THE CANADIAN ELECTRONIC DATABASE INDUSTRY:

IMPACT OF FOREIGN SERVICES AND CANADIAN COMPETITIVENESS

Robertson Nickerson Limited

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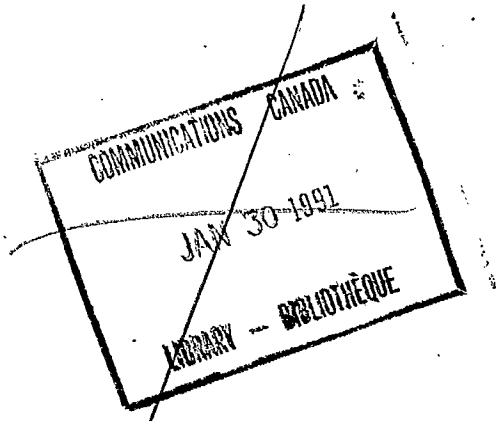

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THE CANADIAN ELECTRONIC DATABASE INDUSTRY:

IMPACT OF FOREIGN SERVICES AND CANADIAN COMPETITIVENESS

FINAL REPORT

Submitted to:

THE FEDERAL DEPARTMENT OF COMMUNICATIONS
AND
THE ONTARIO MINISTRY OF INDUSTRY, TRADE AND TECHNOLOGY

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EXECUTIVE SUMMARY

This study was undertaken to examine the Canadian Electronic database industry with respect to structure, competitiveness and the impact of foreign services. The majority of the report contains primary research and analysis and we have placed a heavy emphasis on industry consultations. The report covers, primarily, producers and supplier/vendors in the public online sector but other sectors such as CD ROM and floppy disk have been included where appropriate. We have also dealt specifically with Canadian content databases.

Some of the major observations are as follows:

1) The typical method of analyzing the growth of the industry, i.e., counting databases, has limited use because of the following factors:

   a) there is no standard for counting between countries;

   b) counting does not take into account the value of information or value-added;

   c) multiple databases have been counted as one and vice versa;

   d) inter-country comparisons in percentage terms have limited value in a high growth market and in comparing databases which have little value outside their own country; and

   e) there is no clear definition of a public online database.

In order to make these figures useful, standards must be set and limits to interpretation must be understood. This would be a useful agenda item at an international conference.

2) Canadian companies and organizations control the vast majority of Canadian content databases at both a producer and vendor level. The level of Canadian control increases with the level of Canadian content. Exceptions in specific areas of business/finance; forestry and pulp and paper are noted. This is likely due to the relative low international demand for Canadian information.

3) Overall, there is a low level of concentration amongst both producers and vendors, but there is concentration in certain subject areas.

4) Foreign competition is not viewed as a threat. The industry believes that any increased foreign presence will occur through acquisition, not competition. This could affect Canadian control in specific subject areas, but not likely to the industry as a whole.

5) There is an increasing number of French-language databases. These are mainly databases previously available in English only.

6) The industry is concentrated in the Toronto area and the National Capital Region.

7) Canada's ratio of profit to non-profit producers is roughly 48% to 52%, similar to Europe but lower than that of the US.

8) The industry views lack of awareness and the high cost of marketing as its major barrier to growth.

9) The industry would like to see clearer guidelines and easier access to government information and would like government to take the lead in the use of electronic information.

10) There are a number of strategic alliances in the industry but the existing level could be much higher.

11) A number of trends and opportunities are discussed.

12) Special CD ROM considerations are discussed. CD ROM is a non-traditional electronic medium in that it is both data and culturally-oriented with CD ROM companies often referring to themselves as publishers. CD ROM may be particularly vulnerable to US competition.

13) There is perceived growth for Canadian information both domestically and internationally (particularly due to increased potential for international trade). Overall, however, demand analysis is still largely intuitive rather than analytical.

14) A potential increase in reliance on US services would likely create a significant imbalance of trade in electronic information services, although this is difficult to quantify.

15) The government can play a significant role in the development of the industry, primarily as a coordinating body and to assist in areas where the industry's lack of critical mass is a problem. This can be achieved through an active role in generic marketing, promoting industry networking, infrastructure support, and access to information. The government could also undertake sectoral demand analysis for industry use.

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1.0 BACKGROUND TO THE STUDY

In response to the increased importance of the electronic information industry, the Department of Communications commissioned a study to examine the Canadian electronic database industry, and specifically, the Canadian online industry.

This study will examine trends in industry, with respect to subject coverage, Canadian content, ownership, structure, etc. It will also provide industry feedback from a range of producers and vendors operating in Canada.

There is an emphasis on the marketing aspects of the industry, including an examination of current marketing practices, the degree of marketing, and any barriers to growth.

1.1 Scope

This study's primary emphasis is on the Canadian public online industry. That is, those databases which are generally available from one or a number of online means without significant restriction to access. We will also examine, where appropriate, other electronic information media such as floppy disk and CD ROM because of their importance to electronic information and because of their potential to be supplemental or complementary to online.

The study will also deal specifically with Canadian content databases as this covers the vast majority of the domestic industry.

1.2 Background to the Information Industry

A great deal has been written on the evolution of the information industry and a number of comprehensive reviews have been written on the subject (see reference section). While some of these reviews date the industry back to the stone age, to the present, we will concentrate on the more recent aspects.

The information industry, as defined by the Digital Information Group (DIG), consists of companies and units of companies that sell tangible products and services that are chiefly of informational nature. They should also be sold on a non-exclusive basis to any entity or qualified group of buyers willing to pay for the information. This definition applies regardless of the medium of delivery and generally excludes anything that is entertainment. For our purposes, we must also include information that is not sold, but given away to a user or intermediary. Such is the case for non-profit or not-for-profit situations as well as the public sector.

The industry can be further defined in terms of general user targets, be they business or consumers.

1.3 General Comments on the Information Market

In order for this study to be useful, it is important to look at the information market as a whole and determine how and where electronic services can fit in. Presumably most, if not all, information can be electronically encoded in some way and we may see the day when the vast majority of information is in some digital form. The question today is, what information should be used in electronic, for economic or other reasons. We stress the term "used" because much publishing is already electronic but is used by end users in some print form.

DIG estimates that North American Information publishing sales where approximately $85 billion (US) in 1988, up from $79 billion in 1987. Of that, online represented $5.1 billion or 6.1%, and CD ROM $189 million. This leaves a large potential universe for both media. The specific potential depends largely on the segment served.

1.3.1 Segmentation of the Information Industry

The information industry can be broken down into any number of segments. The usefulness of the exercise depends largely on the purpose of segmentation (e.g., entry strategy, pricing, format, delivery, etc.). The specific segments are therefore a characteristic of the producer/supplier/user involved.

There are, however, generic segments which can apply to almost all situations and should be examined when looking at the potential for information to be made available in electronic form.

We have chosen to initially segment the market using two criteria:

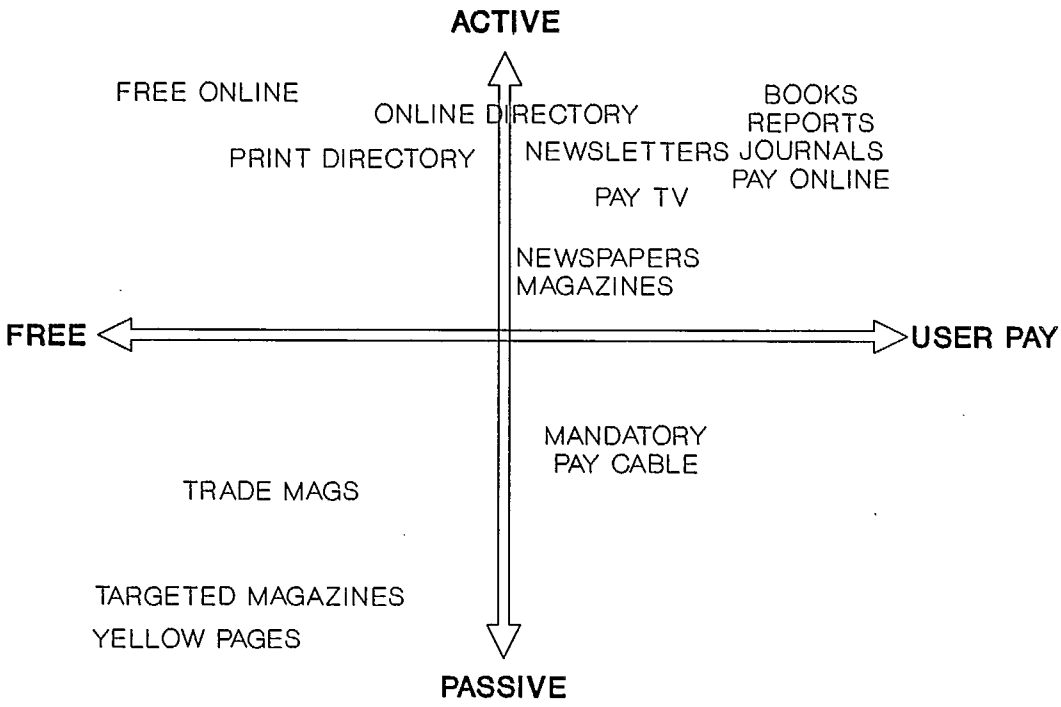
1) Who pays for the information; and

2) Whether the acquisition of information is active or passive.

These criteria have been chosen because they are closely tied with buyer behaviour for the entire industry (see 1.4). Figure 1.1 shows examples of various information sources placed in appropriate positions on the matrix.

FIGURE 1.1

MARKET SEGMENTS OF INFORMATION INDUSTRY



Who Pays for the Information

Information revenue or cost can come exclusively from the user, exclusively from the supplier, from a third party or a combination of all of these.

For the most part, this is determined by whether the information can be considered "market pull" or "market push".

In a market push situation, a party other than the user is prepared to pay the cost of getting information to the user. Primarily this takes the form of advertising in which the advertiser hopes to recoup the costs through sales of a product or service (e.g, targeted trade magazines). This also applies to some government information, provided as a service to individuals or industry.

In a market pull situation it is the user that pays the cost of information he wants (e.g., books, journals, etc.).

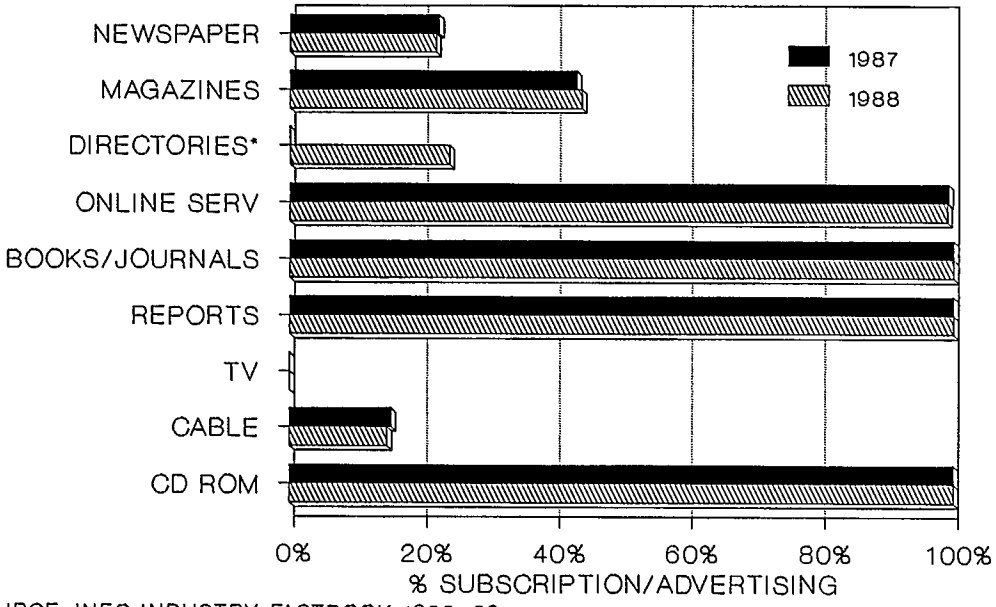
In the middle, are situations where more than one party are prepared to pay (e.g., a commercial directory).

Generally, the ratio of this contribution is proportional to the degree of benefit (tangible or otherwise) expected from that contributor.

Figure 1.2 shows the ratio of subscription vs. advertising revenues from nine different information sections. Revenue to online services and CD ROM is currently provided almost entirely from subscription (along with books, journals, and reports). On the other end, free television derives its revenue entirely from advertising. The rest have developed some balance between user-pay and provider-pay.

FIGURE 1.2

INFORMATION INDUSTRY SOURCE OF REVENUE SUBSCRIPTION VS. ADVERTISING



SOURCE: INFO INDUSTRY FACTBOOK 1988, 89

*1987 data unavailable

Active or Passive Acquisition

Information acquisition can be either active or passive. That is; it can range from actively seeing out the information to having it delivered to the user's door without any action by the user (e.g., Yellow Pages, targeting magazines).

In both categories, the ultimate value of the information does not always enter into the segment. Free and passive information such as a trade magazine can be just as valuable to a user as a paid report.

Government information is harder to segment as it can cover a wide spectrum of segments; free, paid, active or passive, depending on policy and politics.

One can note that the passive, user-pay segment is practically empty. This is logical as it is unusual to obtain information passively, and pay for it.

But again, changes in the industry have lead to entrants even in this category. The best example are the introduction of mandatory information stations on Canadian basic cable TV service at an incremental cost.

Unlike the old cable system, where the user paid for a specific service to the cable company, the new CRTC policy allows the CRTC to mandate new services at additional cost to the user. The fundamental difference is that unlike basic cable where a fee is paid to the company for a service (no funds flowing to the provider), a portion of the new revenues flow directly to the information provider, hence a non-discretionary user pay system (e.g., the weather channel). There has been some backlash to the CRTC decision by cable TV subscribers, which is consistent with why there are few, if any, other examples in this segment. Logically, the situation can only exist in a regulated industry. It will be interesting to see if this situation persists or even increases. The conclusion, however, is that the marketplace prefers control over anything it pays for.

Electronic Information

Electronic information is still relatively new to the information industry. As an emerging technology, it initially positioned itself in the specialized, high value-added segments. In terms of the matrix already defined, that would usually be in the active user-pay quadrant. This is consistent with an innovative technology appealing to innovators. Innovators as a market segment will pay a premium and are more active in their search for the best products (in this case, information).

With time, the free/pay active/passive distinctions will become more important in terms of marketing approach and positioning.

Take for example the Yellow Pages. The Yellow Pages are delivered free to all subscribers of telephone service. By adding an electronic format and charging for access, the seller has to convince the buyer a) to subscribe, b) to pay, a much different approach to the print version (Figure 1.3). Having said that, it is also likely that as the number of users increase, (and especially the number of subscribers to major services and gateways), an electronic Yellow Pages could easily slip back into the free/passive segment. As its use becomes the norm, it could be more profitable to offer the service free as part of a basic suppliers package. That is because a more popular service will lead to higher listing fees to the information provider. Hence a full marketing circle.

A second example of repositioning can be seen in Figure 1.4, where government information, available free in hardcopy form, becomes user pay when it goes to machine-readable format.

These examples demonstrates why it is important for the industry to constantly monitor its position as strategies and approaches to the market are dependant on these positions. Specific implications of position are discussed later in the report.

FIGURE 1.3

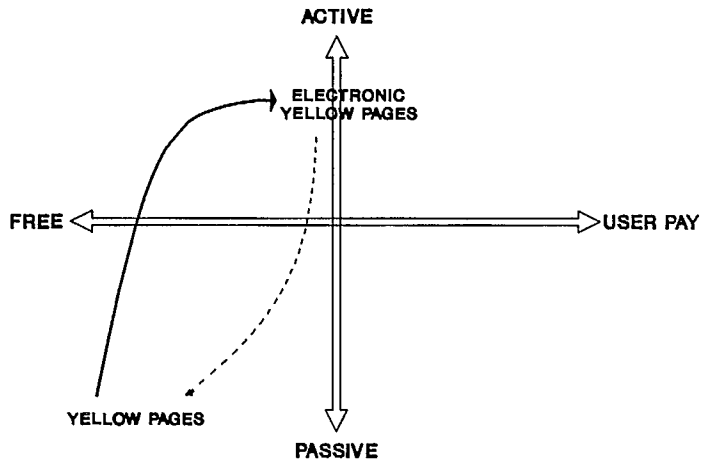
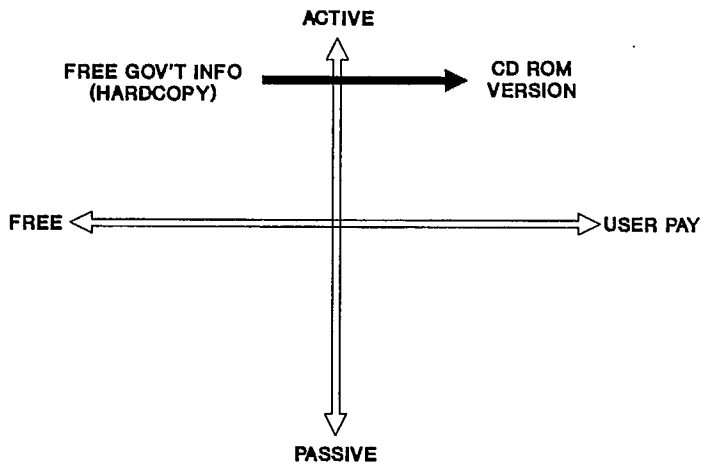


FIGURE 1.4



A very good example of rapid introduction and subsequent evolution of information technology, from a marketing viewpoint, is the Automate Teller Machine (ATM). The ATM was introduced in Canada just over 10 years ago by a number of banks. The approach the banks took was to place machines in areas of potentially rapid acceptance; downtown business districts, universities, etc. The focus was to build subscribers (users) quickly. Now, as most people in Canada (and the developed world) have access to ATMs, the focus is on diversifying services, i.e., subscribership is almost a given (passive) but use of new services is active.

One of the keys to quick acceptance of the ATM was that it was not only free, but in many cases, transaction charges were dropped when using them over a personal bank visit. Thus, the barrier promoting a pay service, previously free, did not exist. Even if the banks instituted fees for use now, it is unlikely they would loose many users, as the service is now so firmly entrenched.

1.4 Information Buyer Behaviour

It is important in any market strategy to understand where a specific product is positioned relative to other products. The comparative factors are based on relative importance to the customer. From previous research done by Robertson Nickerson Limited the following were considered most important in an information search:

1) Quality and Scope of Information

2) Ease of Access

3) Price, or Cost/Benefit

As such, an individual searching for information will undergo the following buyer behaviour pattern:

- What information is available?
- How, when and where can I get it?
- How much will it cost?

In each case, trade-offs are made depending on the weighted importance of each of these three factors and the ultimate source chosen (if any) will depend on the need and relative resources at the time.

For example, if quality of information is paramount (quality can include usefulness, format, etc.), a user will pay a premium and undergo some inconvenience to obtain what they want. By comparison, if speed is most important, the user may be willing to sacrifice quality and pay the premium to meet a deadline. The speed factor will also be affected by familiarity with a search option. The user is likely to use a system which they are most accustomed to, because there is no time to learn something new. In the final scenario, (a student, non profit centre, etc.) financial resources may be limited or non-existent and the user has to make do with whatever is available at no charge. This will also exist in a situation where the user of information has a sunk cost in a specific retrieval system. If, for example, a company has paid researchers on staff, it may be more cost effective to have someone perform a long manual search rather than an electronic search because the latter represents an incremental cost, even though the former may be more efficient.

The scenarios are not mutually exclusive, and any combination of priorities can exist at a given time. The priorities can also shift, as a situation changes. Ultimately, however, a user given a choice, will gravitate to the source which can offer:

- o the highest quality;
- o the easiest access; and
- o the lowest cost.

1.5 Value-Added Networks (VANS) and Electronic Information

It is the integration of information, electronics and communications, as well as technology leaps in the latter two, that have enabled the electronic information industry to grow. This same integration had led to the development of value-added networks or VANS (also known as value-added data services, VADS in the EEC). The key to VANS is the transferral of information electronically rather than on paper as well as the ability to search for information quickly and efficiently.

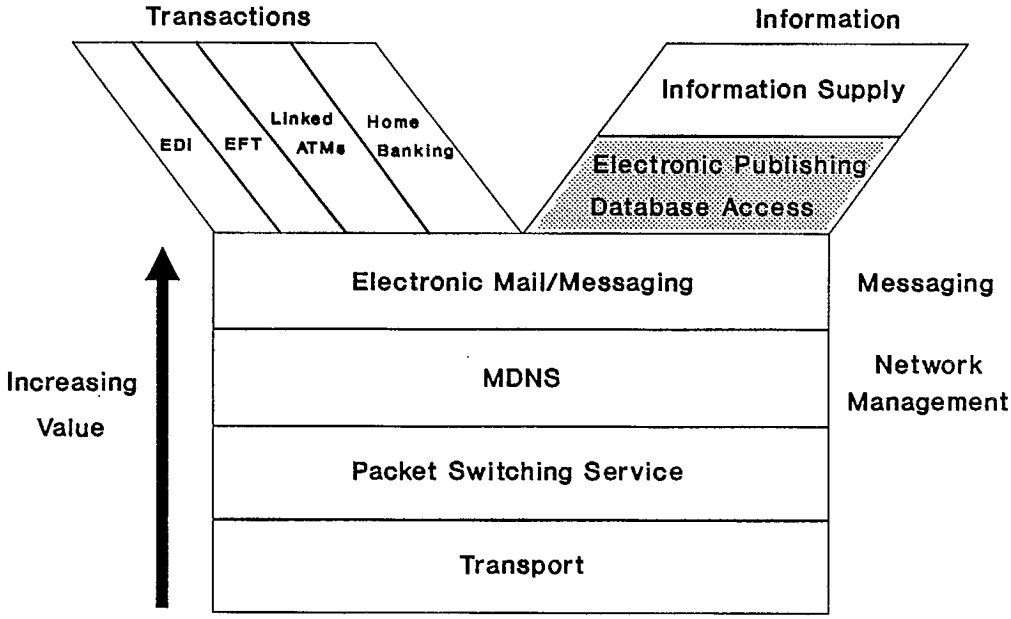
There are three general classifications of VANS:

- o Communication;
- o Information; and
- o Transaction.

Within each classification there are specific services and functions and each has a different value-added component. The UK Department of Trade and Industry (DTI) has developed a VANS classification system based on function and value-added (Figure 1.5).

FIGURE 1.5

VALUE-ADDED NETWORK (VAN) CLASSIFICATION



Adapted from the UK Department of Trade and Industry

Communication represents the lower end of value-added and includes such services as:

- Managed Data Network Services (MDNS);
- Electronic Mail;
- Messaging;
- Video Conferencing; and
- Text and Image Transfer.

Transactional Services include:

- Electronic Data Interchange (EDI);
- Electronic Funds Transfer (EFT);
- Linked Automatic Teller Machines (ATM); and
- Home-Based Transactions (banking, reservations, etc.).

Information Services which are dealt with in this study include:

- Electronic Publishing; and
- Database Access.

2.0 CANADIAN DATABASE PROFILE

2.1 Defining Canadian Databases

A number of reports are available which count databases domestically and internationally. The actual count varies considerably depending on the source, and method of counting. For example, an OECD report on computerized information services (May 1989) shows the worldwide number of online databases in 1986, 1988 as 2897 and 3457 respectively. The report acknowledges that these numbers are from two different sources (EEC Information Market Observatory IDATE and CRID respectively). For the same two years, the Cuadra Directory of online databases lists 2901 and 3699 respectively.

Of more interest to this study, is the counting of Canadian databases by various sources. The OECD report show Canada's proportion of databases produced in Canada to be 7% and 6% in 1986 and 1988. This equates to 202 and 207 databases respectively.

This would mean that Canada's databases grow only 1.2% per year over that period. Other sources disagree with these figures. The publication "Canadian Machine-Readable Databases: A Directory and Guide", lists 427 online databases produced in Canada as of June 1987. The 1987 Espial Canadian Database Directory and 1988 Supplement lists 281 publicly accessible online databases as well as 74 restricted online databases produced in Canada. These figures, if used, would bring Canada's production to 8-11% of world production.

Even within these sources, two individuals counting from the same list may come up with different numbers. The reason is that a particular online source may be considered a single database, or a series of databases, depending on the

interpretation of the researcher. For example, an English and French version of a database can be viewed as one or two databases. Similarly, a single database may really be a gateway to a number of distinct databases. The Canadian Centre for Occupational Health and Safety (CCOHS) has a series of online databases available through its CCINFO service. These 20 databases are listed as one (database number 318) although they could really be classified as 20 distinct databases since they are accessed and updated separately. Adding 20 to a list of 376 is significant both in domestic and international terms.

There are also instances where databases, previously listed as distinct, have been merged under a single name for convenience. The Ontario budgets for example, had been named by year and are now listed only as Ontario Annual Budgets.

Ultimately, the conventions are not yet clear and so, any use and particularly, comparison of statistics, must take into account the source, definitions, and possible, interpretation of data.

If the counting of databases is to continue, clear definitions must be established by international convention for the figures to have any use. Canada could take the lead in this area through its relationship with the OECD, as well as the American and European Information Industry Associations, by suggesting these standards be set.

One final note about counting: It is dangerous to read too much into the percent a given country produces compared to the rest of the world. As mentioned in Section 1, the industry is still at a very early stage of development in many countries. As these countries produce databases to meet their needs (where little or none existed before) the total world number will increase accordingly. More established countries may see a slower growth in world terms or loss of

position because of this factor when in fact the industry could be growing at a projected rate.

For the purpose of this study, we will use the Espial Canadian Database Directory as the principal source of Canadian produced and Canadian content databases. The directory is generally considered accurate, consistent, and representative of the industry. The directory also has the unique advantage of classifying databases by degree of Canadian content.

A list of databases used by acronym is given in Appendix A.

2.2 Espial Definitions

The Canadian profile deals primarily with publicly available online databases and does not include restricted or private databases.

The definitions used are as follows:

Public Database Producer

The person or organization responsible for producing and updating the database. If the base is not updated, the person or organization responsible for initial creation of the database.

Public Database Vendor or Supplier

The person or organization responsible for making available the information in the database through some method of consultation to public users.

Canadian Owned

A producer or vendor for which the place of financial control and the place of incorporation of the business headquarters (if incorporated) is located solely in Canada.

Non-Canadian Owned

Same as above but where the financial headquarters of a Canadian affiliate is not located in Canada.

Espial Canadian Content Rating Category

Annual updating of a database containing:

Category 1	less than 5% Canadian content
Category 2	5% to 29% Canadian content
Category 3	30% to 79% Canadian content
Category 4	more than 80% Canadian content

Subject Classification of Databases

The subject divisions for Canadian content databases described in this report are based on assigned subject area classifications employed in the Espial Canadian Base Director 1987, 89/90, and Supplement, 1988.

Language Used in the Databases

English: Database for which 80% or more of its contents is in English.

French: Database for which 80% or more of its contents is in French.

Bilingual:

(i) Databases in either the French or English language which either are separate or combined and in which the contents of the database is made available in English and French.

(ii) Databases which include both French and English materials in the language in which the material was originally published, but which do not translate the material in its entirety.

2.3 Canadian Database Breakdown

2.3.1 Total Number of Online Databases

The 1989/90 Espial Directory lists 376 online databases with some degree of Canadian Content (Table 2.1). It should be noted that these may not necessarily be produced in Canada.

Table 2.1

Canadian Content Databases	1987	1988	1989
All databases	218	323	376
> 30% Canadian	132	213	262
Growth from Previous Year			
All databases		48%	16%
> 30% Canadian		75%	22%

This is up 16% from the previous year and up 48% from 1987 to 1988. Examining the > 30% Canadian content databases, 261 are listed in 1989, up 22% from 1988 and up 75% from 1987 to 1988. In both cases, the rate of growth is higher than the average growth given by Cuadra as 9.7% from 1987-88 and 14.7% from 1988-89 (current data available).

The growth rates do not take into account the deletion and merging of databases and the figures should not be considered strictly incremental. For example, from 1988 to 1989, the figures show a growth of 52 databases. A closer analysis shows that some 119 district additions or changes

were made during that same period. This means that 67 databases were either deleted or changed.

A full list of databases used is given in Appendix A.

2.3.2 General Subject Areas

Growth of databases in five general categories is given in Tables 2.2 and 2.3 and Figures 2.1, 2.2, 2.3 and 2.4.

Table 2.2

Growth of Databases by Subject Area

	All Canadian Content Databases			> 30% Canadian Content Databases		
	1987	1988	1989	1987	1988	1989
General	46	64	78	31	46	53
Law/Government	36	61	79	35	56	78
Business/Finance	41	74	91	32	57	76
Science/Technology	58	82	86	19	34	37
Other Social Sciences	35	42	42	16	20	19
Total	216	323	376	133	213	263

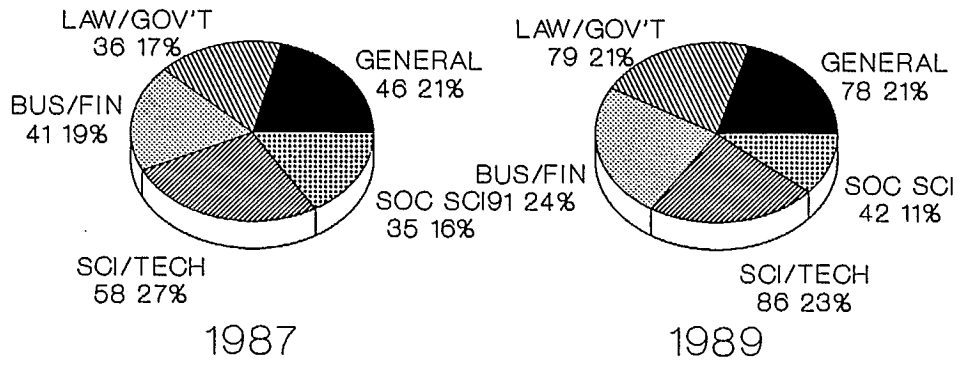
Table 2.3

Percent Growth of Databases by Subject Area from Previous Year

	All Canadian Content Databases		> 30% Canadian Content Databases	
	1988	1989	1988	1989
General	39%	22%	48%	15%
Law/Government	69%	30%	60%	39%
Business/Finance	80%	23%	78%	33%
Science/Technology	41%	3.6%	78%	6%
Other Social Sciences	50%	0	33%	-10%
Total	50%	16%	61%	23%

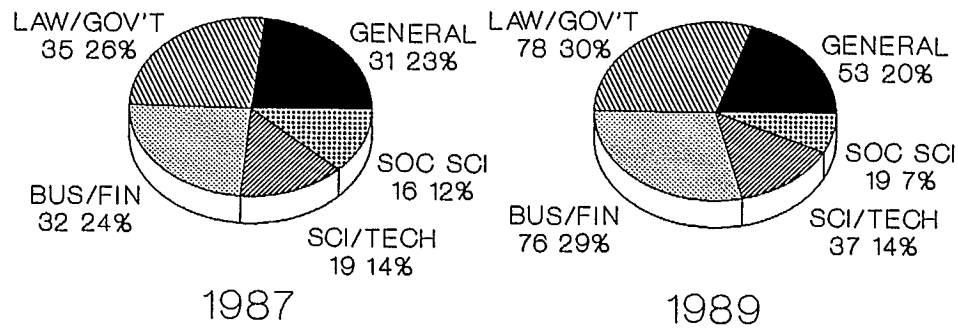
SUBJECT BREAKDOWN OF CANADIAN CONTENT DATABASES

FIGURE 2.1 - All Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1988, 1989

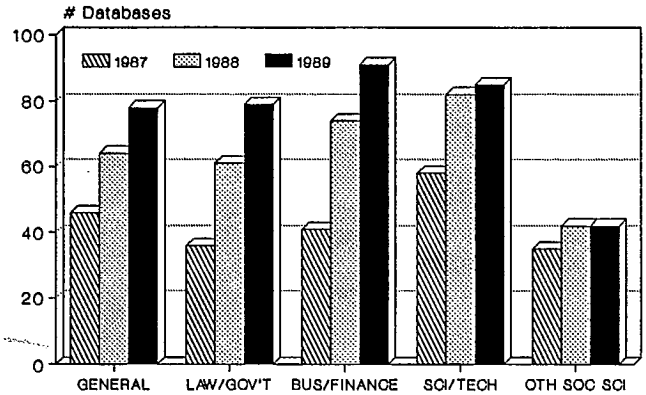
FIGURE 2.2 - > 30% Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1988, 1989

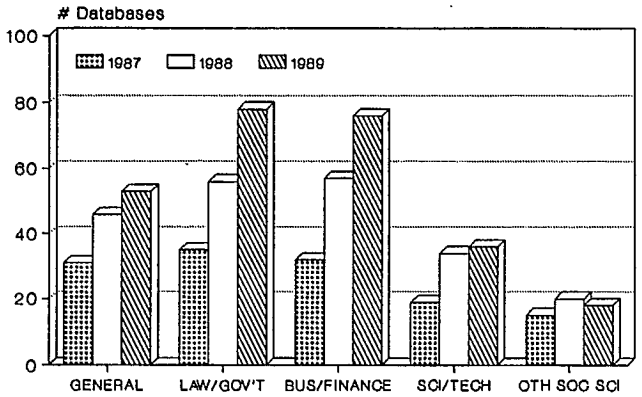
GROWTH OF DATABASES BY SUBJECT AREAS 1987-1989

FIGURE 2.3 - All Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1988,89

FIGURE 2.4 - > 30% Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1988,89

The proportion of databases for a given subject can be seen to change in most cases for the period 1987-1989 (Tables 2.3 and 2.4). For all Canadian content databases, there is a trend to an increasing number of law/government and business-related databases. Lagging behind are science and technology databases as well as those in other social sciences. The general category stayed the same at 21%.

As Canadian content rises, we still see the growth of law/government, business/finance databases, but the proportion of science and technology databases remaining the same at 14%.

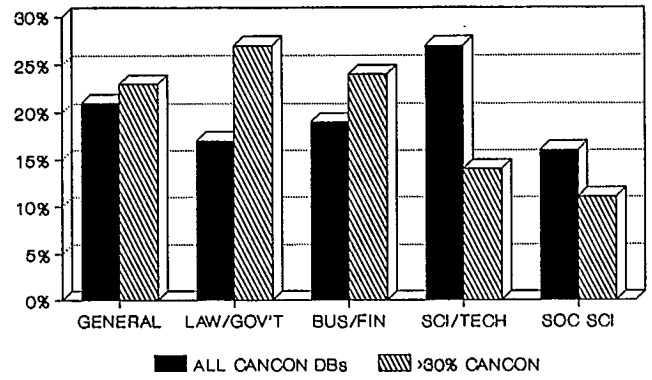
Perhaps what is more interesting, is the differences in breakdown within a given year as Canadian content rises. For both 1987 and 1989, the relative proportion of law/government, business/finance databases increases significantly (Figure 2.5 and 2.6) while decreasing in science/technology and other social sciences. There is a slight movement upwards for the general category in 1987 and slight downward movement in 1989.

These results are consistent with much of the industry feedback obtained (See Section 3) in terms of supply and demand characteristics. Much of the Canadian information available for databases, is in the areas of law/government, business/finance. The commercial demand is also present for these areas. Conversely, much of the science/technology and social science information available is not of Canadian origin and the demand is lower.

For social sciences, however, it appears to be demand problem supported by industry feedback (see Section 3).

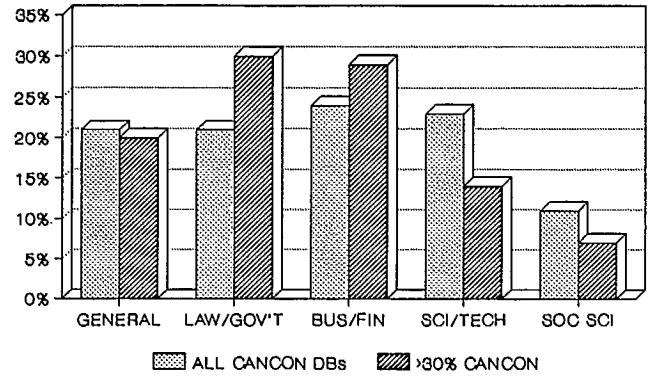
SUBJECT BREAKDOWN OF CANADIAN CONTENT DATABASES

FIGURE 2.5 - 1987



SOURCE: ESPIAL DIRECTORY 1988, 89

FIGURE 2.6 - 1989



SOURCE: ESPIAL DIRECTORY 1988, 89

2.3.3 Language of Databases

The language of Canadian content databases is given in Table 2.4

Table 2.4

Language of Canadian Content Databases

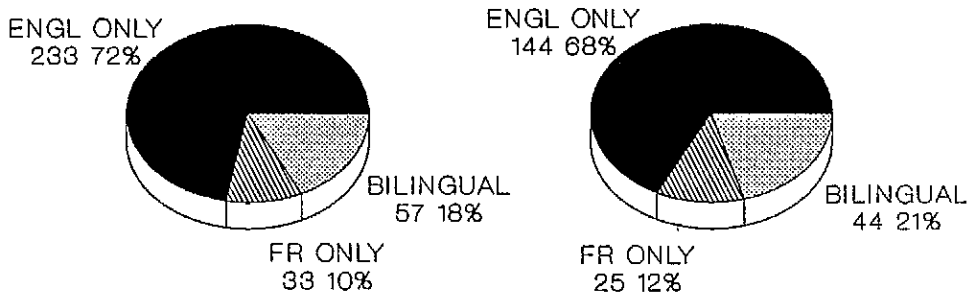
	All Canadian Content Databases		> 30% Canadian Content Databases	
	1988	1989	1988	1989
English Only	233	243	144	158
French Only	33	65	25	53
Both or Bilingual	57	68	44	52
Total	323	376	213	263

Figures 2.7 and 2.8 show a strong movement towards an increased proportion of French-only databases in general, particularly as Canadian content increased. Although growth of French or bilingual databases can be seen in almost all subjects, the highest growth areas are in taxation and law. All 10 taxation databases added in 1989 were French-only and 13 of 22 (59%) of law or statute databases added were either French-only or bilingual. Many of these are translations of existing English-only databases and so give the appearance of faster growth in French. In fact, it is more of a catch-up situation.

Of the 119 additions or changes made from 1988-89, 46% were English-only, 35% were French-only and 19% were bilingual.

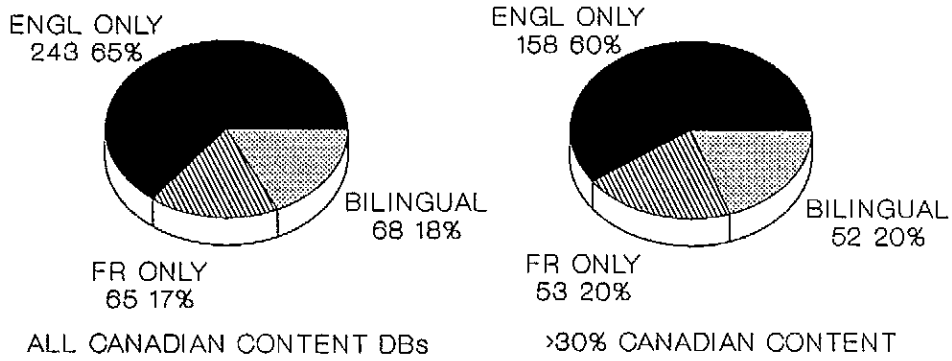
LANGUAGE OF CANADIAN CONTENT DATABASES

FIGURE 2.7 - 1988



SOURCE: ESPIAL DIRECTORY 1988

FIGURE 2.8 - 1989



SOURCE: ESPIAL DIRECTORY 1989

2.3.4 Producer Location

Producer location was broken down into six Canadian geographical divisions and one foreign. The National Capital Region (NCR) is given a separate heading because of the heavy concentration of databases produced there due to the Federal government. The results are summarized in Table 2.5

Table 2.5

Canadian Content Databases by Producer Location

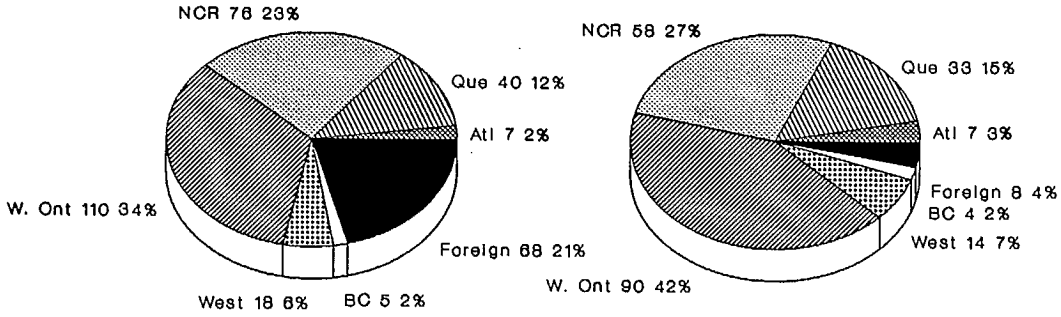
	All Canadian Content Databases		> 30% Canadian Content Databases	
	1988	1989	1988	1989
Atlantic	7	7	7	6
Quebec	40	42	33	33
National Capital Region	76	96	58	81
Western Ontario	110	137	90	117
West	18	21	14	17
British Columbia	5	9	4	7
Foreign	68	64	8	2
Total	324*	376	214*	263

* Includes one database produced in both Western Ontario and Quebec.

The vast majority of Canadian content databases are produced in Canada. As Canadian content rises above the 30% mark, foreign production is negligible (Figure 2.9 and 2.10).

CANADIAN CONTENT DATABASES BY PRODUCER LOCATION

FIGURE 2.9 - 1988



All Canadian Content DB's

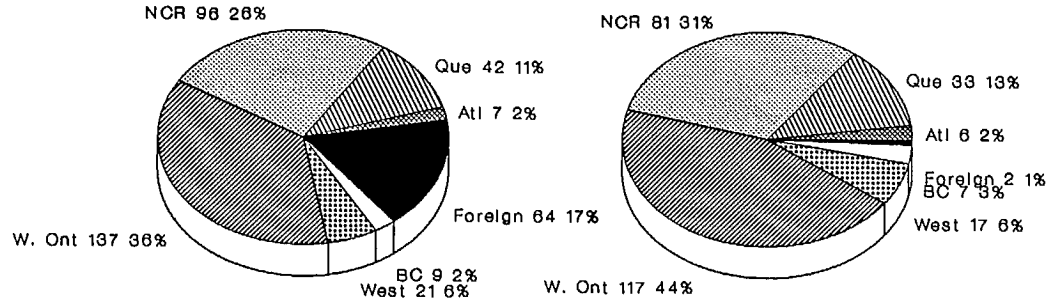
Total: 324

>30% Canadian Content DB's

Total: 214

Source: Espial Directory 1988

FIGURE 2.10 - 1989



All Canadian Content DB's

Total: 376

>30% Canadian Content DB's

Total: 263

Source: Espial Directory 1989

Western Ontario and the national Capital region account for the majority of all Canadian content databases produced and this proportion is increasing at the expense of foreign-produced databases. In the over 30% category, these two regions accounted for 72% and 75% of databases produced in 1988 and 1989 respectively. Not surprisingly, Toronto leads as Canada's database production centre followed by Ottawa-Hull. Quebec (mainly Montreal) accounted for only 11% of all Canadian content databases and 13% of >30% Canadian content. It is interesting to note that although Quebec looks stagnant in database production, there were in fact 12 new offerings from 1988 to 1989. This was cancelled out by the number of databases dropped or altered during that year.

There were 186 producers of Canadian content databases listed in 1989. Production is not highly concentrated, with the top five producers accounting for 78 or 21% of the total and all these being Canadian.

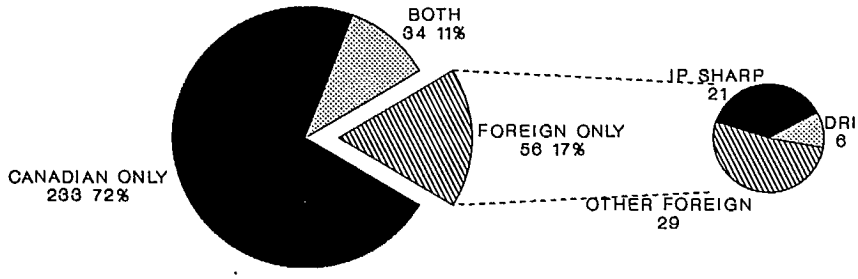
Revenue Canada	20
Southam	18
Maritime Law Book	15
QL Systems	13
Info Globe	12

2.3.5 Ownership of Vendor/Supplier

Databases can be available directly from the producer, through a database vendor/supplier, a gateway, or any combination of the three. Table 2.6 show the proportion of databases available through Canadian vendors only, foreign vendors only and those available through both (Figures 2.11, 2.12, 2.13, and 2.14).

AVAILABILITY OF CANADIAN CONTENT DATABASES THROUGH CANADIAN AND FOREIGN VENDORS - 1988

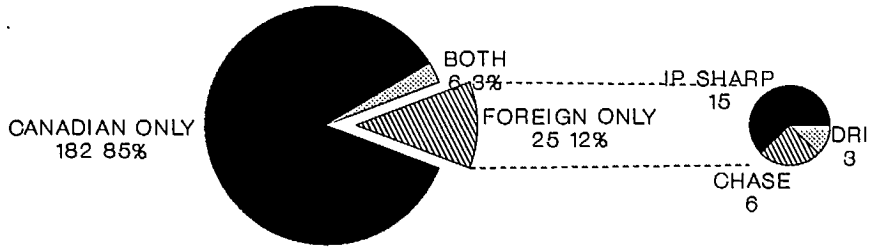
FIGURE 2.11 - All Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1988

AVAILABILITY OF CANADIAN CONTENT DATABASES BY OWNERSHIP OF SUPPLIER - 1988

FIGURE 2.12 - > 30% Canadian Content Databases

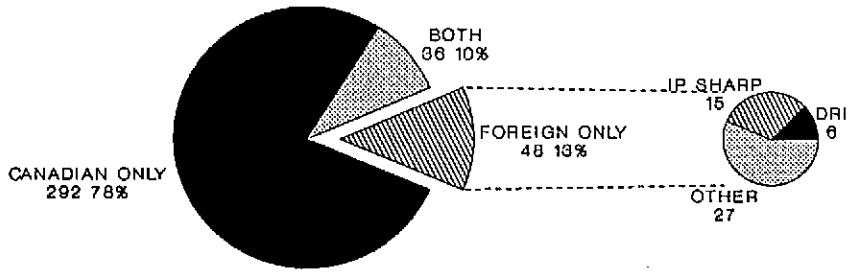


>30% CANADIAN CONTENT

SOURCE: ESPIAL DIRECTORY 1988

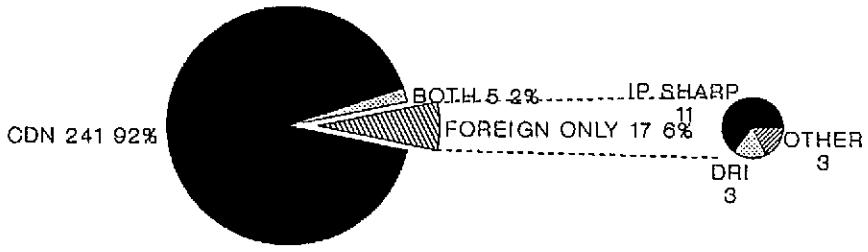
AVAILABILITY OF CANADIAN CONTENT DATABASES BY OWNERSHIP OF SUPPLIER - 1989

FIGURE 2.13 - All Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1989

FIGURE 2.14 - > 30% Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1989

Table 2.6

Availability of Databases by Ownership of Vendor

	All Canadian Content Databases		> 30% Canadian Content Databases	
	1988	1989	1988	1989
Canadian Only	233	292	182	241
Foreign Only	56	48	25	17
Both	34	36	6	5
Total	323	376	213	263

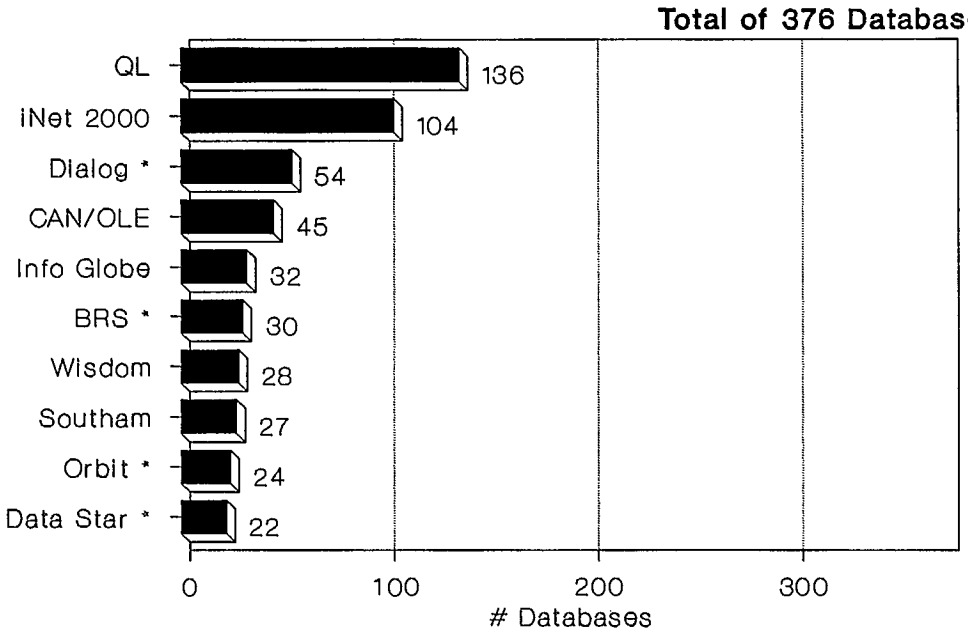
As in the case of products, the vast majority of Canadian content databases are supplied by Canadian companies or both Canadian and foreign firms. The proportion increases considerably as Canadian content rises. The proportion also increased from 1988 to 1989. By the end of 1989, 92% of >30% Canadian content databases were available only through Canadian vendors.

In both years, only a few companies account for the foreign-only segment. In 1988, IP Sharp, DRI, and Chase Econometrics account for the majority in the full category and 96% of the >30% category. The figures are similar for 1989, except that Chase Econometrics ceased to exist (some of their business was taken over by the WEFA group of Switzerland). Nevertheless, IP Sharp and DRI still jointly represented 82% of the foreign-owned >30% Canadian content databases in 1989. The absolute number of databases in this category also decreased from 25 to 17.

The top 10 vendors of Canadian content databases are shown in Figure 2.15. It shows that QL Systems Ltd. and iNet 2000 are the two largest vendors in terms of numbers of databases with 136 and 104 respectively. They offer 36% and 26% of all Canadian content databases respectively. Vendor 3 to 10 range from offering 14% to 6% of all databases.

FIGURE 2.15

TOP 10 VENDORS OF CANADIAN CONTENT DATABASES 1989



SOURCE: ESPIAL DIRECTORY 1989

* indicates foreign owned

Beyond the top 10, vendors generally offer less than 20 and some as little as a single database. Of the 83 vendors listed 57 or 67% offer only one or two databases.

Four of the top 10 are foreign firms, however, the majority of their offerings are databases of under 30% Canadian content.

Subject Concentration of Foreign-Owned Vendors

There are three areas where foreign-owned vendors have a significant level of concentration; business/finance, forestry, and pulp and paper.

Business/Finance

In 1988 the number of Canadian content business/finance databases accessible exclusively through foreign-owned vendors was 28 of 73 (38%) (Figure 2.16) and 17 of 56 (30%) for >30% Canadian content (Figure 2.17). In 1989 the figures were 19 of 88 (22%) and 13 of 76 (17%) respectively (figure 2.18 and 2.19).

The specific subject areas include, company information, banking, stocks/bonds, management/economics and finance. Figures 2.20 and 2.21 show the relative levels of foreign concentration in these areas. For company information, stocks/bonds, and management/economics, both the relative amount and absolute amount of databases decreased from 1988 to 1989. In the latter two, this is particularly so for those of >30% Canadian content. They also moved to below the 50% concentration level.

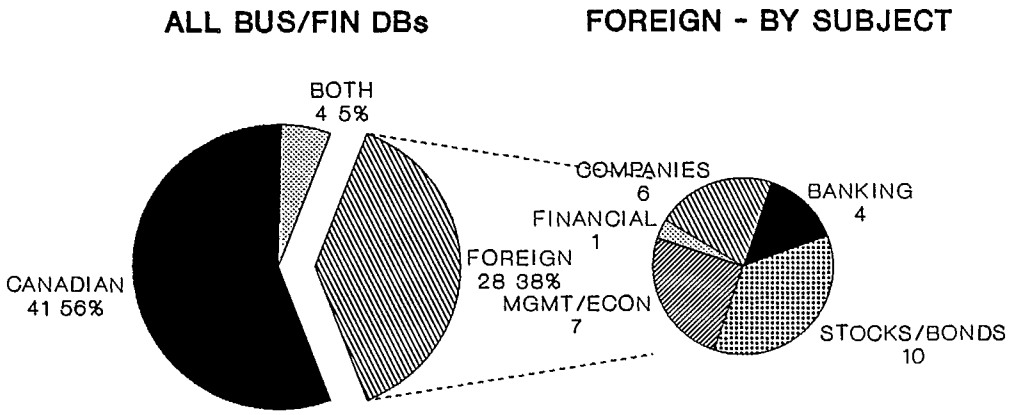
Banking is the only area, completely dominated by foreign vendors. There are only three databases currently listed, all offered by IP Sharp.

Forestry

In 1988, 7 of 13 (54%) of forestry databases were available exclusively through foreign vendors with 4 of 5 (80%) at the >30% Canadian content level. By 1989, 6 of 14 (43%) were from foreign vendors and 2 of 7 (29%) at the >30% level. The shift was due largely to Chase Econometrics ceasing operations.

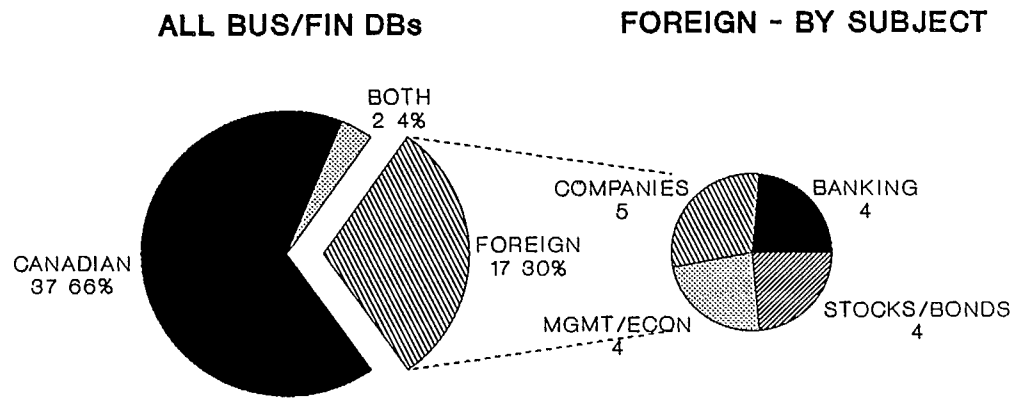
CANADIAN/FOREIGNDATABASE SUPPLIERS OF BUSINESS/FINANCEINFORMATION - 1988

FIGURE 2.16 - All Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1988

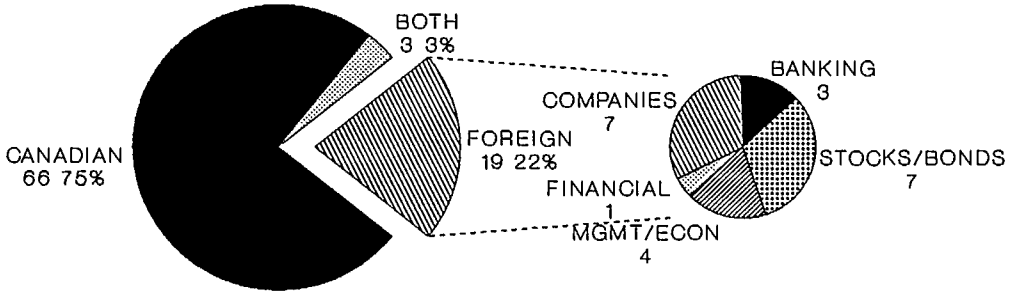
FIGURE 2.17 - > 30% Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1988

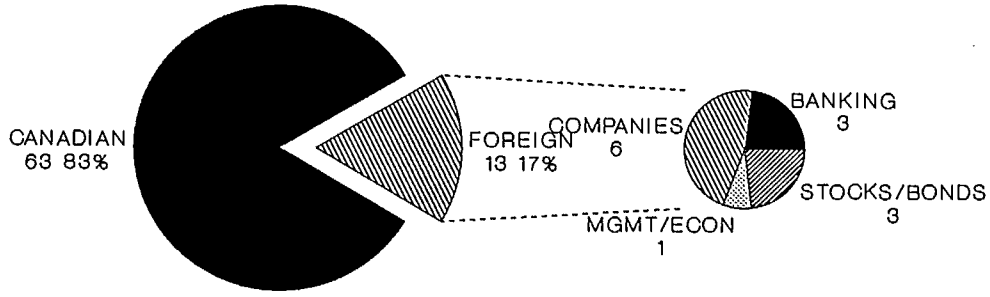
CANADIAN/FOREIGNDATABASE SUPPLIERS OF BUSINESS/FINANCEINFORMATION - 1989

FIGURE 2.18 - All Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1989

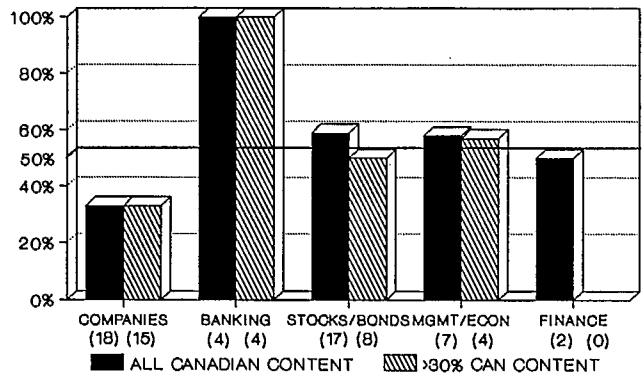
FIGURE 2.19 - > 30% Canadian Content Databases



SOURCE: ESPIAL DIRECTORY 1989

BUSINESS/FINANCEDATABASES
LEVEL FOREIGN CONCENTRATIONOF SUPPLIERS

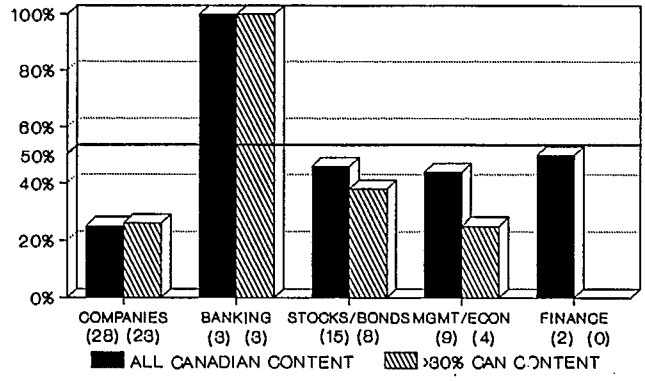
FIGURE 2.20 - 1988



SOURCE: ESPIAL DIRECTORY 1988

TOTAL DBs IN BRACKETS

FIGURE 2.21 - 1989



SOURCE: ESPIAL DIRECTORY 1989

TOTAL DBs IN BRACKETS

Pulp and Paper

In 1988 pulp and paper was the exclusive domain of foreign suppliers (4 of 4) with a very low level of Canadian content. In 1989, one category 4 (>80% Canadian content) was added to the list, and available through Southam. Five of six are still only available through foreign vendors.

2.3.6 Public and Private Sector Database Production

The production of databases generally comes from three distinct sectors; government, private and the not-for-profit sector. Not-for-profit can include councils, associations, agencies, charities, institutes, etc. Although they may receive all or part of their funding from the public and/or private sector, they generally operate independently and are not profit-driven. Table 2.7 shows a breakdown of sectors by subject. Included is further breakdown of the not-for-profit (NFP) sector into domestic and foreign.

Table 2.6

Canadian Content Databases
Sector Breakdown of Producers 1989

Subject	Government	NFP (Not-for-Profit)	Foreign NFP or Gov't	Private Sector
General	10	17	1	50
Business/Finance General	14	8	0	45
Taxation	22	0	0	2
Law Statutes	27	7	0	22
Policies/Government	10	0	0	13
Other Social Sciences	12	7	7	16
Physical/Applied Science	11	3	12	12
Technology	7	14	6	21
Totals	113 (30%)	56 (15%)	26 (7%)	181 (48%)

Overall, private sector produced 48% of Canadian content databases in 1989, government 30%, not-for-profit 15% and NFP foreign 7% (Figure 2.22). Thus, production is roughly evenly split between profit-driven and non-profit-driven entities. These proportions are almost identical to the 1988 figures.

Within specific subject areas, there are wide differences between public and private sector participation (figure 2.23). The highest areas of government production is in taxation, with 92% produced by the public sector. The areas of highest private sector production are in the general and business/finance categories. The lowest areas of government production are in the general and technology categories. Both of these are produce primarily by the private sector, with a significant amount being produced by the not-for-profit groups.

In the rest of the world, the profit to non-profit ratio varies considerably (Table 2.7). A May 1989 OECD report presented a summary of available statistics which showed the US with the highest proportion of profit-oriented databases (80%) and Canada and Europe showing a lower proportion at 41% and 44% respectively. Japan ranked in between at 61% and the rest of the world much lower at 27%. The comparability of all these figures will again depend on how the counting was done but qualitatively it appears that only the US is significantly private-sector driven. This is likely due to a number of factors as discussed in Section 4.

Table 2.7

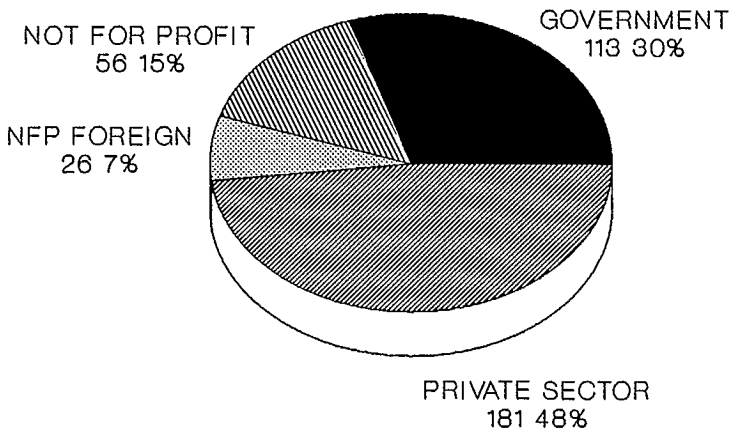
Profit vs. Non-Profit Databases Worldwide 1988

	Profit	Non-Profit	Total Units
United States	80%	20%	1633
Canada	41%	59%	204
European Communities	44%	56%	769
Japan	61%	39%	41
Rest of World	27%	73%	250

Source: OECD Summary 1989

FIGURE 2.22

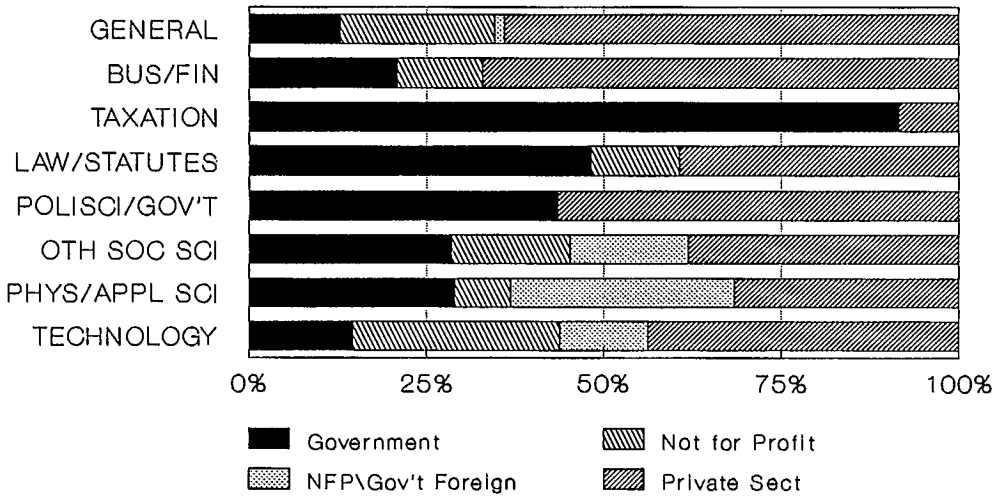
CANADIAN CONTENT DATABASES SECTOR BREAKDOWN OF PRODUCERS 1989



SOURCE: ESPIAL DIRECTORY 1989

FIGURE 2.23

CANADIAN CONTENT DATABASES
SECTOR BREAKDOWN OF PRODUCERS 1989



SOURCE: ESPIAL DIRECTORY 1989

2.4 Canadian Profile Summary

With few exceptions, Canadian content database sectors are produced and distributed by Canadian companies or organizations. As the level of Canadian content rises, so does the level of Canadian control.

This is particularly significant for database production, where in 1989 only 2 (1%) of the >30% Canadian content databases were produced outside Canada. Production, however, is independent of ownership. Although it has not been quantified here, foreign ownership of producers is still quite low.

With respect to suppliers/vendors only 17 (6%) of >30% Canadian content databases are available exclusively through foreign-owned sources. Most of these are still produced and distributed in Canada. A good example of this is IP Sharp in Toronto, which produces and distributes 15 databases in the business/finance area. IP Sharp operates as an autonomous division of Reuters UK, with the majority of staffing in Canada. This compares with some 30% of UK databases distributed exclusively through foreign (mainly US) channels.

Growth in the number of databases, particularly >30% Canadian content, exceeds the world average (see Section 4.3.1). Some of the largest recent growth is in French-language databases. This is due largely to existing English-language databases being translated and put online. In terms of subject growth, law/government and business/finance databases show the largest three year increase. Reasons for this are discussed in Section 4.

Concentration of ownership within producers is low with no one producer dominating. There is, however a moderate level of concentration within subject areas. The majority of producers are also located in or near Toronto as well as in the National Capital region. Roughly half the databases are produced by private sector, with the balance being produced by government or not for profit sectors. Concentration of suppliers/vendors is higher than in producers, but is still relatively low. With the exception of QL Systems and iNet 2000, no vendor offers more than 14% of available databases.

Overall, the Canadian industry is well positioned to meet any growth in demand for Canadian information.

3.0 INDUSTRY VIEWS

3.1 Background

A series of 23 industry interviews were carried out during the course of this study. We attempted to get as wide and representative sample as possible. Included were database producers, vendors, gateways and publishers. Where possible, private and public sectors were involved. A complete list of participants is given in Table 3.1.

The interviews were kept as unstructured as possible, to allow the interviewees the opportunity to think about their responses and to allow them to present their views in the order and format most comfortable to them. We have learned through our experience, that overly structured interviews lead to structured or predictable responses. The respondents were, therefore, often asked to expand on specific areas of interest or to talk about topics that were not on the original interview outline but were relevant to their organization.

A general interview outline was developed to cover the following areas:

- General Company Information;
- Background and Nature of Business;
- Target Markets;
- Competition, domestic and foreign;
- Marketing;
- Strategic Alliances;
- Feasibility;
- Opportunities;
- Trends;
- Problems - barriers to growth;
- Attitude to government and role of government;
- Crown copyright; and
- General comments.

Table 3.1

Study Participants

- Canadian Centre for Organizational Health and Safety, Hamilton
- Canadian Institute of Chartered Accountants (CICA)
- Canadian Tax Online, Toronto
- Cannex, Toronto
- CAN/OLE, Ottawa
- CD-ROM Publishing Services Inc., Toronto
- Dun & Bradstreet International, Toronto
- The Financial Post Information Service, Toronto
- Hutchison Research, Toronto
- Info Globe, Toronto
- Inform II, Montreal
- International Development Research Centre (IDRC), Ottawa
- I.P. Sharp Ltd., Toronto
- Ivation Datasystems Inc., Ottawa
- Marketfax - Faxtel Information Systems Ltd., Toronto
- Mead Data Central, Toronto
- Micromedia Ltd., Toronto
- OPTIM Corporation, Ottawa
- QL Systems, Kingston
- Services Documentaries Multimedia Inc. (SDM), Montreal
- Southam Business Information Group (BICG), Toronto
- STM/WISDOM, Ottawa
- UTLAS, Toronto
- WEFA, Toronto

Participants were told that confidential information would not be released and other responses would be unidentified or released in aggregate form. Some information that has been identified was either on public record or of a non-confidential nature. Where possible the President or head of the organization (or department) was interviewed. In some cases it was more appropriate to speak with the person in charge of marketing or business development.

It is important to note that the following represents industry views and perceptions, and comments may not always be accurate.

3.2 Responses

3.2.1 General Company Information

The supply side of the database industry in Canada covers a very wide structural and economic range. Staffing ranges from 1 to over 100. Similarly revenues, when given, ranged from tens of thousands of dollars to several million.

3.2.2 Origins of Producers-Private Sector

Electronic database producers have evolved from a number of different origins. They range from a straight transformation of an existing print product, to original research for the creation of a database. Typically, they fall into the following categories:

1) **Magazines and Newspapers** - took their own publications and made them available online or on CD ROM on a full text basis. The value-added is primarily in the ability to search and retrieve the text quickly.

Examples:- InfoGlobe
- FP Online
- Southam

2) **Other Publishers** - took publications, such as directories, bibliographies, etc., and converted them to machine readable form as complement or replacement to print. Value-added is the same as above.

Examples:- SDM
- Micromedia
- Inform II

3) **Database Compilers** - this group compiled databases primarily from print sources but not necessarily from in-house sources. They were produced as a means of consolidating information in a defined subject area from various sources. These are perhaps the foundation of the industry, pioneered by Lockheed Aerospace (now Dialog). The value-added is quick access to information from a variety of sources.

Example: - CA Online

4) **Research-Based Producers** - this group developed databases as a result of research performed in the course of their business. These are generally financial and economic-oriented databases and information may be generated internally or from a third party. The value-added is in access as well as synthesis by the producer.

Examples:- Cannex
- WEFA
- Marketfax
- IP Sharp

5) **Exclusive Database Producers** - these firms developed databases as the primary aim of the business. Information is generally acquired from a third party (mainly public sector in Canada) in print or electronic form and is responsible for converting it to a format suitable for online.

   Example: - QL Systems

6) **Research-Based Exclusive Database Producers** - these companies are similar to (4), but whose primary product is the database.

   Example: - Hutchison Research

3.2.3 Target Markets

All respondents had a clear idea of their current target market. The targets varied from broad to narrow range depending on the type of information offered. Most of the smaller producers tended to be more focused, specializing in a specific type of format of information. The smaller producers also served only the business and financial markets. Some larger producers were less focused, but most generally targeted specific market segments. CAN/OLE was the producer/vendor that did not target some financial sector, with science and technology being the main focus.

Almost all respondents said they targeted librarians and information specialists and few targeted end-users. Only some of the smaller investment-oriented services and CCOHS had significant end-user targets. In both cases, end users did not always have information specialists available to them.

None of the producers/suppliers contacted targeted the home market. They felt that with few exceptions, the home or consumer market would not need the information offered or pay the price even if they did. Many felt that Bell's new Alex system would adequately serve this market although few believed Alex would make a profit. Some small producers felt that if they ever did market to the consumer, it would be through Alex as the risk to them would be low.

3.2.4 Competition

The degree of perceived competition varied from extreme, to none at all. The highest perceived levels of competition were in the areas of news and law were there are a number of domestic competitors. Competition was noted primarily by the larger producers. Not surprisingly, those who compete in print form, compete in the database business.

CAN/OLE reported major competition from the US. The main competition was from Dialog with some coming from BRS, ORBIT, and STN. Many of their subscribers use a combination of services.

The balance reported little or no heavy competition at either a domestic or foreign level. Most of the small and medium sized companies have developed a very conscious niche strategy and there does not appear to be the will to compete or the room to compete.

Overall there is no perceived threat from foreign companies. Most believe the market too small to be of interest. One interviewee was told by a US vendor representative that Canada represented a market the size of a few blocks of Manhattan. The industry is also very confident of its ability to compete should foreign services start to look at Canada. Few of the respondents were aware or subsequently concerned about moves by US value-added networks to enter Canada. The mood is very anti-protectionist on this issue which is consistent with this level of confidence.

It seems that in terms of foreign competition, Canada's small and dispersed market is one of its greatest protections. There was a belief that it would be too hard for foreign services to take hold in the market and that any foreign inroads would likely be through acquisition.

3.2.5 Marketing

Marketing approaches vary from organization to organization, but there is one factor common to all; the majority of database services are sold one-on-one. This approach is deemed essential by the industry because most of the market is still not accustomed to using electronic information and is unaware of the value of this information. In order to sell a service, it is important for a potential client to see first hand how the system works, what kind of information can be accessed, and the speed of retrieval. All agree that this is an expensive way to conduct business, but at this stage of industry development, it is the only effective way. It is generally believed that as the concept of electronic information becomes better accepted, the emphasis on the direct approach, or at least the time involved in a sales call may decrease.

Marketing therefore involves two steps:

1) Selling the electronic concept.

2) Selling a specific system or database.

As a result of this two step process, interviewees were asked if they felt that their marketing efforts were helping the industry as a whole (and consequently their competition) as much as their own organization. Many had not thought about this before, but on reflection agreed that this was likely the case. Hence, a marketing effort to a non-online user, aimed at selling a service like InfoGlobe, in fact

opens the door for similar services such as FP Online. Once a potential client is converted to the concept of electronic information, they begin to look for the best system for their needs.

The Canadian industry appears to be somewhat risk-averse when it comes to marketing, which restricts the amount of money spent in this area. There is also a tendency, particularly amongst smaller producers, to pay more attention to the development and maintenance of a database, then in selling the product. Although they are in the business to make money, the smaller producers are very proud of their product and insist it be the best quality possible.

Customer Support

Customer support is a major component of the marketing effort. All the organizations contacted claimed that a high emphasis on service was essential to selling and more importantly, maintaining their customer base. Support included combinations of:

- manuals;
- training;
- dial up assistance;
- newsletters; and
- online help.

Pricing

Pricing policies also vary between producers and vendors. In the majority of cases pricing is still based on a combination of communications, connect time, and information or "hit" charge. Depending on the service, this can vary from $35 to $180 per hour plus hits.

The major problem with the use of online charges is the inability of the searcher to adequately predict the cost of a search. The cost of the search in this case depends on:

- the experience of the searcher;
- the speed at which the CPU is operating (may vary with time-share loading); and
- the accuracy of the search parameters used.

All the organizations which used some form of online pricing, believed that this "meter running" approach limited use, especially for new users. Even with experienced users, it is not uncommon to sign on to a database and then sign off quickly if the search strategy does not yield the right information. The searcher then signs back on with a new strategy. This sign-on/sign-off can continue until the desired results are obtained. Searchers do not want to pay $100 an hour to reflect on their strategy while online.

As a result, there is a great deal of effort that has gone into alternate pricing policies. The new policies will likely move away from charging for the use of the computer (CPU-based charging) and toward an information-based charge. There are also firms looking at fixed annual or monthly rates for searching.

Mead Data Control, for example, charges on a search basis rather than online (this excludes communications charges). The charge can range from $7.00 (US) to $35 per search depending on the database. This offers some cost control for the client but some are leery of this approach because it is not necessarily based on success.

Other organizations are building or have built a "down loading factor" into their pricing scheme. This assumes that some level of downloading is desirable to some clients and that the information remains resident in the client's system for future use. Downloading is, therefore, charged at a higher rate. This is similar to journals charging libraries and institutions a higher rate on the assumption that some photocopying will occur.

Some producers and vendors also offer discounts to universities as a means of developing future business, but there is not much emphasis in this area.

The overriding principal for the shift is that if a client is buying information they should pay for information not for computing.

One factor that may accelerate the pricing shift, is the entry of CD ROM to the market (see Section 3.2.11). Once a CD ROM is purchased (or licensed), there are no incremental search fees. This is particularly attractive to clients who search the same information base frequently.

Pricing is also dependant on the target market and who is willing to pay for information. This is very much a factor in more vertically-oriented markets rather than horizontal markets as vertical markets are geared more to end-users rather then intermediaries.

For example, doctors do not traditionally pay for information so a database like Modern Medical Online is offered free and paid for by pharmaceutical companies. The insurance industry is another group that generally does not pay for information, but may accept a flat yearly rate for a service.

3.2.6 Strategic Alliances

The level of strategic alliances in the industry ranges from simple supply and distribution arrangements, to major alliances with different organizations in different countries.

Alliances have been formed for various reasons and can be seen in all sizes of organizations, both public and private sector. In general, alliances are recognized as being important to growth and a valuable means of conserving resources. Even organizations not currently involved in

some form of strategic alliance believe that this will be necessary for them in the future. The following are examples of alliances that have been formed for different objectives.

Start-up

CA-ONLINE: CA-ONLINE was established in 1986 as an online service dealing with various aspects of the Canadian tax system. It was established as a joint venture between the Canadian Institute of Chartered Accountants (CICA) and Ernst and Young Canada through a division known as CG Tax. The system was developed from a perceived need for the information and it was viewed as a good fit. Ernst and Young is responsible for acquisition and updating of data, while CICA is responsible for marketing.

Canadian Encyclopedia: CD ROM Publishing Service Inc. is in the early stages of negotiation with Hurtig Publishing and Reteaco (CD ROM software) to publish the Canadian Encyclopedia on CD ROM. Each participant would contribute marketing, publishing or technical components based on their respective expertise.

CANTECH: CANTECH was developed by Hutchison Research in Toronto. It is a corporate registry of some 5,600 high-tech companies in Canada. The database is currently sold on floppy disk system but has plans to go online by the end of the year. It was conceived by the company president who was involved in the high-tech consulting business and discovered a similar service in the US called CORPTECH. Hutchison obtained a license agreement with CORPTECH. This alliance is essential to the company's strategy. They have been able to draw on the US company's learning curve and they keep close contact with CORPTECH. They also have a reciprocal distribution agreement.

Financial

There are a number of cases where financial interests have been established between a database producer and a synergistic partner. The partner's interest in participating is generally established to complement the business. Unfortunately, we cannot cite examples given during interviews due to confidentiality.

Marketing and Distribution

This represents the largest proportion of alliances in the industry. They are generally reciprocal arrangements between Canadian producers who are also vendors and a foreign-based producer/vendor. The information usually flows by one of the parties acting as a gateway to the other with a pre-arranged revenue sharing agreement. Marketing is usually the responsibility of the organization offering the foreign service. Therefore, the parties do not have to go through the time and expense of establishing themselves in a foreign market. While most arrangements are between Canada and the US, there are some that exist with Europe and Australia.

The STM/WISDOM network is an example of a domestic distribution and marketing alliance. It was established in 1989 by STM and currently offers four services; INSIGHT; Canada Law Book; FP Online; and Canadian Tax Online. All four services operate independently but are hosted on the same WISDOM system. The four groups do most of their own marketing but there is some common marketing done by WISDOM. The interesting aspect of the arrangement, is that there are five ways of becoming a subscriber; directly through WISDOM or as a subscriber to any one of the four systems. Therefore, a subscriber signed on by FP Online has access to the other three services automatically. WISDOM will also be offering a Datapac-like service. The approach is to offer one-stop shopping and could potentially make it easier to sell an individual service but stressing access to a wider variety of services. Foreign alliances include the distribution of FP by Dialog in the US and internationally Reuters also carries FP in the UK.

Information Alliances

There are a number of firms that have entered into strategic agreements for both acquisition of information and exchange of information. These differ from straight marketing relationships as there is usually a value-added component, rather than the straight distribution of the product. One firm, for example, had a contract with a government body to gather information. As a condition of the contract the firm was allowed to use the information, value-added, and distribute it.

The Canadian Centre for Occupational Health and Safety (CCOHS) is an occupational health information centre funded by the Department of Labour. CCOHS has developed a major network of strategic alliances with different organizations in different countries. They enter into a Memorandum of Understanding (MOU) with organizations interested in producing and/or distributing occupational health information. Generally there are non-monetary exchanges of services. They currently have 25 active MOU's around the world. As an example, the Italian Government established a health and safety database. They were CCOHS subscribers and like the system. The Italian Government signed an MOU whereby they translated some CCOHS information and operations to Italian. The Italians have use of the information and CCOHS can now operate in Italian and better serve the Italian-Canadian segment. A similar agreement has been signed with the Chilean National Institute of Health for the Spanish market.

Technical Alliances

A few technical alliances exist. They differ from the rest of the alliances in that the goal of the arrangement is technology-oriented rather than information oriented. SDM of Montreal has what they term a technical alliance with AmericDisc of Drummondville. This joint venture was established for the development of a CD ROM for their CHOIX database.

Potential Alliances

Most organizations stated that strategic alliances are or should be an important part of their growth strategy. Many are consciously looking for these opportunities and as one respondent stated, "This is a business dependant on relationships". The relationship can even include deals with direct competitors as long as there is perceived synergy.

However, the degree of alliances is not as great as it could be. In the course of the interviews we came across a number of obvious opportunities that were not being exploited. In one case we observed a company going through a learning curve in product development that another firm (non-competing) had just completed. This was a natural situation where an alliance could make the industry more efficient and competitive (We did suggest the first company contact the latter).

Barriers to Alliances

There are some significant barriers to the establishment of more strategic alliances.

1) **Time and Money.** Most who have gone through the process complain that establishing alliances, especially foreign, is very time consuming and costly. One agreement we observed took over a year to complete at a cost that will take years to recover from the revenue obtained. (One respondent commented that if there was a way to keep the lawyers out of it, there would be more.)

2) **Knowledge.** There are a number of firms, particularly smaller ones, that are unsure how to go about the process.

3) **Awareness.** We believe that there is a lack of awareness of the opportunities in the market. Organizations are not generally aware of potential synergies i.e., who is out there, what they are doing, and how they can help each other.

3.2.7 Feasibility and Business Plan

Feasibility and/or market research exists at three levels:

1) Formal-Analytical

2) Informal-Intuitive

3) Non-existent

There is no correlation between the size and type of organization and the level of feasibility analysis used. The bulk of the industry uses an informal, intuitive approach but some do have very strict analytical procedures.

Formal-Analytical

A formal approach is used by a few organizations. These can include full business plans and five-year cash flows for new services. A minimum payback can be required. This is usually combined with some intuitive element. The intuitive element can still override the numbers. This, however, is not always the case as some firms view database services as a new part of their business which is expected to loose money for a number of years. Some firms are beginning to look more closely at establishing a formal feasibility procedure although in general adoption is slow.

One of the problems in developing analytical techniques, is allocating a cost to the raw information. While this may be straight forward when a firm purchases data to put directly online or on disk, the procedure is complicated when the information is gathered as a normal part of a pre-existing business. This can be the case for hardcopy publishers such as newspapers. In some cases, an arbitrary cost is used, in others none at all. This approach makes profit difficult to assess as the criteria can change from company to company. Perhaps the only real concern in a captive

information situation is marginal revenues over marginal cost. The latter can be a sore point amongst companies who pay for or develop their information. They are concerned that marginal pricing sets low price precedents.

One government organization, CCOHS has recently been told to be self-sufficient in the next five years. They developed a formal five year business plan for the transformation and includes a statement of objectives, strategies, product/service plans and analysis.

Informal-Intuitive

This represents the major approach to feasibility and market research in the industry. The organizations here claim to just "know" what they have to do. While certain criteria and "acid tests" are developed, the organizations are guided by:

- o customer feedback (the majority);
- o a high level of in-house knowledge of their targets;
- o the producer or vendor itself may be a major user and hence produce for their own needs; and
- o chance.

In some cases, the producer has a glut of information already in electronic form and will just offer it online as a test. The marginal cost in this case is low enough that mistakes are not costly i.e., it is cheaper to make a mistake than to do market research. As one interviewee put it "sometimes we just throw mud on the wall and see what sticks".

Non-Existent

There are very few organizations which do no research at all. These are usually situations where target penetration is very high and the emphasis is on serving and maintaining their clients.

Summary

Overall there is not a great emphasis in feasibility and planning. Most organizations believe they have a clear understanding of what to do. This may be due to the early level of development of the industry, where the choices may be obvious. Perhaps as the "cream" products begin to diminish the emphasis will shift. We have also observed some level of cynicism towards research. As one respondent stated - you can make a business plan come to any conclusion you want.

3.2.8 Trends and Opportunities

The following lists trends and opportunities as given by the respondents. They are both from Canadian and international perspectives.

3.2.8.1 Trends

CD ROM

The CD ROM industry grew 300% in 1989 and much more for some companies. CD ROM is being examined by a number of online producers but very few currently have products. Public sector and quasi-public sector agencies have led the way in the introduction of CD ROM. CCOHS currently has three titles (soon to be four or five) with over 4,000 subscribers. SDM in Montreal (50% funded by the Quebec Government) has two titles. There is very much a "wait and see" attitude by online producers and growth in this area will likely come from specialized CD ROM publishers.

CD ROM is generally viewed as a stand alone product for archival information that is used frequently and update infrequently. It is also seen as a complement to online, using CD ROM for a base search and online for updating. This is not always the case however, as Lotus produces CD ROM products that are updated weekly, some costing as much as $70,000 US per year.

CD ROM is also good for "Metadata". That is, directories, catalogues, bibliographic data and other information used to find target information. CD ROM is very good for this type of stable data and can be used to gain access to online information. Online vendors can use CD ROM to help market online services and as a metadata gateway.

CD ROM development is different from that of online and online producers will likely use specialty CD ROM publishers for the product.

Pricing

As already stated, changes in pricing online services are being examined. The move is to valuing information rather than valuing computer service. CD ROM will likely accelerate the process as it must be priced to account for the value of information on the disk.

Front-End User-Friendly Software

Many of the larger services are introducing user-friendly front-end software. The software is provided or sold to the information searcher and is resident on the searcher's PC.

This software has three purposes:

1) To allow the searcher to do the preliminary search or search protocol offline, reducing online charges.

2) To allow the searcher to save a search protocol that is used frequently.

3) To allow downloading of information in a predetermined format. (IP Sharp's software allows downloading to a Lotus spread sheet.)

Front-end software is designed to make searches easier, more efficient, and more specific. It is also hoped that it will appeal to more end-users.

Query-Based Searching Software

This approach uses simple English for searching. There is no need to know search commands or Boolean Logic, instead, regular sentences are used.

Artificial Intelligence Gateways

Although this is still quite new, AI Gateways may become more popular (e.g., EasyNet in the US). Rather than signing on to a specific service and database, the AI gateway chooses the best based on the information requested. The searcher may or may not have control over the ultimate source.

If this does become the norm, the implications for producers would be significant. It would become difficult to differentiate a product to a searcher as the AI program would choose the source.

Custom Information Searches

Custom information can be required by middle and senior management on a regular or intermittent basis. A manager may for example, require a specific information set every Monday morning. This can be delivered by a number of means.

1) Pre-programmed front-end software.

2) Via an information broker.

3) From arrangement with the database producer or a vendor.

Real Time

Many producers are trying to move towards faster updates and as close to real time as possible (especially in the financial sector).

Graphics

There is a move toward providing full or limited graphics (e.g., charts, graphs, etc.). This is a major advantage for CD ROM as the technology permits easier graphics capability. Online is limited particularly due to low transmission speeds.

Sub-FM

Two respondents said they were looking at Sub-FM as a transmission mode. This technology provides for transmission of information over specific airwaves to a receiving printer. This significantly alters an online approach as it is not interactive and is limited to large cities to be viable.

3.8.2.2 Opportunities

The opportunities given principally related to expansion of services and geographical coverage. US and European markets are being examined but not very actively pursued. The problem is in assessing the value of information in foreign markets. Both large and small companies are looking at these types of opportunities.

These opportunities appear to lie in business information and some technical areas. With freer trade, Canadian company and financial information is in demand in the US.

Canada also has a small number of very specialized science and technology databases which have foreign commercial potential (e.g., Arctic Sciences areas and Oil Sands research).

Services

Most producers and vendors are looking to expand services. There is a strong emphasis on repackaging and more value-added products (i.e., more synthesis of information). Major vendors are also looking for complementary databases to their existing line and moving to a one stop shopping approach.

Those firms involved in any kind of research development are looking to sell their expertise. This can be in software, production, publishing, etc. Some firms look at selling expertise as their major revenue generator.

Telecommunications

Some of the larger vendors will be providing telecommunications services to compete with Datapac. STM, for example, has purchased trunks throughout Canada with 12 nodes. This will allow them to offer a complete online package.

This move to a more vertical market may help the industry in a number of ways. It may for example, result in lower costs to the user through competition in telecommunications as well as economies of scale (e.g., unified billing). It may also assist companies in the sales effort through the "one stop shopping" approach. In past studies, we have noted that the sales effort can be hindered if the process is complex. It may further provide companies to be more aggressive in marketing, since there are higher overall profits to be made with a successful sale.

Alex

Bell Canada's Alex system was mentioned by two producers as a potential opportunity. They believed that it would be the only efficient way to reach the consumer market although it still would not be very high. The risk is low, however, as the incremental cost of offering through Alex is low. Both are taking a wait and see approach.

3.2.9 Perceived Problems and Barriers to Growth

A wide range of responses were obtained here ranging from technical to marketing to general economics. A number of comments were also made on the role of government but these will be discussed in Section 3.2.10.

Awareness

Lack of awareness of electronic information was generally given as the major problem in the industry and a major barrier to growth. Penetration in many sectors is low even among information specialists. A recent study by Robertson Nickerson Limited showed that even those information specialists who used online, tended to use a minimal number of vendors and databases. The reasons given were that they were either unaware of complementary services or too busy (or unwilling) to learn how to use something new.

Penetration among end-users is extremely low. The industry generally agrees that the major opportunities lie in the exploitation of the end-user segment. Almost all organizations are looking a ways to reach end-users.

Marketing

Overcoming the awareness problem requires a serious marketing effort. The cost and time required for effective marketing was given as another major barrier. One-on-one marketing is the norm and is considered the only way to reach new customers. The sales effort is complicated by having to do "generic" selling. That is selling the concept of electronic information before selling the service. If a producer does not sell direct, but through an online host, they must also sell that host system. Thus, they must overcome up to three levels of resistance to sell their product.

Value of Information

In many cases, electronic information is considered a premium-priced product but not necessarily a premium product. Much of the industry believes that their clients view electronic information as too expensive for what they are getting. This is not surprising as electronic information usually involves an incremental cost for retrieval. This conflicts with the traditional paper mind set where the hardcopy version is usually considered an unallocated sunk

cost. Incremental costs usually have to be allocated and thereby pose a problem. Online also competes with a variety of free, public information.

Fear of Using Online

The traditional connect time pricing for most databases often inhibits use, and especially use by novices. The inability of a searcher to estimate the cost of a search is a major deterrent to use. The "meter running" problem is being dealt with by a number of vendors. CD ROM has a distinct advantage in this area as there is no use charge and its purchase can be viewed much like traditional hardcopy products.

Human Resources

A number of organizations cited the lack of sufficient human resources as a major barrier to internal growth. The void was seen at all levels, from DP personnel to research and development, to marketing. Many do not believe that universities and colleges are turning out enough graduates in this area.

Size

Some firms felt that the lack of a critical mass was preventing growth. They felt that deep pockets and concerted marketing and development efforts were necessary to overcome many of the problems listed. Some believed that critical mass in the US would allow US firms to enter the Canadian market with relative ease, if they chose to do so. Many did not find size a problem and some of the smaller niche-oriented firms felt they were the right size to serve their market.

Telecommunications - Technology and Charges

A few respondents felt that telecommunications in Canada were too slow and too expensive. They felt that US telecommunications charges were much lower (as low as 1/10th) and that this not only inhibited growth in Canada but restricted entry into the US.

Fragmentation of the Medium

New alternative information sources were specifically mentioned by one respondent, but others did talk about fragmentation as something to be aware of. By fragmentation, they mean splitting up of online to other electronic media. The respondent felt that technologies such as CD ROM would make significant inroads into the online market. While this would not significantly affect producers, online hosts may lose revenue as they could be bypassed in the distribution network.

Other factors stated as potentially affecting the online business:

- FAX delivery of timely information;
- Sub-FM (as stated); and
- some movement back to paper even with existing clients.

Lack of PC's and Modems in Target Population

There is still a low penetration of PC's and even lower penetration of modems in potential online client markets. Canada has half the number of PC's per capita versus the US. This is particularly true of potential markets in the end-user population. Even when an end-user has the technology, they may not have the skills necessary to use it.

Banks

Two respondents reported that banks had refused to lend them money for expansion or credit because they did not view the industry as a legitimate business. The lack of quantifiable assets leave the banks without tangible collateral. Even hardware is not accepted because of its rapid depreciation and low aftermarket value. Government loan guarantees were suggested as a way to overcome the problem.

Branch Plant Economy

One respondent noted that Canada's branch plant economy lead to much R&D being done in the US and so most of the information collection is done there as well. Canadian subsidiaries also use their parent as information sources. (This factor has been noted numerous times in previous RNL studies.)

General Economic Conditions

Economic conditions in specific sectors, directly affect the use and budget for information. Since the stock market crash of 1987 the demand for stock-related information has dropped or remained stagnant. Information budgets (especially discretionary budgets) are easily cut and the cost of these services can be justified only when they can be allocated to specific resulting revenues.

3.2.10 Government

The topic of government and government's role in the database industry revealed quite a full range of comments. A few companies had little or no dealings with the government and thus had no comments to make. Another group of companies also had little or no direct dealing with government, but did comment on how government was affecting the operation of their business or on what role it should play in the development of the industry. A third group had direct dealing with the government, usually as a source of information. A number of key issues and discussion points were raised during the interviews.

Government Information Policy

The overriding concern in the industry is government information policy and in particular, the dissemination of information to the industry. A number of firms rely heavily on the Federal government for information and as a result, are very concerned about this point.

The overwhelming feeling in the industry is that government must establish a clear, concise and equitable information policy. The policy should make it easy for private sector firms to obtain and use information in an arrangement that allows it to market the information profitably. Suggestions for implementation of such a policy varied, but the message remained constant through the interviews. Many who voiced concern were aware of the DOC Interdepartmental Working Group on Database Industry Support (IWGDIS) and were waiting to see the results (discussed further in Section 4). The specific points on policy were given as follows.

Access. It was generally felt that any information gathered at public expense, should be open and available to the public. The government should mandate that information dissemination be a priority. There was a feeling by some, that government information is guarded too closely by departments.

Exclusivity. The majority of respondents believed that government information should be distributed on a non-exclusive basis. The feeling was that the marketplace would decide the degree of competition and which databases would be viable. Many were not concerned about having the same information offered by more than one producer or vendor.

Although some respondents liked the principle of non-exclusivity, they stated that the realities of the Canadian market did not always lend itself to the concept. Because of Canada's small size, and the development of the market, they felt that some degree of exclusivity would be necessary to make some databases worthwhile. This would be true of databases with small focused markets or where the markets could not afford to pay a lot for the information. This "semi-exclusive" arrangement would allow the producers a chance to recover the costs of establishing the database. The

difficulty would be in establishing what information had sufficient commercial potential to be distributed on a non-exclusive basis.

Only one respondent felt that exclusivity was necessary for the industry. In this case, it was felt that exclusivity would provide the incentive to develop databases. The respondent felt it was a disincentive to develop a market only to have competitors given the same deal by the government.

Initiative for Development. There were two distinct views on where the initiative should come from for government information use. Those firms who were already familiar with government, felt the initiative should come from the private sector. That is, the government should not bother inventorying its information but that companies should approach departments directly. Those who were not generally dealing with government liked the idea of an inventory so they could choose what information they wanted to deal with.

Licensing Fees. Overall, there were few objections to reasonable licensing fees or royalties. The preference for a fixed fee versus a royalty varied with the company, but overall the mechanism was not as important as the ability to resell at a price acceptable to the market. Many felt that gathering information for government operations should be considered a sunk cost and a reasonable fee would be the marginal cost of providing it to the industry.

Crown Copyright. Crown copyright is generally not an issue in the industry and is considered just a part of doing business. A February 1990 DOC colloquium in fact diffused a lot of the concern over Crown copyright. It is, however, still a sore point with some as it is viewed as a symbol of information control. One respondent stated that abolition would send a signal to the industry that government is open for business even though he recognised that other

copyright aspects would still come into play. It was also noted that the government should determine who is actually the custodian of copyright. The actual person (position) is not taken seriously. Two respondents stated that DSS should stick to its role in publication but not be responsible for electronic information.

Government's Direct Involvement in the Industry. There is a strong perception that government is competing with private sector. The prevailing belief is that government should get out of the business altogether. A popular target is CISTI's CAN/OLE system. The industry believes that CAN/OLE underprices its services because it does not have to account for much of its direct costs. It is felt that this creates an unrealistic price precedent that private sector is measured by. Even those who believe CAN/OLE is justifiable, believe that it is beginning to overstep its science and technology mandate by offering commercial databases such as the Canadian Business Index, Microlog, and the Directory of Associations. Interestingly, when asked who in private sector might take up the slack if CAN/OLE disappeared, there were only a few vague suggestions. The sector served by CAN/OLE is generally viewed as low or unprofitable.

In response to allegations of unfair competition, CAN/OLE states that it was the first on the scene in Canada. It was mandated to serve a specific sector and there is no evidence that private sector could or would do it. They are moving to more full cost recovery. Subscribers currently pay $40/hour plus the prevailing royalty to the database producer. Smaller government databases are pleased to be on CAN/OLE because of its mandate to release information. There is also no exclusivity on the information.

Another government system, CCINFO, was cited as a mixed blessing. On the positive side, it has made major advances at getting to end-users and remarkable success with CD ROM (> 4,000 subscribers). Their efforts have meant that

CD ROM readers have moved into private sector much faster than without them. On the other side, their CD ROM subscriptions are very inexpensive ($150/year) due to subsidies and volume. This again sets a low price precedent that private sector cannot match but the market expects.

The average attitude toward government systems is best summarized by one respondent: The role and/or conflict of government systems depends on the type of information and its reason for existence. When the government gets into packaging, processing, and distribution these activities can be viewed as legitimate or illegitimate depending on circumstances. StatsCan can be considered legitimate as it is program-related with a specific public interest mission. The private sector could not afford to do it. BOSS is viewed as illegitimate as it is policy-related and its benefits are not properly distributed (i.e., private sector could package and distribute it better).

Role of the Government. It is generally felt that government should be involved in the promotion and growth of the industry on a macro level, not a micro level. The two most popular suggestions were for government to promote awareness of the industry and to assist in training, both at a user level and at the educational level. This generic assistance would assist the industry in developing an identify and a level of legitimacy. This could include DOC's database promotion initiative, more conferences, and trade missions.

Overall, direct subsidies were viewed negatively although incentive through the tax system for R&D and other business development aspects would be welcomed.

The industry would also like to see more use of its services by government. The government could be a major customer and lead the way in the use of electronic information for its operations. Many vendors feel that even

when electronic information is used, US vendors get priority because they are better known.

There was also a suggestion that growth would be stimulated by creating an incentive in government departments, to commercialize their information. Incentives (e.g., allowing them to keep some of the revenues) would speed up the licensing process and open more doors.

In general, firms are prepared to work with government to advance the industry. These consultations, for example, were well received by the majority of those interviewed and only one firm contacted refused to be interviewed.

3.2.11 CD ROM Considerations

Because of its recent entry into the database market, and increasing importance, we are including supplementary information to the CD ROM business. While many aspects of operations are similar to online, there are a number of characteristics unique to this segment of the database market.

The CD ROM industry did not develop in the traditional electronic information structure (e.g., from newspapers, government, etc.). CD ROM companies are more like publishers and use much of the same terminology. In this sense CD ROM is almost a hybrid of online and print, offering everything from numerical data to novels, i.e., covers the spectrum from straight data to cultural properties. The following information was taken from an interview with the president of OPTIM Corporation in Ottawa.

BACKGROUND AND NATURE OF BUSINESS

OPTIM was established in May 1989 and specializes in CD ROM technology. They operate in three areas:

1) **Vendor of Tools** (hardware and software) to allow companies/organizations to develop CD ROM in-house.

2) **Service Bureau** - allows companies/organizations to "try before they buy" as well as deal with high load demand.

3) **Publisher/CDROM Developer** - acquire rights to information, add value, use capabilities in 1) and 2) above to produce CD ROMs.

They are not involved with end users (and have no plans to do so) and use distributors such as Micromedia. OPTIM has produced three CD ROMs to-date and expects to publish 15 rom in the next year. They have also produced 40-50 in a service bureau capacity.

SUBJECTS AND TYPE OF INFORMATION

OPTIM is open to the choice of subject mater but most information will likely come from government, existing online products, and reference products.

COSTING

Costing in the CD ROM publishing industry differs significantly from the online industry. In addition to the cost of information, there are three direct costs associated with CD ROM development:

1) **Cost of the Authoring System** (development software)

   In the case of OPTIM, they pay $45,000 upfront to Dataware Technologies Inc. plus 12% (of $45,000) per annum. The 12% represents a fee for maintenance, support and upgrades.

2) **Cost of Retrieval System**

This is the retrieval software and the license fee is based on one of three options available:

a) An end-user CPU license. This licenses the CPU at a given site to use the software. Costs for Dataware range from $610 up front plus 12% per year for 1-24 CPU's to $183 plus 12% for 1000 plus.

b) An annual disc price ranging from $134 to $30 depending on the publisher volume. This fee allows the end-user to use the retrieval system for one CD title for one year.

c) A per replica fee (not available through OPTIM's current software suppliers).

3) **Unit CD Replica Costs**

- o $2000 for the master
  - $2.00/unit > 500
  - $2.50/unit < 500

DiscAmerique of Drummondville is the only company in Canada that can make the glass masters for mass replication. 50% of Optim's production goes to Philips Dupont Optical in the US.

OPTIM has recently (June 1989) purchased equipment that enables them to cut end-user copies. This $250,000 investment allows them to transfer 10 megabytes per minute (about one hour for a full disc of 600 megabytes). They charge clients $175 for the blank disc and $250/hour for use of the equipment.

TARGET MARKETS

OPTIM targets to existing publishing companies, government and online companies. They also deal with large, complex companies and government for intramural publishing (e.g., internal; procedure hand books).

PROBLEMS

Foreign - Three foreign concerns were raised:

1) There could be a problem if a large US software company came into Canada, offered low licensing fees and did not offer the software to OPTIM.

2) The US industry is two years ahead of Canada and have lower costs. The cost of retrieval software is less because they can deal in higher unit volumes (economies of scale). Canada also has 1/25 the US number of CD ROM readers with 1/10 of the population (i.e., 2.5 times lower per capita).

3) A US company could come into Canada and compete without as much as spending money on a hotel. They could send a salesperson up, negotiate, and return the same day with a tape ready to process.

Companies must therefore grow quickly to compete as the US will inevitably enter the Canadian market through establishment of service from the US. Unlike the comments made by the online companies, this represents direct head-to-head competition.

4.0 CANADIAN DATABASE ANALYSIS DOMESTIC AND INTERNATIONAL CONTEXT

4.1 Canadian Information and Databases

In this report we have focused on databases that have some level of Canadian content. We have not included databases of foreign origin that are sold through Canadian vendors. Virtually all online databases (and certainly all CD ROM's) are available to Canadians through some gateway system, so to talk of databases available in Canada is to talk about world production.

The Canadian industry is more complicated than simply using Canadian content as a measure. Some may feel that foreign-produced databases should have been excluded as part of the industry. While there is an argument for this, they do impact or could potentially impact directly on the industry and there inclusion is important. Similarly, we have not included databases produced in Canada that contain no Canadian content. While these do exist (notably IP Sharp) and are certainly part of the industry, they are a small part of the market and were not brought up by producers or vendors during the industry consultations. We will, however, refer to them as necessary during the discussions.

4.1.1 Types of Canadian Information

It is clear from analysis and discussions that the Canadian database industry is characterized by two general markets for information.

1) Canadian-produced information of primarily domestic interest; and

2) Canadian-produced information of domestic and international interest.

We have not seen any examples of public databases produced in Canada exclusively for the foreign market. These distinctions are important to understand how the market has developed.

The majority of current offerings constitute Canadian information for Canadians. These are mainly in the areas of taxation, law, and general news. There are also a number of smaller categories, especially in the social sciences, which have little or no interest outside Canada.

Databases with information of international interest are primarily in the areas of business/economics, technology, and health science.

The reasons for the predominance of information geared at Canadians are primarily due to supply-related factors. Historically, the Canadian government has been the base source for the bulk of the online industry. Because this information is gathered as a part of the government's day-to-day operation it is, by its nature, primarily aimed at Canadians or entities doing business in Canada. The government also encouraged growth in this area and, in the early days of online, paid to develop services.

On the other hand, with the exception of science-oriented information, information of international interest has been primarily developed by private sector initiative. These business-oriented services are relatively new entrants to the market place and are concentrated in just a few suppliers. A recent article in Database magazine (Merry et al., October 1989, p.15-27) cites four principal sources of Canadian business information: InfoGlobe, Infomart, Financial Post, and STM Systems. The article goes on to divide corporate information into five major groups:

1) **Directory Files** - defined as that which supplies basic company name and address details, with the possible addition of incorporation, key personnel, line of business, SIC number and/or sales figure or range.

2) **Stock Quotes** - real time and historical.

3) **Financial Information** - more in-depth information than Directory Files.

4) **Investment Reports** - based on research from various sources.

5) **All-in-one Packages.**

Articles such as this are in response to a growing demand for Canadian corporate information from the US and abroad. Much of this demand is due to the Free Trade Agreement as well as an increasing move to global business patterns.

With respect to non-business oriented information of international value, Canada has developed a series of very specialized data. This niche approach uses Canada's natural information strengths to yield databases of world-class stature. Many of these have been public sector driven and are in the areas of health and safety, arctic research, petroleum, crystallography and education.

4.1.2 Lifecycle Factors Affecting Production and Distribution of Canadian Information

The Canadian database industry is still at a relatively early stage of its development and is currently going through a major transition in its lifecycle. For the most part, the industry is still supply-side driven. That is suppliers, not users, decide what information gets to market. The

emphasis is on taking existing information and converting to an electronic database without much demand analysis. To date, this approach has not been to the detriment of the industry and combined with a good sense of intuition, has been successful for a number of producers. However, as the number of intuitive choices decrease, a more focused demand-oriented (end-user) approach will be required. The industry has begun to recognize this, particularly with respect to new entrants. There is a very strong correlation between the age of a service, and its level of demand-oriented marketing. The older, more established services, tend to rely more on the informal-intuitive approach while the new entrants tend to be more analytical in their decision-making.

Because of the commitment in time and money, it appears that the newer entrants are more concerned with obtaining market information. They are, perhaps, also feeling the effects of a later entrance by having to deal with some established markets. These markets were intuitive choices (and possibly best markets) of the early entrants. Thus, they need the information to decide whether they will compete in an existing segment or develop a new segment.

In order to understand the dynamics of this type of market at an early stage of the lifecycle, we can use experience with business game simulations. McGill University uses business game simulations as a training tool for students and executive management programs. Teams are set up and participants are told to make production, research and development, marketing and plant size decisions, but are not told what they are producing so that there are no market preconceptions. Each team starts on an equal footing and can apply their funds in any proportion to the above. Game parameters can be set to simulate a number of market conditions and positions in product lifecycle. When the marketing parameter is set to early product lifecycle so that marketing funds by individuals affects the market as a whole more than the individual company, a

number of things happen. In the majority of simulations, participants learn quickly that marketing has little effect on sales. They then pull back on marketing and show a short term gain in the bottom line. At the same time they shift these funds to R&D and plant, thereby decreasing unit costs. Unfortunately, as all players move to the same strategy, the market as a whole collapses. In the end, no one players is prepared to take the lead in marketing to benefit the industry as a whole.

As the Canadian database industry matures it will be important for the entire industry to move to even higher market-driven orientation. We believe that there is a recognition of this need, however, there are still fundamental barriers to overcome. It is relatively easy to do market research on a defined user population. Unfortunately, the market for electronic information is still largely undefined. It is undefined because the largest number of potential users are still unaware of the value of the services. It is, therefore, difficult to determine the potential user demand for a specific service because the potential user has nothing to compare it to. This gets back to the industry view on the difficulty in selling:

- one-on-one; and
- selling the concept before selling the service.

4.1.3 Critical Mass

Much has been written on the lack of critical mass in the database industry. The implication is that life would be easier if specific companies, and the industry as a whole, attained a certain critical mass. This critical mass is the level at which the industry is profitable and self-sustainable. Prior to reaching critical mass, the industry must sustain low or negative profits. Unfortunately, no-one has determined at what level critical mass is reached and it remains somewhat of an abstract goal.

However, it is clear, that the main obstacle to reaching critical mass is the lack of generic marketing. We have stated a number of times in the report that the industry views lack of awareness as the biggest barrier to growth. Yet there is very little being done by the industry to overcome it. The larger companies are prepared to sustain low profits or losses in developing their own market, but developing the market at a generic level is consciously or subconsciously viewed as helping the competition. In addition, the smaller companies simply do not have the resources to do anything more than basic marketing of their own services.

The ultimate responsibility in dealing with critical mass will have to come from the distribution end of the business. As we have seen the majority of independent producers are small and will not be able to deal with it.

The vendors, on the other hand, tend to be larger, with more resources available to them. They would also be the major beneficiaries of a stronger market.

A stronger distribution network also benefits the smaller producer. As we have seen, there appear to be fewer mass barriers for producers and even one person operations are able to develop product. Their continued survival would be enhanced by strong distribution.

4.1.4 Overcoming Critical Mass Barriers

Overcoming the barriers due to lack of critical mass and user awareness will require effort by the industry and government, as well as a creative approach to the problem.

First and foremost, the industry must collectively commit itself at all levels, to work towards a better and more dynamic market. This will require a high level of communication within the industry and a commitment of

funds to this goal. There is certainly a mechanism available through CADAPSO but CADAPSO is operating within limited funding. These limits appear to allow CADAPSO to perform its function as an industry association, but do not allow it to provide market intelligence or to promote the industry as a whole. Industry leaders should take a more proactive role in the development of the Canadian market. The synergy of the larger firms may provide part of the critical mass needed to overcome the marketing barrier.

The role of government (discussed further in Section 4.3) should be to assist the industry in reaching this critical mass, be it in role of information provider, market infrastructure support, or funding assistance for special projects. Government is in the position of supporting the market as a whole and can use its resources to strengthen the industry while allowing it to be private sector driven without distorting market forces.

We have also seen examples of strategic alliances used to help organizations grow. Creativity in this area demonstrates that this can be a useful mechanism for organizations. A good example of this is the alliance between Canadian Airlines International and iNet 2000. Just over a year ago, Canadian Airlines offered its CP Plus (frequent flyer) members a free, ongoing subscription to iNet 2000 which now includes the airline's own database. The initiative taken by these two firms accomplishes a number of objectives. Canadian offers its regular customers a perk and eliminates the barrier of having to sell the system for the Canadian database. iNet 2000, on its side, reached a large and likely very business oriented groups which could potentially use its other services (as well as any iNet connect charges for use of the Canadian database). From an industry perspective, a whole group of potential end-users is made aware of electronic services.

This concept of cross-marketing has been used successfully for years in many other industries.

4.1.5 Supplying Canadian Information Needs

The question of whether Canadian information needs are being met cannot be answered directly based on this supply-side study. Nor is it clear whether suppliers know if they are supplying the right information mix to their clients.

From some of the research that has been done (e.g., DOC, IDC Study: The Electronic Information Industry in Canada, 1988), it appears that current users of electronic information are satisfied with the services they use. What is not clear is where the voids are in terms of electronic information. These questions can only be answered through in depth, sectoral demand analysis. This type of sectional analysis has been done in the UK through the VANGUARD program (discussed in Section 4.3) and is necessary since each sector has its own needs and expectations.

4.1.6 Considerations for the Quebec Market

The Quebec market appears to operate as a sub-market within Canada primarily due to language. If the Canadian market suffers from lack of critical mass, then Quebec has an even greater challenge. The reaction by the Quebec government has been to heavily subsidize certain sectors of the industry and to take the lead in production and distribution in others. It appears that without government involvement the online database industry could cease to exist. IST, for example, dropped the majority of its online services after Quebec dropped its cash subsidy to the firm. SDM, one of Quebec's largest suppliers of bibliographic information, relies on Quebec for 50% of its operating budget. SOQUIJ, the major supplier of online Quebec judicial information, is operated by the Quebec government. One can assume that the Quebec government feels that electronic information is an important factor for the province

and is prepared to spend money in this area to help develop or maintain the industry.

Because of the limited size of the market, the lack of profitability and the language factor there appears to be little concern about foreign competition. If any inroads are made into Quebec, they will likely come from Ontario-based producers and vendors as an increasing number of databases are translated into French.

4.1.7 Alex

Alex is a sophisticated videotex gateway developed by Bell Canada, launched in Montreal in December 1988, and now available in Toronto. Alex provides consumers with a wide range of information and transactional services. Alex currently offers just under 300 services, all using a common command structure. The service is aimed primarily at the home consumer market although some inroads are being made to the business market. The vast majority of services are entertainment-related (chat lines, games, messaging) or light information (weather, advertising, directories, etc.). There are also a small number of sophisticated financial databases.

Few of the organizations interviewed felt that Alex would be a opportunity for them, although one service, MARKETFAX, is already listed in the catalogue. Most are taking a wait-and-see attitude but many acknowledge that the cost of offering a service on Alex is low and would be low risk. Except for packet-switched lines paid by the service providers, fees to Bell by the provider and user are only on a use basis.

It is too early to say how successful Alex will be, but if the experience with Minitel in France is any indication, the system will stay geared to the home market with low value-added services. However, it can only help to increase overall awareness of electronic services and the concept of information technology.

4.1.8 Overall Structure of the Canadian Electronic Database Industry

The structure of the Canadian electronic database industry is increasing in complexity with time. While six to eight years ago the structure was relatively simple and linear, through technology and market innovation, the structure has evolved considerably. There are now a number of components which affect the nature of the business, both complementary and competing. Figure 4.1 shows the basic components and relationships active in the industry. The diagram shows general relationships between components although not all components will necessarily be included in a given situation.

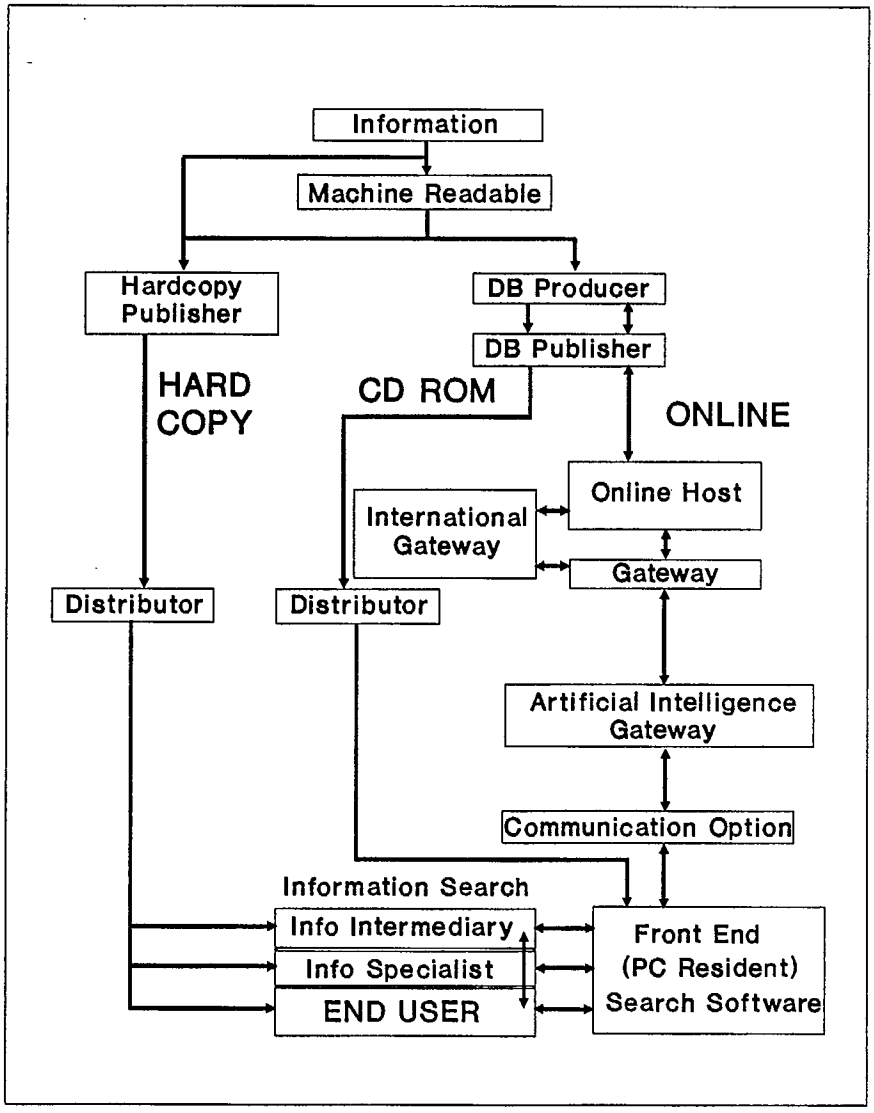
The structure indicates that the goal of the industry is to get information to the end-user. The arrows indicate the potential flows of direct interaction between components.

It is here that we can see the fundamental differences between Online, CD ROM and hardcopy. We assume, first of all, that the process starts with an information search component. This can be the end-user of the information, or more likely at the moment, an information specialist (librarian, etc.) or possibly information intermediary (e.g., information broker).

In online, the searcher can interact directly right up to the producer level in some situations. He or she makes all the decisions available to them including communication, gateway, host, database, etc. These decisions are made at the time of search. Although the search flow may be pre-programmed, the searcher still has the choice to alter the flow if desired.

FIGURE 4.1

STRUCTURE OF THE CANADIAN DATABASE INDUSTRY



For CD ROM, the interaction only goes as far as the PC resident search and retrieval software. As the choice of information banks is made in advance of the search and is fixed at the time of search, the searcher in effect becomes the database manager. The CD is part of a fixed reference base.

For hardcopy, the degree of search interaction is very low and resides primarily with the searcher, aided only by any indexing provided by the source.

A change in the characteristics of any one of these components can significantly alter the dynamics of the industry.

Price will almost always affect choice. For example, as CD ROMs become cheaper, the demand for online in competing sectors will decrease. CD ROM is viewed as less threatening to end-users.

Front-end software improvements will help the online industry. This component reduces skill barriers to searching and can increase the value added nature of online by making searches more efficient.

Changes in communications technology and policy could affect the level of use of online. It is generally agreed that the 1200 baud standard (or 2400 baud), is not fast enough and better technology in this area would help some sectors (notably real time applications). The new technologies available will also affect online use. The ubiquitous fax machine and emerging sub-FM opportunities, mean that producers are no longer tied to interactive online for quick information dissemination.

Perhaps one of the more interesting emerging technologies is the Artificial Intelligence gateway. The AI gateway is designed to perform the search directly using prompts and queries from the searcher. The significance of AI is that

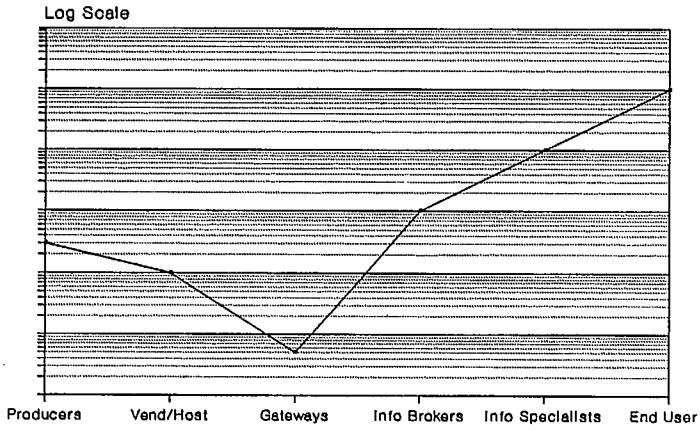
much of the choice is taken out of the hands of the searchers and place in the hands of the AI program. This makes it difficult to market a service to a searcher as they do not necessarily determine the choice of information source. We believe this will become an increasingly significant factor as the focus shifts to end-users who do not want to have to keep up-to-date with the diversity of databases.

There is a trend to larger and more extensive hosts and gateways. This appears to be in response to attaining what we have referred to as "critical mass". This "superstore" approach should have the effect of lowering costs and providing an opportunity for producers. As the suppliers get larger, so will their need for "inventory". This supermarket analogy can be taken one step further as producers will have to decide whether they opt for a large unfocused service, or a smaller more specialized service. We believe that these smaller services will evolve as the industry grows to meet specific needs.

The ratio of industry components will likely remain constant over time (Figure 4.2). This figure is used to demonstrate the number of each component in the chain relative to another. Using a log scale shows that each component is at least on order of magnitude greater or less than another. For example, we know from the CUADRA Directory, that there are greater than 10 times the number of vendors listed over gateways. Similarly, it is not uncommon for one information specialist to serve 10 to 1000 end-users in an organization. The V shape is not unlike that of manufacturing industries and shows where economies of scale are most important (at the bottom of the V). This graph is qualitative and is only used to indicate some relative numbers.

FIGURE 4.2

RELATIVE NUMBER OF COMPONENTS OF THE CANADIAN DATABASE INDUSTRY



4.2 Canada From an International Context

In this section we will look at the Canadian electronic database industry as part of an international industry. We will use information and opinions gathered through the industry interviews, interviews with other researchers, and published data. At times, reconciliation of data was difficult so we have attempted to reflect different views to stimulate discussion.

4.2.1 Size

It is difficult to use any single measure of size when comparing Canada to the rest of the world. We have already discussed the problems involved in comparing straight numbers of databases, yet all of the researchers and specialists contacted for this study agree that sometimes it is all that is available for comparison. Revenue figures, when available and if accurate, can be used for comparative purposes but are even more subjective. Revenues also do not necessarily reflect the intangible value of database sectors that have a low commercial value but may be high in strategic value. Having set another clouded preamble to numerical analysis, there are a number of interesting and relevant points that can be seen from looking at some of the figures.

Mansell and Jagger (1989) prepared an in-depth analysis of the July 1988 Cuadra/Elsevier "Directory of Online Databases". The analysis showed that Canada produced 230 of 3,288 databases listed, or some 7% of world production. It also put Canada third behind the UK (245) and the US (1970) and ahead of France (171), Germany (145) and Italy (92). The research also showed that Canada was fifth in Scientific, Technical as patent databases (40) behind the US (354), UK (104), France (64), and Germany (63).

This would indicate that Canada is, by these definitions, a major player in database production. However, all countries are still dwarfed by the US which produces some 60% of the number of world production. Though this percentage will drop over time, the US's early and aggressive entry will leave it dominant in the electronic information industry for at least the near future. Even if the figures had a fair to large margin of error, it still comes down to the US and everyone else, of which Canada is a significant part.

If one looks at revenue figures, a very different picture is seen. Table 4.1 shows Canadian, US and European online revenue estimates for 1986-1991.

Table 4.1

World Online Revenues

	1986		1991	
	Revenue (millions)	% Total	Revenue (millions)	% Total
Canada	$48	1%	$82	0.7%
US *	$3,700 (US)	74%	$8,600 (US)	71.2%
Europe *	$1,300 (US)	25%	$3,400 (US)	28.1%

* 1987 Figures
Sources: Evans Research Corp (Canada)
Link Resources Corp

It shows that although Canada may be producing approximately 7% of world databases, it is taking in only about 1% of revenues, and may be losing ground. Part of the problem may be in the way services are counted and what services are counted, however, even a 50% error factor on any figure puts Canada substantially behind.

The UK market, for example, was worth $640 million US in 1986 and is projected to grow to $1,802 million by 1991. In revenue terms, Canada ranks closer to countries like the Netherlands and the Nordic countries. It is often stated that the entire Canadian market is smaller than one major US service.

4.2.2 Impact of Foreign Services on the Nature of the Canadian Industry

We have already stated that much of the nature of the Canadian industry was determined by supply-side factors i.e., the availability of information. Foreign supply-side factors have also influenced the nature of the business. Canadian services have stayed away from areas well served by foreign (mainly US) suppliers. Head-to-head competition with US services is viewed as destructive, with the Canadian market seen as too small to justify the expense of trying to carve out a piece of US-dominated areas. In addition, these tend to be in science and technology areas and we have seen no evidence that a Canadian service could or would want to serve this market even if the US were to withdraw completely. The US has too strong an information base and is able to serve world needs in science and technology very well. In addition, Canadian vendors benefit financially by acting as agents for foreign services which assists them in developing Canadian services.

Both these supply factors have led to a Canadian industry that primarily provides Canadian information for domestic use. Canada, for example, has one of the highest proportion of legal databases in the world, 30% of all Canadian content databases compared with 1% in the UK and 8% in the US (Mansell and Jagger, 1989). It has also led to the development of small, niche-oriented databases for international consumption, but only in areas where Canada has a specific information strength.

To some extent foreign services, because of their early entry into the Canadian market, have also helped to promote the industry in general. Foreign services reached the "innovators" at a time when there were no Canadian commercial vendors.

4.2.3 Foreign Competition

In this report we have concentrated on Canadian content databases. From the analysis, it is clear that control of the supply of Canadian content is largely in the hands of Canadians. The Canadian market, however, consists of a high degree of foreign-based (mainly US) electronic information. While US vendors control only a very small portion of Canadian content, they have historically taken up to 30% of the revenues in Canada (ERC Update, volume 1, no.4). This is due to Canada's larger requirement for non-Canadian information which is not produced here. According to Evans Research (Canadian Usage of Canadian-Content vs. US/International-Content Databases, July 1989) only 64% of online expenditures made by heavy online users were on Canadian content (Sample = 8 - Industries: Finance, Mining, Communications, Law, Accounting). In low online users, this proportion drops to 35% (Sample = 7 - Industries: Insurance, manufacturing, Education, Engineering, Public Administration). Although the sample sizes are low, they may be indicative of the need for a wide range of information, which is not all available from Canadian sources. Thus, Canada's international (or "non-Canadian" information requirements are largely being met by foreign firms.

Threat of Direct Competition

The threat of foreign competition is not a major concern of the industry for two reasons:

1) The market is perceived to be too small to be of interest; and

2) Canadian companies have a distinct advantage in Canadian content and already have an established base.

While these points may be valid, if a major US company wanted to compete head-to-head in Canada, the sheer size difference would make it difficult for a Canadian company to defend itself. We believe that head-to-head threats are small because the market is just not profitable enough yet. In addition, we believe that the foreign presence will continue to grow in complementary areas not completely served by Canadian companies. Perhaps the only real head-to-head is between CAN/OLE and US services such as DIALOG and BRS.

Alliances and Acquisitions

Increased foreign presence is likely to come from indirect means, through alliances and acquisitions.

Alliances allow foreign firms to enter the market in a complementary way, usually rounding out basic services from a Canadian supplier. It allows the foreign firm to benefit from an established network and knowledge of the Canadian market. It also allows the Canadian firm to benefit financially from information produced abroad, and so a synergy is developed.

Acquisition is also likely to be a factor in very specific circumstances. Acquisition allows a foreign firm a number of advantages over an alliance relationship. In addition to buying into an established base, the new owner has complete control over any aspects of production and distribution. They also purchase the information itself for integration into their own system. Acquisition is a viable strategic move in the following circumstances:

1) **Speed of Entry** - A large foreign may have the resources to enter the Canadian market, but the time to establish the market may be too long.

2) **Unique Information Source** - In some cases the target company may have unique information sources or efficient information gathering infrastructure.

3) **Reduce Competition** - The market may be too small for another competitor.

4) **Complement to Existing Operation** - The target company may produce an operation that is an integral part of the purchaser's strategic plan.

It is circumstance 4, which probably represents the major reason for the acquisitions the last few years. Mead Data's purchase of Dataline, for example, was part of a plan to move towards real time services and Reuter's purchase of IP Sharp fit very well into their globalization strategy and desire to expand services.

Although any company is a potential target for takeover, based on the above, there are probably some Canadian firms which are more likely to be purchased than others. These companies will likely be entrepreneurially-driven (owner operated) and have been in operation for a number of years. The reason is that entrepreneurially-driven firms often lack a continuity factor. As the owners approach retirement, the companies will be put up for sale. We believe that foreign firms will probably pay the highest price because of their ability to pay, and their recognition of the value of a given firm. Acquisition can very quickly alter the balance of foreign ownership, especially in information sectors of high subject concentration. This is particularly true of the vendor-side of the industry and even a single purchase can shift a sector from majority Canadian to majority foreign control. If, for example, QL Systems was sold to a foreign firm, control of most of Canada's legal databases would be foreign-based. The companies need not have a large number of databases, just a high concentration. We have already seen that the foreign

purchase of IP Sharp resulted in the small number of "banking" databases shifting from Canadian to foreign.

There is little protection available under the Investment Canada Act as seen by such purchases as Dataline and IP Sharp. The Act provides for a review of direct acquisitions of Canadian companies with assets of over $5 million and indirect acquisition (acquisition through a parent company outside Canada) of companies with assets over $50 million. In an analysis of 165 applications resolved by Investment Canada from June 1985 to December 1989 dealing with the computer industry (hardware, software, information) 155 were not reviewable and 10 were approved. There is, however, discretionary power given to the Governor in Council under Section 15. Under Section 15, the Governor in Council can order a review to normally non-reviewable cases if the acquisition is, in his opinion, related to Canada's cultural heritage or national identity or if it is in the public interest to do so. It is unlikely that this discretionary power would or could be used for the database industry as it could be viewed as contrary to the Free Trade Act. Information, although of strategic importance, is treated like any other commodity or resource.

What Constitutes a "Canadian" Company

With the world moving more and more to globalization of economies, it is becoming increasingly difficult to define what constitutes a Canadian company. The general rule is to use a company's head office location and/or location of major shareholder. Although technically correct, this may not be the best representation. IP Sharp, for example, is technically a foreign firm, owned by Reuters UK. However, it is essentially a "Canadian" company with foreign owners as it employs a large number of Canadians, performs a high level of value-added work in Canada, and pays Canadian taxes. There are, on the other hand, other Canadian owned firms that deliver most of their benefits outside the country.

David Worlock, president of the European Information Industry Association (EURIPA), summed up this question as follows:

> "The creation of wealth in Europe and the creation of employment are far more relevant characteristics. Member state governments have long accepted world multinationals as local companies when they were able to demonstrate a favourable balance of trade in the country concerned, and it is likely that this common sense approach will prevail in a European context. In this scenario, IBM Europe is an authentically European company."

Recognition of Multinational Nature of Business

A great deal of discussion has occurred on the globalization of the information industry and all the major players recognize this an irreversible trend. Even the US has not been immune to the series of international mergers and take-overs. Herbert Landau, in an analysis of the US industry (Bull.Amer.Soc. Info.Scie., Aug/Sept 1988), cited 28 examples of international firms with major interests in the US information industry. This included Bell Canada (iNet America) and International Thompson Organisation, Canada (one of the largest of the foreign database publishers). The author welcomed the foreign presence (particularly if it is reciprocal), but did acknowledge that the risk of increasing US dependence on foreign-produced information had yet to be identified and assessed.

4.2.4 Transborder Flows of Online Service Revenues

The calculation of online trade flows is acknowledged to be a near impossibility to determine with any degree of accuracy. The nature of electronic data flows, i.e., their

ability to cross boarders unimpeded and volume of flows, makes accurate mapping difficult. Dr. Harry East of the Polytechnic of Central London (UK) has studied transborder flows using ongoing representative user panels in the UK. He claims that some spending analysis can be done this way but commercial secrecy of suppliers makes complete tracking impossible. This is compounded by the use of gateways and revenue-sharing agreements. His research shows that in Europe much of the funds pass across two national boundaries via numerous pathways. As an example, from research done in 1989, based on a sample of university expenditures, he estimated that the breakdown of revenues received from this UK group was:

United Kingdom	21%
North America	58%
Other Europe	20%
Japan	1%

This was not surprising considering that nearly 40% of the UK-produced databases are hosted exclusively outside the UK. Because Canada hosts most of its databases, the flow of funds is likely to be much lower but probably not below the nearly 30% revenue figure given to US vendors as reported by Evans research. We have not seen any quantitative research dealing with the amount of foreign funds flowing to Canadian companies, but the indications from our interviews is that it is still quite low.

4.3 Enhancing Canadian Competitiveness

A successful Canadian competitive strategy must take into account both supply-side and demand-side characteristics. Supply-side factors have dominated the dynamics of the Canadian market to date and this technology-push has been successful at reaching a specific segment. Demand

dynamics are now necessary for the market to expand. Clearly, a good product is important, but the right product is more important.

4.3.1 Developing a Competitive Strategy

The process of developing a Canadian competitive strategy starts with an understanding of the adoption process of electronic information. This process has been studied extensively by the UK Department of Trade and Industry. In a 1988 DTI report the following stages were identified as necessary for the successful adoption of value-added networks in an organization.

1) **Awareness** - formal awareness by decision makers or opinion leaders in an organization of a problem or opportunity. This may be competitive pressure, cost reduction or marketing expansion.

2) **Matching** - recognizing that VANS solve a particular problem or offer an opportunity. This problem may be a general information need or inefficiency in information gathering (i.e., too slow to be of use). This may require the emergence of a VANS champion.

3) **Introduction** - VANS customized to suit the organization or structure altered to accommodate VANS.

4) **Operation** - putting system to full and regular use.

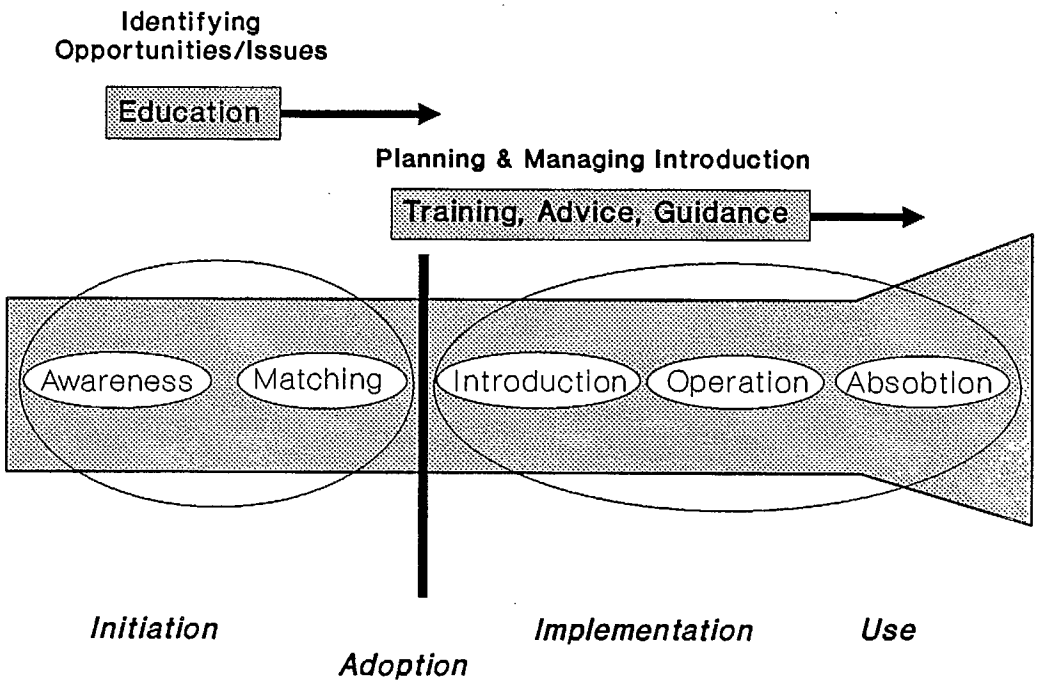
5) **Absorbtion** - where the system loses its separate identity and becomes a routine part of operation.

Although the model is shown at a micro level, it applies equally at an industry level.

Stage 1 and 2 require extensive educating activities (Figure 4.3). The focus is on reaching the innovators in a market. We have seen that primary innovators in the market are information specialists. While the penetration to this sector is viewed as good by the industry, it is still not seen as high as it could be. More emphasis on training in schools (e.g., library, science) may help. This first wave of adoption appears to be levelling off. Although the number of online subscribers is increasing, the rate of increase is dropping (Figures 4.4 and 4.5). This is seen in most countries and in almost all subjects (Figures 4.6 and 4.7).

FIGURE 4.3

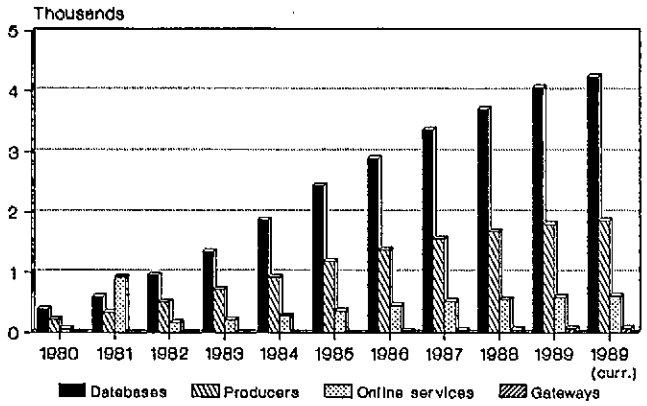
STAGES FOR ADOPTION OF VALUE-ADDED NETWORKS



Adapted from the UK Department of Trade and Industry

FIGURE 4.4

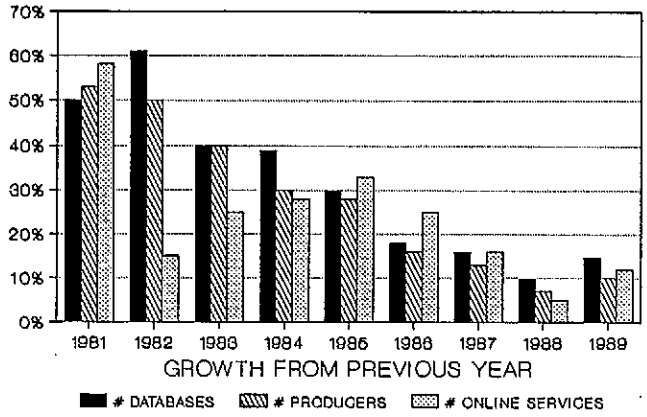
WORLD DATABASE INDUSTRY GROWTH



Source: CUADRA Directory July 1989

FIGURE 4.5

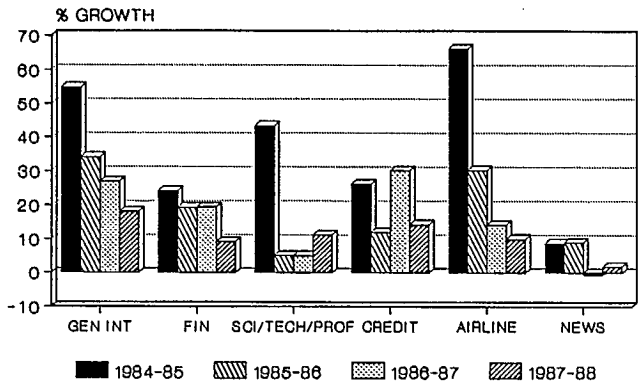
GROWTH OF ONLINE DATABASE INDUSTRY



SOURCE: CUADRA DIRECTORY, JULY 1989

FIGURE 4.6

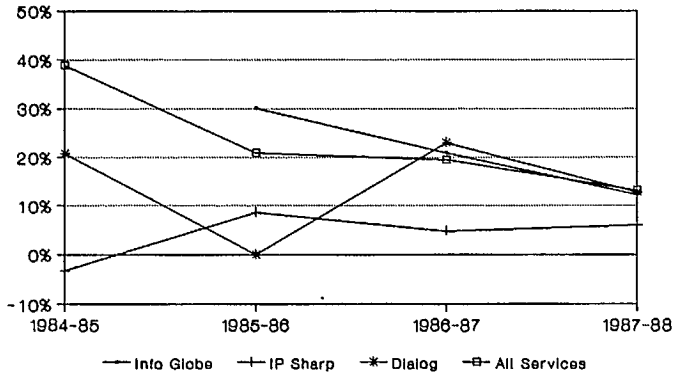
GROWTH OF ONLINE SUBSCRIBERS BY ONLINE SERVICE SUBJECT



SOURCE: INFO INDUSTRY FACTBOOK 1989

FIGURE 4.7

GROWTH OF SUBSCRIBERS TO VARIOUS ONLINE SERVICES



SOURCE: INFO INDUSTRY FACTBOOK 1989

Real growth will now have to come from two sources:

- o increased use from current subscribers; and
- o targeting end-users.

The first sector is very appealing to the industry as increased use has a high profit component due to low marginal costs. There are, however, limits to growth in this area in terms of time and available budgets. The potential with end-users is many times that of information specialists. Consider that for each information specialist in an organization there can be one to many thousand end-users.

Reaching these two opportunity targets requires a significant educating effort. This has to be targeted not only to potential subscribers, but more importantly, to the decision-makers and opinion leaders in an organization. Even current users are limited to increase use if the individual setting budgets does not see the value of electronic information.

The DTI report recommends several measures to reach this new wave of subscribers. They include:

- o Senior Management awareness needs to be improved; the need and vision to identify VANS opportunities and the ability to champion the implementations through to deliver the expected benefits.
- o Business and Management Schools need to develop the capability of raising the visibility and importance of VANS awareness in their programmes.
- o Training providers need to focus more on the issues of planning and implementing VANS and on how to manage the attendant issues.

- Industry-specific examples of "best practice" and the challenges overcome in VANS implementation are required as case material for education and training initiatives.

- Awareness education needs to be provided regionally to reach the industry market which stand to benefit from VANS. Moreover, the Regional Development bodies need the awareness themselves, not least because VANS provide the opportunity for organizations to bridge geographical barriers and trade in areas not previously considered.

4.3.2 The Role of Government

Government can play a critical part in the development of database industry in both the supply and demand side of the market.

Supply Side

Government Information

Government is, and will remain, one of the primary sources of information for the industry. As such, both government and industry agree that a freer flow of information is necessary. It is also generally felt that the current system is cumbersome and ambiguous. Clear and equitable policies for government information are necessary for industry to be able to fully exploit this resource. Current government action in this areas are viewed positively by industry particularly Government/Industry Colloquia organized by DOC. The industry is however impatient to see the results. A discussion paper on government databases to assist Federal Government Institutions in dissemination was issued in December 1989. The paper was the result of interactions between government and industry and outlined options and considerations in licensing databases, be they hardcopy

files or sophisticated electronic databases. It addresses many of the concerns raised in our interviews and suggests that departments have considerable discretion in negotiating with the private sector.

This latter point will please part of the industry but not all. Those who will welcome this approach are those already experienced in dealing with the government. They have the ability to make their way through the system easily. The other will prefer a priced-inventory approach - simple buy and sell. The paper also deals with issues such as facilitating market potential, usefulness, integrity of data, etc. all of which are positive moves and should be well received.

We recommend that DOC examine the UK experience with government information. DTI publishes documents for government and private sector dealing with "Tradeable Information". The documentation covers an introduction to government information, guidelines, and model contract clauses. They address the majority of issues raised in the interviews and deal with them in a manner that should be satisfactory to both government and industry. Perhaps the policy issue addressed which had the most appeal to industry was a recommendation that an information policy should:

> " ... give prominence first, to the stimulation of the UK industry through the release of government-held information, and secondly to the protection of the commercial value of information."

Government Systems

The role of government systems should not be underestimated. Although private sector does not welcome these operations, there is little evidence that private sector would fill the sectors currently dominated by government. Government systems have played, and will continue to play an important role, in the development of the industry. Government provided "critical mass" in the early days and

helped to promote the use of databases. There will continue to be database sectors of marginal profitability, but of high strategic value, which would not be online if it were not for these systems. We do agree, however, that government should question the policy of maintaining commercial databases on government systems.

Financial

Direct financial assistance was ruled out by the industry. However, indirect incentives for research and development through the tax system would be welcome and merit consideration.

Demand Side

Buying Services from Private Sector

There are two demand-related areas where government can play a significant role. The first, and simplest, is as a buyer of database services. Much of the success of the US industry was due to a policy of assigning private sector to develop services and buying great quantities of the services to make them viable. Government can take the lead in this area by promoting database services within departments.

Promotion and Education

The second role, is in promotion and education. We cannot over emphasize the importance of government in these areas. The private sector will not take lead here as it is expensive for an individual company, and as we have seen, assists more than the individual company. The proposal to create a database promotion initiative would accomplish many of these goals. The specifics of the initiative are currently being examined in a parallel DOC study. We would recommend, however, that the initiative focus on generic marketing. Particular emphasis should be made on education to university level students to ensure that the new generation of information users are familiar with the technology.

Coordination

A database promotion initiative should also act as a focal point for the industry. That is, to function as both a networking and clearing house for the industry. Networking will be very important for further development. This coordinating role should be championed and maintained by DOC. Our discussions in the UK revealed that a number of initiatives begun in the early 80's failed because the government disbanded the department responsible for communications in 1985. Now, there is no DOC equivalent in the UK and their industry would like to see the government more active in this area.

The UK has just completed a 4-year program know as Vanguard. This joint government and industry initiative was launched in October 1986 to improve the profitability and competitive position of the British industry. The program received backing from the UK DTI as well as five leading UK information technology companies. The first phase focused on promoting general awareness and the second on sector specific studies. Evaluation of the program is currently being undertaken by PREST (Programme of Policy Research in Engineering Science and Technology) in Manchester. The work should be complete by July 1990 and we recommend that this program and its results be examined.

APPENDIX A

Databases Used for Analysis

REVISED APRIL 26, 1990

Database	PRI CAT	SEC CAT	TER CAT	CANADIAN CONTENT <5%	5-29%	30-80%	>80%
ALD	GENERAL	DIRECTORIES		1			
ASIA PACIFIC	GENERAL	DIRECTORIES					1
CAN PARL GUIDE	GENERAL	DIRECTORIES					1
CMEC	GENERAL	DIRECTORIES			1		
CPCD	GENERAL	DIRECTORIES					1
CRS/CPM	GENERAL	DIRECTORIES		1			
CRS/IBM	GENERAL	DIRECTORIES		1			
DAC	GENERAL	DIRECTORIES					1
DAVID	GENERAL	DIRECTORIES			1		
ESPIAL	GENERAL	DIRECTORIES					1
FVC	GENERAL	DIRECTORIES					1
FVPD	GENERAL	DIRECTORIES					1
JOUETS	GENERAL	DIRECTORIES				1	
LOGIBASE	GENERAL	DIRECTORIES				1	
PAC INFO EX	GENERAL	DIRECTORIES			1		
PRODAV	GENERAL	DIRECTORIES				1	
PRODIL	GENERAL	DIRECTORIES				1	
UNIVRES	GENERAL	DIRECTORIES					1
WHO'S WHO	GENERAL	DIRECTORIES					1
AST	GENERAL	NAT/REG SOURCES			1		
BIP	GENERAL	NAT/REG SOURCES					1
BNQ	GENERAL	NAT/REG SOURCES				1	
BNT	GENERAL	NAT/REG SOURCES				1	
BOREAL	GENERAL	NAT/REG SDURCES				1	
CANADIANA ONLINE	GENERAL	NAT/REG SOURCES					1
CATSS	GENERAL	NAT/REG SOURCES			1		
CHOIX	GENERAL	NAT/REG SOURCES			1		
DOBIS	GENERAL	NAT/REG SOURCES			1		
NLCATBN	GENERAL	NAT/REG SOURCES					1
NRC PUBS	GENERAL	NAT/REG SOURCES					1
PERSDNAL SEARCH	GENERAL	NAT/REG SOURCES				1	
YKB	GENERAL	NAT/REG SOURCES					1
LES AFFAIRES	GENERAL	NEWS				1	
CAN PRESS NEWS	GENERAL	NEWS				1	
CALGARY HERALD	GENERAL	NEWS			1		
CBCA/CBI	GENERAL	NEWS					1
CITIZEN	GENERAL	NEWS				1	
CNW	GENERAL	NEWS				1	
COMPUTING CANADA	GENERAL	NEWS				1	
EDMONTON JOURNAL	GENERAL	NEWS				1	
FINANCIAL POST	GENERAL	NEWS				1	
FINANCIAL TIMES	GENERAL	NEWS				1	
GAZETTE	GENERAL	NEWS				1	
GLOBE AND MAIL	GENERAL	NEWS				1	
INFODEX	GENERAL	NEWS			1		
INFOPUQ	GENERAL	NEWS			1		
MACLEANS	GENERAL	NEWS					1

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Database	PRI CAT	SEC CAT	TER CAT	CANADIAN CONTENT <5%	5-29%	30-80%	>80%
LYR	GENERAL	NEWS					1
NORTHERN MINER	GENERAL	NEWS					1
PCFA	GENERAL	NEWS			1		
PCFT	GENERAL	NEWS					1
PUBLIC SECTOR	GENERAL	NEWS					1
QUEBAQ	GENERAL	NEWS				1	
SDUTHAM NEWS WIRE	GENERAL	NEWS				1	
TORONTD STAR	GENERAL	NEWS				1	
VANCOUVER SUN	GENERAL	NEWS				1	
VPROV	GENERAL	NEWS				1	
WHIG	GENERAL	NEWS				1	
WINDSOR STAR	GENERAL	NEWS				1	
BOOK REVIEW INDEX	GENERAL	PER/REPORT INDEX		1			
CAN INDEX CDMP LIT	GENERAL	PER/REPORT INDEX					1
CAN MAGAZINE INOEX	GENERAL	PER/REPORT INDEX					1
CAN PERIODICAL INDEX	GENERAL	PER/REPORT INDEX					1
CFR	GENERAL	PER/REPORT INDEX					1
CJD	GENERAL	PER/REPORT INDEX				1	
MICROLOG	GENERAL	PER/REPORT INDEX					1
REPERE	GENERAL	PER/REPORT INDEX				1	
CANUCS	GENERAL	UNION LISTS			1		
CODDC	GENERAL	UNION LISTS			1		
CONSPECTUS	GENERAL	UNION LISTS					1
UNION	GENERAL	UNION LISTS			1		
ARCHIMEDE	GENERAL	UNIV LIB COLL			1		
BADADUQ	GENERAL	UNIV LIB COLL			1		
BIBLIB	GENERAL	UNIV LIB COLL			1		
CUBE	GENERAL	UNIV LIB COLL			1		
GUELPH ONLINE	GENERAL	UNIV LIB COLL			1		
NDVANET	GENERAL	UNIV LIB COLL			1		
WATERLOO	GENERAL	UNIV LIB COLL			1		
CAN REG	SOC SCI	GENERAL					1
SOC SCISEARCH	SOC SCI	GENERAL		1			
SOCIOLOGICAL ABS	SOC SCI	GENERAL		1			
BTQ	SOC SCI	COMM/TERMINOL			1		
TERMIUM	SOC SCI	COMM/TERMINOL			1		
J SCHEDULE	SOC SCI	BUS/FINANCE	BANKING				1
O SCHEDULE	SOC SCI	BUS/FINANCE	BANKING				1
W BANK	SOC SCI	BUS/FINANCE	BANKING				1

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Database	PRI CAT	SEC CAT	TER CAT	CANADIAN CONTENT <5%	5-29%	30-80%	>80%
CAN BUS NET	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
CANCORP	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
CANFAX	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
CCO	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
CDMI	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
CFCD	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
CFD	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
CLRA	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
CNAM	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
CNET	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
CORP PASS	SOC SCI	BUS/FINANCE	COMPANIES - GEN			1	
CTIX	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
DBGCM	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
DUNSERVE II	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
FP CORP	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
FP CORP SURV	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
INVESTEXT	SOC SCI	BUS/FINANCE	COMPANIES - GEN	1			
MBIS	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
NASIS	SOC SCI	BUS/FINANCE	COMPANIES - GEN			1	
REPORT ON BUSINESS	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
REPORTLINE	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
SRAM	SOC SCI	BUS/FINANCE	COMPANIES - GEN				1
SSA	SOC SCI	BUS/FINANCE	COMPANIES - GEN			1	
SYNINFO	SOC SCI	BUS/FINANCE	COMPANIES - GEN			1	
CAN OILS	SOC SCI	BUS/FINANCE	COMPANIES - SPEC				1
COPS	SOC SCI	BUS/FINANCE	COMPANIES - SPEC				1
DOIDB	SOC SCI	BUS/FINANCE	COMPANIES - SPEC				1
PROMPT	SOC SCI	BUS/FINANCE	COMPANIES - SPEC	1			
BKRP	SOC SCI	BUS/FINANCE	CREDIT				1
CREDITEL	SOC SCI	BUS/FINANCE	CREDIT			1	
INFORATES	SOC SCI	BUS/FINANCE	FINANCIAL				1
M RATE	SOC SCI	BUS/FINANCE	FINANCIAL		1		
ABI/INFORM	SOC SCI	BUS/FINANCE	MGMT/ECONOMICS	1			
ACCOUNTANTS	SOC SCI	BUS/FINANCE	MGMT/ECONOMICS	1			
CA-ONLINE	SOC SCI	BUS/FINANCE	MGMT/ECONOMICS			1	
CAN UNDERWRIGHTER	SOC SCI	BUS/FINANCE	MGMT/ECONOMICS				1
CFBC	SOC SCI	BUS/FINANCE	MGMT/ECONOMICS				1
DRI CDN PRI SOURCES	SOC SCI	BUS/FINANCE	MGMT/ECONOMICS				1
MGMT	SOC SCI	BUS/FINANCE	MGMT/ECONOMICS	1			
MMA	SOC SCI	BUS/FINANCE	MGMT/ECONOMICS	1			
TRADESTAT	SOC SCI	BUS/FINANCE	MGMT/ECONOMICS	1			
BAR	SOC SCI	BUS/FINANCE	MARKETING				1
BCBN	SOC SCI	BUS/FINANCE	MARKETING				1
BOSS	SOC SCI	BUS/FINANCE	MARKETING				1

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Database	PRI CAT	SEC CAT	TER CAT	CANADIAN CONTENT <5%	5-29%	30-80%	>80%
RADAR	SOC SCI	BUS/FINANCE	MARKETING				1
TRADE AREA	SOC SCI	BUS/FINANCE	MARKETING				1
BIW	SOC SCI	BUS/FINANCE	NEWS			1	
ANNUITY	SOC SCI	BUS/FINANCE	STOCKS/BONDS				1
CAN STOCK QUOTE	SOC SCI	BUS/FINANCE	STOCKS/BONDS				1
CAN FIN	SOC SCI	BUS/FINANCE	STOCKS/BONDS				1
CDN OPTIONS	SOC SCI	BUS/FINANCE	STOCKS/BONDS				1
COMMODITIES	SOC SCI	BUS/FINANCE	STOCKS/BONDS	1			
DRI COMMODITIES	SOC SCI	BUS/FINANCE	STOCKS/BONDS	1			
FP BOND	SOC SCI	BUS/FINANCE	STOCKS/BONDS				1
FP STOCK	SOC SCI	BUS/FINANCE	STOCKS/BONDS				1
MKT DESSYST 7	SOC SCI	BUS/FINANCE	STOCKS/BONDS	1			
MARKET SCAN	SOC SCI	BUS/FINANCE	STOCKS/BONDS		1		
MARKET FAX	SOC SCI	BUS/FINANCE	STOCKS/BONDS		1		
ONT SECURITIES COMM	SOC SCI	BUS/FINANCE	STOCKS/BONDS				1
TRADE MARKET	SOC SCI	BUS/FINANCE	STOCKS/BONDS				1
TSE 300	SOC SCI	BUS/FINANCE	STOCKS/BONDS		1		
VANCOUVER STOCK WATCH	SOC SCI	BUS/FINANCE	STOCKS/BONDS		1		
AAE	SOC SCI	BUS/FINANCE	TAXATION				1
ACI	SOC SCI	BUS/FINANCE	TAXATION				1
BIIR	SOC SCI	BUS/FINANCE	TAXATION				1
CANADIAN TAX ONLINE	SOC SCI	BUS/FINANCE	TAXATION				1
CIIR	SOC SCI	BUS/FINANCE	TAXATION				1
CLE	SOC SCI	BUS/FINANCE	TAXATION				1
DIR	SOC SCI	BUS/FINANCE	TAXATION				1
DTC	SOC SCI	BUS/FINANCE	TAXATION				1
EDB	SOC SCI	BUS/FINANCE	TAXATION				1
ETM	SOC SCI	BUS/FINANCE	TAXATION				1
INST	SOC SCI	BUS/FINANCE	TAXATION				1
LBRF	SOC SCI	BUS/FINANCE	TAXATION				1
LDA	SOC SCI	BUS/FINANCE	TAXATION				1
LMA	SOC SCI	BUS/FINANCE	TAXATION				1
MDA	SOC SCI	BUS/FINANCE	TAXATION				1
NAA	SOC SCI	BUS/FINANCE	TAXATION				1
RISE	SOC SCI	BUS/FINANCE	TAXATION				1
SRDA	SOC SCI	BUS/FINANCE	TAXATION				1
TAR	SOC SCI	BUS/FINANCE	TAXATION				1
TBR	SOC SCI	BUS/FINANCE	TAXATION				1
TCJ	SOC SCI	BUS/FINANCE	TAXATION				1
TIB	SOC SCI	BUS/FINANCE	TAXATION				1
TIC	SOC SCI	BUS/FINANCE	TAXATION				1
TRI/TR2	SOC SCI	BUS/FINANCE	TAXATION				1
DYNIS	SOC SCI	BUS/FINANCE	TRADEMARKS				1
TMRK	SOC SCI	BUS/FINANCE	TRADEMARKS				1

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Database	PRI CAT	SEC CAT	TER CAT	CANADIAN CONTENT <5%	5-29%	30-80%	>80%
BIBLIOL	SOC SCI	DEVELOMENTAL STUD.			1		
IDRIS	SOC SCI	DEVELOMENTAL STUD.			1		
CDI	SOC SCI	EDUCATION		1			
CEI	SOC SCI	EDUCATION					1
COMPETENCESPLUS	SOC SCI	EDUCATION					1
DAF	SOC SCI	EDUCATION			1		
ECER	SOC SCI	EDUCATION		1			
EDUQ	SOC SCI	EDUCATION					1
EDUTEX	SOC SCI	EDUCATION					1
ERIC	SOC SCI	EDUCATION		1			
GRADELINE	SOC SCI	EDUCATION		1			
ONEB	SOC SCI	EDUCATION					1
PELAGIE	SOC SCI	EDUCATION				1	
PETERSON'S COLLEGES	SOC SCI	EDUCATION		1			
REPERES	SOC SCI	EDUCATION					1
SKILLSLINK	SOC SCI	EDUCATION					1
CENV	SOC SCI	ENVIRONMENT				1	
ENV	SOC SCI	ENVIRONMENT					1
ELIAS	SOC SCI	ENVIRONMENT			1		
IRPTC	SOC SCI	ENVIRONMENT			1		
CANADA LAND INV	SOC SCI	GEOGRAPHY					1
AHL	SOC SCI	HISTORY		1			
HISCABEQ	SOC SCI	HISTORY					1
FIRST CITE	SOC SCI	LABOUR					1
LABOORDOC	SOC SCI	LABOUR		1			
ACWS	SOC SCI	LAW/STATUTES					1
ACF	SOC SCI	LAW/STATUTES					1
ACL	SOC SCI	LAW/STATUTES					1
ACS	SOC SCI	LAW/STATUTES					1
APPEL	SOC SCI	LAW/STATUTES					1
BUREAU ENREGISTREMENTS	SOC SCI	LAW/STATUTES					1
CACM	SOC SCI	LAW/STATUTES					1
CITT	SOC SCI	LAW/STATUTES					1
CCC	SOC SCI	LAW/STATUTES					1
CIT	SOC SCI	LAW/STATUTES					1
CJ	SOC SCI	LAW/STATUTES					1
CLAS	SOC SCI	LAW/STATUTES					1
CLL	SOC SCI	LAW/STATUTES					1
CMAR	SOC SCI	LAW/STATUTES					1
COMC	SOC SCI	LAW/STATUTES					1
CPR	SOC SCI	LAW/STATUTES					1
CRR	SOC SCI	LAW/STATUTES					1
DLR	SOC SCI	LAW/STATUTES					1

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Database	PRI CAT	SEC CAT	TER CAT	CANADIAN CONTENT <5%	5-29%	30-80%	>80%
DRS	SOC SCI	LAW/STATUTES					1
ECR	SOC SCI	LAW/STATUTES					1
FCJ	SOC SCI	LAW/STATUTES					1
FCR	SOC SCI	LAW/STATUTES					1
FTR	SOC SCI	LAW/STATUTES					1
JURIS 63/74	SOC SCI	LAW/STATUTES					1
JURIS EXPRESS	SDC SCI	LAW/STATUTES					1
JURIS TRAVAIL	SDC SCI	LAW/STATUTES					1
LAC	SOC SCI	LAW/STATUTES					1
MLB	SOC SCI	LAW/STATUTES					1
NATIONAL REPORTER SYST	SOC SCI	LAW/STATUTES				1	
OCP	SOC SCI	LAW/STATUTES					1
ORP	SOC SCI	LAW/STATUTES					1
RO	SDC SCI	LAW/STATUTES					1
RCE	SOC SCI	LAW/STATUTES					1
RCF	SDC SCI	LAW/STATUTES					1
RCS	SDC SCI	LAW/STATUTES					1
RJA	SOC SCI	LAW/STATUTES					1
RSC	SOC SCI	LAW/STATUTES					1
SA	SOC SCI	LAW/STATUTES					1
SBC	SOC SCI	LAW/STATUTES					1
SCR	SOC SCI	LAW/STATUTES					1
SCJ	SOC SCI	LAW/STATUTES					1
SENTENCING	SOC SCI	LAW/STATUTES					1
SERVICES JUICIAIRES	SOC SCI	LAW/STATUTES					1
SM	SDC SCI	LAW/STATUTES					1
SMCJ	SDC SCI	LAW/STATUTES					1
SNB	SDC SCI	LAW/STATUTES					1
SD	SDC SCI	LAW/STATUTES					1
SS	SDC SCI	LAW/STATUTES					1
TCCE	SDC SCI	LAW/STATUTES					1
TCI	SDC SCI	LAW/STATUTES					1
TMOB/COMC	SDC SCI	LAW/STATUTES					1
TRADEREF	SOC SCI	LAW/STATUTES					1
WCAT	SOC SCI	LAW/STATUTES					1
WCB	SDC SCI	LAW/STATUTES					1
WLP	SOC SCI	LAW/STATUTES					1
WWR	SDC SCI	LAW/STATUTES					1
AGR	SDC SCI	PDLISCI/GDV'T					1
ALE	SDC SCI	PDLISCI/GDV'T				1	
BCONLINE	SDC SCI	PDLISCI/GOV'T					1
BUDGET DATABASE	SOC SCI	PDLISCI/GDV'T					1
BUDGETS	SOC SCI	POLISCI/GOV'T					1
CAC	SOC SCI	POLISCI/GDV'T					1
DORS	SOC SCI	POLISCI/GDV'T					1
FRP	SOC SCI	PDLISCI/GDV'T					1
FTA	SOC SCI	PDLISCI/GDV'T				1	
GOV	SOC SCI	PDLISCI/GOV'T					1

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Database	PRI CAT	SEC CAT	TER CAT	CANADIAN CONTENT <5%	5-29%	30-80%	>80%
HOQ/HQO	SOC SCI	POLISCI/GOV'T					1
HWQ/HQE	SOC SCI	POLISCI/GOV'T					1
LCC	SOC SCI	POLISCI/GOV'T					1
LDDC	SOC SCI	POLISCI/GOV'T					1
OIC	SOC SCI	POLISCI/GOV'T					1
ONB BUDGET	SOC SCI	POLISCI/GOV'T					1
ONT GOVERNMENT INFOR	SOC SCI	POLISCI/GOV'T					1
BUDGETS	SOC SCI	POLISCI/GOV'T					1
PAIS	SOC SCI	POLISCI/GOV'T		1			
PUBLINET	SOC SCI	POLISCI/GOV'T					1
PRIF	SOC SCI	POLISCI/GOV'T					1
SOR/DORS	SOC SCI	POLISCI/GOV'T					1
VGR	SOC SCI	POLISCI/GOV'T					1
PSYCINFO	SOC SCI	PSYCOLOGY		1			
SIRLS	SOC SCI	SPORT/LEISURE		1			
SPORT	SOC SCI	SPORT/LEISURE			1		
ABC	SOC SCI	STATISTICS		1			
ASIST	SOC SCI	STATISTICS					1
CANSIM	SOC SCI	STATISTICS					1
CANSIM MINIBASE	SOC SCI	STATISTICS					1
CSI	SOC SCI	STATISTICS					1
PTS	SOC SCI	STATISTICS		1			
STATCAN	SOC SCI	STATISTICS					1
LORETO	SOC SCI	TRAVEL			1		
TRAVELNET	SOC SCI	TRAVEL			1		
CISTI CAT	PHYS/APPL	SGENERAL			1		
PASCAL	PHYS/APPL	SGENERAL		1			
SCISEARCH	PHYS/APPL	SGENERAL		1			
AGDATA	PHYS/APPL	SAGR/FOOD/FOREST			1		
AGLIB	PHYS/APPL	SAGR/FOOD/FOREST					1
AGRICOLA	PHYS/APPL	SAGR/FOOD/FOREST		1			
AGRIS	PHYS/APPL	SAGR/FOOD/FOREST		1			
ASFA	PHYS/APPL	SAGR/FOOD/FOREST		1			
CAB	PHYS/APPL	SAGR/FOOD/FOREST		1			
CANADIAN AGRI FORECAST	PHYS/APPL	SAGR/FOOD/FOREST					1
CANADIAN FERTILIZER	PHYS/APPL	SAGR/FOOD/FOREST					1
DRI FOREST PRODUCTS	PHYS/APPL	SAGR/FOOD/FOREST			1		
FSTA	PHYS/APPL	SAGR/FOOD/FOREST		1			
HORTI	PHYS/APPL	SAGR/FOOD/FOREST					1
ICAR	PHYS/APPL	SAGR/FOOD/FOREST					1
MARKETROUTES	PHYS/APPL	SAGR/FOOD/FOREST					1

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Database	PRI CAT	SEC CAT	TER CAT	CANADIAN CONTENT <5%	5-29%	30-80%	>80%
WIN	PHYS/APPL	SAGR/FOOD/FOREST					1
BIOSIS/BAT	PHYS/APPL	SBIOLOGY		1			
STN	PHYS/APPL	SCHEMISTRY		1			
GEDDIAL	PHYS/APPL	SEARTH/SPACE				1	
GEDREF	PHYS/APPL	SEARTH/SPACE			1		
NASA	PHYS/APPL	SEARTH/SPACE		1			
RESORS	PHYS/APPL	SEARTH/SPACE			1		
CANCERLINE	PHYS/APPL	SMEDICINE/HEALTH		1			
CCOHS	PHYS/APPL	SMEDICINE/HEALTH					1
CISILO	PHYS/APPL	SMEDICINE/HEALTH		1			
CDLLEAGUE	PHYS/APPL	SMEDICINE/HEALTH			1		
EMED	PHYS/APPL	SMEDICINE/HEALTH		1			
INFDTDX	PHYS/APPL	SMEDICINE/HEALTH					1
ISST	PHYS/APPL	SMEDICINE/HEALTH					1
JURRISST	PHYS/APPL	SMEDICINE/HEALTH					1
MEDLINE	PHYS/APPL	SMEDICINE/HEALTH		1			
SANTECOM	PHYS/APPL	SMEDICINE/HEALTH					1
SIE	PHYS/APPL	SMEDICINE/HEALTH		1			
TOXLINE	PHYS/APPL	SMEDICINE/HEALTH		1			
INIS	PHYS/APPL	SPHYSICS/NUCL		1			
INSPEC A	PHYS/APPL	SPHYSICS/NUCL		1			
SPIN	PHYS/APPL	SPHYSICS/NUCL		1			
CPD	TECHNDLDGY	GENERAL					1
FEDSTAN	TECHNOLOGY	GENERAL					1
GATT E	TECHNDLDGY	GENERAL			1		
GATT F	TECHNOLDGY	GENERAL			1		
IRC PUBS	TECHNOLDGY	GENERAL					1
MFB	TECHNOLDGY	GENERAL		1			
STANNDRM	TECHNOLDGY	GENERAL					1
WPI/WPL	TECHNOLOGY	GENERAL		1			
CANADATA DATA BANK	TECHNDLOGY	CONSTRUCTION					1
CCIS	TECHNOLOGY	CONSTRUCTIDN					1
COAL	TECHNOLOGY	ENERGY		1			
DRI CAN ENERGY	TECHNOLOGY	ENERGY					1
ENS	TECHNDLDGY	ENERGY					1
EPD	TECHNOLDGY	ENERGY		1			
WISER	TECHNOLDGY	ENERGY					1
COMPENDEX	TECHNOLOGY	ENGINEERING		1			

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Database	PRI CAT	SEC CAT	TER CAT	CANADIAN CONTENT <5%	5-29%	30-80%	>80%
INSPEC/ELEC/COMP	TECHNDLOGY	ENGINEERING		1			
INSPEC B	TECHNOLOGY	ENGINEERING		1			
INSPEC C	TECHNOLOGY	ENGINEERING		1			
INSPEC D	TECHNOLOGY	ENGINEERING		1			
ASB	TECHNOLOGY	MINERALS/MET					1
CAN MINING JOURNAL	TECHNOLOGY	MINERALS/MET					1
METADEX	TECHNOLOGY	MINERALS/MET		1			
MNP	TECHNOLOGY	MINERALS/MET				1	
MNT	TECHNOLOGY	MINERALS/MET				1	
WAA	TECHNOLOGY	MINERALS/MET		1			
DRI PULP AND PAPER	TECHNOLOGY	PAPER			1		
PAPER CHEM	TECHNOLDGY	PAPER		1			
PIRA ABS	TECHNOLOGY	PAPER		1			
PULP & PAPER C	TECHNOLOGY	PAPER					1
RAPRA ABS	TECHNOLOGY	PAPER		1			
RAPTN	TECHNOLOGY	PAPER		1			
AOSI	TECHNOLOGY	PETROLEUM			1		
CPSTATS	TECHNOLOGY	PETROLEUM					1
DAIL OB	TECHNOLOGY	PETROLEUM					1
HERI	TECHNOLOGY	PETROLEUM				1	
P/E NEWS	TECHNOLOGY	PETROLEUM		1			
TULSA	TECHNOLOGY	PETROLEUM			1		
WORLD TEXTILES	TECHNOLOGY	TEXTILES		1			
CANADIAN AIRLINES	TECHNOLOGY	TRANSPORT					1
CTDS	TECHNOLOGY	TRANSPORT				1	
IRRD	TECHNOLOGY	TRANSPORT		1			
MTOAVI	TECHNOLOGY	TRANSPORT			1		
TRANSCAT	TECHNOLDGY	TRANSPORT				1	
AQAREF	TECHNOLOGY	WATER					1
BANQUEAU	TECHNOLOGY	WATER					1
NAQUADAT	TECHNOLOGY	WATER					1
INFLORMATIQUE	TECHNOLOGY	WATER					1

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