotex. A list of the titles of the five experts who participated, along with the nature of their experience with videotex, is described in Table 1. Four of the five attendees were from different Fortune 500 corporations, and all of them had extensive investigative experience and knowledge about videotex. The fifth participant was the director of a large university department that conducted research on videotex. The group thus included a diversity of organizational backgrounds, a high level of seniority and a richness of knowledge to address the proposed question.

### The Results

The NGT session produced an aggregate list of reasons in response to the posed question (Step 1). These appear as a direct transcription from the original flip charts in Table 2. The reasons were then categorized by the group along 6 major dimensions as shown in Table 3. Finally, Table 4 provides the mean rank (the sum of the ranks divided by the number of participants) and the mean score (the sum of the five-point scale scores divided by the number of participants) for each of the dimensions.

#### Cost

A major concern of the group was the overall economic viability of videotex services. There are two components of the cost for consumers.

**Table 1**

<b>Job Titles and Experience of Participants</b>		
<b>S. No.</b>	<b>Title</b>	<b>Nature of Experience</b>
1.	Manager, Information and Communication Services	Investigation of videotex for organizational use
2.	Department Manager	Investigation of videotex potential. In charge of a videotex pilot project
3.	Vice President, Information Services	Investigation of large scale, private videotex services in all sales offices and homes
4.	Director of University Center for Instructional Resources	Creation and use of AT&T frame creation and sceptre devices for instructional purposes
5.	Management System Consultant	Project leader of an internal review for evaluating videotex products

One is the cost of the specialized equipment needed to convert their terminal into a videotex receiver, while the other is the cost of communication based on access time. Both of the cost elements are prohibitively expensive for home consumers. For example, in the Viewtron project, AT&T sold its Sceptre terminals for \$600. The monthly fee is set at \$12, and the telephone charges amount to one dollar per hour. While these high videotex costs are established by market demands, the consumer does not seem willing to pay these prices for shopping, mail, home-banking and airline scheduling services.

Also, there is an overemphasis on the technology being marketed. Color and graphics have taken the cost of videotex services even further beyond the reach of the average consumer. In the end, do advertisers care more about how many consumers they can reach through a medium or how well the medium can reproduce its logos? As a result of these high costs, there is a slow but definite shift in emphasis toward marketing videotex to businesses that can afford the price.

#### Benefits

An issue raised by the group, closely related to costs, was the other side of the coin: the benefit to the consumer. The group members felt that the high costs could not justify the low

value added by the service. The benefit issue was related to the replacement of other technologies. Is the new system worthwhile enough to justify displacing what is already in use? Videotex presumes that consumer's information needs can be satisfied by large databases of general interest information. However, this technology forced on the consumer does not justify his paying of 100 times the cost (on a per-word basis) of the conventional, universally accessible newspaper. On a more positive note it was noted that while there are printed replacements for information retrieval services, there is nothing as convenient for transactional services. This is the area in which videotex can provide the maximum benefits to the user, and a shift in emphasis is required.

**Table 2**

**Initial List Of Reasons Identified  
by Participants  
(Step 2 Of NGT)**

S. No.	Description
1.	Business/Consumer understanding of concept. What is it meant to do?
2.	How to market videotex?
3.	It is not economically viable.
4.	Cost of communication time and equipment too high.
5.	Cost of using the facilities is too high.
6.	Offers limited value added. Some information can be communicated in other ways, often at a lesser cost.
7.	So many options and choice. People want to wait.
8.	Lack of government support.
9.	Human factors involved in using a TV set for viewing text.
10.	Resistance to change.
11.	Poor documentation available to users.
12.	Local interest/national interest conflict.
13.	Requires special equipment (hardware/software) on the part of the users.
14.	Lack of regulation on TV commercials. Too much democracy.
15.	Business sector: Limitations on imports.
16.	Learning curve associated with implementation.
17.	Asynchronous nature of videotex. Slower, less reliable.
18.	Lack of user training. Who will train the public?
19.	A major advertised strength "Graphics" suffers because of the slow speeds.
20.	No standard protocol.
21.	Need to take technologies currently available and put them in a standard protocol.
22.	Hardware incompatibility.
23.	Lack of industry or trade organization.

**Table 3**

Major Dimensions and Their Subitems	
Item	Subitems (from Table 1)
I. COST	3, 4, 5, 13
II. BENEFITS	6, 12
III. STANDARDS	7, 8, 20, 21, 22
IV. HUMAN/SOCIAL FACTORS	9, 10, 16
V. CONCEPT/MARKETING	1, 2, 8, 11, 14, 18, 23
VI. TECHNOLOGY	15, 17, 19, 22

Another issue mentioned was the clash of local versus national interests in videotex. As most videotex projects have been confined to a particular region, providing information about that region to consumers, provision of national level information suffers. It was felt by the group, that unless videotex is made available through a national network (e.g. cable), it is unlikely to succeed in the consumer market.

**Standards**

Incompatibility between systems was raised as a significant problem and elaborated as follows. In the early 1980s, many videotex suppliers spent time debating the standards for global communication. Meanwhile, ASCII-based personal computer sales were thriving. When NAPLPS (the North American standard) was agreed upon, more than 10 million households were equipped with personal computers. Most personal computers use conventional ASCII and are incompatible with NAPLPS. Advertisers, however, insisted on NAPLPS as it could support sophisticated graphics that they felt necessary to promote products. As a result, videotex companies and advertisers both started pushing dedicated NAPLPS-based terminals, thereby adding to the incompatibility problem.

The need for one universal standard to resolve hardware incompatibility remains an issue. A possible solution is government intervention to guarantee a standard — but then what about the free market philosophy?

**Human/Social Factors**

The concept of videotex involves new and different ways of doing things. The group saw consumer acceptability as a major issue in the implementation of videotex. First, selling videotex to the average television viewer involves recognition of the fact that people already have difficulty in dealing with complex gadgets at home. The supposedly user-friendly tree

Table 4

## Ranking and Importance Scores

Item	Total Rank Score	Rank <sup>1</sup>	Mean Importance Score	Rank <sup>2</sup>
I. COST	24	2	4.6	2
II. BENEFITS	19	3	4.4	3
III. STANDARDS	14	4	4.2	4
IV. HUMAN/SOCIAL FACTORS	10	6	3.6	6
V. CONCEPT/MARKETING	25	1	4.8	1
VI. TECHNOLOGY	13	5	4.0	5

<sup>1</sup>This rank refers to the conventional ranking of the "rank scores."

<sup>2</sup>This rank refers to the conventional ranking of the 5 point scale "importance scores."

searches required to access information from large databases are generally incomprehensible to the consumer. Also, the difficulty in understanding different formats and approaches used by the numerous information providers may increase the resistance to the technology. An overriding concern, of course, is the consumer's willingness to browse through masses of material on a screen.

Second transactional services such as teleshopping reflect a revolutionary change in the distribution and retailing system. The absence of tactile experience in teleshopping is a major weakness. As one of the participants commented, "I won't buy a tie off a screen, I need to feel the material."

#### Concept/Marketing

A major reason for the low impact of videotex, emphasized by the group, was the technological push given to the concept. Videotex advocates spent years debating the technical specifications of the systems while virtually ignoring the question of whether the consumer even wanted the service. It was the technology that was marketed, not the concept. The marketing thrust of most companies failed to stress what videotex would do for the consumer that could not be done otherwise. User training was not given enough attention and there was very poor documentation available.

The laissez-faire market orientation added to the problems. Many companies were test marketing the product in isolated areas, with competing standards and with the objective of making additional revenues needed to offset slow growth in telephone service. The lack of regulation led to videotex being a service for

those who could afford it or visualize an application, rather than an essential service required for all.

#### Technology

Some technological limitations of videotex systems were pointed out by the group. Since videotex systems involve asynchronous transmission, they are slower, more error prone and more expensive than synchronous transmission systems. This is reflected in the relatively slow graphics communication where the user has to wait 10-15 seconds for a complete figure to be formed on the screen. Also, restrictions on the import of advanced videotex systems for businesses is a limiting factor.

#### Ranking

As shown in Table 4, the group identified the inappropriate marketing of videotex as the most important reason for its low acceptability. The dimensions of cost, benefits, standards and technology follow in that order, with human/social factors being the least important. The participants showed perfect consistency in the numerical importance scores given to each dimension. It should be noted that there is a uniform difference (0.2) between the importance scores of all adjacently ranked dimensions, except human/social factors (rank = 6), which is of a considerably lower importance (difference = 0.4) than technology (rank = 5).

#### Conclusion

This study contributes a first attempt at a systematic identification of reasons for the poor performance of videotex. A number of issues were identified by the participants.

---

These issues have direct implications for a possible future orientation of videotex. A change in strategic direction is required if videotex is to reach its fullest potential. More specifically:

1. There is a need to identify marketable uses for the technology as opposed to searching for technological uses in a market.
2. There is a need for more macro level marketing of the concept, i.e., how it changes the way of doing things and the advantages of the new way, rather than the marketing of specific systems and technologies.
3. Standards should evolve naturally out of applications rather than out of power struggles.
4. Technologies should be matched to the needs of the application. Not all videotex applications require high level graphics.
5. The growth of personal computers should be visualized as an opportunity to reduce on-line time and promote a single standard rather than as a threat.
6. There should be an increasing emphasis on benefits to the consumer vis a vis existing systems. Transactional services should be emphasized and the purchase of information for its own sake should be a limited activity.
7. There should be integration of videotex services at a national level through cable networks.

It should be recognized that for promoting such an orientation, a certain measure of government support is required. Subsidization,

standardization and integration are three areas in which regulation can help gain a certain level of acceptance for the concept of videotex.

While recommendations such as these may be fundamental and basic in nature, it was the absence of such an orientation that almost led to the failure of videotex. With the main areas of concern identified, there is now a need to proceed cautiously in resolving them. ●jsm

#### References

1. "An Introduction to Videotex," *Datapro Research Corporation Report*, Delran, NJ, 1985.
2. "Cable Television: Finding New Users," *The Economist*, October 20, 1981, pp. 90.
3. Fletcher C., "Videotex: Return Engagement," *IEEE Spectrum*, October 1985, pp. 34-38.
4. Hurly P., "The Promises and Perils of Videotex," *The Futurist*, April, 1985, pp. 7-13.
5. Meadow C. T., Tedesco A. S., *Telecommunications For Management*, McGraw Hill, New York, 1985, pp. 249-268.
6. Noll M. A., "Videotex: Anatomy of a Failure," *Information and Management*, Vol. 9, 1985, pp. 99-109.
7. "Note on the Consumer Videotex Industry," *HBS Case Services*, Harvard Business School, Boston, MA, 1983.
8. Sigel E., "Videotex: The Coming Revolution in Home/Office Information Retrieval," *Knowledge Industry Publications*, White Plains, NY, 1980.
9. "The Home Information Revolution," *Business Week*, June 29, 1981, pp. 74-83.
10. Sigel E., "Is Videotex Venible?," *Datamation*, July 1983, pp. 209-222.
11. Sigel E., "Videotex Into the Cruel World," *Datamation*, September 15, 1984, pp. 133-144.
12. Thomas H., Londner E., Lewis R., "The Prestel Public Service," *Communication Studies and Planning Report*, London, 1979, pp. 17-22.
13. "Knight Ridder's Cutbacks on Viewtron Show Videotex Revolution is Faltering," *Wall Street Journal*, Nov. 2, 1984.
14. Seshaderi N., Motivala J., Thesen A., Delp P., *Systems Tools for Project Planning*, IDI, Bloomington, Indiana, 1977.
15. Van de Ven A. H., Delbeca A. L., "The Effectiveness of Nominal, Delphi, and Interacting Group Decision Making Processes," *Academy of Management Journal*, December, 1974.
16. "Where From? Where To? Interactive Picture Information Systems," *IEEE Journal on Selected Areas in Communication*, Vol. 1, No. 2, Feb. 1983.