

DEPARTMENT OF COMMUNICATIONS  
TELIDON PROGRAM EVALUATION  
BACKGROUND STUDY 5: VIABILITY  
OF THE TELIDON INDUSTRY  
FINAL REPORT

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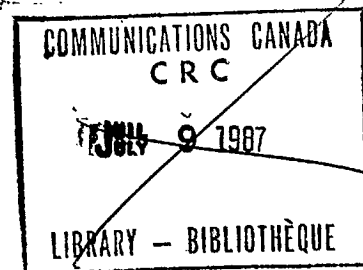
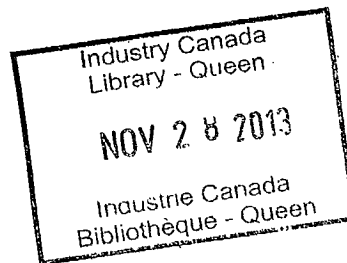
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FINAL REPORT



Prepared by: Peat, Marwick and Partners  
April 22, 1985

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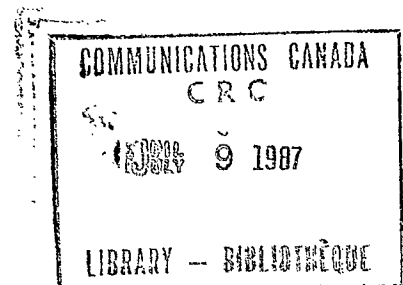




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## I - EXECUTIVE SUMMARY

This chapter provides a summary of the issues covered in the Department of Communication's (DOC) Background Study #5 for the evaluation of the Telidon Program, regarding industry viability. The objectives of the study, the issues addressed, the methodology employed, the study findings, and the study conclusions are presented in the following sections of this chapter.

### STUDY OBJECTIVES

There are two objectives of Background Study #5:

1. To create a company-based electronic data base for the "Telidon industry".
2. To use that base to assess the viability of the "Telidon industry".

The first objective was met from an industry survey, designed to answer specific issues. The results obtained were then analyzed to meet the second objective regarding industry viability.

In terms of the seventeen specific study issues comprising the study's Terms of Reference, two issues were identified as being of primary concern:

- The extent to which the Canadian "Telidon industry" could be viable without government support (Study Issue 12).
- Whether it is feasible to create a comprehensive Canadian videotex industry, and if not, what would be the best strategy for specialization (Study Issue 11).

EXHIBIT I-1  
STUDY ISSUES FROM TERMS OF REFERENCE

<u>Issue</u>	<u>Page Reference</u>
1. What is the structure of the Canadian videotex industry?	V.35-V.37
2. How many people are employed in the Telidon industry?	V.23-V.26
3. What types of skills are required? Availability? Sources?	V.26-V.28
4. How much have Canadian firms invested in Telidon?	V.28-V.35
5. Is the current Canadian Telidon industry profitable without government assistance?	V.15-V.23
6. If not profitable, what level of sales are required to yield a reasonable profit?	V.15-V.23
7. What is the current market for Videotex products?	III.6-III.16
8. For what proportion of total videotex (sales and services) does Telidon account?	IV.17-IV.18
9. What proportion of Telidon products are produced in Canada?	IV.19-IV.20
10. Can Canadian Telidon producers compete with foreign NAPLPS producers?	IV.14-IV.22
11. Is creating a complete Canadian videotex industry feasible? Is specialization a better Strategy? If so, in what areas?	VII.14-VII.19
12. Could the Canadian Telidon industry be viable without government assistance?	VII.6-VII.14
13. How useful did the firms find the Telidon assistance program?	VI.1-VI.5
14. What type of assistance is preferred for the future?	VI.5-VI.7
15. Which firms received transfer of Telidon technology from government?	V.7-V.8
16. How important is location to the operation of Telidon firms?	V.4-V.7
17. What effect did NAPLPS standardization have on the industry?	IV.10-IV.14



The answers to the other fifteen study issues were sought, and provided the basis for our conclusions on these two primary issues. A list of the seventeen study issues is provided in Exhibit I-1, opposite, along with a reference to the Chapter and page(s) in the report which addresses each of them. For the purposes of the report and this summary, the issue order has been rearranged to provide a more logical flow of findings which support our conclusions.

#### STUDY APPROACH AND METHODOLOGY

Originally, it was anticipated that the study issues could be addressed through a survey instrument (see Appendix A) which would be mailed to companies active in the Canadian "Telidon industry". The survey was, in fact, the major method used for soliciting quantitative information from Canadian firms on revenues, profits, investment, R&D and marketing expenditures, number of employees, and government funding. The surveyed population consisted of 84 organizations (see Appendix B). A 50% response rate was obtained, and the information provided by the 42 respondents constitute the basis for the company-based electronic data base developed from the study.

In order to more fully address some of the qualitative issues, a series of personal interviews were conducted with several industry "experts" and with selected firms participating in the survey (see Appendix C). In addition, the Videotex Canada Conference sponsored by DOC was attended. The opinions gathered by these means, along with information available from literature reviews, also provided primary input to our findings and conclusions.

In order to assess industry viability and feasibility, it is necessary to know the status of videotex markets - their accessibility, growth, competitive forces, and product requirements - and to know the status of the Canadian firms within those markets - their products, financial, and personnel strengths. It is the marketplace which will determine the viability of the "Telidon industry".



Therefore, we have structured this report to address the current videotex markets, the competition in those markets, and the position of firms in the Canadian "Telidon industry". Findings for each of the seventeen study issues are presented under the different sections.

#### TELIDON MARKET PROFILE

Four principal market sectors for videotex services (Study Issue 7) have been identified:

- Business Information Services
- Public Access Systems
- Specific Closed Loop Services
- Home Videotex/Teletext Services.

A brief summary of these sectors and their expected growth potential is presented in the following subsections.

#### Business Information Services

This sector is characterized by services which offer time-sensitive information and/or utilize the videotex medium for more effective graphic presentation, for a broad base of business users. For services such as Infomart's Grassroots and Faxtel's Marketfax, it has been demonstrated that business users are willing to pay for these services, as long as the perceived value of the information exceeds the cost of the service.

Within the Business Information sector, Telidon-based services will have to compete with other traditional business information sources, such as journals and newspapers, as well as ASCII based business information services. The videotex services for this sector are expected to be specialized "niche" markets, and will require identification of, and database developments for, specialized business applications.





In the short term (12 to 18 months) growth prospects are generally expected to be low relative to growth in other market sectors, but to improve somewhat in the medium term (18 to 36 months) as new target groups are identified and specialized services developed.

#### Public Access Systems

The distinguishing feature of a Public Access System is that the service is provided free of charge through terminals or displays located in public or semi-public places; all revenues for the system operator are provided by the system sponsor(s), or advertisers who pay for "space" on the data base. This group includes both interactive videotex services and one-way display systems using Telidon technology. Examples include tourist information systems such as Infomart's Teleguide, government information services such as CANTEL, and display systems used in shopping malls and conference centres.

These "free" services are generally well received by the public who utilize them. The biggest challenge would appear to be for system operators to find enough advertisers willing to use the videotex medium to reach an intended audience. The competition to videotex in this sector includes all other forms of advertising and information media, from simple printed material to sophisticated audio visual and broadcast communications.

The Public Access videotex sector is an area where there is much activity, and it is estimated that in the short term (12 to 18 months) growth potential is high relative to other market sectors. This market sector is also likely to continue to show significant growth in the medium term (18 to 36 months), with integrated videotex/videodisk applications becoming increasingly popular.

#### Specific Closed Loop Services

This sector is characterized by videotex systems offering specific services to a particular audience or user group for particular, and usually commercial, purposes. Examples of Closed Loop Services include hotel videotex systems (for



use by registered guests), point-of-sale terminals and computer aided marketing and educational applications. The characteristics of Closed Loop and Public Access systems tend to overlap at times, since Closed Loop systems can be developed either in-house by the user, or be more generic in the sense of being developed for sale as in an in-house service to multiple users.

The educational market is expected to be fairly limited with strong competition from other technologies. Much may depend on how well NAPLPS becomes established as a standard for computer graphics. The commercial side of the Closed Loop sector, however, shows good growth potential, with an expected growth pattern similar to Public Access systems.

#### Home Videotex/Teletext Services

The Home Services sector is still in the developmental stage (although for years the focus has been on the use of videotex in the home). Many of the early Canadian field trials and the current field trials in the U.S. have been targetted in this sector, yet it appears to be difficult to assemble a service which can attract enough consumer and advertising revenue to cover minimum capital and operational costs. It seems that three things are required before the Home Services market takes off: cheaper hardware, cheaper service, and broader content.

Several American consortia have developed in this sector, particularly for the U.S. marketplace. Norpak has targetted the Home Teletext sector through the Norpak-Rockwell VLSI chip, and Videoway is planning on launching a single interface cable unit which will include NAPLPS capability.

Growth expectations are constantly being scaled down by industry observers such as Link Resources. Initial estimates have been too optimistic. Therefore, the current expectation is for relatively low to medium growth in both the short-term (12 to 18 months) and the medium term (18 to 36 months). It is generally believed that the right combination of content and price is still three to five years away.



In conclusion, Public Access and Closed Loop markets are the two sectors which have the greatest expected growth in the short and medium term (see Exhibit III-2 and Page III.17). The potential size of these sectors is relatively limited when compared to the potentially huge Business and Home markets, which will likely experience lower growth in the near term.

#### TELIDON COMPETITION PROFILE

The current markets for videotex have mainly been developed in Canada to date, but the focus is rapidly shifting to the U.S. marketplace. As Canadian companies move to penetrate U.S. markets they will face very stiff American competition. Many key U.S. corporations; for example, AT&T, IBM, Knight-Ridder, Times Mirror and CBS, have entered the videotex industry through the mechanism of inter-corporate joint ventures as a means of optimizing rapid market access. The future viability of Canadian companies will depend, to a large extent, on the market sectors they are positioned in, and the competition they will face in each.

We have qualitatively assessed the American companies according to stated criteria (see Exhibit IV-6 and page IV.7). This assessment indicates that the American effort, now and in the future, will be concentrated in two key market sectors: Business and Home Services. Potentially, these are the two largest markets. While these sectors are not expected to have high growth potential much earlier than three to five years into the future, major U.S. firms appear to be laying the groundwork for substantial activity and high volumes at that point.

#### Impact of NAPLPS Standardization

One of the main factors which has affected the ability of Canadian firms to compete in international markets has been the ratification of the NAPLPS standard (Study Issue 17). Standard development activities lead to AT&T's Presentation Level Protocol (PLP) announcement at the Videotex 81 Conference in May 1981. The PLP was based largely on Telidon, but had enough technical differences and additional features to be incompatible with the then-current Canadian product.



Conversion to NAPLPS delayed the expected drop in Telidon terminal/decoder prices in three ways:

1. The standard was inherently more complex than "699" Telidon and therefore required a more complex processor and more memory in the terminal/decoder.
2. Additional engineering costs were incurred which needed to be recovered through equipment sales.
3. The evolving specifications during the standards definition process delayed the technological steps (such as the development of custom VLSI chips) which would significantly lower the manufacturing costs of large scale production.

The net effect of the standards development process was, in the opinion of most of the participants interviewed, to produce a "better" standard (compared to "699") and a better competitive position in the U.S. for Telidon versus Prestel and Antiope. However, this was achieved at the cost of a considerable setback to the pace and strength of the Canadian industry's development. Much of the technological lead which Canada enjoyed, particularly in the area of hardware, was lost as Canadian manufacturers had to adapt their product lines to an ever-changing specification, while U.S. and Japanese manufacturers (principally AT&T and Sony) were in a position to wait until the main NAPLPS issues were settled before producing their NAPLPS equipment.

#### Competition to Telidon

Study Issue 10 deals with the capabilities of Canadian Telidon producers competing with foreign NAPLPS producers. Also addressed in this section are Study Issue 8, concerning the proportion of total videotex sales and services accounted for by Telidon, and Study Issue 9, concerning the proportion of Telidon products produced in Canada.




The viability of the Canadian "Telidon industry" is dependent on both the market for videotex products and services and the competition from other videotex suppliers. The competitive position of NAPLPS videotex versus other videotex protocols (including ASCII videotex), and the competitive position of Canadian Telidon products and services versus similar NAPLPS products and services from other countries both pose threats to the Canadian "Telidon industry". The traditional competitors have been European and Japanese videotex systems, but these markets tend to follow geographical and political influences rather than technical ones, and these markets tend to use their own videotex technologies rather than Telidon.

In terms of Study Issue 8, the proportion of total videotex sales and services accounted for by Telidon, available estimates indicate that the proportion is less than 1%. Using the number of terminals as the base and including teletext terminals, CSP International have estimated that combined pre-NAPLPS Telidon and NAPLPS terminal sales account for 0.38% of 2.3 million terminals sold worldwide. According to Link Resources, and using the number of subscribers as the base and including ASCII services, the percentage increases to 0.87%.

The figures presented in the text of this report, (see pages IV.16-IV.17) indicate two significant trends:

- There is potentially a much larger market, at least in the reasonably new future, for teletext services than for interactive videotex.
- There is a very large market for information services which is currently being addressed by ASCII services. Most of this market consists of personal computers equipped with modems.

With respect to Study Issue 9, the proportion of Telidon products produced in Canada, there was no indication that Canadian producers are producing their Telidon products outside Canada. There were 32 survey respondents who used videotex equipment in providing their services, and of these only 13 indicated that 50% or less of their equipment was produced in Canada. It appears that most of the videotex currently in use is Canadian, although there is a trend towards the purchase of AT&T and Sony decoders for new equipment acquisitions.



The major Canadian terminal/decoder manufacturers are unanimous in the opinion that they should not attempt to compete internationally with AT&T and Japanese companies for the mass consumer decoder market. However, there did appear to be opportunities for hardware products which are more specialized and therefore design intensive and are manufactured in smaller production runs with customized features.

In the area of system software, there is little competition to Canadian products such as Infomart's ITSS. In general, the areas where Canadian firms do believe they can compete successfully are in the development of software and content for videotex systems.

#### TELIDON INDUSTRY PROFILE

The profile of the key Telidon-related firms active in the Telidon market was developed to facilitate an assessment of their corporate characteristics, both as an overall industry, and relative to each other in terms of market position vis-à-vis the four major Telidon market sectors. The findings on specific study issues discussed below, constitute the major components of this profile.

#### Overview

An industry mail-out survey was conducted, with follow-up made via telephone. The survey population consisted of 84 firms, of whom 42 responded. Of these 42 firms, four are non-profit organizations and one is a crown corporation. The remaining 37 firms are all commercial organizations. Forty firms are 100% Canadian owned and the remaining two were at least 50% Canadian owned. Thus, the findings pertain mainly to commercial Canadian firms currently active in the "Telidon industry".


The majority of firms (15) have been actively involved in Telidon-related activities since 1981. While the mean value for number of years of involvement is three, there is an approximately equal number of companies with either shorter or longer periods of involvement.



### Location

Study Issue 16 deals with the perceived importance of corporate location to the operation of Telidon firms. There is a geographic concentration of "Telidon industry" firms in Ontario, particularly Toronto and Ottawa. This may well be due to the facts that the technology was developed in Ottawa's high-tech industry and, since the study focussed on commercial firms, a large proportion of such firms were located in, or near, the major commercial centre of Toronto.

The importance of location for operations is dependent upon the market focus of the particular firms, and how their services are provided to customers. Organizations with an international market focus are most likely to perceive location as insignificant. Firms with highly focussed client groups, such as government, perceive location as very important to their operations. Companies whose services depend on a particular transmission mode, or on the relationship of their Telidon activities to other corporate activities, are also more likely to view location as very important.



### Technology Transfer

Study Issue 15 requested the names of companies which received a transfer of Telidon technology from government. Telidon technology was developed in the laboratory at DOC's Communications Research Centre, and was transferred, through licensing agreements, to the private sector for product development. Licenses were obtained through Canadian Patent and Development Ltd.

The only firm to receive a transfer of Telidon technology for manufacturing hardware was Norpak, in 1978. Norpak subsequently sub-licensed the technology to AEL Microtel and Electrohome Ltd. Royalty-bearing licenses on the Telidon data base software have been granted to British Columbia Telephone, Infomart, New Brunswick Telephone, Bell Canada, Alberta Government Telephone, Saskatchewan Telephone, and the Genesys Group. Royalty-free licenses on the Telidon data base software have been granted to University of Montreal,



University of Waterloo, Environment Canada, Department of National Defence, Clinical Research Institute of Montreal, University of Prince Edward Island, Red River Community Centre, National Museum of Canada, College d'Enseignement Général et Professionnel d'Alma, Sheridan College of Applied Arts and Technology, and Brock University.

#### Product and Service Activity

Survey data analysis was focussed on identifying relationships among survey data categories (e.g., revenues, profits and investments) and between data categories and Telidon products and services. However, as almost 80% of respondent firms are involved in three or more products and services, it was difficult to identify clear or categoric results and relationships. It is clear that Telidon activities are highly interrelated, and while many of the large organizations provide a full range of Telidon products and/or services, smaller firms are likely to have found niches supplying Telidon components to larger firms.

There are relatively few firms (5 to 7) manufacturing or distributing hardware, or providing telecommunications services. A large number of firms (28 to 33) develop software, are involved in page creation, and/or consulting. A medium number of firms (15 to 19) distribute software, provide turnkey systems, are system or information sponsors, are system operators, and/or are involved in other Telidon-related activities.

#### Revenues and Profitability

Study Issues 5 and 6 deals with whether the current Canadian Telidon industry is profitable without government assistance, and if not profitable, what level of sales is required to yield a reasonable profit. This composite issue was investigated in terms of government assistance received by respondents, domestic and foreign sales revenue of respondents, and their profitability.





### Government Support

There were 24 firms who reported receiving a total of approximately \$14,703,000 from DOC over the last five years. A further 12 of the 42 respondents reported no funding from DOC, and the remaining six did not specify. Twelve firms reported receiving a total of \$8,494,000 from federal departments other than DOC, and six firms received a reported \$14,502,000 from non-federal sources.


### Revenue

There were 33 firms who reported sales revenue data, for a total of \$24,180,400 in 1984. This was allocated as \$10,834,150 from domestic sales, and \$12,866,250 from foreign sales (two firms did not split revenue by source). There was a wide range in reported revenues. The five firms reporting sales greater than \$1 million account for 83% of the total reported revenues, and have been involved with Telidon for three or more years, and four of them have more than 25 employees. There are 15 firms with sales of less than \$500,000 each and which have sales only in the domestic marketplace.

Approximately 62% of respondents indicated that revenues have increased during the past two years, and 81% expect revenues to increase in the next two years. The few firms that anticipate future revenue decreases were mostly involved in consulting. However, the majority of firms appear optimistic about future sales potential, even with the termination of DOC's Telidon Program.

### Profitability

Forty firms reported on their current profitability. Of these, 17 are currently making a profit, 15 are currently incurring a loss, and 8 are breaking even. The total profit figure for 25 firms providing this information



is a loss of \$12,250,389 for 1984. However, this is due to the large losses reported by a small number of firms. Nine firms had total losses of \$13,369,000, whereas 14 firms reported a total profit of \$1,118,611. There appears to be some relationship between profitability and the scope of sales activity; of the 12 firms with no foreign sales only three reported a loss, while half of the firms with sales in foreign markets reported losses.

Approximately 55% of respondents indicated increased profitability over the past two years, and 76% expect profitability to increase in the next two years. Again, it was usually consulting firms that indicated decreases in future profitability.

In conclusion, the issue of whether or not the Canadian "Telidon industry" is profitable without government assistance remains unclear. On one hand, the total "profitability" figure is negative, implying that the industry is not profitable even with government assistance to date. On the other hand, of the 12 respondents who reported receiving no funding from government sources, only four are currently incurring a loss. Of the 24 firms reporting funds received from DOC, 10 reported that they are currently making a profit, three are breaking even, two did not respond, while nine indicated that they are currently incurring a loss. Three firms, which alone account for a combined total of more than \$22.6 million in government funding (60% of the total \$37.7 million reported), are in a loss situation.

In considering the profitability of the industry as a whole, it must be recognized that a very small proportion of the firms responding to our survey have a very significant effect on the results. Large corporations are willing to take on the risks of developing new products and penetrating new markets, with the prospects of significant profits in the future. Decreased investment for these firms could well increase profitability, but at the probable cost of losing market position in areas which can justifiably be expected to enter rapid growth phases in the medium to longer term.



Given the diversity of products and services comprising the "Telidon industry", and the relative immaturity of that industry, it would be misleading and counter-productive to attempt to assess the level of sales required to yield "a reasonable profit". Profitability can be effected by changes in both revenues and expenses, while increasing sales may also require increasing expenses, thus potentially leaving profitability unchanged. The indications are that many current industry expenses are still developmental and that large sums are being committed knowingly now, against current revenues, for future returns. In simplistic terms, the industry would appear to require sales of at least \$12.25 million more than were achieved in 1984 to breakeven. However, it is impossible at this stage of industry development to determine the cost of achieving such sales or the cost of R&D and market development necessary to sustain or achieve stable future profitability.

#### Employment

Study Issues 2 and 3 deal with employment in the Telidon industry. This includes the number of people employed, the skills required for working in Telidon-related jobs, the availability of workers to fill positions, and the source of supply in the labour force.

#### Number of Jobs

From the 40 respondents reporting employment data, there are 717.5 full time employees assigned to Telidon-related activities, and an additional 73 part-time workers. Most of the employment is provided by relatively few firms; 77.5% of the firms account of only 15% of the full time employees, 62% of the firms employ fewer than six people, and 63% of the jobs are provided by only 7% of the firms. Large firms tend to be large in terms of both sales revenue and number of employees. Approximately 71% of the respondents indicated that employment has increased over the past two years, and 74% expect employment to continue to increase in the next two years.



### Job Skills

The types of job skills required in the Telidon industry can be broadly classified as technical or communicative. Technological development requires technical skills similar to the EDP industry, since computer technology is involved. These skill categories include electrical engineers, technicians, programmer/analysts and computer operators. The development of videotex content requires communicative and artistic skills, along with an understanding of the medium, gained through experience. The required job skills include those of writers/editors, graphic artists, designers, journalists, and advertising copy writers. In addition, Canadian videotex firms require accounting, financial, and marketing management skills. In the increasingly competitive markets, the technical and communicative skills must be directed by management capable of adapting to rapidly changing market factors.

### Availability and Source

There appears to be no lack of qualified people in the Canadian labour force for Canadian videotex firms. This is due partially to the fact that there is currently a high level of unemployment in Canada, and that many highly educated and skilled people are looking for work. In other cases, it appears that people with experience in similar media can be easily trained to use Telidon technology. One major source of skilled and experienced employees seems to be from within other companies in the industry. Several of the newer, smaller firms are built around former employees of Infomart, Norpak, and DOC.

### Investment

Study Issue 4 deals with how much Canadian firms have invested in Telidon. The total investment figure reported by 32 of the 42 respondents who provided the data is \$76,103,500. Again, the investment per firm varies widely, with six firms accounting for 92% of this total.

Company investment in Telidon-related activities appears to be a function of:



- the number of years the firm has been involved
- the major industry sector of the company
- the resources available to the firm (i.e., parent company relationships)
- the number of employees (as an indication of size).

When the dollars invested by companies are compared with funding from DOC, it appears that those firms reporting both figures have invested approximately four times that of government. However, the ratio varies widely, with a mean value of 9.24 times, and a standard deviation of 11.8 which illustrates the wide variation. When company investment is compared with total public sector funding support for the 20 respondents reporting both investment and support figures, the mean value drops to 4.41 times with a standard deviation of 4.65.

#### Research and Development

The total reported annual R&D expenditure for 33 of the 42 respondents is \$12,165,000, although three firms account for 72% of this total. This was the only area where a large proportion of firms (55%) did not report expected increases in expenditure in the next two years. A decreased growth of annual R&D expenditure would appear to be consistent with the theory that the technology has evolved to the point where further increases in such expenditure are not necessary.

#### Marketing

Marketing expenditure data was provided by 34 firms, and the total reported annual marketing expenditure figure is \$5,875,500. In this case, 2 firms account for 68% of the total. Marketing expenditure is generally less than R&D expenditure, however 74% of the respondents indicate that marketing expenditure is expected to increase in the next two years. When compared to the declining R&D expenditure, this tends to indicate that marketing is becoming of greater concern for industry firms.



## Industry Structure

Study Issue 1 deals with the structure of the Canadian Telidon industry, its components and its linkages. In summary, the basic structural characteristics of the Canadian industry appear to be:

- The majority of firms are 100% Canadian-owned.
- Organizations are primarily located in Ontario, with a high concentration in the Toronto and Ottawa areas.
- The average period of involvement with Telidon technology is three years, with an equal distribution of earlier and later entrants.
- The Canadian industry is dominated by one organization, in terms of sales revenues, profitability, number of employees and investment.
- The strength of most of the rest of the industry decreases fairly rapidly in terms of the above variables. One or two other firms, while smaller than the dominant firm, are still larger than the majority of participants. In total, seven major participants provide 80% of the employment, generate more than 85% of industry revenues, and have provided more than 93% of total industry investment in Telidon.
- In terms of products and services, relatively few firms manufacture hardware, turnkey providers out-number system operators, but many firms develop software and are involved in page creation. The capital investment required for manufacturing hardware does not allow easy market entry, whereas the large number of page creation operations indicates lower barriers to entry and that a competitive market exists at this level.
- The financial backing available to different organizations varies - whereas the majority of firms appear to be independent ventures, even "cottage industry" types of companies, a few firms are subsidiaries of major publishing, advertising, mining or communications parent organizations, while others consider Telidon only a small part of their overall activities.



- There appears to be a high degree of intra industry employee migration among Canadian participants, both from government to industry and within the industry itself.

In order to categorize Canadian Telidon companies relative to their strengths in each market sector in the Canadian market, we have qualitatively assessed the companies according to stated criteria (see Exhibit V-2 and page V.38) Canadian firms have products and/or services that make them generally strong in Public Access, Closed Loop Services and, to a limited extent, Business Information Services. A number of companies have some presence in the Home Videotex/Teletext and the Business Information Services markets. In the main, Canadian companies have positioned themselves to capture existing, short and medium-term opportunities.

#### TELIDON PROGRAM ISSUES

This section details our findings dealing with the industry's perceptions of the Department's Telidon Program activities. Opinions have been expressed on both past program activities and on the types of any future assistance that would be preferred.

#### Government Telidon Support

Study Issue 13 deals with how useful the surveyed firms found the Telidon Assistance Program. The program was composed of several component activities, some of which provided grants or work contracts to specific organizations, and others which were directed at providing assistance to the industry as a whole.

It appears that the Standards Development and Product R&D components of Telidon program activities were felt by respondents to be of greatest benefit to the industry. These activities have given the industry an international standard to increase their capability to penetrate foreign markets, and a product with which to do so.

EXHIBIT I-2

RELATIVE POSITIONS OF CANADIAN VIDEOTEX PLAYERS IN THE  
NORTH AMERICAN MARKET

	Business Information Services	Public Access Systems	Specific Closed Loop Services	Home Videotex/ Teletext Services
DOMINANT				
STRONG	Compuserve Dow Jones/MCI The Source	Infomart	Infomart	AT&T Bank of America Chemical Bank Knight-Ridder Times Mirror
PRESENT	Apple      Infomart AT&T Honeywell IBM Sony	AT&T    Cable- Sony    share Genesys St. Clair Videotex	AT&T    Genesys DEC    St. Clair IBM    Videotex Sony	Apple    Infomart ADP CBS Centel Citicorp Commodore Honeywell IBM Sony Time Inc.
TENABLE	American Express Merrill Lynch	Electro- home New Media Techno- logies Norpak	Formic Electro- home Norpak	RCA      Genesys Research Norpak Videoway
WEAK	Electro- home Market- fax Norpak			Electro- home Formic





The Behavioural Research and Market Development components appear to have been least beneficial to the industry. The former activity does not seem to have produced many meaningful results, and the latter activity does not appear to have been successful in its efforts to bring in more business to Canadian firms.

#### Future Assistance Preference

Study Issue 14 concerns the type of future assistance that would be preferred by the industry. More effort in the areas of Product R&D, Market Development, and grant programs were most favoured of the choices provided. Additional suggestions were also solicited, and the single most desirable form of future government assistance to the "Telidon industry" appeared to be government procurement and use of Telidon-related products and services. This type of assistance appears to fall primarily within the control of either the Department of Supply and Services or user departments rather than through DOC.

#### STUDY CONCLUSIONS

In order to assess industry viability and feasibility (Study Issues 12 and 11), we have first drawn together the findings on market growth, foreign competition, and Canadian company positions in the North American marketplace. The composite Exhibit I-2, opposite, (also see Exhibit VII-1), indicates the relative positioning of the Canadian companies in the larger marketplace.

In terms of overall North American markets, some Canadian firms appear to be well positioned to capture opportunities in Public Access and Closed Loop applications; sectors with relatively strong short to medium-term growth expectations. In the longer term, when Business and Home markets should begin to grow rapidly, Canadian firms will in general not be as well positioned to compete.



With the exception of Infomart, and possibly its suppliers, Canadian firms are unlikely to play a significant role in mass Business or Consumer-oriented videotex services in the U.S. The competitive forces that have entered these markets are already too well financed and too well positioned to give most Canadian firms any serious prospects of gaining a significant foothold.

#### Viability of the Canadian Telidon Industry

With respect to Study Issue 12: the extent to which the Canadian Telidon industry could be viable without government support, viability is interpreted in terms of whether the markets for, products from, funding of, and skills/experience within Canadian companies is sufficient to make their survival possible without government subventions. Four criteria were developed (see page VII.7) for assessing overall industry viability.

In summary, it appears that the market for Telidon products and services will be adequate in the short and medium-terms (12 to 36 months) in terms of accessibility, and real and rational growth. The Canadian industry is well positioned in the Public Access and Closed Loop sectors. However, the Canadian industry will face increasing difficulties in terms of developing and marketing its products in the market sectors of greatest future potential growth.

While there is likely to be some interest in further government support particularly through product procurement, it appears that the industry either has adequate funding in the short term, or is capable of surviving on current operating profits. However, the availability of new capital financing, whether debt or equity, is likely to be seriously impacted by any significant negative (or positive) indicators as to market developments and prospects. This is to be expected given the volatility inherent in many electronic technologies facing the possibility of rapid obsolescence and fierce competition.

Finally, there is no reason to believe that the Canadian Telidon industry is not well served in terms of the kinds of technical skills necessary to develop future generations of Telidon products and services. While it is less obvious



that there is or will be an adequate supply of appropriate management skills, the absolute number needed is not great, and there is no evidence to believe that the key companies in the industry will not be able to fulfill their needs.

In conclusion, there are some concerns as to the possible limitations on growth in the medium term and beyond, for those sectors where Canadian companies appear to be strongest. If Canadian companies are able to continue to market Public Access systems and develop new applications for the Closed Loop sector, the Canadian industry should be able to sustain its viability. However, foreign companies could still decide to enter these sectors, and/or developments in the Business and Home Services sectors may over-shadow the other sectors. In such cases, short to medium-term Canadian industry viability may prove to be unsustainable, other than for one or two leaders and possibly some of their key suppliers.

With respect to industry dependence on government, it would appear that the termination of government funding, with the end of the Telidon Exploitation Program on March 31, 1985, is not a particularly major issue for many firms. Most survey respondents indicated that revenues, profitability and employment is anticipated to increase during the next two years, even without government assistance. However, there was recognition of the very great importance of government sustaining, and hopefully increasing, its industry support through direct procurement of Telidon-related products and services.

The Telidon technology and a number of the Telidon organizations, are viable and will probably survive. Interestingly enough though, the name "Telidon", and the identification of those businesses using the technology as "an industry", will probably not survive.



### Feasibility of a Comprehensive Canadian Videotex Industry

For Study Issue 11, feasibility is interpreted to mean capability of achievement. Two criteria for assessment of feasibility were defined in terms of Canadian companies' capability of establishing a full range of Telidon products and services, and capability of sustaining a full range of Telidon products and services in light of foreign competition.

In summary, it appears that Canadian firms are not only capable of establishing a wide range of Telidon products and services but they have, to a very substantial degree, already demonstrated that they can do so. While at present Canadian capabilities are not evenly distributed across the four videotex market sectors, we believe that a comprehensive industry capability does exist in niches within the market sectors.

In terms of sustainability, while there appear to be no technological limitations to the Canadian industry's capabilities to sustain their comprehensive range of Telidon products and services, there are sound commercial reasons why it may not be appropriate to follow a comprehensive product development and marketing strategy.

#### Strategy for Specialization

A strategy based on specialized product development and marketing appears to be appropriate for virtually all Canadian companies. The Canadian industry should continue to maximize its returns on the two sectors where it has historically been most successful - Public Access and Closed Loop Services. The industry should rapidly and actively focus on the development of new, or enhanced and expanded old, products and services in these two sectors. A very careful review would appear to be warranted, before substantial funds are committed, of continuing development and commercialization of products and services in the Business and Home sectors.



In such a review, particular emphasis should be placed on attempting to identify potential niches in the Business and Home system component hierarchy. For example, Canada has traditionally had a substantial degree of success, relative to its competition, in developing specialized software. Such areas of comparative advantage should be highlighted in the search for particular niches in these two sectors, which otherwise appear to be increasingly dominated by foreign competitors.



## II - INTRODUCTION

This chapter of the Report documents the structure of this Report, the study's stated objectives, its two primary issues, and definitions proposed for key terms. Details of the approach to, and methodology for, the study are summarized, and a number of related problems identified, including those resulting from the non-responses to the data survey.

### REPORT STRUCTURE

This report has been structured into seven chapters, the first of which is an Executive Summary.

Chapter II describes the study objectives, definitions and approach. Chapters III, IV, V, and VI address the findings of the study. These findings are presented in four categories, the first three of which are profiles of the Telidon market, the competition for that market, and companies that make up the Canadian Telidon industry. The fourth category, presented in Chapter VI, is a description of the industry's opinions and preferences concerning government activities in support of Telidon.

Chapter VII presents the conclusions we have drawn from our analysis of the findings in Chapters III through V, and addresses the primary issues of the study as described in the current chapter.

  
STUDY OBJECTIVES

There were two objectives of the Background Study #5 of the Department of Communications' evaluation of the Telidon Program:

1. To create a company-based electronic data base for the Telidon industry.
2. To use that base to assess the viability of the Telidon industry.

The first objective relates directly to, and is fulfilled by the results of, the industry survey. Summary findings of this survey are presented in Chapter V in the section on Telidon Industry Profile. A floppy disc of survey results will also be provided.

The second objective - the assessment of Telidon industry viability - is the central issue to be addressed by the study. It is also the subject to which, in some way, the findings from almost all of the other sixteen issues contribute. It is the most complex of these issues, and is of particular interest to DOC in terms of the industry's viability with and without government support. Although it was included as an issue rather than an objective in the Terms of Reference for the study, the other issue which was a primary concern to DOC related to the feasibility of creating a comprehensive Canadian industry and related options.

In light of the above, the two primary issues defined and addressed in this study were:

- The extent to which the Canadian Telidon industry could be viable without government support.



- Whether it is feasible to create a comprehensive Canadian videotex industry, and if not, what would be the best strategy for specialization.

These two primary issues were two of the seventeen issues in the Terms of Reference (12 and 11). While the overall study conclusions are oriented towards these two primary issues, answers to the other fifteen issues were sought, and are provided in Chapters III to VI where information was obtainable. After initial data collection, a review was held with the DOC project authority, during which priorities were established and some issues deemphasized.

#### SCOPE OF STUDY

This study focused on determining the current status of Telidon industry firms, in order to obtain indications of the opportunities and threats to the industry. Commercial firms were considered to be of primary interest for an assessment of industry viability, though the important role and impact of several not-for-profit organizations was recognized.

#### Definitions

One difficulty that has been encountered in the conduct of this study is that of defining precisely what is meant by the terms "Videotex" and "Telidon". Definitions for both terms have evolved along with the technology, and even today there is some confusion and disagreement over their definition within the industry. In this section we attempt to define these terms, along with the related terms "teletext" and "NAPLPS".

#### Videotex

The Request for Proposal on which this study is based describes Videotex as:





" . . . a means of exhibiting letters, numbers, and pictures on a television screen."<sup>1</sup>

Gutenberg II, a popular early book on videotex technology by Douglas Parkhill, et al, has defined videotex as:

" . . . an information delivery system that makes use of the telephone for two-way communications. It may also be linked into two-way cable TV or hybrid cable TV/telephone systems. Electronic mail is made possible by this system."<sup>2</sup>

A Department of External Affairs marketing publication entitled "Videotex and Business" describes videotex as:

" . . . a protocol for creating, storing, transmitting and retrieving computer text and graphics."<sup>3</sup>

Yet another definition of videotex, which was provided with the conference material for the DOC-sponsored Videotex Canada Conference in Toronto on March 4-5, 1985, is as follows:

"Videotex is a two way interactive service which provides access to databanks of information. Terminals used for access to the databanks can be of various kinds ranging from dedicated videotex terminals connected to display monitors or TV sets to micro-computers which also serve other purposes."<sup>4</sup>


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<sup>1</sup> DOC, Request for Proposal for Background Study #5 - Telidon Industry Survey.

<sup>2</sup> Godfrey, David and Douglas Parkhill. (1979) Gutenberg Two. Press Porcepic Ltd. Toronto, Glossary.

<sup>3</sup> Department of External Affairs, Videotex & Business, Pg. 5.

<sup>4</sup> Videotex Canada Conference background materials, "Definitions", distributed March 4, 1985.



Finally, the following definition was presented by Haines Gaffner of Link Resources at the Videotex Canada Conference:

" . . . an easy-to-use interactive electronic medium aimed at non-specialized users in broad based, horizontal markets."<sup>1</sup>


It is worth noting that the first four of the above definitions (from Canadian government sources) have stressed, and in some cases limited, the technology, while the final definition (from a U.S. based consulting firm) has stressed the user. This is, perhaps, indicative of the overall direction which the Canadian Telidon program has taken.

All of the above definitions pose some limitations which could exclude certain applications or services often described as "videotex". The first definition centres around the television screen, and would appear to exclude integrated Telidon terminals or personal computers equipped to receive or transmit NAPLPS frames. The second definition defines videotex in terms of specific carriers: telephone and cable T.V. The third does not limit the display or communications medium, but does include graphics as an integral part of videotex; thereby taking a stand against those who refer to certain ASCII-based services as "videotex". The last two definitions would disqualify non-interactive Telidon systems, such as the OC Transpo bus schedule displays in Ottawa; although perhaps such non-interactive displays should not be classified as videotex. The Link Resources definition could also exclude services such as Marketfax and Telichart, which are designed for specialized users.

We will not attempt to add to the confusion by proposing another definition of "videotex". In this study we have taken a broad view of the videotex medium, with the understanding that a certain amount of fuzziness is inevitable. In assessing the viability of the "Telidon industry", we have attempted to

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<sup>1</sup> From presentation by Haines Gaffner, Link Resources, Videotex Canada Conference in Toronto, March 5, 1985.



consider all applications of Telidon technology, whether fully interactive "videotex", broadcast "teletext" with user selection, specialized information or transaction services for expert users, or non-interactive cyclic display systems. In examining the world market position for Telidon, we have considered not only the traditional videotex competitors (Prestel, Antiope, CEPT and Captain), but also the "ASCII videotex" services which fall within the Link Resources definition. We have not, however, examined non-Telidon time-sharing computer systems, database services, office information systems, etc. which do not fit within the Link Resources definition of videotex.

### Teletext

The definition for teletext which was provided with the Videotex Canada Conference material is:

"Teletext is a one way broadcast of limited amounts of information to users. TV broadcasters and cable companies, who utilize unused portions of a broadcast channel for the transmission of teletext data, are the normal sources for this service. Reception is usually with a teletext decoder connected to a TV set."<sup>1</sup>


Fortunately, there seems to be less confusion over the term "teletext" than there is over "videotex". In this study we have used the term to describe only those information systems which involve the selective capture and display of broadcast information by an intelligent receiving device. Cyclic display systems which do not allow any user selection would not be referred to as "teletext".

### Telidon

The term "Telidon" should be easier to define than "videotex", because the technology is more specific. Yet even here there has been some confusion. Telidon has its roots in the development of a Common Visual Space Conferencing

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<sup>1</sup> Videotex Canada Conference background material. op. cit.




System for the military; the graphics representation techniques from the Common Visual Space Conferencing System were then combined with the concept of a user-friendly information retrieval system such as Prestel, and a "made-in-Canada" videotex system called "Telidon" was born. The essence of Telidon was a presentation level protocol (in the International Standards Organization Open Systems Interconnect model) for text and graphic images as described in CRC Technical note 699, although in the early days the term "Telidon" also seemed to imply:

- An information storage and retrieval system designed around a tree-structured database, with some cross-referencing capabilities, and interfaces (called "action pages") for interactive application programs.
- A particular application level protocol defining the user commands (principally menu selections) for navigating the database.
- The concept of using a colour television set with a decoder to interpret and display the text and graphics images.

As hardware and software evolved, special purpose Telidon business terminals were developed, some of which could also operate as industry standard ASCII terminals for flexibility. These were followed by software packages and circuit boards which would enable certain micro-computers to emulate a Telidon terminal. Interactive Telidon database services were also developed which used specialized user commands and keyword searches. Although systems based on the original menu-driven, tree-structured, television plus decoder technology have remained, the term "Telidon" has been applied to almost any type of system using the particular presentation level protocol. The term "Telidon" is also applied to teletext equipment which uses the same presentation level protocol as Telidon videotex.

In May, 1981, AT&T announced their Videotex Standard Presentation Level Protocol (PLP), which was based largely on the original Telidon protocol. This announcement triggered a standards definition process lasting more than two years and resulting in the replacement of the "699" Telidon protocol by NAPLPS (North American Presentation Level Protocol Syntax).



The official Canadian position today is that Telidon and NAPLPS are the same thing. For example, the following definition of "Telidon" was provided with the conference material for the DOC-sponsored Videotex Canada Conference in March, 1985:

"Telidon is the graphics communication protocol which was developed by the Department of Communications. It formed the basis of the North American and international standards for videotex and is identical to NAPLPS" (emphasis in original)<sup>1</sup>

Some observers, however, such as Martin Lane from Link Resources, Inc., have described Telidon as the "precursor of NAPLPS",<sup>2</sup> implying that the "real" Telidon is the old 699 protocol. Most Canadian companies would refer to their NAPLPS-based products and services as "Telidon", although non-Canadian companies generally do not use the term. (A definition of the term "NAPLPS" is given in the following section.) To illustrate the definition problem, consider whether the following products or services should be called "Telidon":


- A Japanese-built Sony VDX-1000 videotex decoder (Sony literature for this product contains several references to "NAPLPS", but does not mention the term "Telidon").
- A U.S.-based database service designed for non-specialized users in broad-based, horizontal markets, and offering information in either ASCII or NAPLPS format at the user's request.

Since the purpose of this study is to assess the viability of a Canadian industry, we have applied the term "Telidon" only to those NAPLPS products and services which are developed, manufactured, or provided by Canadian firms. The above-mentioned Sony decoder, for example, would not be considered a "Telidon"

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1 Ibid.

2 Lane, Martin, "Confessions of a Prognosticator", Videotex World, Dec. 1984, p.28.



product in this study, although it might be included as a component in a Telidon turnkey system offered by a Canadian vendor. The hypothetical ASCII-NAPLPS database service would also not be "Telidon", although it could provide a potential market for Canadian Telidon decoders and terminals.

#### NAPLPS

"NAPLPS", or North American Presentation Level Protocol Syntax, is the standard presentation level protocol for videotex services, as published in Canadian Standards Association (CSA) document T500-1983, and American National Standards Institute (ANSI) document X3.110-1983.

#### Telidon Industry

It has been extremely difficult to identify any generally accepted definition of "the Telidon industry". During the case studies, a few of the interviewees even objected to being considered part of a "Telidon industry". They insisted that their business was publishing, advertising, information provision, etc., and that they were using Telidon because it was an effective medium for communicating with their intended audience. As one respondent stated:

"There is no Telidon industry. There are a series of applications of interactive technologies within the information industry which seem to have viable futures."<sup>1</sup>

It was also pointed out that Telidon could be compared with ASCII or COBOL. No one speaks of an "ASCII industry" or a "COBOL industry", despite the fact that computer system vendors supply a vast array of products based on the ASCII and COBOL coding standards, and many businesses use ASCII-based computer communications and COBOL-based application software.

Clearly, assessing the viability of an industry that cannot even agree on its own definition, is a challenging task. However, from a review of the original objectives of the Telidon Program the following implicit definition of the Telidon industry was obtained:

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<sup>1</sup> Douglas Peter, president of St. Clair Videotex Design. Personal interview.




- (Assist in the creation of) a complete, commercially viable Canadian videotex industry comprised of:
  - a manufacturing industry to provide system terminals, computers, communications and associated software
  - an electronic publishing (information providing) industry to provide information content
  - a distribution industry, and
  - a public data base operating industry.

This was treated as a working definition to ensure that all key segments of the industry were included in the survey and in the assessment of viability.

#### STUDY APPROACH

The ideal data base for assessing industry viability would be one which contained detailed financial data from all firms involved in Telidon activities, preferably covering several years. Cost and revenue figures allocated by various products and/or services, and other activities broken down by categories, would provide a composite picture of profitable segments within the industry and how these segments have grown.

However, the ideal data base is only that, an ideal. In reality, there are several reasons this ideal is unattainable. Many firms in the industry are small, private businesses. As such, financial information is not public information. Owners and executives in small businesses are also far more likely to be experts in their respective fields, and not necessarily experts in accounting. Company statements for any firm, large or small, are unlikely to be disaggregated in the format requested and accurate figures would only be attainable at a bookkeeping level, if at all. In addition, some firms will be unwilling, even if able, to provide such information.



Consequently, the data base resulting from the Telidon industry survey has limitations. The approach of asking for the ideal amount of data had to be traded-off for what would be a reasonable expectation of the level of information the firms in the industry might be able and willing to provide. In addition, even under the best of circumstances, a 50% response rate to mail surveys is considered to be very good. The probability of receiving data from all firms in the industry survey was recognized to be very low.


Because of these potential difficulties with survey based studies, it was proposed that a number of case study interviews would also be conducted with key people/firms in the industry. The case study approach was also seen as providing more insight into several of the study issues which could not be addressed in the survey. It was also a means of supplementing some of the information resulting from the survey.

#### Methodology

The survey population consisted of 84 organizations. These were identified by DOC. All were commercial firms believed to be currently active in the industry, with the exception of five non-profit organizations. The April 1984 Telidon Directory lists 240 organizations, of which 175 appear to be commercial. Thus, the survey population represented 35% of the total "official" industry as at April 1985, and 45% of the commercial company components. These percentages are likely to be low, as we understand that a considerable but undetermined number of organizations had ceased to be active participants, by 1985.

The survey instrument, included in Appendix A, was agreed upon with DOC following a test survey with one firm to determine what information could reasonably be expected from the industry. Telephone follow-up calls were placed to firms, after three weeks, to determine if there were questions about the survey and whether a response would be forthcoming. This procedure was repeated in following weeks if the questionnaire had still not been returned.





Personal interviews were conducted with several industry "experts" and with selected firms participating in the survey. This approach was used to answer some of the evaluation issues not covered by the survey, and to solicit opinions on the status of Telidon.

The recent Videotex Canada Conference sponsored by DOC was also attended; both to hear a range of views on the industry, and also in order to interview people who would otherwise be difficult to reach.

At the time of writing of this report, 42 completed surveys had been returned. In addition, five surveys were returned as undeliverable, and three companies returned the survey stating that they were not involved in the Telidon industry and would be unable to answer the questions. This accounts for 50 of the 84 surveys sent out.

In the process of making follow-up telephone calls, four companies indicated that they would not be returning the survey, although some comments were given over the phone at that time. Four other companies were unreachable by telephone as the numbers provided were no longer in service, and no listing was available from Bell. In 11 cases, the relevant people were unreachable despite several attempts, and our messages were not returned. The remaining 15 firms expressed a willingness to return the survey, albeit with varying levels of commitment. None of their responses have yet been received.

#### STUDY APPROACH ISSUES


In the process of conducting this study, several issues have arisen which place limitations on the analysis of the company-based database developed from the 42 responding organizations:

- Industry firms have been subjected to a number of studies and evaluations recently, and when combined with the fact the program funding was drawing to a close, some firms appeared to resist yet another enquiry.



- Not all firms returning the survey were able (willing) to provide all the requested information, particularly financial data.
- For those firms which did provide financial data, it is not possible to determine the accuracy of the figures.
- Certain types of data, for example, investment or R&D expenditure, may mean different things to different people - it is not possible to determine what items were included in such figures.
- Interpretation of trend indicator questions by the respondents may differ. For example, if a loss figure was recorded and the trend response indicated that the past trend of profitability was 'increased', this might mean that the loss has increased. In addition, the ambiguity of 'profitability' may or may not lead to interpretation of profit/loss as a percentage of revenues.
- Recently incorporated firms may not have had a first fiscal year period completed. These firms often appear to involve principals who have been active participants in the "Telidon industry" prior to the new incorporation, frequently with companies under another name. The data provided by these firms was specific to the new corporate entity, thus revenues and profits earned in 1984 but applied to old corporate entities were not included. Consequently, most total dollar values are probably underestimates of the true situation; the extent of which is undeterminable.

We have not attempted to "correct" any of the information provided to us from the survey; to do so would be of little additional benefit for the purposes of the study. As indicated, most of the problems associated with the data, in terms of the entire surveyed "Telidon industry" population, are a result of non-responses.


  
Non-Response

There are two sets of non-response problems with which we must be concerned -- total non-response (no information from the firm) and item non-response (only partial information from a given firm). We will discuss each separately, although conceptually the problems are similar.

In the case of total non-response, we are interested in whether the non-respondents differ from the respondents on significant measures of interest. Since the objective of any survey (and this one in particular) is normally to collect information on these measures of interest, we do not know whether or to what extent response bias exists. The standard procedure to adjust for potential non-response bias is to determine what known variables are related to the measures of interest, and estimate these measures for the non-respondents on the basis of this relationship. For example, if revenue were the measure of interest, and it were related to number of employees and the nature of Telidon involvement:

- We could estimate the relationship between revenue (the dependent variable) and number of employees and nature of Telidon involvement (the independent variables). This estimation would obviously be carried out over the respondent sample.
- If we knew, e.g., from file data, the number of employees and nature of Telidon involvement for the non-respondents, we could use the relationship of the variables to revenue to generate estimates of revenue for the non-respondents.

Unfortunately, in the case of our current survey, data on the non-respondent firms are almost non-existent. We do not know their Telidon involvement, their number of employees, etc. It is therefore impossible to impute anything to them, and hence we have no alternative but to ignore them. If they are different in the variables of interest, clearly we will have some bias.



In the case of item non-response, we conceptually try to do similar imputations. In this case, we try to quantify a relationship between the dependent measure of interest and explanatory variables on the respondents. However, in our data set, we were unable to determine any such stable relationship, e.g., we could not develop a model which allows us to predict revenue (based on general characteristics like number of employees) with any degree of precision. In such a case, the only imputation which can be made is an average over the individuals who did respond. For purposes of direct estimation of averages (e.g., average revenue per firm) this is equivalent to ignoring the missing data.

For these reasons, we have based our survey conclusions entirely upon the responses received, and have not attempted to impute missing data.




### III - TELIDON MARKET PROFILE

#### INTRODUCTION

The viability of any industry is dependent on its markets. This may be particularly true of the "Telidon industry", whose product has often been said to be a technology in search of a market. The objective of this Chapter is to define the markets that have been found by companies in the industry, and to assess the growth potential of such markets. Only in this manner can an assessment of the future viability of the industry as a whole be made.

The market profile has been developed from four main sources: the industry survey, case study interviews, supplementary interviews with industry experts, and a review of available literature. The survey population and interview contacts are listed in Appendices B and C, respectively. The survey responses contained opinions on which markets, and which products and services, were felt to have the greatest future sales potential. Thus, opinions on Telidon markets have been gathered from more than 40 industry participants via the survey, and from approximately 25 personal interviews (with some overlap between these groups). These interviews included the key corporate players in the Canadian industry and a very broad cross-section of individuals that are very knowledgeable about Telidon. The review of published documents and the study team's background knowledge of the industry supplemented the fact finding from the industry.

The presentation of our findings answers one of the questions in the study's Terms of Reference; namely Study Issue 7 concerning the current market for videotex products. Background Study #3 is a study concerned with the marketing aspects of Telidon, and more detailed information should be available from that source.



Within this Chapter, we first present background information on the historic market penetration evolution of some consumer electronic products to indicate some of the market acceptance factors which influence market potential for new technologies. This is followed by our findings for four Telidon product and services market sectors, and a summary of expected market sector growth.


#### CONSUMER ELECTRONICS MARKET EVOLUTION

The early focus of Telidon Program activities was on consumer videotex. When Telidon was introduced, the primary focus was on developing a consumer videotex service, and there were highly optimistic predictions that videotex would soon become about as common in the home as television or telephones. Home field trials such as Ida, Elie, and Vista were sponsored by telephone companies to test the new technology in sample homes. Database content was broadly (and sometimes haphazardly) chosen. Since the new service was offered through the home television set, the industrial emphasis was placed on the manufacture of decoders.

Before addressing the issue of current markets for videotex products, it is useful to review the evolution of some consumer electronic products. Much of the theory and historical precedence for forecasts of terminal placements in the Telidon program appear to have been based on this type of comparison.

In order to receive NAPLPS graphics, whether on a television set, a personal computer, or a dedicated NAPLPS terminal, the consumer must have some type of decoder capable of translating the protocol to a visual format. The decoders are typically add-on modules at the present time, although the Norpak-Rockwell International VLSI chip will soon be available in new television sets, and Le Group Videotron will soon be marketing a NAPLPS-capable cable converter.

Consumer acceptance and use of NAPLPS applications will be affected by the market penetration of the decoders. If a videotex/teletext decoder is available in equipment that the potential consumer already owns, such as a television set or a pay-television decoder, subscriptions to NAPLPS services



will be much easier to market. Dedicated decoders or terminals require different consumer decisions, since the decoder is an additional purchase by itself. Software and firmware to make personal computers NAPLPS-capable is now available. The potential consumer would already have the personal computer and a few application software packages. The addition of NAPLPS capability would involve the purchase of another application package.

In this section, we consider the market evolution of two other consumer electronic products:

- Video Cassette Recorders
- Colour television sets.

Decoder penetration, and the adoption of NAPLPS services, would seem to have been identified with similar evolutions in early market forecasts.

Consumer electronics products and communications services typically go through a 15 to 20 year evolution in the following stages:

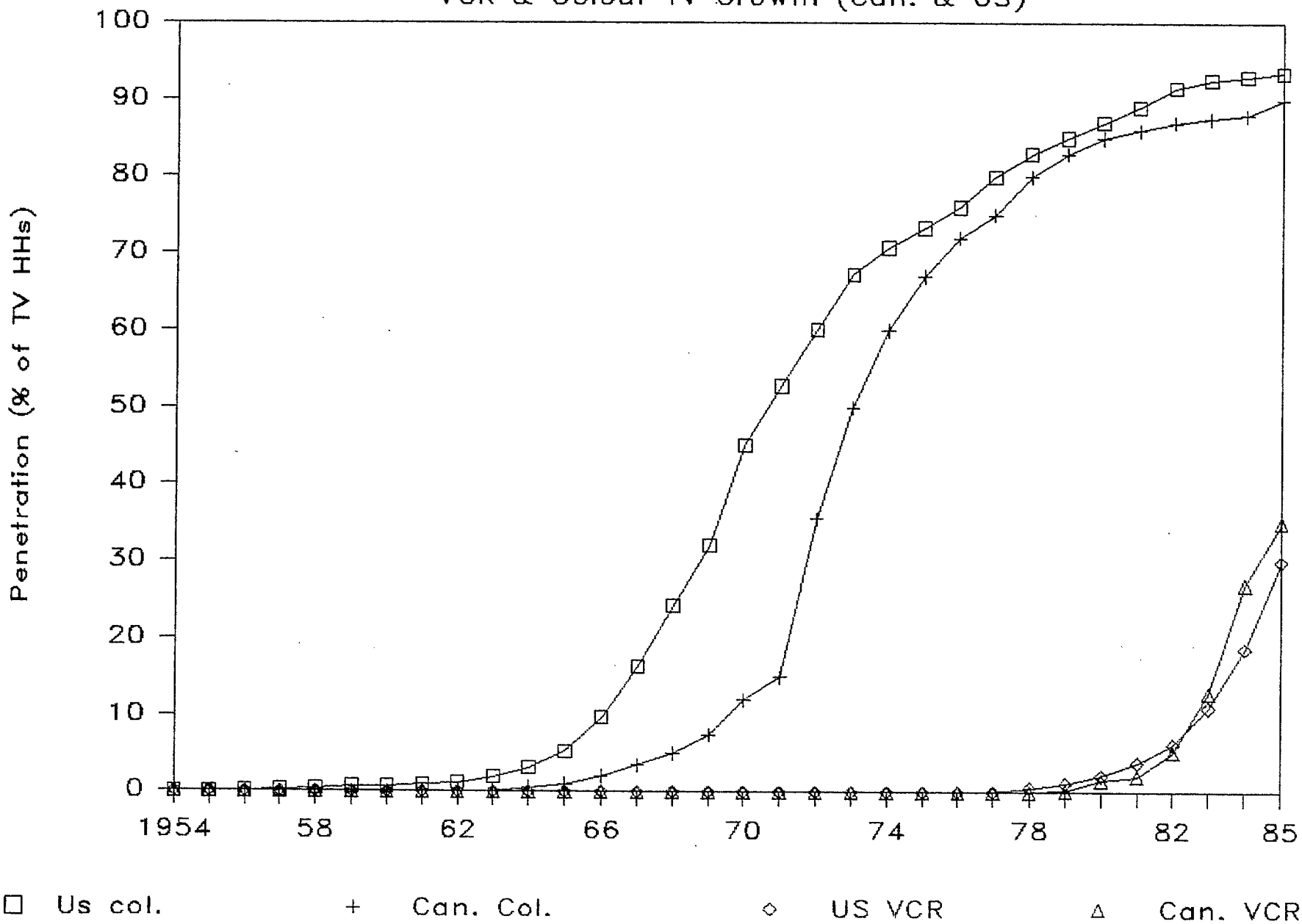
- Introduction - First five years; average unit price still high; penetration less than one percent.
- Acceptance - Next three to five years, average unit price begins to fall; penetration rises to five to ten percent.
- Rapid growth - Next three to five years, penetration increases rapidly to 60 to 70 percent.
- Saturation - Next five years; slow steady growth in penetration; replacement accounts for the majority of sales.

#### Video Cassette Recorders (VCRs)


The home video market was born in 1975 with the introduction of the Sony Betamax VCR. However, it was not until 1977, when Magnetic Video licensed 50 films from Twentieth Century Fox, that attractive content (i.e., feature films)

EXHIBIT III-1

VCR & Colour TV Growth (Can. & US)







for VCRs became available. Almost 10 years after the introduction of Sony's Betamax, the VCR market is now in its rapid growth phase in Canada and the United States. Two significant events have recently occurred to spark a dramatic increase in VCR sales:

- a marked decrease in the average price of a VCR; and
- rapid growth in the number of video retail outlets and, therefore, a marked increase in the availability of videocassettes.


#### Colour Television

Colour television, when first introduced in 1954 in the United States, offered enhanced picture quality compared with the black and white standard. It took colour at least 10 years, to 1965, to penetrate 5% of U.S. television households. From 1965 to 1971 colour experienced rapid growth in the U.S., with penetration rising from 5% to 50%. The growth of colour in Canada has lagged the U.S. by 4 to 5 years.

Although the average wholesale price of a colour television set had dropped by 64% in just two years, from \$1,100 (U.S.) in 1954 to \$400 (U.S.) in 1956, it was not until the amount of colour TV programming increased significantly that colour television took off. In 1954, annual colour TV programming offered by NBC and CBS combined, totalled less than 100 hours. In 1960, these same networks offered a combined total of slightly over 1,000 hours. By 1962, this total had risen to about 1,800 hours, or an average of 4.9 hours per night.

Exhibit III-1, opposite, shows the growth of colour television and VCRs expressed as a percentage of television households in Canada and the U.S.

In conclusion, it should be obvious that the rate of acquisition of a consumer electronics product depends strongly on the price of that product and the availability of suitable content. The same relationship appears to apply to consumer videotex services.


  
Videotex

Current estimates of the number of Telidon terminals in Canada vary from 5,000 to 6,000. Not only is this a low penetration of the potential market, but growth in penetration has been slow. Some industry experts relate this to the fact that there has been considerable consumer uncertainty while the standards issue was being resolved.

Prices for hardware have remained high. At the same time, the content base for videotex services appears to be quite small. Discussions at the Videotex Canada Conference indicated that a restaurant guide, for example, would need 70% of available listings in order to be perceived by consumers as useful. Most such databases would currently only contain about 5% of the potential listings.

The high price and lack of meaningful content produce the "chicken and egg" dilemma experienced by VCRs and colour televisions in their early years; no one is interested in purchasing the equipment while the price is high and content is lacking, and suppliers are reluctant to produce content without a large audience. Meanwhile, equipment production volumes are too low to allow significant decreases of price. This argument is the same as the one used in justifying the IISP component of the Telidon program.

To date, decoder prices are still relatively high, and the available content is often insufficient to attract significant numbers of consumers. However, the situation appears to be changing. In the next few years, decoder prices can be expected to drop as the VLSI chip becomes available for teletext reception. Videoway is developing capabilities for reception via cable. Content which exploits the superior graphics aspects of the Telidon technology is being created. As penetration increases, more information providers should become attracted to utilizing videotex services for their customers; and customers are likely to be attracted to using videotex services.



These concepts work well in theory. However, several problems are encountered in attempting to use the concepts as a basis for forecasting, particularly with respect to the timing of events. The Telidon system "product" has been developed; but opinions as to where the product stands in relation to the introduction and acceptance stages of product evolution, vary with which industry expert you wish to believe. The answers given by industry representatives would appear to depend on the particular market segments in which Canadian companies have positioned themselves.

Only Videotron is currently positioned to offer a consumer videotex service in Canada in the foreseeable future. The telephone company field trials are history. Most Canadian firms are focussing their marketing efforts on the U.S. rather than Canada. Those services, which are currently offered in Canada, usually fall into one of two categories: services sponsored by advertisers or government and offered through public access terminals; or selected business applications, such as Grassroots.

While the initial emphasis of the Telidon Program was on the mass consumer market, mostly as a means for increasing the production of terminals and thereby reducing costs, other market sectors now exist. In the next part of this chapter of the report, we examine the current market for Telidon products and services (Study Issue 7).

#### CURRENT MARKET SECTORS

Based on our industry surveys and case study interviews, we have classified the market for Telidon products and services into four principal sectors. These identified market sectors are:




- Business Information Services
- Public Access Systems
- Specific Closed Loop Services
- Home Videotex/Teletext Services.

These sectors, their approximate growth potential, and the opportunities they present for the industry, are described in the following subsections.

#### Business Information Services

A key selling point of videotex systems, whether NAPLPS-based or other, is the provision of up-to-date information in an easy-to-use manner. This aspect of videotex has made it possible to develop a few specialized business markets where such timely information has not been as readily available from other sources, and/or where the videotex medium is especially suited to the presentation of such information. Examples of such services are Grassroots, a database service providing agricultural information to farmers; and Marketfax, a service providing stock market information and technical analysis, used by stock brokers and corporate investors. Common to both of these services is the offering of time-sensitive information, graphic presentation where it is effective, and interactive calculations based on user requests.


Experience with these types of services has shown, not surprisingly, that business users are willing to pay for these services, as long as the value of the information exceeds the cost of the service. For Grassroots users, the value of the information is based on the competitive edge enjoyed by farmers who can monitor weather patterns, determine the best markets and market timing



for selling their products, and optimize their operations using interactive calculator utilities. The key selling point for Grassroots is the speed and convenience with which the information is delivered in comparison with alternative information sources. For Marketfax users, the value lies in the ability to view stock market trends and a variety of technical indicators graphically, and make decisions regarding stock market trades. In this case, the raw information is readily available from other sources, and the key selling point lies in the graphic presentation of the information.

Despite the value of these services, the high cost of hardware has posed a major hurdle for establishing a viable market. The system operators providing both services stressed the importance of the IISP in making Telidon terminals affordable to their users. Both services charge a usage fee, although the fee for Grassroots usage is small. Grassroots also benefits from a very favourable telephone tariff, which allows farmers located anywhere in Manitoba to dial the host computer for a flat rate of only five cents per minute.

The Grassroots service is being adapted for other agricultural markets and is now offered in other provinces in Canada, plus a few regions in the U.S. It is likely that other business applications will be developed in the future which can also provide specialized information services via videotex. However, these are also likely to represent specialized "niche" markets, rather than broad Business Information markets. Telidon-based services will have to compete with other traditional business information sources, and also with ASCII based business information services. The amount of time required to develop NAPLPS videotex content can also be considerable; the Grassroots database, for example, has been evolving for about four years. For these reasons, we would expect the short term (18 months) growth prospects for Telidon business information services to be low, but to improve somewhat in the medium term (1½-3 years) as new target groups are identified and specialized services developed.




The Business Information market offers opportunities primarily for system operators providing the specialized services, personal computer software developers/distributors, information providers and page creators, and hardware manufacturers/distributors. It is likely that the trend will be away from specialized videotex terminals and toward personal computers equipped to receive NAPLPS.

#### Public Access Systems

Public Access videotex systems represent sponsored information services which are made available to the public free of charge through terminals or displays located in public or semi-public places. Examples would include tourist information systems such as Teleguide, government information services such as CANTEL, and display systems used in shopping malls and conference centres. We have included in this group both interactive videotex services and one-way display systems using Telidon technology.

The distinguishing feature of a Public Access System is the fact that the service is provided free to the user; all revenues for the system operator are provided by the system sponsor(s), or advertisers who pay for "space" on the database. Some Public Access Systems are operated by, or on behalf of a single sponsor in order to disseminate specific information; the OC Transpo bus schedule information system in Ottawa shopping malls, and the now-defunct CANTEL service sponsored by Supply and Services Canada, are examples of such systems. Other systems are operated by system operators who attempt to make a profit by selling "space" on the database to advertisers; Infomart's Teleguide and similar systems operate in this fashion.

Large Public Access Systems, such as Teleguide, offer a prospective system operator a highly visible entry into consumer-oriented videotex, with less risk than offering a home service. Infomart offers Teleguide franchises, and has sold several in the U.S., along with a recent sale in Tokyo. Other firms, such as Genesys, have also sold software or turnkey systems to new U.S. operators. Some specialized Canadian-made hardware, such as public access terminals, has also been purchased by U.S. operators.




Shopping malls, conference centres, and other organizations can use Telidon in either interactive or cyclic display systems to provide information and advertisements to shoppers/attendees. Several conference centres (Montreal Palais des Congres, Toronto Convention Centre) have already installed Telidon displays for this purpose. The Eaton Centre in Toronto has standalone interactive Telidon systems to help customers locate the goods and services they are seeking. The above mentioned Teleguide system also contains advertisements for local restaurants, stores, etc. It is not known how much additional business is generated by the use of these systems, but the potential is apparent.

Provincial governments have also used Telidon to communicate information to the public. The province of Manitoba has sponsored several pilot projects, including a tourist information service, and services aimed at special community groups. The Ontario Ministry of Tourism has provided information as well as funding for the Teleguide service offered by Infomart in Toronto and Ottawa. The Quebec government is currently considering the establishment of a Telidon/videodisk based tourist information system, and a Teleguide-like service is being developed for the city of Montreal.

The Public Access videotex market is an area where there is much activity, and we would estimate the short term (18 months) growth potential to be high. This market is also likely to continue to show significant growth in the medium term (1½-3 years). We would also expect to see integrated videotex/videodisk services become increasingly popular in public access applications.

The Public Access market offers opportunities for turnkey system suppliers, system operators, manufacturers of public access terminals, and page creation services.



### Specific Closed Loop Systems

We have used the term "Closed Loop System" to refer to a videotex system which offers a specific service to a particular audience or user group for a particular, usually commercial purpose. The actual system may be either a dedicated host system, or a "closed user group" on a shared host system.


Examples of such services would be hotel videotex systems (for use by registered guests), point-of-sale terminals, and computer aided educational applications. The distinction between a "Public Access System" and a "Closed Loop System" may be blurred in some instances; for example, a hotel may offer a public access tourist information service in its lobby, with the same service being available as part of a closed loop system in guest rooms.

Videotex systems offering information and transactional services to registered hotel guests are proving to be quite successful where they have been tried. Hotels cater to business and vacation travellers who are likely to be in an unfamiliar city with time and money on their hands. The system can offer information about the city, interactive games, etc. for a fee charged to the room.

Telidon can also be used to help market specific products. One major automobile manufacturer has already set up such a system for use in dealers' showrooms. Point-of-sale terminals in supermarkets can use Telidon graphics to advertise a product, then print discount coupons for the customer to use. In instances such as these, Telidon is used simply as a standard computer graphics protocol, with little relationship to the original home videotex concept.

The colour graphics capabilities of Telidon also make it well suited to applications in computer aided education. However, there are other systems which are equally suitable for this purpose, such as Plato, or standalone personal





computer based systems. The competitive position of Telidon in educational systems is likely to depend on how well NAPLPS becomes established as the standard for computer graphics. Again, the high cost of Telidon equipment has been cited as a deterrent; some industry representatives have indicated that the IISP was a critical factor in the ability of educational institutions to purchase Telidon terminals.


From our observations, the educational market would appear to be fairly limited, at least in the short term. Computer aided education is still largely an experimental approach, with old fashioned human instruction still the predominant mode. The major Telidon industry players are concentrating their efforts on other markets.

The commercial side of the Closed Loop market, however, shows good potential. We anticipate that commercial Closed Loop Systems will show a growth pattern similar to the Public Access Systems described earlier.

The Closed Loop market offers opportunities primarily for turnkey system suppliers, application software developers, page creators, and hardware manufacturers.

#### Home Videotex/Teletext Services

The Home Videotex market is a controversial area. Despite the early optimistic projections and enthusiastic promotion by a number of key players, home Telidon in Canada is an idea which seems to have fizzled, at least for the immediate future. Related home computer service offerings, such as NABU, have also not been profitable. Several U.S. players are offering home field trials, but are also finding that it is extremely difficult to assemble a Home Videotex Service which can attract enough consumer and advertising revenue to cover the capital and operational costs.



Industry experts have cited three things required before the home market will take off:


- Cheaper hardware. Home users will gladly accept a free videotex decoder during a field trial, but are not so willing to pay the approximately \$600-\$1,000 that units typically cost.
- Cheaper service. Most current videotex systems need to charge approximately \$30-\$40 per month in order to cover their operating costs. A U.S. marketing study has indicated that the basic service would need to be offered for \$8-\$12 per month to reach the upscale user market, and \$4-\$6 per month for general penetration.<sup>1</sup>
- Adequate content. Most Home Videotex Services to date have offered only a sample of the information and services required to produce a real demand for the service. Much of the information contained on videotex is also available from television, radio, newspapers, telephone calls, libraries, etc.; often in more depth on the competing media. A few interactive services are offered, but again a much broader and deeper range of services will be required.

In essence, the perceived value to the user must exceed the cost of the service; this is generally not yet the case.

Despite this situation, there is still a long-term interest by a few Canadian and U.S. firms. Home videotex field trials are a game for the big players. Some major Canadian firms are actively participating in U.S. field trials through joint ventures, both to provide a short term market for products and services, and to establish a long term "piece of the action" for the anticipated growth of videotex in the U.S. American system operators have been quite willing to import Canadian expertise and software in this area. They have been less willing to import Canadian hardware, based on previous negative experiences with reliability and servicing, and the availability of competitive products from AT&T.

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<sup>1</sup> CSP International Study, quoted by John Madden in a presentation at the Videotex Canada Conference, Toronto, March 4-5, 1985.




Some industry representatives, such as Norpak president Jim Carruthers, believe that teletext, rather than videotex, is the best approach for penetrating the home market. This opinion would seem to be borne out by the Prestel experience, since the installed population of Prestel terminals is approximately 98% teletext and 2% videotex. The host-end technology for teletext can support a much larger base of users for the same investment, and it is also projected that NAPLPS teletext decoders will soon be available as a low-cost, built-in option in television sets, just as cable converters are today. The chief disadvantage of teletext, of course, is that it is limited to the distribution of a comparatively small amount of information, and cannot support the transactional services such as home banking which are included with Home Videotex services.

The only firm identified which is currently pursuing a mass Home Videotex market in Canada is Le Group Videotron, along with the associated engineering/manufacturing company Le Group Videoway, in Montreal. Videotron is the second largest cable-TV company in Canada, with approximately 600,000 subscribers in the province of Quebec.

Videotron's strategy for penetrating the home market is to introduce a service (called Videoway) based around a single interface unit which combines a multi-channel converter, remote control, pay TV decoder, closed-caption decoder, video game unit, home security monitor, and NAPLPS teletext/videotex decoder. Interfaces will be included for a VCR or home computer to allow the downloading of movies or software. Current plans are to launch a one-way version of the service (including teletext and a subset of other features) in the fall of 1985, and to offer the two-way service (including interactive videotex) starting in late 1986.

Videotron hopes to avoid the experience of other videotex home trials and services such as NABU by offering a multi-function unit rather than a single function videotex decoder, and by interfacing to existing personal computers



rather than introducing a new personal computer tied to their service. The pricing structure for their proposed array of services was not revealed, but it remains to be seen whether they can offer the services at a low enough cost to attract a large consumer response, and still make a profit.

Videotron's projections for the number of subscribers are reminiscent of some of the enthusiastic projections made in the early days of the Telidon program. Currently stated projections are:

- 50,000 subscribers by the end of 1986
- 100,000 subscribers by the end of 1987
- 200,000 subscribers by the end of 1988.

Equipment is to be manufactured in Canada by Le Group Videoway, and will be marketed internationally as well as being used by Videotron. The projected subscriber figures represent a rather large scale consumer electronics manufacturing industry - precisely the type of industry which has proved very difficult for several other Canadian companies. On the other hand, Videotron would appear to offer a captive market for the Videoway product. The multi-faceted Videoway service and the existing subscriber base of 600,000 homes might be the key to achieving the elusive "critical mass" required for a viable Home Videotex service, or it might be another overly ambitious and unprofitable venture. Many observers outside of Videotron are skeptical of their subscriber projections.

Some industry observers predict a moderate growth for consumer NAPLPS videotex for both the short (18 months) and medium (1½ - 3 years) terms. Link Resources, for example, projected in September, 1984, the following NAPLPS subscriber base (including subscribers using personal computers as NAPLPS decoders):

- 1984 - 10,000 subscribers
- 1985 - 20,000 subscribers
- 1986 - 40,000 subscribers



1987 - 55,000 subscribers  
1988 - 95,000 subscribers  
1989 - 210,000 subscribers<sup>1</sup>

These figures have been scaled down considerably from earlier Link Resources projections, and we believe that even these figures are optimistic. A dramatically successful offering by Videotron would obviously change the picture significantly.

The Home Videotex/Teletext market offers long-term opportunities for hardware manufacturers and distributors, system operators, information providers, application software developers, page creation firms, telecommunications carriers, and software developers/distributors of personal computer based products.

#### MARKET SECTOR GROWTH

The four current markets for videotex products have been defined and some indications provided about growth potential. As indicated earlier in this Chapter, videotex services have not yet entered a rapid growth stage. In fact, these services could be considered to be only in the acceptance phase. The timing of future events is still unknown, and accurate predictions are still a matter of "crystal ball gazing" to some extent.

One thing is clear - NAPLPS graphics are superior to those of other current videotex protocols. Given the period of time it has taken to develop the NAPLPS protocol, it is highly unlikely that a new protocol supplanting NAPLPS, could be introduced to the marketplace within the next 10 years. Use of Telidon technology will depend mainly on the demand for computer graphics, and the perceived value of the content versus the cost of the service.

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<sup>1</sup> Link Resources, Interactive Videotex Forecast: 1984 - 1989, September, 1984, p. 14

EXHIBIT III-2

EXPECTED RELATIVE GROWTH IN DIFFERENT TELIDON MARKET SECTORS

		Business Information Services		Public Access		Closed Loop Services		Home Videotex/ Teletext	
HIGH				/ / / / / / / /		/ / / / / / / /			
	MEDIUM								
			/ / / / / / / /					/ / / / / / / /	/ / / / / / / /
LOW		/ / / / / / / /	/ / / / / / / /					/ / / / / / / /	/ / / / / / / /
		Short-term	Medium-term	Short-term	Medium-term	Short-term	Medium-term	Short-term	Medium-term

Short-term: Next 12 - 18 months  
 Medium-term: 18 months - 3 years



The viability of the Canadian "Telidon industry" will be determined by the marketplace. In this section, we examine the expected growth potentials of the four market sectors. Survey respondents were asked to give their opinions on future products/services and markets which will utilize Telidon technology. The responses from both the surveyed organizations and the interviewees, plus the background knowledge of the study team members, has resulted in estimates for the four market sectors. We do not have actual growth forecasts from documented literature, and our relative projections for growth are not expressed as either dollar or penetration percentages.

Exhibit III-2, opposite, is a matrix illustrating the relative growth of Telidon market sectors projected over both the short (next 12-18 months) and medium (18-36 months hence) terms.

The potential growth in each market sector is described on a qualitative basis and relative to each of the other market sectors. Clearly, on an absolute scale, the potential growth in large sectors, such as the Business and Home Consumer markets, is far more significant in dollar terms than the potential growth in either the Public Access or Closed Loop sectors. Thus, the points on the high/medium/low scale of Exhibit III-2 have been defined on the basis of the expected level of market activity as follows:

- High: Rapid and sustained market growth relative to growth activity in other market sectors.
- Medium: The beginnings of market growth; penetration still low; the product or service/price equation has not been fully worked out.
- Low: Little or no market activity; potential market participants positioning themselves for the longer term.

The four Telidon market sectors are assessed below.



### Business Information Services

Generally, this is a large potential market but it requires that applications for multiple users be developed. Over the next 12 to 18 months, growth in the Business Information Services market is generally expected to be low relative to growth in other market segments. Use of Telidon-based graphics in many business applications has had slow uptake. To date, the perceived value of many potential videotex-based business applications has not exceeded the cost of obtaining both the services and the requisite hardware to access those services. However, based on expectations of the long-term market potential, key industry players are already positioning themselves for market entry.


### Public Access Systems

This sector could be considered a limited market, in the sense that there is a finite number of shopping malls, conference centres, etc., but one of the principal conclusions of the Videotex Canada Conference was that, in the short-term (next 12-18 months), much of the growth activity in videotex would take place in the Public Access market. Indeed, many Canadian players are concentrating their short-term market strategies to capture opportunities in this market. It is expected that growth activity in this market will continue at a relatively high level at least well into the medium-term (next 18-36 months).

### Specific Closed Loop Services

When special closed-user group business applications are included, this is a potentially large market sector. However, for hotel rooms and even point-of-sale terminals, the market will be limited by the number of potential locations. Closed Loop services such as videotex services in hotel rooms,





point-of-sale terminals, and other specific commercial applications are expected to parallel the growth activity in the Public Access market in the short-and medium-terms. Because this market sector is closely related to the Public Access market, Canadian firms are generally well positioned to capture opportunities in this market sector.

#### Home Videotex/Teletext Services

Home Videotex/Teletext Services are still in their infancy. While potentially an extremely large market sector, it is not currently cost effective. It is generally believed that the right combination of content and price is still 3 to 5 years away. Although the potential in this market sector is great, there will be a relatively low level of activity, at least in the short and medium-terms.

In conclusion, Public Access markets and Closed Loop markets are the two sectors which have the greatest expected growth. Although survey responses most frequently mentioned business applications as future markets, further explanations indicated that these applications fall within our definition of Closed Loop services.

Now that the market sectors and their expected growth potentials have been defined, it is necessary to examine both Canadian company's positioning in these markets and the competitive forces they face. The next Chapter examines aspects of competition; Chapter V examines the Canadian companies, their products and services, their positioning, and their ability to compete. The conclusions Chapter draws these three aspects together in order to determine the viability and feasibility of the Canadian "Telidon industry".



## IV - TELIDON COMPETITION PROFILE

### INTRODUCTION

No industry can afford to ignore its competition. To do so, could result in sudden death. Consequently, in this study, we are not only concerned with defining the markets for Telidon products and services, as presented in the Telidon Market Profile Chapter, but also with the competition for those markets and how this relates to Canadian firms. The objective of this Chapter is to determine the threats and opportunities for companies in the Canadian "Telidon industry", for each of the four major Telidon market sectors.

The competition profile has been developed from four major sources: the industry survey, case study interviews, supplementary interviews with industry experts, and a review of available literature. The survey responses contained opinions on the threats to and opportunities for the Canadian industry. Thus, opinions on Telidon competition have been gathered from more than 40 industry participants via the survey, and from approximately 25 personal interviews, including a major foreign producer represented by Sony of Canada Ltd. These interviews included the key corporate players in the Canadian industry and a very broad cross-section of individuals that are very knowledgeable about Telidon. The information has also been supplemented with background document reviews and the technical knowledge of study-team members.

The presentation of our findings answers several questions in the study's Terms of Reference; specifically, Study Issue 17, which is concerned with the effect NAPLPS standardization has had on the industry, and Study Issue 10, which deals with Canadian Telidon producers' ability to compete with foreign NAPLPS producers. Specific data for total videotex sales and services, Study Issue 8, and production of Telidon products, Study Issue 9, are not available.



Consequently, these two issues are addressed indirectly with respect to the ability of Canadian Telidon producers to compete with foreign NAPLPS producers (Issue 10).

Within this Chapter, we first present background information on the composition of competitive forces in the U.S. and what this means for Canadian companies. Foreign companies are then positioned in each of the four market sectors. This is followed by our findings on the effects of NAPLPS standardization, since this standardization has had competitive implications for Canadian firms. Findings on the competition to Telidon, in relation to various markets and products, are then discussed.

#### FOREIGN COMPETITORS

The purpose of this section is to address the issues of:

- how key players in the North American videotex/teletext industry have formed alliances, joint ventures and consortia to position themselves to enter the consumer and/or business videotex/teletext markets, and
- the implications of these alliances/joint ventures/consortia for Canadian companies in the videotex/teletext industry.

#### American Developments

In the United States, videotex and teletext have attracted large publishing, telecommunications, broadcasting, financial and information processing concerns. Companies are positioning themselves for the next generation of business equipment and services (the integration of text and graphics capabilities in computer hardware and business services) and potentially the next boom in consumer electronics, i.e., a fully integrated text and graphics home computer.

EXHIBIT IV-1

PROJECTED U.S. PERSONAL COMPUTER HOUSEHOLDS

(millions)

	U.S. Households	% With PCs	PC Households	% With Modems	Households with PCs and Modems
1984	86.7	12.0%	10.4	20%	2.1
1985	88.7	18.0%	16.0	35%	5.6
1986	90.8	24.4%	22.2	45%	10.0
1987	92.8	31.8%	29.5	55%	16.2
1988	94.9	39.4%	37.4	63%	23.6
1989	96.4	47.5%	45.8	70%	32.1

Source: Link Resources, "Interactive Videotex Forecast: 1984 - 1989", September 1984



### Potential Consumer and Business Markets

Link Resources has estimated that the installed base of personal computers (PCs) in U.S. homes will grow from 11.4 million in 1984 to 55.9 million in 1989 - or, discounting multi-computer households, from 10.4 million in 1984 to 45.8 million in 1989. Furthermore, the proportion of PC households equipped with modems will rise from 20% in 1984 to 70% in 1989 (see Exhibit IV-1, opposite).

These projections are probably optimistic given that the majority of home computers have rapidly fallen into disuse. While Link estimates are optimistic, there is still a significant micro-computer base. "Electronic Mail and Micro Systems" (EMMS)<sup>1</sup> estimates that only about 500,000 home computers are both modem-equipped and in active use. Of the non-modem-equipped home computers, many cannot be upgraded to have communications capability. This suggests that a significant proportion of future home computer sales will be accounted for by replacement purchases. Thus, assuming the next generation of personal computers is NAPLPS-capable<sup>2</sup> then the consumer market could present computer manufacturers, videotex service providers and system operators with a potentially large market similar, for example, to the present consumer market for pay television services; roughly 31 million subscribers.

The business personal computer installed base is presently estimated at about 12-14 million units. Of an estimated 45 million white collar workers in the U.S., about 35 million could be considered candidates for micros. Thus, roughly 35% to 40% of that market is currently penetrated. EMMS projects that the business microcomputer market will probably reach saturation at 65% of the potential market, i.e., 22 million units. That saturation level will probably be achieved within the next two years. Beyond 1987, therefore, replacement will begin to become a significant factor in annual sales of business micros.

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<sup>1</sup> "EMMS", October 15, 1984.

<sup>2</sup> One of the conclusions that came out of the Videotex Canada Conference in March 1985 was that it would be very likely that the next generation of personal computers would be NAPLPS-capable.

EXHIBIT IV-2

EARLY VIDEOTEX/TELETEXT JOINT VENTURES

Company	Nature of Service	Content Focus	Partners
Time Inc.*	<ul style="list-style-type: none"><li>• full channel teletext delivered by satellite</li></ul>	<ul style="list-style-type: none"><li>• 5,000 most popular pages</li></ul>	<ul style="list-style-type: none"><li>• local cable companies (starting with ATC and newspapers)</li></ul>
Knight-Ridder	<ul style="list-style-type: none"><li>• telephone videotex</li></ul>	<ul style="list-style-type: none"><li>• consumer-oriented information and transactional services</li></ul>	<ul style="list-style-type: none"><li>• AT&amp;T, local newspapers and banks</li></ul>
CBS	<ul style="list-style-type: none"><li>• telephone videotex and VBI teletext (Extravision)</li></ul>	<ul style="list-style-type: none"><li>• consumer information, advertising and transactions</li></ul>	<ul style="list-style-type: none"><li>• ADP, AT&amp;T</li></ul>
Times Mirror	<ul style="list-style-type: none"><li>• videotex (by cable and telephone)</li></ul>	<ul style="list-style-type: none"><li>• consumer information, advertising and transactions</li></ul>	<ul style="list-style-type: none"><li>• Bank of America, TM-owned newspapers and cable systems</li></ul>

Source: The Yankee Group, "YankeeVision", April/May, 1982.

Note: \*Time Inc. has since dissolved its teletext venture.



Again, if we assume that the next generation of business micros is NAPLPS-capable, then the significance of making an early entry into the business-oriented videotex arena is self-evident.

### Joint Ventures

To date, many of the key players have entered the videotex industry through the mechanism of inter-corporate joint ventures as a means of optimizing rapid market access. In general, the joint venture is a mechanism whereby corporations, each of which is in a different geographical or market segment, agree to pool resources in a specific technological application in order to achieve an overall improvement in competitive strength and market position. In approaching the joint venture, each participant realizes that he himself has something unique to offer, within the proposed partnership, and that the other party has capabilities or position which would be more difficult or more expensive to secure by other means.

In early 1982, several videotex/teletext joint ventures began to emerge primarily under the auspices of publishing giants such as Time Inc., Knight Ridder and Times Mirror (see Exhibit IV-2, opposite).

The first generation of joint ventures, positioned primarily to enter the consumer videotex/teletext market, has spawned new alliances aimed at

- retaining a presence in the consumer market
- gaining a foothold in a potentially more promising business market.

Exhibit IV-3, overleaf, presents some of the current joint ventures in consumer and business videotex/teletext. It is evident that these new alliances bring

EXHIBIT IV-3

CURRENT U.S.-INTER CORPORATE JOINT VENTURES IN VIDEOTEX/TELETEXT

Joint Ventures	Players	Strategy	Status	Commitment
<u>CONSUMER</u>				
Trintex	IBM, CBS, Sears	<ul style="list-style-type: none"> <li>• Service in planning stages</li> </ul>	<ul style="list-style-type: none"> <li>• launch 1986/87</li> </ul>	<ul style="list-style-type: none"> <li>• \$75M to \$100M over the next two years</li> </ul>
	RCA, Citicorp, and third unidentified partner	<ul style="list-style-type: none"> <li>• Service in planning stages</li> </ul>	<ul style="list-style-type: none"> <li>• regrouping after the RCA/Citicorp/J.C. Penney consortium dissolved</li> </ul>	<ul style="list-style-type: none"> <li>• both RCA and Citicorp claim to have made sizeable investments</li> </ul>
Viewtron	AT&T, Knight-Ridder	<ul style="list-style-type: none"> <li>• Consumer videotex service positioned as "all-things-to-all-people"</li> <li>• Transactional services - homebanking, home-shopping</li> <li>• Using AT&amp;T Sceptre terminals</li> </ul>	<ul style="list-style-type: none"> <li>• launched Sept. 1983</li> <li>• 2,000 to 2,500 subscribers</li> <li>• failed to meet expectations of 5,000 subscribers in its first year</li> </ul>	<ul style="list-style-type: none"> <li>• over \$100M</li> </ul>
Keycom (KISS)	Centel, Honeywell	<ul style="list-style-type: none"> <li>• News retrieval, transactional services</li> </ul>	<ul style="list-style-type: none"> <li>• launched Nov. 1984</li> <li>• 300 subscribers</li> </ul>	N/A
Gateway	Times-Mirror, Infomart	<ul style="list-style-type: none"> <li>• Range of services including information, educational and entertainment</li> </ul>	<ul style="list-style-type: none"> <li>• start-up Sept. 1984</li> </ul>	N/A
<u>HOME &amp; BUSINESS</u>	AT&T, Chemical Bank, Bank of America, Time Inc. and Others	<ul style="list-style-type: none"> <li>• ASCII-based home and business oriented service including banking, shopping, ticketing and news retrieval</li> </ul>	<ul style="list-style-type: none"> <li>• start-up within 1 year</li> </ul>	N/A
<u>BUSINESS</u>	IBM, Merrill Lynch	<ul style="list-style-type: none"> <li>• Service in planning stages</li> </ul>	<ul style="list-style-type: none"> <li>• start-up date not announced</li> </ul>	N/A
	Honeywell and other unidentified partner	<ul style="list-style-type: none"> <li>• Business videotex applications for existing base of PCs and ASCII terminals</li> <li>• Using Antiope</li> </ul>	<ul style="list-style-type: none"> <li>• operating a videotex demonstration centre in Schiller Park, Il.</li> </ul>	N/A

N/A: not available



EXHIBIT IV-4

CANADIAN VIDEOTEX VENTURES

Videotex/Tele-text Ventures	Players	Strategy	Status
Infomart	Southam, Torstar	<ul style="list-style-type: none"> <li>• Initially positioned for the consumer market</li> <li>• Concentrating on proven applications:                             <ul style="list-style-type: none"> <li>- public access systems</li> <li>- Grassroots (agricultural market)</li> </ul> </li> <li>• Planning to launch a business service.</li> </ul>	<ul style="list-style-type: none"> <li>• has established a significant lead in public access systems and in the agricultural market</li> </ul>
Videoway	Le Groupe Videotron, G-Tech, Societ� de developpement industriel	<ul style="list-style-type: none"> <li>• Provide Videotron cable subscribers with two-way services:                             <ul style="list-style-type: none"> <li>- home-banking and shopping</li> <li>- electronic mail</li> <li>- pay-per-view</li> <li>- meter reading</li> </ul> </li> <li>• Service hinges on the development of the Vidacom terminal</li> <li>• Service is part of Videotron's strategy to generate a significant proportion of subscriber revenues from non-programming services</li> </ul>	<ul style="list-style-type: none"> <li>• start-up third quarter 1985</li> </ul>
iNet	Bell and other Telecom Canada members	<ul style="list-style-type: none"> <li>• Provide a gateway service to database vendors and electronic mail (Envoy 100)</li> <li>• Available to ASCII and NAPLPS terminals</li> <li>• Positioned for business market</li> </ul>	<ul style="list-style-type: none"> <li>• commercial start-up late 1983</li> </ul>
B.C. Tel	B.C. Tel and subsidiaries AEL Microtel, Microtel Pacific Research	<ul style="list-style-type: none"> <li>• Consumer-oriented videotex services</li> </ul>	<ul style="list-style-type: none"> <li>• no service launched after field trial</li> <li>• B.C. Tel abandoned videotex</li> <li>• New Media Technologies grew out of remnants of this venture</li> </ul>
Cableshare	Rogers Cable Systems	<ul style="list-style-type: none"> <li>• Develop videotex application for cable operators</li> <li>• Public access hardware manufacturer</li> </ul>	
Edimedia	Unimedia, Quebec-based publishing concern controlling Le Soleil, Le Quotidien, Le Droit	<ul style="list-style-type: none"> <li>• Teletext service for cable operators</li> <li>• Public access and a Quebec version of Grassroots - Mediagro</li> </ul>	<ul style="list-style-type: none"> <li>• Mediagro launched in Nov. 1984 - cancelled in Jan. 1985 after Unimedia's decision to pull-out of videotex</li> </ul>



to bear a formidable array of financial, technical, and computer manufacturing resources. Consider, for example, the marriage of IBM, CBS and Sears in the Trintex Consortium:

	IBM	CBS	Sears
POSITION	<ul style="list-style-type: none"><li>. dominates personal business computer market</li><li>. strong in word processor, business graphics &amp; communicating PC markets</li><li>. strong in the home computer market.</li></ul>	<ul style="list-style-type: none"><li>. dominant in television broadcasting</li><li>. extensive film and television programming production capabilities</li><li>. extensive news gathering and reporting capabilities</li><li>. operating Extra-vision teletext service.</li></ul>	<ul style="list-style-type: none"><li>. dominant in consumer merchandising, selling everything from "socks to stocks"</li><li>. operating Compu-shop, teleshopping service.</li></ul>
REVENUE 1984	. \$40.2 billion	. \$2.5 billion.	

#### Canadian Players

In general, videotex in Canada has not generated the kinds of alliances that have emerged in the United States. While the first round of videotex field trials encouraged joint ventures among manufacturers, information providers and system operators, none of these resulted in an ongoing consumer oriented videotex service.<sup>1</sup> As Exhibit IV-4, opposite, illustrates, only Videoway is currently positioned to offer a consumer videotex service. Other potential key players have either already positioned themselves for specific market niches (e.g., agribusiness, public access services, stock market analysis), are currently positioning themselves for specific business applications, or have

<sup>1</sup> Grassroots is not considered here because it is primarily an agribusiness service and not a consumer-oriented service. Videoway, scheduled for launch in the third quarter of 1985, will be the first commercially available consumer videotex service (initially teletext) in Canada.

EXHIBIT IV-5

INFORMAL LINKAGES FORGED BY CANADIAN COMPANIES  
WITH U.S. MICROCOMPUTER MANUFACTURERS

Company	Microcomputer/Videotex Strategy
Formic	<ul style="list-style-type: none"><li>● NAPLPS decoding software for the Apple IIc &amp; IIe</li><li>● No formal relationship with Apple, although Formic has attempted to establish one.</li></ul>
PDI	<ul style="list-style-type: none"><li>● UNIX based videotex generation, presentation and management system</li><li>● Targetting UNIX-based operating systems</li><li>● No formal relationship with AT&amp;T, DEC or other UNIX-based system vendors.</li></ul>
Microtaure Microstar	<ul style="list-style-type: none"><li>● NAPLPS decoding software for the IBM PC</li><li>● No formal relationship with IBM.</li></ul>
MTS Avcor	<ul style="list-style-type: none"><li>● NAPLPS decoding software for the Commodore 64</li><li>● No formal linkage with Commodore.</li></ul>



pulled out entirely (e.g., B.C. Tel). One of the principal conclusions of the recent Videotex Canada Conference was that future opportunities for Canadian videotex players will emerge in the United States. Indeed, for the next two to three years Canadian companies must be positioned to export videotex products and services. With this reality in view, Canadian firms with exportable capabilities have sought out American joint venture partners. The following examples are pertinent:

<u>Joint Venture</u>	<u>Participants</u>
• Grassroots California	- Videotex America - Infomart.
• Teletext VLSI Chip Decoder	- Norpak - Rockwell International.

In addition to forming agreements with American companies, both Infomart and Norpak have established formal links with Japanese and Korean companies; Norpak with Samsung for manufacturing of TV sets incorporating the VLSI chip, and Infomart with Mitsui & Co. Ltd., its agent for Japan, Korea, Hong Kong, the Philippines and Singapore.

Smaller firms such as Formic, PDI, and Microtaure which have successfully carved out market niches (or are on the verge of carving out a niche) are also seeking to forge informal linkages by producing products for a specific line of personal computers (see Exhibit IV-5, opposite).

In conclusion, it is apparent that Canadian firms will be facing some very strong competitive forces in American videotex markets. The future viability of Canadian companies will depend, to a large extent, on the market segments they are positioned in, and the competition they face in those segments. The U.S. market is viewed, by many, to be the major market of the future, and the survival of Canadian firms demands an ability to compete successfully in the American market.

EXHIBIT IV-6

RELATIVE POSITIONS OF CANADA'S COMPETITORS IN THE  
NORTH AMERICAN MARKET

	Business Information Services	Public Access Systems	Specific Closed Loop Services	Home Videotex/ Teletext Services
DOMINANT				
STRONG	Compuserve Dow Jones/MCI The Source			AT&T Bank of America Chemical Bank Knight-Ridder Times Mirror
PRESENT	Apple AT&T Honeywell IBM Sony	AT&T Sony	AT&T DEC IBM Sony	Apple ADP CBS Centel Citicorp Commodore Honeywell IBM Sony Time Inc.
TENABLE	American Express Merrill Lynch			RCA
WEAK				



### MARKET POSITIONING OF THE COMPETITION

As noted in the previous section, foreign NAPLPS companies (or those with current ASCII products or services that could rapidly be converted to NAPLPS), primarily American, are positioning themselves in the North American videotex market. Exhibit IV-6, opposite, represents an attempt to situate key players in terms of their relative strength in each market sector.

We have qualitatively assessed their positions according to the following criteria:

- Dominant: a company is considered dominant if it controls a significant (over 50%) share of a given market sector, and exerts a strong influence on the behaviour and/or strategies of other competitors.
- Strong: a company is considered strong if it has successful products/services, high market visibility, acknowledged expertise, access to financial backing, and can generally maintain long-term position in a given market in the face of competitors' actions.
- Present: a company is considered to have market presence if it is represented in a market sector but does not play a major role, has developed products/services which have not yet had a significant impact on the market, has strengths which are exploitable, and has more than average ability to improve its relative position.
- Tenable: a company is considered tenable if it is developing a product/service which has not yet reached the commercialization stage and/or is developing its distribution network, but has sufficient potential and/or strengths to warrant continuation in the market sector.
- Weak: a company is considered weak if it does not have a product/service at the commercialization stage, and/or it may lack financial strength, expertise or market presence. A weak company may have the characteristics of a company in a better position, but suffers from past mistakes or current weaknesses.



Most of the relationships for these firms are detailed in Exhibits IV-2 and IV-3 on joint ventures. We have included only those companies for which we were able to obtain some background information through literature review. Company position within each block of Exhibit IV-6 is alphabetical, and the market positions have been assessed by the stated criteria. A brief summary on our positioning of the companies is given below.

Compuserve, Dow Jones/MCI, and The Source are all "Strong" in the Business Information sector. They all currently offer interactive ASCII services to a wide variety of businesses, and could conceivably add-on NAPLPS capability quickly if demand warrants it. They essentially provide content and operating systems.

American Express is "Tenable" in the Business Information sector because its service is not yet at the commercialization stage. Merrill Lynch, another content provider in the Business Information sector, is "Tenable" because of its affiliation with IBM, although their service is still in the planning stage.

AT&T is "Present" in all market sectors except in Home Videotex where it is considered "Strong". The AT&T Sceptre terminals are gradually supplanting Canadian terminals. One reason given for the increasing use of AT&T hardware is that its lower price is being used as a market penetration strategy and is probably selling below cost. AT&T's affiliation with Knight-Ridder in Viewtron, and with Bank of America, Chemical Bank and Time Inc., in the Home market give it a stronger position in the Home sector than the others.

Apple is "Present" in the Business Information and Home Videotex sectors because of its penetration of these markets with its microcomputers which can be made NAPLPS capable. Along with Commodore and IBM, the personal computers of these firms constitute a major threat to dedicated NAPLPS terminals in these sectors.



Honeywell is "Present" in the Business Information sector and, along with Centel, in the Home Videotex sector. Its products are used in both these sectors and the Keycom joint venture is an on-going consumer service.

Sony is "Present" in all four market sectors where its decoder is being used more frequently in new and on-going services. The integration of videotex and videodisk technologies utilizes Sony equipment to a high degree.

DEC and IBM are "Present" in the Closed Loop market, frequently in the form of providing the minicomputers for operating services.

Times Mirror is "Strong" in the Home Videotex sector as part of the Gateway joint venture with Canada's Infomart.

CBS is "Present" in the Home Videotex sector in that it is providing on-going services, in Extravision with ADP and AT&T, and in the Trintex joint venture.


Citicorp is also "Present" in the Home Videotex sector through its joint venture with RCA and others.

It is evident that much of the American effort, now and in the future, will be concentrating in two key market sectors: Business and Home Services.

Moreover, it is important to note that large American consortia are attacking these markets from a vertically integrated "total systems" approach, in which consortia members provide all of the requisite components and sub-components. Viewtron is a case in point: with AT&T supplying user hardware (Sceptre Terminal), system hardware, telecommunications services and operating system software; and Knight-Ridder providing content.

This trend to vertical integration means that potential Canadian suppliers to emerging markets will likely find few opportunities for supplying hardware, software or any of the required sub-components in markets where large America






consortia are taking a "total systems" approach. By contrast, many Canadian firms have evolved in a domestic market where the development of videotex services has typically involved pulling together system components and sub-components from various autonomous sources. Therefore, those Canadian firms which have found competitive niches within the domestic market may find that few, if any such niches exist in emerging U.S. markets. While Videoway and Bell's Vista services could be considered as "total systems" approaches, Videoway's service is not yet available and Vista has ceased operations. Infomart and MTS have teamed up to provide Grassroots in Manitoba, although the hardware has been purchased separately.

#### IMPACT OF NAPLPS STANDARDIZATION

One of the main factors which has affected the ability of Canadian firms to compete in international markets has been the ratification of the NAPLPS standard.

An assessment of the effect NAPLPS standardization had on the industry was one of the questions posed in the Terms of Reference (Issue 17). Some indication of how the firms in the industry viewed standards development activities of the DOC program was elicited in the survey (this is discussed further in the section on government activities). The principal source of information to address this issue was obtained from personal interviews with industry participants. It has also been supplemented with some background document review and the technical knowledge of study-team members. No quantification of impacts is available.


NAPLPS began in May, 1981, at the Videotex 81 conference held in Toronto, when AT&T announced their new Videotex Standard - Presentation Level Protocol, which shortly thereafter became known as "PLP". The "PLP" announced by AT&T was based largely on Telidon, but had enough technical differences and additional features to be incompatible with the then-current Canadian product. Canadian representatives at Videotex 81 agreed to adapt Telidon to comply with the AT&T "standard", and the process of defining NAPLPS began. This process was not completed until December, 1983, two and a half years later, when the joint CSA/ANSI NAPLPS standard was issued.



The net effect of this standards development process was, in the opinion of most of the participants interviewed, to produce a "better" standard (compared to "699") and a better competitive position in U.S. for Telidon versus Prestel and Antiope, but at the cost of a considerable setback to Canada's industry. Much of the technological lead which Canada enjoyed, particularly in the area of hardware, was lost as Canadian manufacturers had to adapt their product lines to an ever-changing specification, while U.S. and Japanese manufacturers (principally AT&T and Sony) waited until the dust settled before producing their NAPLPS equipment. Some of the industry participants interviewed have expressed the opinion that the AT&T "PLP" announcement was a deliberate move to set back the Canadian industry so that the U.S. could catch up.

Ironically, the IISP was launched a few months after the AT&T announcement, stimulating the demand for and production of Telidon terminals and decoders during a period of time when it was still undecided exactly how a Telidon terminal was supposed to perform.


During the two and a half year period of standards development, manufacturers were reluctant to commit to large scale production runs, even with IISP stimulation. The launching of new Telidon ventures was also slowed. Those who needed to purchase quantities of Telidon equipment to expand services already launched (e.g., Grassroots) experienced delays in shipment, and/or had to pay premium prices for smaller production runs. There were also problems with protocol incompatibilities among terminals/decoders from different manufacturers, different generations of terminals/decoders from the same manufacturer, and different database services. These incompatibilities ranged from minor differences in the alignment of text and graphics, to database pages which would display correctly on one type of terminal, but would produce only a series of flashing solid colours on another type. Many of these incompatibilities arose because manufacturers were forced by production schedules into making arbitrary decisions on technical issues which needed further discussion within the CVCC.



It should be noted that the NAPLPS standard still allows for a degree of interpretation and implementation dependency which has proved frustrating to information providers and system operators. It has even been asserted by some observers that a light bulb which turns on and off at appropriate times in response to sequences of NAPLPS code, could legitimately be classified as a NAPLPS terminal with 1 pixel by 1 pixel resolution.

The Service Reference Model (SRM) was proposed as a means of resolving most of the incompatibility problems which the basic NAPLPS standard allowed. SRM, which was added as an appendix to the NAPLPS standard document, defines a minimum level of NAPLPS implementation to be implemented voluntarily by terminal/decoder manufacturers, and the level which may be assumed by information providers. Unfortunately, the SRM specification did not anticipate that personal computers would pose a major market segment for videotex services, and did not consider the hardware limitations of popular personal computers. Several software packages have been developed for a number of popular microcomputers (including the IBM PC, Apple IIc and IIe, and Commodore 64) to allow them to decode NAPLPS frames, but none (at least that we have identified) can meet the SRM specifications without the addition of special hardware to the microcomputer.

Conversion to NAPLPS delayed in three ways the drop in price which was expected for Telidon terminals/decoders. First, the standard was inherently more complex than "699" Telidon, and therefore required a more complex processor and more memory in the terminal/decoder. Second, additional engineering costs were incurred which needed to be recovered through equipment sales. Third, the evolving specifications during the standards definition process delayed the technological steps (such as the development of custom VLSI chips) which could significantly lower the manufacturing costs for large scale production. No manufacturer wanted their design "cast in silicon" when the required functionality was likely to change within a few months.




The installed base of "699" terminals was also a problem for the industry. Converting databases and software from "699" to NAPLPS was relatively easy; with proper preparation the switchover could be made overnight. Exchanging more than 1,000 terminals distributed around Manitoba and other provinces was another matter. The CVCC proposed a "retrofit program" with three key stages:

- Upgrade the existing "699" terminals so that they could handle both the "699" protocol and a minimum subset of the (still evolving) NAPLPS protocol.
- Convert the existing databases and software services to NAPLPS, using only the minimum subset of features until the retrofit program was completed.
- Replace or upgrade the "retrofit" terminals with full NAPLPS terminals.

The first two stages of the retrofit program were essentially successful, although fraught with difficulties and delays. The physical retrofitting of widely dispersed terminals was a time-consuming and costly process which offered the users nothing in improved functionality. Some equipment and database incompatibilities were also experienced, as described earlier. But perhaps most significantly, the final stage has generally not occurred. Grassroots subscribers, for example, predominantly use retrofit terminals, and are not prepared to pay the cost of a new NAPLPS terminal for the extra features (e.g., more colours) it could provide. Consequently, a year and a half after the NAPLPS standard was ratified, the Grassroots database service is still restricted to the minimum NAPLPS subset which can be displayed by the retrofit terminals.

A related standards issue which has had an adverse affect on the market for Canadian NAPLPS terminals/decoders is the Telidon modem standard. In an attempt to reduce manufacturing costs, the CVCC approved a 1200/150 baud specification as the standard for Telidon communications, even though 1200/1200 baud modems were more commonly used in other computer communications. This choice has tended to confine Telidon terminals (at least those with integral 1200/150



baud modems) to specially provided ports, rather than encouraging integration with other computer systems and networks. Most significantly, DATAPAC (Canada's nationwide packet switched computer network) supports 1200/1200 baud modems, but not the 1200/150 baud Telidon modems. This was the primary reason cited by one Canadian Telidon service provider who has opted to use AT&T Sceptre decoders (which include a 1200/1200 baud modem) rather than Canadian manufactured decoders.

In summary, the development of a North American standard for videotex was important in order to establish Telidon technology firmly on this continent, but the long conversion process was a major blow to the fledgling Telidon manufacturing industry in Canada. In retrospect, it might have been advantageous in 1981 to delay the IISP and instead push for a rapid resolution of NAPLPS standards issues. While this would have delayed the growth of a number of services, it would also have reduced the problems experienced with the "moving target" phase of Telidon.

While the acceptance of NAPLPS provides Canadian companies with great export potential, the delay in implementation has allowed American competitors to "catch up" with Canadian firms.

#### COMPETITION TO TELIDON

Study Issue 9 deals with what proportion of Telidon products are produced in Canada. Part of the problem with this issue is the definition of a "Telidon product" presented in Chapter II. We have applied the term "Telidon" only to those NAPLPS products and services which are developed, manufactured, or provided by Canadian firms, in order to distinguish them from foreign NAPLPS products, e.g., AT&T and Sony NAPLPS decoders. This presents a problem in terms of this issue because, by definition, only those NAPLPS produced by Canadian firms would be considered, and the answer would be 100%.




However, taking the broader view, we did research reference materials to obtain market share estimates of competing technologies. This section, therefore, combines the production issue (Issue 9) with the ability of Canadian Telidon producers to compete with foreign NAPLPS producers (Issue 10), although competition with other technologies is also included. Also addressed, to the extent possible, as part of this discussion, is Study Issue 8 concerning the proportion of videotex sales and service accounted for by Telidon.

The viability of the Canadian Telidon industry is dependent not only on the market for videotex products and services, but also on the competition from other videotex suppliers. There are two aspects to this competition from a technological perspective:

- the competitive position of NAPLPS videotex versus other videotex protocols (including ASCII videotex)
- the competitive position of Canada Telidon products and services versus similar NAPLPS products and services from other countries.

Telidon's traditional competitors have been the European and Japanese videotex systems: Prestel, Antiope, Captain, and more recently, CEPT. The markets for all of these systems have tended to follow geographical and political influences more than technical ones. Canada, Britain, and France are dedicated to Telidon, Prestel, and Antiope, respectively; with the rest of Europe leaning towards CEPT. Captain was developed by the Japanese in order to be able to represent Kanji and other Japanese characters which European alphamosaic systems could not handle; they have not tried to market Captain against the other videotex technologies internationally. Currently, the Japanese are beginning to use NAPLPS as well as Captain, since NAPLPS can also represent the Japanese characters, and in fact, can do so more efficiently.

The United States is tending strongly toward NAPLPS, with the major home videotex trials (Viewtron, Gateway, and Keyfax) all using NAPLPS. Prestel is still alive in North America, however, with some operators choosing it over NAPLPS because of low terminal/decoder costs. For example, the National Bank



of Detroit will be offering a home banking service, and Illinois Bell will be offering an electronic directory assistance service; both will use the Prestel protocol and will begin commercial service later this year. But NAPLPS can be reasonably expected to dominate the North American market, especially as hardware prices drop.

The rest of the world is up for grabs, with Australia the latest battleground between NAPLPS and Prestel. It is difficult to predict how the remaining world market will be divided, since the choice of system is often made more on political considerations than technical ones.


It has been very difficult to locate up-to-date figures to show the relative world market share of the different systems. A 1983 worldwide census of videotex, teletext, and "cabletext" (teletext via cable) terminals by CSP International found 2.3 million terminals with the following breakdown by protocol:

- 98.07% Prestel
- 1.33% Antiope/Teletel
- 0.25% Pre-NAPLPS Telidon
- 0.22% Proprietary
- 0.10% Captain
- 0.03% NAPLPS.<sup>1</sup>

It should be noted that the overwhelming majority of these terminals were Prestel teletext terminals, rather than interactive videotex. ASCII terminals were excluded from the study.

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<sup>1</sup> Videotex Canada, "1983 Worldwide Census Summary by CSP International", Spring, 1984, p. 55.



In September, 1984, Link Resources published their projections for the number of videotex users in North America and Europe by the end of 1984. The projected figures, which in this case did not include teletext subscribers, were:

- 10,000 North American NAPLPS users
- 500,000 North American ASCII users
- 460,000 French Antiope users
- 60,000 British Prestel users
- 24,000 Other European users (principally German Bildschirmtext)<sup>1</sup>.

(Actual terminal counts at the end of 1984 have not been confirmed.)


The strong showing of Antiope in this instance is due primarily to the free distribution of several hundred thousand Minitel terminals by the French telephone system for its electronic directory system.

In terms of Study Issue 8, the proportion of total videotex sales and services accounted for by Telidon, the figures shown by these sets of figures would indicate that the proportion is less than 1%. According to CSP International, using number of terminals as the base and including teletext terminals, the combined pre-NAPLPS Telidon and NAPLPS terminals account for 0.38% of 2.3 million terminals worldwide. According to Link Resources, using the number of subscribers as the base and including ASCII services, the percentage increases to 0.87%. While there certainly are problems with both of these estimates, they are the best available information we have.

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<sup>1</sup> Link Resources, Interactive Videotex Forecast: 1984-1989, 2nd edition, September 1984.





Survey responses of 33 firms provided us with a figure for total revenue from Telidon-related sales and services in 1984 of \$24.2 million (this is discussed further in the Telidon Industry Profile section of this report). Unfortunately, earnings of non-respondents cannot be determined. Similarly, no figure appear to exist for any other form of videotex sales and services. The answer to this question requires such data. The number of terminals and the number of subscribers are really poor substitutes. In reality, terminals account for a small proportion of Telidon products and services, and more revenues are probably generated from the services Telidon companies provide. The number of subscribers is potentially more useful, in that it considers the number of consumers for videotex products and services, but it does not indicate the revenue from this source.

The two sets of figures presented above, although not a complete picture, do indicate two significant trends:

- There is potentially a much larger market, at least in the reasonably near future, for teletext services than for interactive videotex. This opinion has also been expressed by some industry representatives.
- There is a very large market for information services which is currently being addressed by ASCII services. Most of this market consists of personal computers equipped with modems.

The ASCII videotex market on personal computers is also a potential market for NAPLPS services, which will grow as NAPLPS emulation software and hardware for personal computers becomes more widespread. Some technical problems remain, which should become less significant as the technology develops:

- Most current NAPLPS implementations on personal computers are below the SRM level, and consequently cause display problems for many existing NAPLPS services.
- Many personal computers are equipped with only a 300 baud modem, which is adequate for ASCII, but terribly slow for NAPLPS. A 1200 baud modem is generally considered the minimum for reasonable speed in communicating NAPLPS frames.




The competition between NAPLPS and other videotex technologies is one facet of the international competitive position of Canadian Telidon companies. The other facet is the ability of Canadian NAPLPS products to compete against NAPLPS products manufactured in other countries, principally the U.S. and Japan.

With respect to Study Issue 9, the proportion of Telidon products produced in Canada, we were not given any indication that Canadian producers are producing their Telidon products outside Canada. Norpak has worked with Rockwell International on the development of the VLSI chip, and has made arrangements with Samsung of Korea to manufacture television sets incorporating the chip. However, production has not yet begun.

Survey respondents who used videotex equipment in their business were asked to indicate the percentage of the equipment (based on dollar value) produced in Canada. There were 32 responses to this question, of the 42 returned surveys. Some indicated that the host computers, usually Digital Equipment VAX and PDP minicomputers, were included in total videotex equipment or that microcomputers were used as part of the equipment.

Of the 32 respondents, 12 reported 100% of the equipment was produced in Canada, four reported 90%-99%, three reported 80%, two reported 50%, five reported 30%, six reported 25% or less, and one reported 0%. There are indications that newer equipment purchases are for AT&T and Sony decoders.

When asked to indicate the importance of several possible reasons for using foreign suppliers, only 16 responded. The most commonly ranked reason of extreme importance was that no Canadian supplier of the particular equipment was available; this was followed closely by the indication that a better product was available from foreign suppliers. In some cases, better service from foreign suppliers was important; but interestingly, better price from foreign suppliers was not as important. Other factors mentioned for using foreign suppliers included cross licensing agreements and one instance where a third party insisted on Sony equipment.




This implies that when the Canadian "Telidon industry" uses non-Canadian equipment, it is because of a lack of Canadian suppliers and/or the availability of better foreign products. Service is important and, due to the developmental nature of the early years of the technology, equipment reliability problems may be a factor. However, price does not appear to be as important to equipment users.

Volume estimates for foreign NAPLPS products are not available, so even by expanding our definition of Canadian Telidon products, we could not provide a proportion figure, even if Canadian data were available. The following section, however, does provide a qualitative assessment of the competition Canadian products face. Telidon technology, in the form of NAPLPS, is incorporated in these products, and this provides a threat to Canadian Telidon producers.

In the area of hardware, the principal foreign competition to Canadian manufacturers presently comes from two firms: AT&T and Sony. The NAPLPS videotex products providing the most serious competition are:

- AT&T:     - Sceptre videotex decoder
- Frame Creation System (FCS).
- Sony:     - VDX-1000 videotex decoder
- Videodisk players integrated with videotex decoders  
            and Sony microcomputers.

In the area of system software, there is little competition to Canadian products such as Infomart's ITSS. IBM has a videotex product, Series/I Videotex System (SVS), which supports both Prestel and NAPLPS, but its capabilities are quite limited. The fact that IBM chose a relatively unpopular machine with limited capacity (the Series/I minicomputer) for its Videotex offering, rather than one of its business mainframes, indicates that IBM is not yet ready to attack the large scale videotex system market.




The major Canadian terminal/decoder manufacturers are unanimous in the opinion that they should not attempt to compete internationally with AT&T and Japanese companies for the mass consumer decoder market. Some of the reasons given were as follows:

- The Canadian firms have a shorter planning horizon (perhaps 3-5 years), while firms such as AT&T and Sony take a longer (e.g. 10 year) view of the market. The large U.S. and Japanese players can afford to take larger losses up front in order to establish a strong long-term market position.
- Canadian firms generally do not have the vertical integration necessary to manufacture the units, which are component intensive, at competitive prices. Many of the components used in the Canadian products are manufactured in the U.S., and must be purchased through distributors.
- Japanese firms tend to work more effectively than North American firms in cooperative efforts, such as mass manufacturing; while North American firms generally excel in the more individualistic areas of innovation and design.

The Canadian manufacturers did believe, however, that Canadian firms could compete internationally with hardware products which are more design intensive, and which are manufactured in smaller production runs with customized features. Examples would be teletext broadcasting systems, NAPLPS page creation systems, and public access terminals.

Other areas where Canadian firms believe they can compete successfully are those of software and content for videotex systems. For example, Infomart's ITSS appear to be the leading software system product internationally for NAPLPS videotex systems. Genesys, Cablesare, Formic, and other firms are also marketing software products successfully in the U.S. In the area of content, St. Clair Videotex has indicated that much of their page design and creation business is coming from U.S. markets. U.S. system operators are also buying Teleguide franchises in order to use both the name and the database design for their tourist information services.



An examination of the current major videotex trials in the U.S. shows that AT&T is becoming the dominant hardware supplier. This is the case for both decoders and page creation systems. The major reason for this dominance is the price of the decoder; several industry representatives gave the opinion that AT&T was selling the Sceptre decoders below cost.

Several Canadian firms are also using AT&T or Sony decoders for their own products and services. Primary reasons given are price and DATAPAC compatibility for the AT&T product, and reliability for the Sony. Sony is also the clear leader in videodisk/videotex integration.

Canadian microcomputer products (software and circuit board decoders) are currently quite marketable, but may become obsolete if computer vendors produce a new generation of personal computers with built-in NAPLPS capabilities. Some of the interviewees indicated that they expected such a development from the microcomputer vendors.

In summary, there are definite product areas where Canadian firms can compete successfully. Mass manufacturing of decoders (a primary objective of the Telidon program) does not seem to be one of them. However, Canadian firms will have to be aggressive in remaining on the leading edge of technology as the U.S. market grows and the large American players (e.g. AT&T and IBM) begin to make strong moves.



## V - TELIDON INDUSTRY PROFILE

### INTRODUCTION

One of the primary purposes of this study was to develop a profile of the key Telidon-related firms and a cross section of other companies active in the Telidon market. The objective of developing such a profile is to facilitate an assessment of their corporate characteristics, both as an overall industry, and relative to each other in terms of market position vis-a-vis the four major Telidon market sectors identified in the earlier Telidon Market Profile section.

This industry profile has been developed from three main sources: an industry survey, case studies and supplementary interviews with industry experts. The quantitative industry data coming from the survey has, by far, been the major source. While the final survey response rate was disappointing (50%) and produced some complex results, the data received was adequate to enable some conclusions to be drawn and some general relationships and trends to be identified.

The presentation of survey results, supplemented by information from the interviews, answers several specific questions contained in the study's Terms of Reference; namely, Study Issue 1, concerning the structure of the Canadian videotex industry, Study Issue 2, concerning the number of people employed in the Telidon industry, Study Issue 3, concerning the skills required, the availability and the sources of Telidon industry employees, Study Issue 4, concerning the amount Canadian firms have invested in Telidon, Study Issue 5, concerning the profitability of the industry, Study Issue 6, concerning the level of sales needed to produce a reasonable profit, Study Issue 15, concerning the firms which received transfer of Telidon technology from government, and Study Issue 16, concerning the importance of location to the operation of Telidon firms.



However, the study issues are not addressed in numerical order. Within this chapter, we first present an overview section dealing with the issues of location (Issue 16) and technology transfer (Issue 15), as they apply specifically to those organizations comprising our survey respondent and interview population. Subsequent sections deal with responses according to industry product and service activity, revenues, and profitability (Issues 5 and 6), employment (Issues 2 and 3), and investment (Issue 4). The results obtained from an analysis of these issues are then summarized to determine the structure of the Canadian industry (Issue 1).

#### OVERVIEW

Before providing details from the survey related to specific study issues discussed in this section, some general information on our study population, with respect to the survey responses and results, is worth noting.

The first item to note is that four of the 42 respondents are non-profit organizations, and one is a Crown corporation. While these firms are unlikely to contribute directly to overall profitability data, their inclusion in the study is based on the value of their indirect contribution. These firms affect the potential viability of the "Telidon industry" in four ways:

- Through the purchase of equipment and software, the major non-profit sector provides a market to commercial Canadian firms.
- Employees of non-profit organizations gain knowledge and experience with the Telidon technology which could be transferred to commercial pursuits through the movement of labour to the private sector.
- Used as a base for public service applications, the non-profit firms increase the visibility of Telidon.
- Potentially marketable applications for videotex content could be developed by these organizations, and they increase the content available for NAPLPS databases.

Although there are more than five non-profit organizations using the Telidon technology, the five organizations responding to our survey are quite active examples of the group. The remaining 37 firms responding to the survey are commercial firms.

Another characteristic of the survey respondents is that all but two organizations are 100% Canadian owned and all were at least 50% Canadian owned. At least for this population, the major issues addressed in the study pertain to Canadian firms.

The following table shows the distribution of the period of time the responding firms have been involved with Telidon:

<u>No. of Years<sup>1</sup></u>	<u>No. of Firms</u>
1 or less	6
2	7
3	15
4	7
5 or more	7

The majority of firms have been active in Telidon-related activities since 1981. This corresponds to the first augmentation of the Telidon program, when field trials began to move from the planning to operational phase. There is a normal distribution of the time companies have been involved; thus, the data and opinions obtained from the survey covers a range of early program participants and later entrants.

It should be noted, however that there is a slight misrepresentation involved here. In at least one case, the reported year of Telidon involvement was later than departmental records show. How many others might be inaccurate is

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<sup>1</sup> Calculated as 1984 less the year the firm stated that they became involved with Telidon.



undetermined. Furthermore, some organizations have only recently become incorporated, although the companies' principals have been involved with Telidon for a longer period than the corporate entity. Most responses identified the year the company became active, rather than the founders. However, for the analytical purposes of this study, the reported dates are used.

#### Location

One of the study issues (Issue 16) deals with the importance of location to the operation of Telidon firms. The following table shows the geographic distribution of both the survey population (84 firms) and that of the 42 respondents used for analytical purposes of this report.

<u>Location</u>	<u>Number of Firms</u>	
	<u>Survey Population</u>	<u>Survey Respondents</u>
Maritimes	2	0
Quebec	12	6
Ontario Total	57	31
Toronto area	26	16
Ottawa area	23	11
Western Canada	13	5

As can be seen, there is a geographical concentration of firms in Ontario, particularly Toronto and Ottawa. This is not too surprising, given the nature of the Telidon Program. The technology was developed in Ottawa, and the initial product development work began with firms in Ottawa's high-tech industry. Toronto and Montreal tend to be the commercial centres of English and French Canada, respectively, and since the study was focused on commercial firms, a large proportion of such firms were located in, or near, these centres.




The survey asked participants to indicate the importance of location to corporate viability. The response was as follows:

	<u>Very Important</u>	<u>Important</u>	<u>Insignificant</u>	<u>N/A</u>
Quebec	3	1	1	1
Toronto	4	5	6	1
Ottawa	4	3	4	0
Other Ontario	0	2	1	1
Western Canada	2	0	2	1
	<u>13</u>	<u>11</u>	<u>14</u>	<u>4</u>

Regional differences were found when the reasons given for a specific response were analyzed.

<u>Response</u>	<u>Region</u>	<u>Reason</u>
Very Important	Quebec	. nature of primary market . linkage with other company services
	Toronto	. must be near main customers - commercial clients
	Ottawa	. proximity to main customers - government and high-tech sector
	West	. western location perceived as major impediment to government assistance.
Important	Quebec	. cost of telecommunications
	Toronto	. large market potential . proximity to suppliers, customers and financial markets
	Ottawa	. access to markets, airport and skilled people
	Other Ontario	. access to airports and customers.
Insignificant	Quebec	. services are provided at client offices
	Toronto	. must be close to corporate investors . market is international, not national or local
	Ottawa	. services are provided at client offices . market is in the USA or international.




In general, firms view the importance of location in relation to their markets. Firms which have the federal government as a client generally must be located in Ottawa. Those firms concentrating on the international market see location as less significant, although access to airports is important.

Telecommunications costs also entered into location factors, since areas outside major urban centres or DATAPAC nodes incur additional charges for the use of telephone lines. Cable networks are also more prevalent in urban areas, which consequently, affects the mode of transmission available for providing videotex services to users. The telecommunication cost factor has had a large impact on the use of the technology, both from a system operator and end-user point of view. Not only are rural users more likely to incur higher costs, but the population density is quite low. A far greater number of potential users can be targeted within the Metropolitan Toronto area than is possible for the same physical area in Alberta.

On the other hand, Grassroots in Manitoba does prove that Telidon applications can be sold to users in relative geographical isolation, as long as the information provided is of value to the user, and telecommunications cost is subsidized.

Participating firms were asked to indicate the importance of factors in determining the firm's geographical location. Not surprisingly, the majority felt that the fact they were already operating in the area was an extremely important factor (75%). Convenience to a skilled labour supply was felt to be an important factor (50%), but low overhead was considered not very important (59%).

Eleven of the 42 respondents indicated that their firm had offices in foreign locations, often agents or distributors, but only four are providing the same Telidon-related goods and services as the Canadian operations.



In conclusion, for the firms responding to the survey, the importance of location for operations is dependent upon the market focus of the particular firm, and how service is provided to those customers. Organizations with an international market focus are most likely to perceive location as insignificant. Firms with highly focussed client groups, such as government, perceive location as very important to their operations. Companies whose services depend on a particular transmission mode or the relationship of their Telidon activities to other corporate activities, are also more likely to view location as very important.

#### Technology Transfer

The Telidon technology was developed in the laboratory at DOC's Communications Research Centre. The technology was then transferred through licensing to the private sector for product development. Licenses were obtained through Canadian Patent and Development Ltd. (CPDL).

Study Issue 15 requested the names of companies which received a transfer of Telidon technology from government. The only firm to receive a transfer of Telidon technology for manufacturing hardware was Norpak, in 1978. Norpak subsequently sub-licensed the technology to AEL Microtel (March 6, 1980) and Electrohome Ltd. (June 26, 1980).

According to CPDL documents, as of January 10, 1985, royalty-bearing licenses on the Telidon database software, Case 7128, had been granted to:

British Columbia Telephone	April 15, 1980
* Infomart	May 16, 1980
New Brunswick Telephone	May 16, 1980
Bell Canada	June 9, 1980
Alberta Government Telephone	October 1, 1980
* Saskatchewan Telephone	-
* The Genesys Group	-

Royalty-free licenses on the Telidon database software have been granted to:

University of Montreal	March 10, 1980
University of Waterloo	March 10, 1980
Environment Canada (AES)	March 27, 1980
Department of National Defence (DND)	-
* Clinical Research Institute of Montreal (CRIM)	-
University of Prince Edward Island	-
Red River Community Centre	-
National Museum of Canada	-
College d'Enseignement Général et Professionnel d'Alma (CEGEP)	-
Sheridan College of Applied Arts and Technology	-
Brock University.	-

The asterisk (\*) indicates organizations included in the survey population, although not necessarily in the population of respondents. In addition, the three hardware manufacturing firms mentioned previously were surveyed (AEL Microtel in the form of New Media Technologies at the current date).

Infomart and Genesys are the only commercial, non-telephone companies which received a transfer of Telidon database software. Due to confidentiality constraints, further analysis of the firms as an identifiable subset (those firms receiving transfer of technology from government versus those firms that did not) will not be provided. However, all five commercial firms (Infomart, Genesys, and the three hardware manufacturers) have been actively involved in the "Telidon industry" and continue to be so.

#### PRODUCT AND SERVICE ACTIVITY

For the purpose of this study, the firms surveyed were categorized according to the Telidon-related product and/or service sectors in which they are active. The sectors, and number of firms responding to the survey who are active in each, are shown below:




<u>Product/Service Sector</u>		<u>Number of Firms</u>
• Hardware	- manufacturer	6
	- distributor	7
• Software	- developer	28
	- distributor	17
• Turnkey systems		15
• System or information sponsor		19
• System operator		17
• Page creation		29
• Telecommunications		5
• Consulting		33
• Other		18

(For definitions of the above sectors, see page 1 of the survey in Appendix A).

Only 3 of the 42 responses identified only one area of involvement. Most firms are providing products and/or services in several sectors; 78.6% (33 firms) are involved in three or more products or services, and the average is 4.6 sectors per firm amongst those responding to the survey. Consequently, it becomes quite difficult to analyze the data by service/product sector, except in very broad terms.

Survey data analysis was focussed on identifying relationships among survey data categories (eg., revenues, profits and investments) and between data categories and Telidon products and services. The results of such analysis are presented under the sub-sections following. However, as almost 80% of respondent firms are involved in three or more products or services and the survey responses did not distinguish among them in terms of data provided, it



was extremely difficult to identify clear or categoric results and relationships. As a result, the analysis is necessarily rather tortuous and the results rather difficult to interpret. However, a brief summary of conclusions has been presented at the end of each of the sub-sections below. These deal with survey analysis findings. A review of these summaries before reading the more detailed survey findings may be helpful. In addition, the immediately following sub-section summarizes the incidence and extent of overlaps in products and services provided by respondents. This information expands on the table above, and further illustrates the extent of heterogeneity in companies' Telidon product and service activities.

#### Product and Service Overlaps

Hardware - Six firms responding manufacture hardware for Telidon systems. This includes keyboards, terminals, decoders, and page creation terminals. Of these six, four also provide turnkey systems and are involved in page creation; five also develop software; and three consult.

Seven firms distribute hardware but only one of these also manufactures hardware. All seven are also involved in developing software and are in page creation. Six provide turnkey systems and distribute software, and four are system operators. These latter four also create pages, develop and distribute software, provide turnkey systems and are system operators.

Software - Of the 42 responses, 28 firms are developing software. Because such a large proportion (67%) are active in this area, but also in many others, it is particularly difficult to draw conclusions from this sector.

Of the 42 responses, 17 firms are distributing software. Of these 17, 16 develop software, and 16 are involved in page creation.

Turnkey - Fifteen firms provide turnkey systems. All fifteen are also involved in page creation, and 14 develop software. Ten also distribute software, and eight are system operators.



Information Provider - Nineteen firms are information providers. Of these 19, 12 develop software, 15 are involved in page creation, and 12 are system operators. Only seven of these firms provide turnkey systems. Six are also involved in software development and distribution, page creation and system operation.

System Operator - There are 17 system operator firms. Of these, 15 are involved in page creation, and 12 are information providers. Ten also develop software, eight distribute software, and seven provide turnkey systems.

Page Creation - There are 29 firms involved in page creation. Of these, 22 also develop software, and 23 consult. Again, however, this large proportion is difficult to categorize further.

Telecommunications - Only five firms are involved in telecommunications. Of these, all are also involved in page creation, four develop and distribute software, and four are system operators.

Consulting - There are 33 firms (78.9%) which consult on Telidon. Only two firms reported consulting as their only involvement. A further 10 firms have only one or two other areas of involvement, although those areas differ. In the majority of cases, it appears that consulting may be a 'side line' rather than the main activity of the company.

Other - Eighteen firms also indicated that they were offering Telidon-related products and/or services which did not fall within the specified sectors. These included, among others:

- training systems for Telidon use
- Telidon videotapes and/or slide production
- marketing research
- product R&D
- custom software
- automatic conversion of raw data into NAPLPS graphics
- project management.





Any further comments relating to a particular sector are made with this high degree of overlapping activities in mind. Only general comments apply specifically to any one group. However, certain relationships become apparent:

- Hardware distributors also develop and distribute software and are involved in page creation.
- Turnkey system providers are involved in page creation and almost all develop software.
- Telecommunications providers are involved in page creation.
- Almost all software distributors are software developers and are involved in page creation, although the reverse is not true.
- System operators are usually involved in page creation.


While this overlap presents problems for data analysis with respect to the survey, this overlap of offered products and services does provide insight into the relationships of the industry. Telidon activities are highly inter-related, and while many of the larger organizations provide a full line of Telidon products and/or services, smaller firms are likely to have found niches supplying Telidon components to larger firms. A recent newspaper article<sup>1</sup> illustrates how Words Associated Ltd., Stanley Robert Illustration and Design Ltd., Maruska Studios and the Genesys Group have worked together to provide a Telidon information system for Expo 85 in Japan.

#### Product and Services Relationships

A Telidon videotex system essentially starts with some means of creating pages which contain the information to be provided, by encoding the information in NAPLPS format. The pages must be stored and be retrieved as required. The

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<sup>1</sup> "Telidon team develops flashy package for Expo 85". Ottawa Citizen, March 16, 1985.



information must be transmitted, via telephone lines, cable or satellite, to a receiver. End-users of the information must have a monitor for viewing the information, and this monitor must have a decoder to translate the NAPLPS code into text and graphics images.

Telidon hardware consists of page creation units at the front end, and decoders and terminals at the receiving end. Telidon software can be of two types: system software and applications software. The system software allows the pages to be stored and retrieved, providing the interface between machines. The applications software may be used in interactive transaction services.

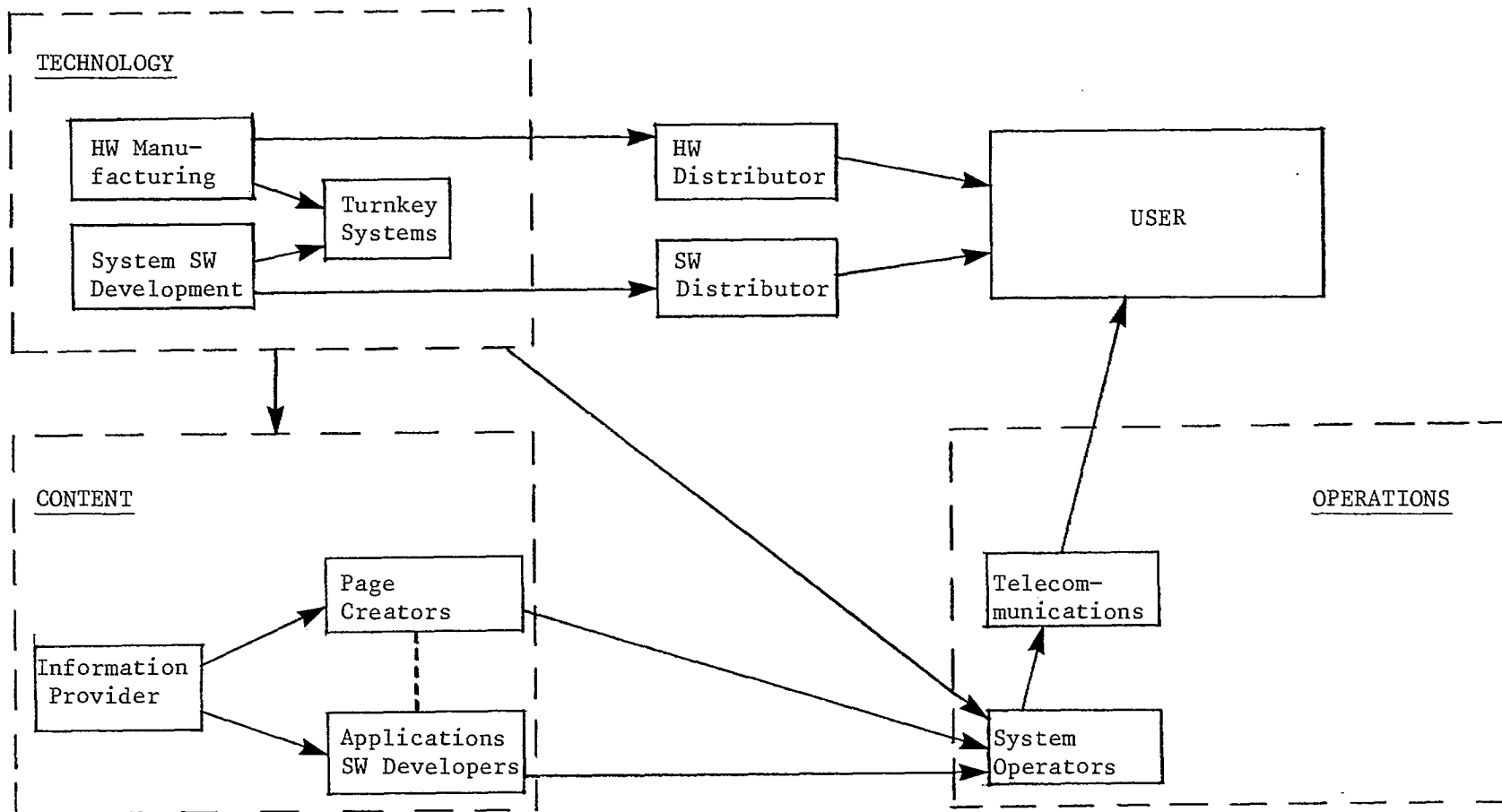
"Turnkey system" is the term used when one source provides all the requirements for a Telidon system (hardware, software, host computer, and installation support) as a complete package to customers. A system operator maintains the system and physically operates the host system. Telecommunications carriers transmit the information between creator and host, and host and receiver. Information providers (IPs) supply the content to the system. An information provider need not actually create the pages containing the information. The IPs are analogous to the advertisers in the publishing industry. Those firms involved in page creation are the editors and graphic artists who translate the message to the medium used.


Given these types of relationships, the overlap in firm activities is not too surprising. Hardware manufacturing (in addition to restrictions imposed by the licensing of Telidon technology) is a specialized area, requiring high capital investment and involving many persons. In most cases, the distribution of hardware is handled by separate companies, although manufacturers often tend to be involved as well with software development, page creation, and turnkey system provision.

Hardware distributors appear to participate in similar activities. In fact, the survey responses show that all firms describing themselves as hardware distributors also develop and distribute software and create pages.

EXHIBIT V -1

TELIDON INDUSTRY RELATIONSHIPS  
OF PRODUCTS AND SERVICES






Several of the distributors obtain the hardware, develop the systems software, and provide the combination as turnkey systems - a common activity for six of our seven firms. Page creation activities also involve hardware, so it is not surprising that this is also an activity of this group.

Hardware distribution is not a prerequisite for a provider of turnkey systems. However, all turnkey system providers are involved in page creation, and generally develop software. Not all turnkey system providers are system operators and vice versa. The major other sectors of involvement for system operators are in information provision, page creation and software development. The major alternative sectors for page creators are software development and information provision, although not all IPs are involved in page creation. Most firms combine Telidon-related activities. The stylized diagram in Exhibit V-1, opposite, is an attempt to show the relationship of the different activities. Consulting activities essentially encompass the whole area, as expert advice could be given at any level.

The large number of firms reporting page creation activity (29/42) and software development activity (28/42) tends to indicate that these are related and are a point of relatively easy entry. Small firms can take information, create pages, and distribute them to system operators. These firms do not have to become operators themselves.

System operators do not have to provide information or create pages themselves, but most appear to do so, in addition to operating the system. Turnkey systems are essentially the physical end product produced by combining the hardware and software for operation.

In conclusion, some Canadian firms provide entire videotex systems. However, the majority of Canadian firms appear to be small organizations who have found product or service niches where the components are provided to larger services. This implies that some of the Canadian "Telidon industry" vulnerabilities evolve out of the buyer/supplier relationships and dependencies of the industry.



## REVENUES AND PROFITABILITY


The survey was the main instrument used to obtain financial and quantitative information from industry firms. This next section presents the survey results for the issues involving quantitative analysis. There are, however, some points to be made beforehand.

- In the case where a dollar range was given (eg., for average annual R&D expenditure), the midpoint was used for analysis.
- In the case where a total dollar figure was given along with the percentage split (eg., domestic/foreign split of total revenues), the corresponding values were computed.

In this section, we present the survey findings reported for sales and profit data. This provides data to Study Issue 5: is the current Canadian Telidon industry profitable without government assistance? Study Issue 6 involves subsequent findings, in that if the industry is not profitable, the level of sales required to yield a reasonable profit is investigated.

The survey requested financial information from firms for revenues and profit related to their Telidon activities for the latest completed fiscal year. Revenue data was to be allocated according to domestic and foreign markets, where applicable, while a single figure was requested for profit/loss. In addition, sources of government funding and amounts were also solicited for the period covering the previous five years.

From the 42 responses, 33 provided total sales revenue, 31 split revenue between domestic and foreign sources, and 25 provided profit figures. All figures were for fiscal years ending in 1984. Three firms had no revenue reported, either because their Telidon product was not yet being marketed, or the companies were newly formed and did not yet have a fiscal year end figure. Before presenting the results for revenues and profitability, the amount of government assistance received by Canadian firms is shown.

  
Government Support

There were 24 firms who reported receiving a total of approximately \$14,703,000 from DOC, over the last five years. A further 12 of the 42 respondents reported no funding from DOC, and the remaining six did not specify. Twelve firms reported receiving a total of \$8,494,250 from federal departments other than DOC, and six firms received a reported \$14,502,000 from non-federal sources. Whereas some DOC funds are a product of either the IISP and/or the CDP, some firms have also included contract funding while others have not. Therefore, this figure and the ones for funding from other federal departments and non-federal departments cannot be taken as accurate. Although not substantiated through department records in all cases, it appears that firms tend to underestimate rather than overestimate funding from government sources; the degree to which this occurs is unknown.

Other government department (OGD) funding appears to have been through the Enterprise Development Program (EDP) of DRIE and programs with DEA or DSS. Both Ontario and Quebec provincial governments have also made significant funds available to specific companies.

Of the 28 firms who did receive funding, 93% felt the funding from DOC was "quite" or "extremely" important. Explanations given for this response indicate that many projects would not have been started without DOC funds. Internally generated funds would not have been provided, and some firms indicated that they would not be in business today, or have the required knowledge of the Telidon technology they do have now, without government assistance.

Of the 12 firms receiving funds from other government departments, three did not receive funds from DOC. Funds appear to have been applied to business start-ups, U.S. market penetration strategy development and French translations; all funds were ranked as "very important" sources of funds to the companies.

The survey also asked participants to rank the extent to which government involvement in the Telidon industry had helped the firm to raise capital and loans. Twenty-two firms felt government involvement was of "small importance" or "none at all" in raising capital; 23 had a similar view of its lack of importance in raising loans. However, government involvement did appear to be of more importance for purposes of raising capital than loans, overall. Firms located in Quebec frequently ranked government involvement as "very important" or "essential" for raising both capital and loans.

#### Revenue

The totals of the revenue data and the distribution of income by firm is shown below:

<u>Revenue</u>	<u>Total</u>	<u>No. of Firms Within Revenue Ranges</u>				<u>Total</u>
		<u>\$0</u>	<u>\$1 - 99K</u>	<u>\$100K - \$999K</u>	<u>&gt;\$1M</u>	
Domestic	\$10,834,150	4	13	11	3	31
Foreign	<u>12,866,250</u>	15	7	5	4	31
Total	\$24,180,400	3	13	12	5	33

There are large differences among responding firms. Of the 15 firms who reported no foreign sales, three did not indicate any revenues. Of the remaining 12, eight had total sales of less than \$100,000 and four others had total sales of less than \$500,000. All five firms with total sales greater than \$1M have been involved with Telidon for three or more years, and four have

greater than 25 employees. Foreign sales as a percentage of total sales range from 20% to 90% for these five. These five account for \$20,089,000 or 83% of the total reported revenues.

Due to involvement in more than one sector, it is not truly possible to categorize revenues by sector. However, generally speaking, the top five firms are likely to manufacture hardware and/or software, provide turnkey systems and create pages. The other similarities are that they generally do not distribute hardware and are not involved in information provision or telecommunications.

Similar sector areas for the six firms reporting less than \$25,000 total revenue are software development, information provision and consulting, with some involvement in page creation. Five of these six employ five or fewer employees and all have been associated with Telidon three or more years.


With respect to revenue trends, the following indications were given:

	<u>Increase</u>		<u>Decrease</u>		<u>Same</u>		<u>Not Applicable</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Previous 2 years	26	61.9	6	14.3	8	19.1	2	4.8
Future 2 years	34	81.0	5	11.9	2	4.8	1	2.4

Of the six firms reporting decreased revenue over the past two years, five had total sales of \$500,000 or less, have less than 10 employees, and have been involved in Telidon three years or less. Three expect revenue to increase in the future, two expect a continuing decrease, and one expects to remain the same. Of the eight reporting constant revenue, five did not provide revenue figures, seven have fewer than 10 employees, and seven have three or fewer years with Telidon. All eight of these firms expect future revenue to increase over the next two years.

One firm with previously increasing sales expects this to remain the same in the future. Of the five firms expecting decreasing sales, three have previous sales increases. Four of the five are firms with no foreign sales revenue. All five have fewer than five employees and less than \$250,000 in revenue.





It is interesting to note that, of the 13 firms who felt location was very important for their viability, only three had both domestic and foreign sales revenue. Furthermore, the majority of this group with profit orientation and no foreign sales can be broadly classified as consultants.

In summary, it appears that firms selling only in the domestic Canadian market are small, both in terms of revenues and employees. Four of the 13 firms expect sales revenue to decrease in the future. On closer examination, the most common area of involvement for these four is consulting. Consequently, it can be concluded that those firms whose main function is consulting to the Telidon industry, are expecting decreased demand for their services.

This is not unexpected, since most firms in the industry now have enough knowledge of the technology to carry on themselves, without hiring consultants. It is also possible, since three firms are located in the Ottawa area, that the cessation of the government Telidon program may have a direct bearing on their future involvement. Overall though, 62% (26) of the firms have had increased revenues in the last two years and 81% (34) expect revenue increases in the next two years. Therefore, the majority of firms are optimistic about future sales potential, even with the termination of DOC's Telidon Program.

#### Profitability

The survey requested information on profitability in two questions. The first asked for an indication of the current situation, and the second asked for the most recently completed fiscal year profit/loss on Telidon-related activities, along with trend indications.



The response for the current situation was:

<u>Currently</u>	<u>No. of Firms</u>
Making a Profit	17
Incurring a Loss	15
Breaking Even	8
No Response	2

The total profit figure for the 25 firms providing this information is a loss of \$12,250,389 for fiscal years ending in 1984. This total is broken out below:

<u>No. of Firms</u>	<u>Total Profit/Loss</u>	<u>Revenue of Respective Firms</u>	<u>Average Profit Margin</u>
14	\$ 1,118,611	\$ 7,707,400	14.5%
9	(13,369,000)	11,948,000	-89.4%
2	<u>Breakeven</u>	<u>*</u>	
	(\$12,250,389)	\$19,655,400	

\* amounts for fewer than 3 firms are not provided. Also not included are revenues for firms which did not report profit/loss figures.

Nine firms report total losses of \$13,369,000, but loss per firm varies widely. Six firms have losses of less than \$100,000. Six of the nine employ less than 10 people and all nine have been involved with Telidon for three or more years. The only generally common sectors for these nine are in the areas of page creation, information provision and consulting, although some also include system operations and software development.

Profitability of firms does appear to vary with total revenue, but in relation to domestic and foreign sales. Of the 12 firms with no foreign sales, only three reported a loss. Six of the 12 had profit margins of 15% or greater, a figure only two of the firms with foreign revenues achieved overall. Of these latter two, one had a high proportion of sales from domestic sales. For the 12 firms reporting foreign sales and a profit/loss figure, only half were profitable.

The response to trends in profitability was as follows:

	<u>Increase</u>		<u>Decrease</u>		<u>Same</u>		<u>Not Applicable</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Previous 2 years	23	54.8	5	11.9	11	26.2	3	7.1
Future 2 years	32	76.2	4	9.5	3	7.1	3	7.1

There are five firms whose profitability has decreased in the past two years, four of which provided data values. Of these four, two reported a loss, one of which had no sales revenue for the year. All five employ five or fewer employees and have been involved with Telidon three years or less. Three of the five also had decreased sales in the previous two years. The most common sectors for this group are software development and page creation. Three expect profitability to increase, one to decrease further, and one to remain the same.

Of the 11 firms with constant profits, all but two, who did not respond, expect future profitability to increase. Four of the 11 firms did not specify profit level, and of the remaining seven, one is breaking even, two report losses, and four are profitable. The 11 firms encompass the range of employees per firm and the number of years associated with Telidon.



Four firms expect profitability to decrease in the next two years. All have consulting in common, and three develop software, as well. All four firms employ fewer than five people and have been involved with Telidon three years or more. The three firms expecting profitability to remain the same also have consulting in common, but little else.

In summary, from the data provided, it appears that most firms in the Telidon industry are reporting profits, at least on the basis of number of firms. However, the size of the loss reported by nine firms overrides the profit of the other 14. The extent of the losses does not depend on corresponding revenue. Some firms with large losses report low revenue, and other firms with relatively low losses may have high revenue figures. When loss is taken as a function of total revenues, it ranges from -5% to -250%.

Overall, the profitable firms are smaller firms with relatively small profits. But small firms are unlikely to survive if they are not profitable. These "cottage industry" firms are usually entirely dependent on their businesses for income. They do not have the backing and resources to continue operations, such as are available to large firms with parent companies to carry them through the hard times.

The firms reporting a loss are generally able to continue operating and investing in this technology. Only one firm reporting a loss indicated that future expectations for revenues and profitability was continued loss. The others appear to be optimistic that their investment will begin to pay off in the future.

In conclusion, the issue of whether or not the Canadian "Telidon industry" is profitable without government assistance remains unclear. On one hand, the total "profitability" figure is negative, implying that the industry is not profitable even with government assistance to date. On the other hand, of the 12 respondents who reported receiving no funding from government sources, only four are currently incurring a loss. Of the 24 firms reporting funds received from DOC, 10 reported that they are currently making a profit, three are



breaking even, two did not respond, while nine indicated that they are currently incurring a loss. Three firms, which alone account for a combined total of more than \$22.6 million in government funding (60% of the total \$37.7 million reported), are in a loss situation.

In considering the profitability of the industry as a whole, it must be recognized that a very small proportion of the firms responding to our survey have a very significant effect on the results. Large corporations are willing to take on the risks of developing new products and penetrating new markets, with the prospects of significant profits in the future. Decreased investment for these firms could well increase profitability, but at the probable cost of losing market position in areas which can justifiably be expected to enter rapid growth phases in the medium to longer term.

Given the diversity of products and services comprising the "Telidon industry", and the relative immaturity of that industry, it would be misleading and counter-productive to attempt to assess the level of sales required to yield "a reasonable profit". Profitability can be effected by changes in both revenues and expenses, while increasing sales may also require increasing expenses, thus potentially leaving profitability unchanged. The indications are that many current industry expenses are still developmental and that large sums are being committed knowingly now, against current revenues, for future returns. In simplistic terms, the industry would appear to require sales of at least \$12.25 million more than were achieved in 1984 to breakeven. However, it is impossible at this stage of industry development to determine the cost of achieving such sales or the cost of R&D and market development necessary to sustain or achieve stable future profitability.

#### EMPLOYMENT

Study Issues 2 and 3 deal with employment in the Telidon industry. This includes the number of people employed, the skills required for working in Telidon-related jobs, the availability of workers to fill positions, and the source of supply in the labour force.



The majority of government programs are concerned with job creation potential. Since one objective of the Telidon program was to create a Canadian videotex industry, the provision of employment in this industry is important.

#### Number of Jobs

Of the 42 respondents to the survey, 40 (95.2%) provided the number of full time and part time employees in their firm. The total number of full time employees assigned to Telidon-related activities is 717.5, and there are an additional 73 part time employees in 28 of the 40 firms.

With respect to full time employment, the distribution of the number of employees per firm varied. Seven firms have only one full time position, and eight employ two people. However, not all of these firms are "Telidon-dedicated" and the overall organization may well employ a large total number of employees, of which only a few deal with Telidon activities.

<u>No. of Empl/Firm</u>	<u>No. of Firms</u>	<u>% of Firms Reporting</u>	<u>Total Empl.</u>	<u>% of Total Empl.</u>
0 - 5	26	61.9	65.5	9.1
6 - 10	5	11.9	43	6.0
11 - 20	3	7.1	44	6.1
21 - 50	3	7.1	110	15.3
> 50	3	7.1	455	63.4

Most of the employment is provided by relatively few firms; 77.5% of the firms (31/40) only account for 15% (108.5/717.5) of the full time employees. Some 62% of the firms employ fewer than six people, whereas 63% of the jobs are provided by only 7% of the firms.

If segregated by sector, the following split is observed:



- 5 of 6 hardware manufacturing firms employ more than 10 employees per firm (83% of those manufacturing hardware employ 41% of the people).
- 3 firms, employing a total of 225 people, manufacture hardware and software, provide turnkey systems and are involved in page creation along with some additional products/services.
- The seven firms employing one full time person are not involved in hardware manufacturing or distribution, turnkey systems or telecommunications; the most common area is consulting (5 of the 7).

With respect to trends in employment, the following response was given:

	<u>Increase</u>		<u>Decrease</u>		<u>Same</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Previous 2 years	30	71.4	5	11.9	7	16.7
Future 2 years	31	73.8	3	7.1	8	19.1

Of the 13 firms involved in Telidon for two or fewer years, only one had decreased employment and one remained the same. Of those five firms reporting decreased employment, four had fewer than five employees per firm. Of those seven firms remaining the same, six had five or fewer employees.

Three firms whose employment had increased in the past two years expected to remain at current levels for the next two years; all three firms have been involved for three or more years, and two employ less than five employees. Four firms with unchanged employment in the past also expect to remain at the same level; all have five or fewer employees and have been involved with Telidon three or more years. Of the three firms expecting decreased employment in the future, two have ten or more employees and three or more years of involvement with Telidon.



The firms employing ten or more people provide 88% of the industry employment. Of these 11 firms, one reported zero revenue and two did not provide revenue data. However, the eight remaining firms reported 88% of the industry revenue. Only one of these firms had revenues of less than \$100,000, and only one firm with less than 10 employees had revenues in the same range as the seven major employers reporting revenues.

In summary, large firms are large both in terms of sales revenue and number of employees. Eleven firms employ 629 of the reported total 717.5 full time employees. The remaining 65.5 full time positions are provided by 26 firms. These smaller firms provide approximately half of the part time positions (37/73).

#### Job Skills

The special job skills required by the Telidon industry vary with the particular industry sector, but basically fall into two broad categories: technical and communicative. The development of the technology requires essentially the same technical skills as the EDP industry, since computer technology is involved:

<u>Industry Segment</u>	<u>Skills Required</u>
Equipment Manufacturers	Electrical Engineers Technicians
Software Developers	Programmer/Analysts
System Operators	Computer Operators Technicians

The development of videotex content, on the other hand, requires certain communicative and artistic skills, along with an understanding of the medium gained through experience:





<u>Industry Segment</u>	<u>Skills Required</u>
Page Creators	Writers/Editors Graphic Artists
Information Providers	Designers Advertising Copy Writers Journalists

While the above listings are not a complete picture of the type of people who work in the industry, they should provide a general understanding of the special types of skills involved.

In the increasingly competitive videotex markets, it becomes equally important that marketing and management skills be available to Canadian videotex companies. Initially, skill emphasis was on technical aspects for development of the Telidon systems. Many of the current industry participants have become involved at the technical level. In such cases, it is possible that the skills necessary to develop products and services would differ from those needed to run a profitable business in a competitive market. To survive, Canadian videotex firms require accounting, financial, and marketing skills able to meet changing market needs.

#### Availability and Sources

Our case study interviews have indicated that, in general, appropriately skilled people are readily available. This appears to be due to the fact that there is currently a fairly high rate of unemployment in Canada, and that many highly educated and skilled people are looking for work. For example, a recent advertisement for a position in Ottawa resulted in more than thirty responses from qualified applicants.

In the case of Telidon page creation, however, one source indicated that there was a shortage of people familiar with the medium. The preference of this firm was to hire editors and graphic artists with experience in other media, and train them in the ways of Telidon. Approximately three to four months is required for a graphic artist to become well trained in the videotex medium.



One major source of skilled employees for companies in the industry seems to be other companies in the industry. Several of the smaller firms are built around former employees of Infomart, Norpak, and DOC. A number of independent videotex consultants also got their start working for one of the early Telidon players.

#### INVESTMENT

As of the end of fiscal year 84/85, it is estimated that DOC has contributed \$64 million in the Telidon Program. It was anticipated that industry would invest four times as much as government over the course of the program. In 1981, it was estimated that Canadian industry had invested \$100 million in Telidon-related activities. The current "conventional wisdom" places the figure for current investment at close to \$200 million.

Study Issue 4 deals with how much have Canadian firms invested in Telidon. In the survey, firms were asked to indicate the total amount they had invested in videotex activities since becoming involved. Investment was defined to be the sum of bank loans, bonds, stock capital, and retained earnings. This was meant to include capitalized amounts, usually readily accessible on corporate balance sheets. Theoretically, the amounts repaid on loans or depreciation on equipment would be reflected through the retained earnings portion since net income would be lower.

However, there are still potential problems with any figure provided for total investment. Different companies may include different items, and some items might be expensed rather than capitalized. In addition, the comment was made that this figure does not include "blood, sweat, and tears" on the part of individuals.

The total investment figure from 32 of the 42 respondents who provided the data is \$76,103,500. Again, the investment per firm varies significantly.



<u>Investment Range</u> (\$000's)	<u>No. of Firm</u>	<u>Total</u>	<u>% of Total Investment</u>
0 - 10	4	\$ 13,000	0.02
11 - 50	4	170,500	0.22
51 - 100	7	650,000	0.85
101 - 1,000	11	4,868,000	6.40
OVER 1,000	6	70,402,000	92.51

Only 19% (6/32) of the firms have provided 93% of the total investment for these firms.

Generally speaking, company investment in Telidon-related activities would be a function of:

- The number of years the firm has been involved
- The major industry sector of the company
- The resources available to the firm (i.e., parent company relationships)
- The number of employees (as an indication of size).

Given the economics of the industry, the most capital intensive sectors would be telecommunications and hardware manufacturing. Consulting, on the other hand, is more labour intensive and does not incur as great a capital investment. Companies owned by large telephone companies or publishing houses have far greater sources of funds available to them, than do small cottage industry firms.

Part of the difference in investment by firm is explained by the number of years the company has been involved with Telidon.



<u>No. of Years With Telidon</u>	<u>No. of Firms In Survey</u>	<u>No. of Firms Reporting Investment</u>	<u>Total Investment</u>	
			<u>Amount</u>	<u>% of Amount</u>
1 or less	6	4	\$ 5,237,500	6.9
2	7	3	490,000	0.6
3	15	14	7,286,000	9.6
4	7	6	2,848,000	3.7
5 or more	<u>7</u>	<u>5</u>	<u>60,242,000</u>	<u>79.2</u>
	42	32	\$75,538,500	100.0

Firms involved with Telidon for the longest period of time have invested the largest proportion of the total investment.

Of the five firms providing telecommunications services, three reported investment of \$46,302,000 - 61% of the total investment reported. The other two firms did not explicitly state a figure, but had been involved in some of the Telidon field trials, thus they also belong in the group with long-term involvement in Telidon.

If the dollar figures are compared for companies reporting investment and DOC funding, it appears that those firms which received DOC funds have invested approximately four times that of government. There were 17 survey respondents who provided both figures, and these breakdown as follows:

<u>Company Investment/DOC Funding</u>	<u>No. of Firms</u>
1.0-1.9	4
2.0-2.9	2
3.0-3.9	2
4.0-9.9	5
10.0 or more	4

The mean value for this group is 9.24, with a standard deviation of 11.8 which illustrates the wide variation.

When company investment is compared with total public sector funding support for 20 respondents reporting other funding, the breakdown changes slightly.

<u>Company Investment/Total Public Funding</u>	<u>No. of Firms</u>
Less than 1.0	2
1.0-1.9	4
2.0-2.9	6
3.0-3.9	2
4.0-9.9	4
10.0 or more	2

The mean value for this group becomes 4.41 with a standard deviation of 4.65. The substantial amount of funding received from other federal departments and provincial government sources reduced the mean ratio. However, it does appear overall that the private sector firms have invested at least four times as much as the public sector. There are also several companies which reported investment data but which did not receive any government funding, and it can be assumed that their investment has not been dependent on government funds.

Although the reported figure of \$76 million is much less than the estimated \$200 million, it must be recognized that many of the corporations involved in the early years, particularly some telephone companies, were not included or did not respond to the survey. The field trials and systems development were the large capital investments required in creating functional Telidon systems. Later entrants have not had as long a time to invest, nor has the investment had to be made for systems development.

The firms employing 10 or more full time employees (11/42) account for \$71,792,000 of investment (95%). However, these again are the firms that have been involved three years or longer. Of the six firms reporting over a million dollars of investment, two did not report sales revenue but the remaining four all had revenues of greater than \$3 million.

Before attempting to draw conclusions from the investment data, it is also of interest to investigate the firms' reports of expenditure on research and development (R&D) and marketing.



### R&D and Marketing Expenditure

The survey also solicited information from firms as to their annual expenditure on R&D and marketing activities, along with trend indications. Both of these areas are of concern to the Telidon Program and separate evaluation background studies on each have been conducted as part of the overall program evaluation.


As a cautionary note the reported figures may include a wide variety of activities; no breakdown was provided. Depending on the type of firm, R&D may include hardware and/or software product development, system integration work, and/or market research. Similarly, marketing activities may include advertising, promotional displays, sales calls, and/or after sales service, among others.

At best, these figures may be viewed as what industry participants consider to be R&D and marketing.

### Research and Development

There were 33 of the 42 respondents who specified R&D expenditure. The total R&D expenditure per year for these firms is \$12,165,000. This is distributed as follows:

<u>R&amp;D Expenditure Range</u>	<u>No. of Firms</u>	<u>% of Total Annual R&amp;D Expenditure</u>
\$0	5	-
\$ 1,000 - \$ 24,000	6	0.6
\$ 25,000 - \$ 49,000	4	1.0
\$ 50,000 - \$ 99,000	8	4.1
\$100,000 - \$999,000	7	22.0
over \$1,000,000	3	72.3



The three companies with expenditures over \$1 million employ 63% of the total full time employees and are prominent program participants in the industry. They are also the three firms with the highest investment figures in Telidon. There does not appear to be a direct relationship between corporate revenues and R&D expenditure. Although firms with higher revenues are able to spend higher amounts on R&D, when average annual R&D expenditure is taken as a percentage of total revenue the figure varies from 0% to 400%. However, since R&D activities often result in future benefit rather than present profits, the lack of a direct linkage is not surprising.

Trends in R&D expenditures are summarized below:

	<u>Increase</u>		<u>Decrease</u>		<u>Same</u>		<u>Not Applicable</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Previous 2 years	26	61.9	3	7.1	7	16.7	6	14.3
Future 2 years	23	54.8	4	9.5	10	23.8	5	11.9

The firms indicating that expenditure has remained the same in the past, also indicated that this level will continue about the same. There are no other characteristics which would distinguish this group from the others.

Overall, there is a trend towards decreased growth of annual R&D expenditure. This would appear to be consistent with the theory that the technology has evolved to the point where further increases in expenditure are unnecessary. Four firms actually expect expenditure to decrease.

#### Marketing

Marketing expenditure data was provided by 34 of the 42 respondents. The total marketing expenditure per year for these firms is reported to be \$5,875,500. This is distributed as follows:



<u>Marketing Expenditure Range</u>	<u>No. of Firms</u>	<u>% of Total Annual Marketing Expenditure</u>
\$0	2	-
\$ 1,000 - \$ 24,000	15	2.2
\$ 25,000 - \$ 49,000	5	3.0
\$ 50,000 - \$ 99,000	5	5.3
\$100,000 - \$999,000	5	21.3
over \$1,000,000	2	68.3

More firms reported having marketing expenditures than R&D expenditures. However, the amount for marketing is generally less than the amount for R&D, except in the case where nothing was being spent on R&D. Again, the firms with higher expenditure levels are large firms employing most people and generating the higher revenues.

There does not appear to be a direct relationship between marketing expenditure and company revenues. Of the 28 respondents reporting both marketing expenditure and revenue data, the average annual marketing expenditure as a percentage of total revenue breaks down as follows:

<u>Marketing Expenditure as % of Total Revenue</u>	<u>No. of Firms</u>
1-10	11
11-20	7
21-50	5
51-100	3
Greater than 100	2

For this group, the mean percentage is 31.07 with a large standard deviation of 40.66. The five firms whose marketing expenditure is greater than 50% of revenues, reported revenues ranging from \$2,000 to \$110,000.



Reported trends for marketing expenditures are summarized below:

	<u>Increase</u>		<u>Decrease</u>		<u>Same</u>		<u>Not Applicable</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>
Previous 2 years	29	69.0	3	7.1	7	16.7	3	7.1
Future 2 years	31	73.8	4	9.5	5	11.9	2	4.8

The firms expecting marketing expenditure to decrease in the future tend to be the consulting firms indicating in early trends that their involvement may well be declining in the future.

Generally, more firms indicated that the marketing expenditure would increase in the future. When compared to the declining R&D expenditure, this tends to indicate that marketing is becoming of greater concern for industry firms.

In considering investment, R&D, and marketing expenditure, there are no surprises. The firms with large investment and expenditures are also the firms with large revenues.

#### INDUSTRY STRUCTURE

Study Issue 1 deals with the structure of the Canadian Telidon industry, its components and its linkage. The questions answered in the preceding sections provide primary data sources, and these have been supplemented by knowledge acquired through interviews with key companies and industry players.

The basic structural characteristics of the Canadian industry involved in Telidon-related activities are:

- The majority of firms are 100% Canadian-owned.
- Organizations are primarily located in Ontario and Quebec, with a high concentration in the Toronto and Ottawa areas.



- The average period of involvement with Telidon technology is three years, with a normal distribution of earlier and later entrants.
- The Canadian industry is dominated by one organization, in terms of sales revenues, profitability, number of employees and investment in the industry.
- The strength of the rest of industry organization decreases fairly rapidly in terms of the same variables; one or two firms, while smaller than the dominant firm, are still larger than the majority of participants. In total, seven major participants provide 80% of the employment, generate more than 85% of industry revenues, and have provided more than 93% of total industry investment in Telidon.
- In terms of products and services, relatively few firms manufacture hardware, turnkey providers out-number system operators, but many firms develop software and are involved in page creation. The capital investment required for manufacturing hardware does not allow easy market entry, whereas the large number of page creation operations indicates that a more competitive market structure is exhibited at this level.
- The financial backing available to different organizations varies - whereas the majority of firms appear to be independent ventures, even "cottage industry" types of companies, a few firms are subsidiaries of major publishing, advertising, mining or communications parent organizations, and others consider Telidon only a small part of their overall activities.
- There appears to be a high degree of intra industry employee migration among Canadian participants, both from government to industry and within the industry itself.

Various organizations involved with the Telidon technology exhibit both the characteristics of perfectly competitive markets with few barriers to entry, and of monopolistic competition where entry restrictions are less flexible. The vulnerability of different companies in the industry is, therefore, a function of their relative positions within the industry structure.



Small page creation firms are common, as are consultants. Whereas it is highly probable that there are product and service differences for these types of firms, they are potentially limited in the size of the market for those products and services. A page creation firm must compete with other page creators in marketing its content to system operators. Consultants, on the other hand, will be affected by their areas of expertise and the principal market groups requiring their services.

Hardware manufacturers are relatively few in number, but at the present time, face a limited market for products such as dedicated Telidon terminals. The major factor here has been the cost of the terminals and the threats from both foreign hardware producers and NAPLPS "software decoders" for home computers, substituting for the dedicated terminal.

Whether one page creation firm survives or not, may be of little significance to the industry as a whole, although it would be of great significance to the individual firm. But if a major consumer of small firms' products and services, in the form of a prominent system operator, were to become extinct, a large proportion of these suppliers could potentially go with it.

There is another factor in firm vulnerability which should be noted. The firms within the industry vary in their reliance on revenue from Telidon-related activities. Telidon-related revenues and profits as a percentage of total company revenues and profits vary significantly among firms. Exact data is not available for all firms in our study. However, the more dependent an individual firm is on Telidon-related revenue, the more vulnerable it will be to factors affecting the videotex market.

#### MARKET POSITIONING OF THE CANADIAN COMPANIES

In order to categorize Canadian Telidon companies relative to their strengths in each market sector in Canada, we have qualitatively assessed their positions according to the following criteria:

EXHIBIT V-2

THE RELATIVE POSITIONS OF CANADIAN VIDEOTEX PLAYERS  
IN THE CANADIAN MARKET

	Business Information Services	Public Access Systems	Specific Closed Loop Services	Home Videotex/ Teletext Services
DOMINANT		Infomart		
STRONG	Infomart Marketfax	Cableshare Genesys St. Clair Videotex	Formic Genesys Infomart St. Clair Videotex	
PRESENT	Electrohome MTS Norpak Telecom Canada (iNet)	Electrohome New Media Technologies Norpak	Electrohome Norpak	Electrohome Formic Genesis Research Infomart Norpak Videoway
TENABLE			PDI TVO	
WEAK	PDI			TVO



- Dominant: a company is considered dominant if it controls a significant (over 50%) share of a given market sector, and exerts a strong influence on the behaviour and/or strategies of other competitors.
- Strong: a company is considered strong if it has successful products/services, high market visibility, acknowledged expertise, access to financial backing, and can generally maintain long-term position in a given market in the face of competitors' actions.
- Present: a company is considered to have market presence if it is represented in a market sector but does not play a major role, has developed products/services which have not yet had a significant impact on the market, has strengths which are exploitable, and has more than average ability to improve its relative position.
- Tenable: a company is considered tenable if it is developing a product/service which has not yet reached the commercialization stage and/or is developing its distribution network, but has sufficient potential and/or strengths to warrant continuation in the market sector.
- Weak: a company is considered weak if it does not have a product/service at the commercialization stage, and/or it may lack financial strength, expertise or market presence. A weak company may have the characteristics of a company in a better position, but suffers from past mistakes or current weaknesses.

Exhibit V-2, opposite, represents an attempt to position Canadian companies in the Canadian market against the criteria identified above for each of the four market sectors. These assessments are based on the results of case studies, expert interviews and, to some extent, the industry survey.

Although much of the reasoning for positioning the Canadian firms, as shown, is derived from information provided throughout earlier sections of this report, a summary of the reasons for relative positioning of each company is presented



below in view of the identified criteria. We have not positioned all the firms in our survey population (see Appendix B), only those firms which we have been able to assess through general knowledge and from interview results. Companies are listed within each section of Exhibit V-2 alphabetically rather than as a reflection of position.

Infomart is at least "Present" in all four market sectors with products and services, mainly software and turnkey operations, with proven sales potential. It is a very significant player in terms of the Canadian market with access to financial backing, several operational services, and several agreements with other companies both in North America and Japan. In the Business Information sector, Infomart has the Grassroots system servicing farmers in the prairies and in the U.S. In the Public Access sector, its Teleguide service is a model for similar operations. In the Closed Loop sector, it provides hotel information services. In the Home Videotex sector, it has relatively less strength, although it has participated in several of the field trial experiments and is associated with the Times-Mirror Gateway in the U.S.

Marketfax is a proven business application of stock market information and has high visibility in this sector. The Firm's access to financial backing is not definitely known, but it has developed Telichart with Statistics Canada and is in the process of expanding into the U.S. marketplace.

MTS is "Present" in the Business Information sector mainly in its role of providing telecommunications services for Infomart's Grassroots system. While it has adequate access to financial backing, its services are basically restricted to the Manitoba area.

Telecom Canada offers the iNet service which is a gateway to a variety of databases, some of which are NAPLPS. There is little question of financial backing availability, but access is not that widespread and the majority of the databases are ASCII. It is currently facing rate-restructuring and the service is still in its infancy, thus its "Present" positioning.



Electrohome is "Present" in all four market sectors on the basis that its terminals and decoders constitute a major installed base of hardware in on-going services, such as Teleguide. The company is highly diversified and Telidon-related activities do not form a large part of total revenues. There are indications that the company is retreating from increased future involvement with NAPLPS hardware.

Norpak is also "Present" in all four market sectors for similar reasons, in that the installed base of NAPLPS terminals are Norpak products. It also appears to be retreating from increased future involvement with NAPLPS decoders, but is still involved with page creation equipment and teletext chips.

New Media Technologies is "Present" in the Public Access sector. As AEL Microtel, its terminals also composed part of the installed terminal base. However, the new corporate entity has a new product, PIRT, which is a Public Access terminal. It has successfully marketed some of these in the U.S., and it has recently announced activities in Japan.

PDI is "Weak" in the Business Information sector since its product is still in the developmental stages and is not yet at a commercialization phase. It has no strong visible financial backing. In the Closed Loop sector, it has targetted specific applications which have identified short-term market opportunities, and thus is "Tenable" in this sector.

Cableshare is "Strong" in the Public Access sector since it has a stand-alone public access system currently in use in a number of environments including the U.S. It is affiliated with a major cable company and it is diversified, serving cable and computer communications clients.



Genesys is also considered "Strong" in the Public Access sector where it provides turnkey and systems management. Although it does not have a parent backing, it does have established products in current, on-going operations. Because of the similarities between Public Access and Closed Loop sectors, it is also "Strong" in the latter sector.

St. Clair Videotex is "Strong" in both the Public Access and Closed Loop sectors as well. It is mostly involved in page creation activities, and is affiliated with a major advertising company which provides access to financial backing.

Formic is "Strong" in the Closed Loop sector since it has several established products in convention centres in Ontario and Quebec. It also appears to be a "favoured son" of provincial government sponsored programs for financial backing. In the Home Videotex Sector, it is considered "Present" with its software Apple decoder.

TVO is considered "Tenable" in the Closed Loop sector since it has a number of databases for the educational field, but its on-going operations are highly dependent on the whims of provincial government funding. Its services are provided through public libraries and are meant for students in schools and in the home. It is considered "Weak" in the Home Videotex sector since its service is not specifically targetted for used in the home, but applications do exist.

Genesis Research is "Present" in the Home Videotex sector because of its story book application which is used in Infomart's Grassroots system and on cable networks in the U.S.





Videoway is considered "Present" in the Home Videotex sector, even though its "black box" is not yet on the market, because it does have a large potential market and could become very strong locally. Its affiliation with Videotron and support from the provincial government provide it with strong financial backing.

In summary, Canadian firms have products and/or services that make them generally strong in Public Access, Closed Loop Services and, to a limited extent, Business Information Services. A number of other companies have a presence in the Home Videotex/Teletext market and the Business Information Services market. In the main, Canadian companies have positioned themselves to capture existing, short and medium-term opportunities.



## VI - TELIDON PROGRAM ISSUES

### INTRODUCTION

This final chapter of our findings deals with the industry's perceptions of the Department's Telidon Program activities. The Telidon Program has consisted of several different components, all directed towards the creation of a viable Canadian Telidon industry. The purpose of this section is to determine how successful these activities have been from the industry's point of view.


The opinions have been forthcoming from three major sources: the industry survey primarily, case study interviews, and supplementary interviews with industry experts.

The presentation of survey results, supplemented by interviews, answers two questions contained in the study's Terms of Reference; specifically, Study Issue 13, concerning the usefulness of the Telidon assistance program, and Study Issue 14, concerning preferred types of assistance in the future.

Within this chapter, opinions expressed on past program activities (Issue 13) are presented first. The second section then presents our findings with respect to the types of future assistance preferred (Issue 14).

### GOVERNMENT TELIDON SUPPORT

The survey posed questions directed to the issue of how useful the firms surveyed found the Telidon assistance program (Issue 13). Although some components of the Telidon program consisted of grants to specific organizations and others involved work contracted out to the private sector, other components were directed at providing assistance to the industry as a whole. Telidon product R&D, field trials, and database development were all early activities



of the program needed to develop the Telidon technology delivery system. Much of the work was performed through contracts to various organizations.

The Industry Investment Stimulation Program (IISP), otherwise known as "2-for-1", loaned terminals to organizations on a matching basis with industry. The IISP was carried out over FY 1981/82 and 1982/83. The Content Development Program (CDP) is a more recent grant program, FY 1983/84 and 1984/85, and provides funds to companies for up to 30% of the costs of developing content for Telidon databases.

Standards development, market development, and behavioural research components, were essentially government efforts to aid the industry in these areas. The timing of the emphasis of these components varies; standards were more important at the beginning, markets near the latter part, and behavioural research throughout. The CVCC was also an early component in developing the "Telidon industry".

There were some additional program activities, such as the Public Initiatives Program (PIP), which did not necessarily have commercial implications. The preceding components were the most relevant to industry, and therefore, firms were asked to indicate the degree to which those activities provided indirect benefit to them.

A summary of the responses is provided below:

	<u>Detri</u> <u>mental</u>	<u>Marginal</u> <u>Benefit</u>	<u>Helpful</u>	<u>Very</u> <u>Useful</u>	<u>Large</u> <u>Positive</u> <u>Impact</u>	<u>No</u> <u>Response</u>
A. Telidon Product R&D	0	12	11	9	8	2
B. Field Trials	5	9	5	12	8	3
C. Market Development	8	20	5	6	1	2
D. Standards Development	2	7	11	7	12	3
E. Technical Operational Services	4	20	5	3	4	6
F. Database Development	6	19	5	5	4	3
G. Behavioural Research and Evaluation	4	26	5	0	2	5
H. Canadian Videotex Consultative Committee (CVCC)	7	20	6	4	0	5
I. Industry Investment Stimulation Program (IISP)	5	11	8	9	6	3
J. Content Development Program (CDP)	9	11	6	7	5	4


Overall, it appears that behavioural research and market development are felt to have had the least benefit. Of those responding, 81% felt behavioural research was of "marginal benefit" or even "detrimental" and 70% felt market development was not very beneficial. The CVCC was felt to have little benefit by 73% of those responding.

Field trials and standards development are seen as two quite beneficial activities of the Telidon program. Of those responding, 64% felt field trials, and 77% felt standards development, were "helpful", "very useful", or had a "large positive impact".

EXHIBIT VI-1

RESPONSE BY FIRMS TO BENEFITS OF TELIDON PROGRAM SUB-COMPONENTS

<u>PROGRAM COMPONENT</u>	<u>MOST BENEFICIAL</u>		<u>LEAST BENEFICIAL</u>	
	<u>NO. OF FIRMS</u>	<u>MAJOR REASONS</u>	<u>NO. OF FIRMS</u>	<u>MAJOR REASONS</u>
A. Product R&D	4	<ul style="list-style-type: none"> <li>. gave Canada a world class technology</li> <li>. helped develop knowledge base essential for the technology</li> </ul>	-	
B. Field Trials	6	<ul style="list-style-type: none"> <li>. enabled company to learn the technology and make informed judgements about applications</li> <li>. gave opportunity to develop working systems</li> </ul>	-	
C. Market Development	1		6	<ul style="list-style-type: none"> <li>. appears naive, government not in marketing</li> <li>. more support given to large companies</li> <li>. ineffective</li> </ul>
D. Standards Development	12	<ul style="list-style-type: none"> <li>. fostered an international market, particularly in U.S., which uses Canadian expertise</li> </ul>	1	<ul style="list-style-type: none"> <li>. adaptation to AT&amp;T standard, set Canadian industry back two years</li> </ul>
E. Technical Operational Services	1	<ul style="list-style-type: none"> <li>. provided technical opportunities</li> </ul>	2	
F. Database Development	-		1	<ul style="list-style-type: none"> <li>. database not updated and of little use for demonstration purposes</li> </ul>
G. Behavioural Research and Development	1	<ul style="list-style-type: none"> <li>. provided information on how end users relate to the system</li> </ul>	5	<ul style="list-style-type: none"> <li>. very little output</li> <li>. may actually have had negative effect in industry and stalled growth</li> </ul>
H. Canadian Videotex Consultative Committee (CVCC)	1		3	<ul style="list-style-type: none"> <li>. may have contributed to chronic misdirection of program priorities</li> </ul>
I. Industry Investment Stimulation Program (IISP)	9	<ul style="list-style-type: none"> <li>. felt to be major impetus in companies becoming involved in Telidon</li> <li>. launched several commercial operations and field trials</li> </ul>	1	<ul style="list-style-type: none"> <li>. grants lead to gross distortion of market realities</li> </ul>
J. Content Development Program (CDP)	5	<ul style="list-style-type: none"> <li>. recognized need for marketable content applications</li> <li>. stimulated private sector involvement</li> </ul>	7	<ul style="list-style-type: none"> <li>. seen as supporting IISP recipients mostly</li> <li>. not felt to be responsive to industry needs</li> <li>. too late</li> <li>. few new applications, fresh ideas</li> </ul>



Firms that have been involved with Telidon four or more years, generally favoured product R&D, field trials, and standards development as the most beneficial. These firms comprised the highest proportion of those favouring these components, although firms with less than three years involvement with Telidon also felt field trials and standards development were of benefit.


The two grant programs received mixed responses. The IISP was felt to be very beneficial by firms with three years involvement with Telidon, whereas the firms that have become involved more recently generally felt it had been of little benefit. This correlates closely to the time of the IISP.

Response to the CDP is not as closely related to years of involvement; however, it did elicit very strong reactions, both positively and negatively, by firms with less than three years with Telidon. This group may well be responding to direct benefit, depending on whether or not a grant was received.

There are no discernable differences in responses to this question by industry sector, since company activities overlap so greatly. Of the 42 survey responses, 11 firms received IISP funds, and 11 were scheduled for CDP funds, although in the latter case, not all eventually participated.

The firms were also asked to indicate which one of the program components was most beneficial/least beneficial to their company, and why. Not everyone responded, or gave reasons, and some mentioned more than one component. However, the responses are tabulated in Exhibit VI-1, opposite.

From this table, again it can be seen that market development and behavioural research activities evoked the least favourable responses. The CDP received mixed revues. Of those companies reported to have received CDP funds, four felt CDP was the most beneficial and ranked it highly on the previous question for benefits to the industry. Only two companies reported to be eligible for CDP funds ranked this activity as detrimental and of least benefit. It is not known if all the companies responding with a strong negative opinion had applied for funds and not received any, but at least three companies fell into this category.



The five companies reporting over \$1 million in DOC funding have all been involved with Telidon for four or more years, and generally tended to be the firms receiving major funding from OGD's and provincial governments. These firms tended to rank product R&D, field trials, standards development, and IISP most highly. The twelve firms who reported receiving no DOC funding, have generally been involved fewer than four years and received no other funding either. Not surprisingly, the IISP and CDP were ranked either poorly or not at all by these firms.

In conclusion, it appears that the Standards Development and Product R&D components of the Telidon program activities were felt to be of greatest benefit to the industry. These activities have given the industry an international standard to increase their capability to penetrate foreign markets, and a product with which to do so.

The Behavioural Research and Market Development components appear to have been least beneficial to the industry. The former activity does not seem to have produced many meaningful results, and the latter activity does not appear to have been successful in its efforts to bring in more business to Canadian firms.

#### FUTURE ASSISTANCE PREFERENCE

Although the Telidon Exploitation Program ends March 31, 1985, the evaluation study did address the issue of the type of assistance preferred in the future (Issue 14). Consequently, one question in the survey requested a ranking of possible assistance activities and provided space for other suggestions.

Ironically, the activities listed tended to be the ones from the program which were ranked as little benefit activities in a previous question. The survey response is broken down as follows:



	<u>Not at all Beneficial</u>	<u>Limited Value</u>	<u>Beneficial</u>	<u>Would be Helpful</u>	<u>Very Beneficial</u>	<u>No Response</u>
A. Telidon Product R&D	6	9	5	3	12	7
C. Market Development	6	6	1	11	16	2
D. Database Development	10	11	6	4	6	5
E. Technical Operational Services	9	11	8	5	1	8
G. Behavioural Research and Evaluation	12	8	8	4	3	7
Grant Programs to Specific Firms	6	1	5	10	16	4

As can be seen, product R&D, market development, and grant programs were most favoured; whereas the others are generally not perceived as beneficial.

Over 20 respondents also specified other areas where it was felt future assistance would be very beneficial. Several were mentioned; some by more than one firm. In approximately decreasing order of frequency cited, the types of preferred future assistance are:

- Use of videotex by government (procurement), both as an information provider and as a consumer of videotex service.
- More support for content development.





- Market research and development efforts.
- Standards development efforts.
- Government coordination for conferences.
- Funds for support of travel expenses, attendance at trade shows.
- Investment tax credits for international marketing and lower corporate tax rates for companies generating most of their income from Telidon-related activities.
- Forgivable loans for new initiatives.
- Matching grants with government where some investment must have first been made by firm.
- New features R&D.

Since these items were not presented to all participants, it is not possible to determine how many other firms would agree that these are the favoured approaches. However, it did become clear from the responses that an appropriate future role of government for Telidon will be to continue to use, and increase the use of, Telidon technology in government departments. One must also bear in mind that 11 of the 42 respondents are located in the Ottawa area and consequently, are dependent, to various degrees, on government procurement of services.

This does not mean, however, that this form of future assistance should be discounted. Government has been a major client for many of the firms developing the technology, and a sudden cessation of interest from this market could well result in some firms going out of business.

In conclusion, the single most desirable form of future government assistance to the Telidon industry is government procurement and use of Telidon-related products and services.



## VII - STUDY CONCLUSIONS

### INTRODUCTION

This Chapter of the report draws together the study findings regarding the market, competitive, and industry profiles documented in Chapters III through V. The Chapter then presents our overall study conclusions concerning the Canadian Telidon industry as a whole. These overall conclusions are presented in terms of the two primary issues noted at the front of Chapter II, namely:

1. The extent to which the Canadian Telidon industry could be viable without government support.
2. Whether it is feasible to create a comprehensive Canadian videotex industry, and if not, what would be the best strategy for specialization.

These two issues incorporate Issues 12 and 11 from the study's Terms of Reference. The other fifteen issues have already been addressed in Chapters III through VI.

### Methodology

Any supportable assessment of the Canadian Telidon industry as a whole requires knowledge and judgements about the individual companies involved, market sectors, and products, as well as an assessment of foreign competitive forces. From this base of information, judgements and opinions as to industry-wide issues can be drawn, and supported to the extent allowed by underlying knowledge of the industry and its circumstances.



To assess industry viability and feasibility it is important to know three things:

- what are the growth potentials for videotex markets,
- where Canadian companies are positioned relative to those markets, and
- what are the competitive features of those markets

in addition to information about the financial and human resources of the industry.


The methodology used to develop conclusions about industry viability and feasibility consisted of two elements. The first element involved drawing separate conclusions about Telidon market sectors in terms of their relative growth potentials, about Canadian companies in terms of their relative positions in each market sector, and about the relative positions of foreign companies competing in each market sector. The second element of the methodology involved identifying criteria for assessing the Canadian industry's viability and the feasibility of creating either a comprehensive or specialized Canadian videotex industry, and then comparing the separate conclusions from the first element against these criteria. This comparison resulted in overall conclusions being drawn about the two primary study issues concerning industry viability and feasibility.

The following observations on the study findings which underlie our conclusions are pertinent in terms of the quality of such conclusions. Although the industry survey did not produce, or enable estimation of, a full data base for the Canadian Telidon industry, reported data on trends, prospects, and issues are felt to be of reasonable consistency and of sufficient strength to enable us to draw conclusions about them and their significance. In relation to case

EXHIBIT VII-1

RELATIVE POSITIONS OF CANADIAN VIDEOTEX PLAYERS IN THE  
NORTH AMERICAN MARKET

	Business Information Services	Public Access Systems	Specific Closed Loop Services	Home Videotex/ Teletext Services
DOMINANT				
STRONG	Compuserve Dow Jones/MCI The Source	Infomart	Infomart	AT&T Bank of America Chemical Bank Knight-Ridder Times Mirror
PRESENT	Apple      Infomart AT&T Honeywell IBM Sony	AT&T    Cable- Sony    share Genesys St. Clair Videotex	AT&T    Genesys DEC    St. Clair IBM    Videotex Sony	Apple    Infomart ADP CBS Centel Citicorp Commodore Honeywell IBM Sony Time Inc.
TENABLE	American Express Merrill Lynch	Electro- home New Media Techno- logies Norpak	Formic Electro- home Norpak	RCA      Genesys Research Norpak Videoway
WEAK		Electro- home Market- fax Norpak		Electro- home Formic



study and supplementary interview results, while some of the views expressed reflected understandable instances of self-interest, as well as a wide range of priorities and perspectives, there appeared to be few, if any, real contradictions concerning the information provided. As a result of these observations, the study team feels reasonably confident about the conclusions presented in this chapter, with the provisos that survey data was not complete, and interviews relied upon statements and opinions that were not verifiable on an individual basis.

#### THE NORTH AMERICAN MARKETPLACE

Chapter III provided indications of expected market sector growth for the four market sectors (Exhibit III-2). Chapter IV positioned Canadian firms' major competition within these four sectors in the North American market (Exhibit IV-6). Chapter V positioned the Canadian firms within each sector in the Canadian market (Exhibit V-2).

When these three factors are brought together for the North American market, the relative strengths of the Canadian companies shift downward, as illustrated in Exhibit VII-1, opposite. Even the relative positions of the Canadian firms changes from that shown in Exhibit V-2. According to the previously defined criteria of position strength, Canadian companies fair less well in the larger North American market. Market share declines and the Canadians face very strong American competition.

Our reasons for positioning the Canadian companies in the North America market as shown, are given in the next sections.

#### Business Information Services

In terms of the North American market, the Canadian videotex firms will have to contend with several consortia and well established companies in providing Business Information Services. Infomart is the only Canadian company expected



to be "Present" in this sector with its currently operating Grassroots service. Marketfax, being a more specialized application, will drop to a "Weak" position relative to the large American financial organizations which could add-on similar services. Electrohome's and Norpak's position will also drop to relatively "Weak" as the major hardware competitors penetrate more of this market. Telecom Canada's iNet service and MTS do not generally operate outside Canadian borders, and have, therefore, been eliminated from the composite Exhibit. In relation to the American competition, PDI also is not a current contender.

#### Public Access Systems

The smaller Public Access sector has not attracted significant interest from large American companies. The Canadian videotex firms, on the other hand, have established a certain amount of expertise in this area. Consequently, the only major shift on a North American market level is that the previously mentioned positioning (Exhibit V-2) decreases by one criterion. The increased size of the total Public Access in the North American market stops any one firm from being "Dominant", but the relative positions of the other firms to each other does not change significantly.

#### Specific Closed Loop Services

Because of the similarities between the Public Access and Closed Loop sectors, Canadian firms can again be expected to maintain the same relative positions even in the larger North American marketplace. Infomart is still considered to be "Strong" in this sector, mainly because no significant U.S. firms have specified an active interest in providing Closed Loop Services. Genesys and St. Clair Videotex will achieve at least a "Present" position, and both currently provide Closed Loop Services in the U.S. Formic would drop to a "Tenable" position, mainly because it is a fairly small firm operating within Canada. Electrohome's and Norpak's relative position would, again, drop to



"Tenable" when faced with the major hardware competitors. PDI, without a commercial product, would not be a contender in the North American market, nor is TVO which operates within Ontario.

#### Home Videotex/Teletext Services

This market sector has attracted some very strong competition for the North American marketplace. Infomart is the only Canadian firm likely to maintain a "Present" position in the enlarged market, mainly through its current affiliations and its sales of systems in the U.S. Genesis Research has an established niche in this sector, selling its storybook applications via cable networks. However, since the company is relatively small, we expect it to drop to a "Tenable" position, relative to the large American consortia. Formic becomes "Weak" in the sector, mainly due to its relatively small size and Canadian sphere of operations. Electrohome will also be "Weak" as it begins to withdraw when faced with American and Japanese competition for hardware decoders. Norpak, on the other hand, is considered "Tenable" because of the VLSI teletext chip which, when incorporated in the home television set, will be represented in this market. Similarly, Videoway will also be represented in the Home sector when its "black box" is available, thus it is also considered to be "Tenable".

#### Implications for Canadian Companies

In terms of overall North American markets, some Canadian firms appear to be well positioned to capture opportunities in Public Access and Closed Loop applications. As Exhibit III-2 illustrated, these sectors appear to represent relatively strong short to medium-term opportunities. In the longer term, when business and home markets begin to grow, Canadian firms will in general not be well positioned to compete in them. Moreover, if the viability of these Canadian firms hinges on playing a role in providing videotex-based products/services to the Business and Home markets, it is likely that smaller firms, whose current positions in these markets are weak or tenable, will not have a stake in these markets, at least not at the North American level.



With the exception of Infomart, and possibly its suppliers, Canadian firms are unlikely to play a significant role in mass Business or Consumer-oriented videotex services in the U.S. The competitive forces that have entered the U.S. Business and Consumer videotex markets are already too well financed and too well positioned to give most Canadian firms any serious prospects of gaining a foothold.

Having presented conclusions about the status and near-term prospects of Telidon markets, the relative strengths of Canadian companies, and the nature and likely impact of competitiveness forces, the following sections consolidate these views and document our overall conclusions regarding industry viability and feasibility.

#### THE VIABILITY OF THE CANADIAN TELIDON INDUSTRY

This section addresses Study Issue 12.

##### Definition and Criteria

Viability, in terms of the extent to which the Canadian Telidon industry could be viable without government support, is interpreted in terms of whether the:

- markets for,
- products from,
- funding of, and
- skills/experience within

Canadian companies is sufficient to make their survival possible without government subventions.





In developing criteria for assessing viability, the concept of adequacy has been applied to the four areas noted above:

- to what extent are the potential Telidon market sectors adequate in terms of being accessible, rational and growing
- to what extent are the industry's products adequately suited for, and adaptable to, the present and anticipated needs of Canadian and foreign markets
- to what extent does the industry have the investment capital and/or operating profits adequate to meet its financial requirements
- to what extent are the technical and managerial skills and experience within the industry adequate to meet its present and prospective requirements.

These criteria have been deliberately stated in relative rather than absolute terms. This is because our assessments will rely to a substantial degree on informed judgement and thus are not suited to the expression of a single definitive opinion.

#### Viability Assessment

The following sub-section presents our assessment of the industry in terms of the four criteria, noted above.

##### Adequacy of Market

This criterion involves assessing the extent to which the potential Telidon market sectors are adequate in terms of being accessible, rational and growing. From our conclusion regarding the Telidon market (see Chapter III), it appears that all four sectors are active and either growing or sustainable. Furthermore, from the profiles of each sector, and the examples of market evolution for VCR and Colour Television, it would appear that the development



of the market in each sector is likely to behave reasonably rationally. Rationality is seen in terms of market growth as prices (in real terms) decrease, and the range and quality of services increases. While our analysis of the prospects of Canadian companies in each market sector indicates uneven potential, we are not aware of any reasons why the full range of each market sectors would not be accessible to Canadian companies, although barriers to entry do exist in the form of a definite need for financial backing with which to meet the strong American consortia.

In summary, it appears that the market for Telidon products and services will be adequate in the short and medium-terms (12-36 months) in terms of accessibility and real and rational growth.

#### Adequacy of Products and Services

This criterion requires an assessment of products and services in terms of their suitability and adaptability to present and anticipated market needs. Our conclusions concerning the relative strengths of Canadian companies in each market sector, (see Chapter V), indicate that a number of Canadian firms are either dominant or fairly strong in the Public Access sector, show considerable strength in the Closed Loop sector, and have some strength in Business Services. We believe that Canadian companies have positioned themselves to capture existing and short to medium-term opportunities, particularly in the Public Access and Closed Loop sectors. However, it appears that these sectors may have relatively less potential beyond the medium-term, when the sectors in which Canadian companies are less strong are likely to become the areas of high growth.

Although there are indications that some Canadian companies already have, and may further develop, capabilities in the Business and Home Service sectors, our conclusions regarding the likely levels of short and medium-term competition from foreign competitors (see Chapter IV) indicate that opportunities for Canadian companies in these growth areas will be severely limited. It is also likely that foreign competitors in the Business and Home sectors will actively pursue these sectors in Canada.



In summary, it appears that the Canadian industry is well positioned in terms of its products and services in the Public Access and Closed Loop sectors. However, the industry appears not to be as well placed in terms of the Business and Home Services sectors, which are likely to grow very substantially beyond the medium-term. When combined with the strong competitive pressures from foreign suppliers in these sectors, we conclude that the Canadian industry will face increasing difficulties in terms of developing and marketing its products in the market sectors of greatest future potential growth.

#### Adequacy of Financing

This criterion involves an evaluation of the extent to which the industry has either investment capital or operating profits adequate for its financial requirements. To answer this question with a high level of confidence it would be necessary to have a comprehensive base of financial information about individual companies in the industry and accurate forecasts of future revenue. It would also be necessary to know related expenditures, including those such as R&D which do not generate corresponding revenues in the short-term. Unfortunately, these types of information are not available. However, what is clear is that the scope and size of companies vary widely. Companies range from sizeable operations, some of which are well supported by parent organizations and some that are members of a consortium, to those companies which appear vulnerable in terms of their ability to finance both ongoing operations and essential but non-revenue generating activities, such as R&D and marketing.

Of the forty firms reporting profitability, seventeen (42%) reported making a profit; although of twenty-five firms providing operating results, just nine were responsible for the net loss of \$12.25 million reported in 1984. Survey results also show that the 1984 average profit (of profitable firms) was \$80,000, while the average loss (of loss-making companies) in 1984 was almost \$1.5 million. While full industry data was not available, these results



suggest that it may be the larger firms that are investing heavily in current product and business development, while the smaller firms may be forced to pursue shorter-term profitability in order to survive and improve their prospects of raising substantial amounts of equity (or debt) to finance down-stream development and operating costs.

However, company size and scale of operations are not necessarily good indicators of overall financial strength and viability. While detailed information is not available, the overall financial health of the industry appears to be in surprisingly good shape for a new and rather ill-defined business. While it is impossible to be more specific in relation to the adequacy of industry financing, some of the major players appear very committed to continued investment in their product and target markets. Whether they have the requisite level of financing to deliver on this commitment is not known.

In summary, while there is likely to be some interest in further government support, a view reported by some interviewees is that the industry either has adequate funding in the short term, or is capable of surviving on current operating profits. The availability of new capital financing, whether debt or equity, is likely to be seriously impacted by any significant negative (or positive) indicators as to market developments and prospects. Should market prospects be seriously threatened, as suggested above, it is likely that reduced amounts of capital financing will be available in medium-term and beyond. Obviously market developments also effect the amount of financing that can be provided through operating profits.

#### Adequacy of Human Resources

This criterion involves an assessment of the adequacy of technical and managerial skills and experience within the Canadian industry. This is probably the most difficult criterion of the four on which to draw a supportable conclusion. The evaluation of this criterion involves highly



personal judgements that can, at best, only really be based on relatively short interviews, and even then on contacts with normally no more than two senior representatives of any organization.

However, from our review of the its background, and discussions with experienced senior managers in the industry, it appears reasonable to conclude that the industry in general is not limited in terms of technical skills and experience. The reason for this conclusion is that most new industries, particularly those in high-tech areas, tend to be started by entrepreneurs having a strong technical/product orientation. In addition, during the case studies and supplementary interviews, shortages of technical skills was not noted as being a material problem.

It is less certain that the Canadian industry is adequately served in terms of the full range of management skills and experience that will be required to efficiently and effectively convert market opportunities into confirmed sales. There are two main reasons for this conclusion. The first is a consequence of the preponderance of technical entrepreneurs typically found in emerging high-tech areas. Such entrepreneurs are often either unaware of the full range of skills required to manage complex businesses, or do not assign a sufficiently high priority to obtaining necessary management skills. Secondly, in cases where companies are evolving they are very often not in a position to attract or remunerate the appropriate calibre of experienced manager, in key areas such as marketing and finance, when they may most need them. This particular problem does not normally effect relatively well-established companies, or those which have access to management expertise through their relationship with a parent company or other members of a consortium.

In summary, there is no reason to believe that the Canadian Telidon industry is not well served in terms of the kinds of technical skills necessary to develop future generations of Telidon products and services. While it is less obvious that there is or will be an adequate supply of appropriate management skills



available within the industry, the absolute number of such resources required is not great, and there is no evidence to believe that the key companies in the industry will not be able to fulfill their needs.

Perhaps the most difficult judgement to make is whether or not a sufficient number of companies will be able to put together the right combination or team of managers and technical experts that can collectively lead this industry through what is likely to be an increasingly competitive environment. Very often the success of such teams lies in an indefinable quality, generally described as "chemistry". Conclusions as to the adequacy of this quality can only ever be made on a detailed and company-by-company basis.

#### Overall Conclusion

The above assessments and conclusions indicate that in the short and medium-terms (12 to 36 months) there are quite good prospects that the industry as a whole will continue to develop and improve in commercial viability through pursuit of its relative strengths, particularly in the Public Access and Closed Loop markets. This conclusion is dependent to a very substantial extent upon the continuing evolution of those two market sectors, and the ability of the Canadian industry to vigorously and effectively pursue them, and in the North American market in particular.

There are, however, some concerns as to the possible limitation on the continuance of such growth, especially in the medium-term and beyond. To the extent that the Canadian industry can extend the range of the Public Access systems and maintain its market share, and to the extent that new applications for Closed Loop systems can be developed and marketed, the Canadian industry should be able to sustain its viability. To the extent that foreign companies can penetrate these two markets, and to the extent that these markets are over-shadowed by developments in the Business and Home Services sectors, short to medium-term Canadian industry viability may prove to be unsustainable, other than for one or two leaders and possibly some of their key suppliers.



### Industry Dependence on Government

Our overall conclusion addresses the first primary issue identified for this study, that of industry viability. The wording of that issue raises the question of the extent of the Canadian industry's dependence on government support. To fully answer this question quantitative evidence would be required, and in particular a comparison of the Canadian industry's total cash flow requirements with a valid projection of total income, broken down into separate revenue streams for government and non-government sources. As indicated elsewhere in which report, such information has not been forthcoming and there is really no other source. However, in light of our overall assessment of the viability issue, we do not believe that such a detailed "proof" is necessary.

It has been common knowledge throughout the industry for some time that specific industry assistance from government would end with the Telidon Exploitation Program on March 31, 1985. With the exception of some consulting firms, noted in Chapter V, survey respondents anticipate that revenues, profitability and employment will increase overall during the next two years. It appears that termination of government funding is not a particularly major issue for many of the firms, particularly those that are relatively well positioned in their respective product areas and market sectors. It is, however, worth noting one caveat to this position.

While the study found industry expectations for new financial support from government were generally low to non-existent, there was recognition of the very great importance of government sustaining, and hopefully increasing, its industry support through direct procurement of Telidon-related products and services. In other words, while grants and contributions are generally not expected, the industry will be relying fairly heavily on all levels of government for significant support through product and service purchases, particularly in a short term.



Canadian "Telidon industry" viability depends, to a large extent, upon one's definition of the "Telidon industry". Some of the definitional problems of both the technology and the industry were discussed in Chapter II. The industry segments where the technology is used generally do not consider themselves to be members of the "Telidon industry". "Telidon" (NAPLPS) will become invisible and transparent to the user; but the technology will be there. As with ASCII today, most users of personal computers are not aware, and do not need to be aware, that ASCII is the protocol they are using.

The Telidon technology will be used for applications in business, advertising, education and training, financial information, and weather reporting; applications that derive additional utility from the use of graphic representation. The Telidon technology, and a number of the "Telidon" organizations, are viable and will survive. The name Telidon, and the identification of all businesses using the technology as an industry, as such, will probably not survive.

#### THE FEASIBILITY OF A COMPREHENSIVE CANADIAN VIDEOTEX INDUSTRY

This section addresses Study Issue 11.

#### Definition and Criteria

Feasibility, in the context of developing a comprehensive Canadian videotex industry, is interpreted to mean capability of achievement - that is: can a comprehensive Canadian videotex industry be created?

In developing criteria for assessing feasibility, the concept of capability has been applied to the two areas felt to be prerequisites to creation of a comprehensive industry:

- to what extent do Canadian companies have the capability of establishing a full range of Telidon products and services





- to what extent can a Canadian capability to provide a full range of Telidon goods and services be sustained in light of foreign competition.

These criteria have been deliberately stated in relative rather than absolute terms. This is because our assessments rely to a substantial degree on informed judgement and are therefore not suited to a single definitive answer.

Our focus on the concept of capability represents a rather strict interpretation of what feasible means. To have expanded the concept of feasibility would have quickly resulted in very substantial overlaps with the kind of considerations used to assess industry viability. Nevertheless, in formulating our conclusion as to the feasibility of implementing a comprehensive (or specialized) product development strategy, we have drawn upon some of the same study findings and conclusions concerning the markets and competition for Telidon products and the status and prospects of the Canadian Industry. Where the supporting rationale for our conclusions about feasibility mirror those concerning viability, we have limited our description and made references to the earlier description.

The following are our conclusions regarding the criteria for feasibility, noted above:

#### Telidon Development Capability

This criteria is based on assessing the extent to which the Canadian industry has the capability of creating a comprehensive Canadian videotex industry, i.e., a full range of Telidon products and services.

At present, there appear to be at least three or four Canadian companies that are actively pursuing each of the four Telidon market sectors. Exhibit VII-1, summarizes our assessment of these companies in relation to each market sector, using a scale ranging from Dominant to Weak. While the companies identified in this Exhibit do not comprise the entire Canadian industry, they do represent the key players in terms of current commercial activity. Our analysis of the



Canadian industry in terms of market sectors is not repeated here. The significance of our analysis is that a number of Canadian companies have already demonstrated that collectively they do have the capability to successfully develop a wide range of Teldion products and services, some of which have proven acceptance in foreign markets.

In the course of this study, we found nothing to indicate that the quality of Canadian products and services, up to this time, was other than fully comparable to those of foreign competitors in terms of technical features and quality. However, some concerns were identified relating to the capability of developing Telidon products and services cost-competitively. It is not possible to clearly determine to what extent such pricing issues relate to comparisons with other videotex technologies, such as Prestel and Antiope, and to what extent they relate to other Telidon/NAPLPS products and services marketed by non-Canadian companies.

The production of mass market Telidon terminals is unlikely to be an area of involvement of Canadian firms. Both Sony and AT&T decoders are becoming the principal terminals for new services in several market sectors. NAPLPS-compatible micro-computer software reduces the need for dedicated Telidon terminals in the Business sector. Most of the equipment producing Canadian firms positioned in the North American market of Exhibit VII-1 are there because they already have products which are being used (this, in fact, is due to a large extent to the IISP). However, as new systems are introduced, the large foreign companies; AT&T, Sony, IBM, Honeywell and DEC, are providing the majority of new terminals.

Canadian manufacturers, however, do feel there are specialized hardware niches where they will be able to compete. These include specialized Public Access terminals, page creation units, and equipment for teletext broadcast and reception.



The systems and applications software products developed by Canadian firms do appear to be marketable in the American market. Much of the expertise of the Telidon technology resides in Canada, and several Canadian firms have been able to market their products and services in the U.S. and abroad.

In summary, it appears that Canadian industry is not only capable of establishing a wide range of Telidon products and services but it has, to a very substantial degree, already demonstrated that it can do so. While at present Canadian capabilities are not evenly distributed across the four Telidon market sectors - being strongest in Public Access and weakest in the Home Services Sector - we believe that a comprehensive industry capability does exist in niches within the market sectors.

#### Telidon Product Sustainability

This criterion requires an assessment of the extent to which a demonstrated Canadian capability could be sustained in the future, in light of foreign competition. This assessment recognizes that future product and service development by competitors could diminish, or even extinguish, the commercial justification for continuing to develop and/or improve upon existing Canadian products or services.

In our assessments of industry viability we concluded that foreign competitors, and Americans in particular, appear to be positioning themselves for a major product development and marketing attack on the Business and Home Services market sectors. We also concluded that in these two sectors it would likely be extremely difficult for Canadian companies to compete, with the possible exception of Infomart in the Business Services sector.

In summary, while there appear to be no technological limitation to the Canadian industry's capabilities to sustain their comprehensive range of Telidon products and services, there appear to be clear indications that, for sound commercial reasons, it may not be appropriate to follow such a comprehensive product development and marketing strategy.



### Strategy for Specialization

Study Issue 11 contains the conditional question of what would be the best strategy for industry specialization if it were not feasible to create a comprehensive Canadian videotex industry. To the extent that we have indicated the likely limitation on the wisdom of pursuing a comprehensive Telidon industry strategy, it appears that some form of strategy for specialized product development and marketing is appropriate. The supporting rationale for our conclusion on the subject of specialization is inherent in our observations on both industry viability and feasibility.

In the short to medium-term (up to 36 months), commercial wisdom indicates that the Canadian industry should continue to maximize its comparative strengths and advantages in the Public Access and Closed Loop sectors. These are sectors where the Canadian industry is relatively well established, and it appears to have good prospects for substantial market penetration in the U.S., as well as in Canada.

However, we have also noted that in the medium-term, there are some significant potential problems in continuing to pursue such a strategy to the exclusion of others. The Public Access sector in particular appears to have some fairly significant constraints in terms of on-going potential, unless attractive new services can be developed and effectively marketed. To some extent, the Closed Loop sector will require on-going development, in terms of new applications, in order to maintain both sales volumes and a high market profile vis-à-vis foreign competitors attracted by probably the lowest barriers to entry, (in terms of technology and cost), of any of the four Telidon market sectors. The dilemma facing the Canadian industry in terms of specialization is that the sectors where it is strongest are likely to decline in relative importance, while the sectors in which it is relatively weak are those in which foreign competitors are rapidly establishing positions of very considerable strength.



In summary, we believe that Canadian industry should continue to maximize its returns on the two sectors where it has historically been most successful - Public Access and Closed Loop Services. Secondly, the industry should rapidly and actively focus on the development of new, or enhanced and expanded old, products and services in these two sectors. Thirdly, a very careful review would appear to be warranted, before substantial funds are committed, of continuing development and commercialization of products and services in the Business and Home sectors.

In such a review, particular emphasis should be placed on attempting to identify potential niches in the Business and Home system component hierarchy. For example, Canada has traditionally had a substantial degree of success, relative to its competition, in developing specialized software. Such areas of comparative advantage should be highlighted in the search for particular niches in these two sectors, which otherwise appear destined to be increasingly dominated by foreign competitors.

#### Overall Conclusions

It is our overall conclusion that given the present relative positions and strengths of Canadian and foreign companies in each of the Telidon market sectors, it would not be feasible in the medium-term (18 to 36 months) and beyond to adopt a market strategy based on the development of a comprehensive Telidon industry.

A more feasible strategy would be to continue to maximize the potential inherent in the Public Access and Closed Loop Services sectors, where Canada already has an established position. In addition, this specialization strategy should call for specific efforts both to expand the range and attractiveness of products and services in these two sectors, and for the seeking out of specialized niches in the Business and Home Services sectors.

APPENDIX A  
TELIDON INDUSTRY SURVEY

APPENDIX A  
TELIDON INDUSTRY SURVEY

I. COMPANY BACKGROUND INFORMATION

1. a) Year business started \_\_\_\_\_  
 b) Year of first involvement in Telidon (if different) \_\_\_\_\_  
 c) Company's financial year end is: \_\_\_\_\_ (month/day)

2. What percentage of your firm is Canadian-owned? \_\_\_\_\_ %

3. What Telidon products and/or services are currently offered by your Firm?

(Check all that apply. These categories will be used in analysis)

- a. Hardware Manufacturer ( )  
 (Telidon terminals, decoders, keypads, page creation systems, printed circuit boards, cabinets, etc.) Distributor ( )
- b. Software Developer ( )  
 (Telidon data base systems, application programs, micro software, communications utilities, etc.) Distributor ( )
- c. Turnkey Systems ( )  
 (complete, packaged Telidon host systems)
- d. System or Information Sponsor ( )  
 (provides or sponsors Telidon services or information to users, using own or third party's host system; "information provider")
- e. System Operator ( )  
 (physically operates a Telidon host system on behalf of sponsors and/or users)
- f. Page Creation ( )  
 (editorial and artistic services to produce Telidon pages from information supplied)
- g. Telecommunications ( )  
 (Telidon network provider; data carrier/distributor)
- h. Consulting ( )  
 (provision of expert advice and technical information related to Telidon technology)
- i. Other Telidon Products or Services

Please describe \_\_\_\_\_

II. BUSINESS INFORMATION

1. a) What was your firm's videotex sales revenue for the most recently completed financial year?
- Domestic sales \_\_\_\_\_
- Foreign sales \_\_\_\_\_
- Total sales revenue \_\_\_\_\_ Year 19\_\_
- b) Over the last two years, has your total videotex sales revenue:
- Increased ( )      Decreased ( )      Remained the same ( )
- c) In the next two years, do you expect your total videotex sales revenue to:
- Increase ( )      Decrease ( )      Remain the same ( )
2. For your videotex products and services, is your firm currently:
- Making a profit ( )
- Incurring a loss ( )
- Breaking even ( )
3. a) What was your profit/loss on videotex for the most recently completed financial year?
- \$ \_\_\_\_\_ Year 19\_\_
- b) Over the last two years, has your videotex profitability:
- Increased ( )      Decreased ( )      Remained the same ( )
- c) In the next two years, do you expect your videotex profitability to:
- Increase ( )      Decrease ( )      Remain the same ( )
4. How much has your firm invested in videotex activities since your firm became involved in the industry? (i.e., investment includes the sum of bank loans, bonds, stock capital and retained earnings)
- \$ \_\_\_\_\_
5. a) How many people does your firm currently employ in videotex-related activities?
- Full-time employees \_\_\_\_\_
- Part-time employees \_\_\_\_\_
- b) Over the last two years, has your total number of employees:
- Increased ( )      Decreased ( )      Remained the same ( )
- c) In the next two years, do you expect your total number of employees to:
- Increase ( )      Decrease ( )      Remain the same ( )
6. If your firm manufactures videotex hardware, what percentage of components (based on cost to your firm) are purchased in Canada? \_\_\_\_\_ %



7. If your firm uses videotex equipment in your business, what percentage of the equipment (based on dollar value) is produced in Canada? \_\_\_\_\_ %

8. If your suppliers are not Canadian firms, please indicate the importance of the following reasons for using foreign suppliers by circling the most appropriate response:

	<u>Not At All</u> <u>Important</u>	<u>Minor</u> <u>Importance</u>	<u>Important</u>	<u>Quite</u> <u>Important</u>	<u>Extremely</u> <u>Important</u>
No Canadian suppliers available	1	2	3	4	5
Better prices from current foreign supplier	1	2	3	4	5
Better service from current foreign supplier	1	2	3	4	5
Better product from current foreign supplier	1	2	3	4	5
Most convenient source of supply is used	1	2	3	4	5
Other _____	1	2	3	4	5
_____	1	2	3	4	5

9. a) How much is your firm spending on videotex R&D per year?

\$ \_\_\_\_\_

b) Over the last two years, has your R&D expenditure:

Increased ( )      Decreased ( )      Remained the same ( )

c) In the next two years, do you expect your R&D expenditure to:

Increase ( )      Decrease ( )      Remain the same ( )

10. a) How much is your firm spending on videotex marketing activities per year?

\$ \_\_\_\_\_

b) Over the last two years, has your marketing expenditure:

Increased ( )      Decreased ( )      Remained the same ( )

c) In the next two years, do you expect your marketing expenditures to:

Increase ( )      Decrease ( )      Remain the same ( )

11. Would you be willing to provide more detailed financial information on your firm's videotex activities, in the future?

Yes ( )      No ( )

III. GOVERNMENT ASSISTANCE

1. a) Has your firm received direct, firm-specific support from government in the last five years?

Yes ( ) No ( )

b) If yes, please provide the following information, by source:

Total Value of Support to Date (\$000's)

Sources

Department of Communications \_\_\_\_\_

Other Federal Departments/Agencies \_\_\_\_\_

Non-Federal Departments/Agencies \_\_\_\_\_

2. If you received public sector funding, how important was this funding to your firm? Please explain the reason for your response following each source.

SOURCES                      Not At All Important    Minor Importance                      Quite Important    Extremely Important

Department of Communications                      1                      2                      3                      4                      5

Reason for response \_\_\_\_\_

Other Federal Departments/Agencies                      1                      2                      3                      4                      5

Reason for response \_\_\_\_\_

Non-Federal Departments/Agencies                      1                      2                      3                      4                      5

Reason for response \_\_\_\_\_

3. To what extent did government involvement in the Telidon industry help your firm to raise:

Not At All                      Of Small Importance                      Helpful                      Very Important                      Essential

Capital:                      1                      2                      3                      4                      5

Loans:                      1                      2                      3                      4                      5

4. In addition to direct assistance to individual firms through grants, the Telidon program also provided support to the industry as a whole. Please indicate the degree to which the following activities provided INDIRECT benefit to your firm. (Check only one per line).

	<u>Detri- mental</u>	<u>Marginal Benefit</u>	<u>Help- ful</u>	<u>Very Useful</u>	<u>Large Positive Impact</u>
A. Telidon product R&D	1	2	3	4	5
B. Field Trials	1	2	3	4	5
C. Market development	1	2	3	4	5
D. Standards development	1	2	3	4	5
E. Technical operational services	1	2	3	4	5
F. Data base development	1	2	3	4	5
G. Behavioural research and evaluation	1	2	3	4	5
H. Canadian Videotex Consultative Committee (CVCC)	1	2	3	4	5
I. Industry Investment Stimulation Program (IISP) in general	1	2	3	4	5
J. Content Development Program (CDP) in general	1	2	3	4	5

5. In your opinion, which of the above Telidon Assistance Program components was most beneficial/least beneficial? Please explain.

Most beneficial: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Least beneficial: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. In your opinion, has the role of the federal government in Telidon industry support been appropriate to date? Please explain.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. If the federal government was to provide assistance to the Telidon industry in the future, which of the following types of assistance would be beneficial?

	<u>Not At All</u>	<u>Limited</u>	<u>Beneficial</u>	<u>Would be</u>	<u>Very</u>
	<u>Beneficial</u>	<u>Value</u>	<u>Beneficial</u>	<u>Helpful</u>	<u>Beneficial</u>
Telidon product R&D	1	2	3	4	5
Market development	1	2	3	4	5
Data base development	1	2	3	4	5
Technical operational services	1	2	3	4	5
Behavioural research and evaluation	1	2	3	4	5
Grant programs to specific firms	1	2	3	4	5
Others _____	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5

IV. GENERAL INFORMATION AND OPINIONS

Location

1. How important were the following factors in determining your firm's geographical location?

	<u>Not At All</u> <u>Important</u>	<u>Minor</u> <u>Importance</u>	<u>Important</u>	<u>Quite</u> <u>Important</u>	<u>Extremely</u> <u>Important</u>
Already operating in area	1	2	3	4	5
Convenience to primary market	1	2	3	4	5
Convenience to skilled labour supply	1	2	3	4	5
Low overhead expenses (e.g., labour, space)	1	2	3	4	5
Others _____	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5

2. How important a factor is location to your corporate viability?

Very Important ( )      Important ( )      Insignificant ( )

Why? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. a) Does your firm have offices in foreign locations?

Yes ( )      No ( )

b) If so, where? \_\_\_\_\_

- c) Are these offices providing the same Telidon-related goods and services as Canadian operations?

Yes ( )      No ( )

Please explain: \_\_\_\_\_

\_\_\_\_\_

Vulnerability

1. In your opinion, what are the major areas of vulnerability for the Telidon industry? Please explain.

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2. What are the major constraints/threats to growth of the Telidon industry?

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Future Trends

1. Which types of Telidon products or services do you feel have the greatest future sales potential? Please explain.

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2. Which markets for Telidon products or services do you expect to have the largest growth in the next five years? Please explain.

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APPENDIX B

TELIDON INDUSTRY COMPANIES OF SURVEY POPULATION

APPENDIX BTELIDON INDUSTRY COMPANIES OF SURVEY POPULATION

1. ADEUM Electronics, Ottawa
2. Alphatel, Edmonton, Alta.
3. Apple Computers of Canada, Toronto
4. Ashdune Software Inc., Nepean
5. Async Corp., Toronto
6. Addison Information Systems (formerly AVCOR), Toronto
7. Stanley Robert Burnesche, Portland, Ont.
8. Cablesare, London
9. Canadian Hospital Association, Ottawa
10. Cape Videotex, Sydney, N.S.
11. Cemcorp, Don Mills
12. Corvideocom, Ottawa
13. Cybernex Ltd., Ottawa
14. Dominion Directory, Burnaby, B.C.
15. Electrohome, Kitchener
16. Faxtel Information Systems Ltd. (Marketfax), Toronto
17. FBN Inc., Ottawa
18. Fenn Company Inc., King City, Ont.
19. Fulcrum Technologies Inc., Ottawa
20. Genesis Research Corp., Winnipeg, Man.
21. Genesys Group, Ottawa
22. GIPSy Graphics Inc., Toronto
23. William G. Hutchison & Co., Toronto
24. Home Management Systems Inc., Winnipeg, Man.
25. IDON Corporation, Ottawa
26. IEPCO, Toronto
27. Image Base Videotex Design, Toronto
28. Impagination, Toronto
29. Infomart, Toronto





30. InfoNorth Computing Inc., Sudbury, Ont.
31. Softwords (formerly Information Technology Group Inc.), Victoria, B.C.
32. Kubas Research Consultants, Toronto
33. Landsdowne Consulting Group, Ottawa
34. Limicon Inc., Toronto
35. McLeod Young Weir, Toronto
36. MEP Company, Markham, Ont.
37. New Media Technologies, Burnaby, B.C.
38. MTX Telecom Services Inc., Winnipeg, Man.
39. Manitoba Telephone System (MTS), Winnipeg, Man.
40. Media Videotex, Vancouver, B.C.
41. Michael A. Dagg Associates, Ottawa
42. Micropixel Inc., Toronto
43. Microstar, Nepean
44. Microtaure, Ottawa
45. Network Videotex Systems Inc., Don Mills
46. Norpak, Kanata
47. Perle Systems Ltd., Scarborough
48. Phippard and Associates, Nepean
49. Picture Data Inc. (PDI), Toronto
50. Pixel Productions, Toronto
51. Premier Cablesystems, Vancouver, B.C.
52. Renmark Electronics Limited, Toronto
53. Elodie C. Sandford & Associates, Toronto
54. Saskatchewan Telephone System, Regina, Sask.
55. Socioscope Inc., Ottawa
56. Sonoptic Communications Limited, Ottawa
57. St. Clair Videotex Design, Toronto
58. Systemhouse, Ottawa
59. TDS Display Products Inc., Kanata
60. TVOntario, Toronto
61. Talamark Systems, Ottawa
62. Tayson Information Technology, Scarborough
63. Technical Consultants International, Edmonton, Alta.
64. Telecom Canada, Ottawa



65. Tele Direct, Scarborough
66. Telethought, Brampton, Ont.
67. United Audio-Visual Resources, Ottawa
68. University of Guelph, Guelph, Ont.
69. Videographex Videotex Consultants, Winnipeg, Man.
70. Videoaccess, London, Ont.
71. Videotex Atlantic Ltd., Halifax, N.S.
72. Words Associated, Wakefield, Que.
73. Actualité médicale, Montreal, Que.
74. Douserv Télécom Inc. & Gemsystel, Montreal, Que.
75. Edimédia Inc., Quebec, Que.
76. Formic, Montreal, Que.
77. Info Age, Ville St. Laurent, Que.
78. Institut de Recherches Cliniques de Montréal, Montreal, Que.
79. Proulx Bros. (EPIX), Ottawa
80. Tévicore, Verdun, Que.
81. Videoway Inc., Montreal, Que.
82. Télé-Université, Montreal, Que.
83. Laboratoire de Télématicque, Université du Québec à Montréal,  
Montreal, Que.
84. Palais des Congrès, Montreal, Que.

APPENDIX C

CASE STUDY & INDUSTRY EXPERTS INTERVIEWS SCHEDULE



APPENDIX C

CASE STUDY INTERVIEW SCHEDULE

<u>Participants</u>		<u>Date</u>
Genesys Group, Gunter Kurz	Ottawa	February 12
Michael Dagg, Consultant	Ottawa	February 13
George Piskor, Consultant	Ottawa	February 15
TVOntario, John Syrett	Toronto	February 27
TVOntario, John Freeman	Toronto	February 27
PDI, Pat Nicholls	Toronto	February 27
PDI, Scott McDougall	Toronto	February 27
St. Clair Videotex, Douglas Peter	Toronto	February 27
Electrohome, Don Harrold	Kitchener	February 28
Faxtel/Marketfax, John McLauchlan	Toronto	February 28
Searchmart, Peter Bowers	Toronto	March 1
Infomart, Maurice Sprumont	Toronto	March 1
Link Resources, Martin Lane	Convention	March 4
New Media Technologies, John Madden	Convention	March 4
Bank of Montreal, Cathie Irwin	Convention	March 5
Sony, Scott Campbell	Convention	March 5
Micropixel, David Carlisle (Consultant)	Convention	March 6
Telecom Canada, Larry Wilson	Ottawa	March 8
NORPAK, Jim Carruthers	Kanata	March 15
MTS, R.J. Kachulak	Winnipeg (phone)	March 15
Formic, Bob Croll	Montreal	March 21
Edimedia, Jean-Pierre Lauzon	Montreal	March 21
Videoway, Manon Marchand	Montreal	March 21
Videoway, Pierre Hebert	Montreal (phone)	March 26

