SUMMARY REPORT

"SCIENTIFIC AND TECHNICAL INFORMATION" A STUDY OF THE PRESENT AND FUTURE NEEDS OF CANADIAN INDUSTRY

PREPARED FOR: THE MINISTRY OF STATE FOR SCIENCE AND TECHNOLOGY

PREPARED BY: MARKET FACTS OF CANADA LTD.
TORONTO OTTAWA MONTREAL

SEPTEMBER, 1977

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#4152

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (cont'd)

EXECUTIVE SUMMARY

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An early finding of the study was that executives and leaders in industry tend to perceive Scientific and Technical Information as an integral part of the input needed to solve a problem or make a decision. They seldom think of STI as a separate entity. On the other hand, the technologists, specialists and information experts with close working relationships to laboratories and research development activities often view STI as a separate commodity.

There were twelve main categories of sources identified as the primary providers of STI to industry in Canada. 'Experts, colleagues' was the top ranked source followed in descending order of importance by magazines, seminars, conventions and exhibits, libraries, trade associations, research organizations and consultants, government agencies, the company sales force, clients and customers, commercial reference services and finally newspapers which were the lowest ranked as an STI source.

Only two-thirds of the respondents ventured an estimate for the future. There was little if any noticeable change expected within the next five years in the way that STI would be obtained.

The responses to this survey suggest that there is a high concern that government is not providing STI as desired by business. Businesses also have an important need for confidentiality that can affect the flow of STI. There has not been a major change within the past five years in the priority

of STI as viewed by business. The importance of STI will remain high for the next five years.

The business value of STI is felt to be on a par with investment in plant and equipment and STI can be regarded as an important national resource. The STI systems presently in Canada were judged as inadequate and expected to remain so for the next five years. Canada should develop its own STI system in spite of easy access to foreign STI.

INTRODUCTION

BACKGROUND AND OBJECTIVES

METHODOLOGY

BACKGROUND AND OBJECTIVES

In March 1977, the Ministry of State for Science and Technology commissioned Market Facts of Canada Limited to conduct a survey of the Scientific and Technical Information (STI) needs of Canadian industry. The survey data are intended to provide informed input from industry concerning:

- perceived current and future needs of business for Scientific and Technical Information (STI).
- the role of industry itself and other sectors in filling those needs.
- perceived satisfactions and dissatisfactions with current information sources.

Thus, the major objectives of the study can be summarized as assessing the needs for STI by industry in Canada at the present time, and how these might change in the future. These objectives were also related to each source of STI.

The product of this study would be a 'real world' perception of STI in business terms. A viewpoint was sought which would not be constrained by the language of the information specialist. A benefit of the study would be to help evaluate channel efficiencies and to provide input to help sensitize the information (STI) community to the business users' needs.

This report is an important part of the several components which make

up this study. In addition to this document, the full project will comprise:

- Extensive desk analysis being done by MOSST personnel on the open-end statements which were received with the first questionnaire.
- Additional study information from the discussion groups which have been planned across Canada to allow study participants to react to these findings.

The categories of position title and job functions used in this report required that a wide range of respondent work experience be grouped into a manageable listing.

The titles and functions used in this report are highly specific in identifying Presidents, C.E.O.'s, and Chairmen. The other functions were designated on the basis of the most predominant work experience indicated in the questionnaire.

The administrative category was assigned where work experience was diverse or the technical function was not clearly elaborated.

METHODOLOGY

The survey employed a methodology based on the Delphi method. This involves having 'experts' making forecasts of future events or assessing the likelihood of future occurrences. The collected forecasts are summarized and returned to the 'experts' to allow for a refinement of their estimates. A series of iterations may then take place to develop a forecast consensus. In this study the 'experts' were a cross-section of generalist and specialist executives drawn from Canadian Industry.

In view of the heterogeneous nature of the 'experts' involved in the study, it was decided to undertake a qualitative stage of research before proceeding to the quantitative, Delphi method. A series of in-depth interviews was conducted amongst a broad range of 'experts'.

In summary, the survey actually comprised three stages:

1. In-Depth Interviews
2. A First, Self-Completion Mail-Delivered Questionnaire
3. A Second, Self-Completion Mail-Delivered Questionnaire

A more detailed methodology for each of the stages follows.

1. In-Depth Interviews

This qualitative stage was conducted during April, 1977.

This stage was the preliminary testing of the survey design to ascertain, on a qualitative basis, how best to present the subject of STI. A short list of names of business people was made available by MOSST's project director. The individuals were eminently suitable for their ability to provide insight and frames of reference for use in designing various pilot questionnaires. Respondent occupations and positions ranged from high level policy and decision-making positions in large corporations to persons involved in media and library functions. In each case, the respondents were considered to have responsibilities which required the knowledge of and need for scientific and technical information. These personal interviews were conducted in depth using the following guide:

1. What are primary scientific and technical information needs in the course of work?
2. What major problems occur when seeking STI?
3. How does the 'cost factor' influence use of an information source?
4. What are the primary sources for STI?
5. How these sources are used?
6. How are the sources rated 'qualitatively'?
7. Comments on how the storage of STI relates to inquiries for such information?
8. Types of written or verbal information sources normally used?
9. Names of types, if not mentioned directly; if names mentioned, what are the information sources called?

10. For each name of source, discuss whether or not it is?

    1. Easily available
    2. Too expensive
    3. Easily accessible
    4. Too narrow in scope
    5. Sufficient for your needs
    6. Helped you do your job

11. About each discussed: which sources are of most value; how often is each used?

12. Which sources (by name) are used most often? Why?

13. Why other sources mentioned not used?

14. Last time a source was used:

    - What was the source? If more than one, which was the most important; why?

    - What subject area? Is this a familiar area?

    - What prompted it?

    - Describe how information obtained. Was it readily available? Was route known and open or did it have to be developed?

    - Was the information adequate or not? In what way? Was it general or specific? Was the information presented in a form easily applicable or did it need to be cross-referenced, extrapolated or manipulated in some way?

    - How was it applied? In what work area/task/project? For what kind of organization was the information required? Describe the flow pattern this information would follow once it is received.

The major benefit of these in-depth interviews was to improve the quality and precision of the questionnaire for use in the first quantitative phase of the study.

2. The First, Self-Completion Mail-Delivered Questionnaire

The sample design called for national representation of business establishments within industry groups. MOSST's Project Director arranged to provide professional and trade association membership lists. Within these constraints and where the data were available, Gross Domestic Product by Factor Costs were applied to ensure representation of each category.

SAMPLE DISTRIBUTION

(Table 1-1)

INDUSTRY GROUP	(i) 1975 GDP %	(ii) 1975 Rebalanced %	(iii) Original Sample Design #	(iv) Actual Mail-out #
Communications	2.5	5.3	80	80
Construction	7.5	16.0	240	273
Manufacturing	21.4	45.0	675	675
Mining	4.3	9.0	134	138
Public Utilities	2.7	5.7	86	66
Services (Business Related)	9.0	19.0	285	281
Total	47.4%	100.00%	1500	1513

Similar computations were made by region.

The following trade associations and professional societies were contacted by MOSST's project director to obtain lists and endorsement of the study in principle. (Each name with an asterisk beside it indicates a covering

letter of endorsement was provided.)

* ASSOCIATION OF CONSULTING ENGINEERS OF CANADA
* BUSINESS COUNCIL ON NATIONAL ISSUES
* CANADIAN CONSTRUCTION ASSOCIATION
* CANADIAN DIRECT MAIL ASSOCIATION
* CANADIAN GAS ASSOCIATION

THE CANADIAN INSTITUTE OF CHARTERED ACCOUNTANTS

* THE CANADIAN INSTITUTE OF MINING AND METALLURGY
* THE CANADIAN MANUFACTURER'S ASSOCIATION
* THE CANADIAN MEDICAL ASSOCIATION
* THE CANADIAN CHEMICAL PRODUCERS ASSOCIATION

INFORMATICS INSTITUTE OF CANADA

* PHARMACEUTICAL MANUFACTURERS ASSOCIATION OF CANADA
* PURCHASING MANAGEMENT ASSOCIATION OF CANADA

The lists were divided by industry groups, and a count by region was done manually. A random selection was then made to conform as closely as possible to the sample frame. Certain lists were used completely, because they were representative of a particular function of the sample, e.g. Business Council on National Issues.

The number of individual questionnaires mailed out and returned by respective industry groups is as follows:

	Mail-out	Return		Return of Mail-out
	#	#		%
Communications	270	45		17
Construction	761	68		9
Manufacturing	1831	214		12
Mining	414	37		9
Public Utilities	198	35		18
Services	507	79		16
Total	3981	478	Avg. % Ret'd	12

The first mailout was completed as of the close of business on May 6, 1977.

In order to expedite the turn-around of the questionnaires and to help boost the response rate in this first mail phase of the study, a telephone follow-up was done from 17 through 20 May, 1977. The telephone contacts were primarily in Ontario and in the Toronto area.

The processing of returned questionnaires began on July 15, 1977. It should be noted that since between two and three questionnaires were mailed to each organization in the sample, the proportion of responses in terms of companies is about 22%. This is explained by the fact that in many instances the chief executive officer decided that either he or some other person could speak for the whole organization.

Four hundred and sixty-eight questionnaires, in total, were found to be usable for data processing purposes.

3. The Second, Self-Completion Mail-Delivered Questionnaire

The sample for the second mail-out was based upon the returns received from the first wave of the study. The number of firms included in the second mail-out and returning questionnaires is as follows:

	Mail-out	Returns	% Return
	#	#	%
Total Firms	335	202	60

The number of questionnaires mailed out and returned in the second mail-out is as follows:

	Mail-out	Returns	% Return
	#	#	%
Total Questionnaires	470	276	59

The second mailing commenced the week of July 15, 1977 and ended the week of August 12, 1977. At that date, 276 questionnaires were returned and submitted for processing. An additional 25 questionnaires were received after the cut-off date and forwarded directly to MOSST's project director. Coding, along with keypunching and processing, of the second wave materials were conducted in-house by Market Facts' personnel.

At this point it is worth mentioning that despite the pressure to close out the return mailing in as short a time as possible and despite the time of year, the high response was particularly gratifying.

With both waves of mailing, questionnaires continued to come in after the close-off date, but due to time constraints these have not been included in the analysis presented. However, all have been reviewed and are consistent with the analyzed data.

MAIN FINDINGS

STAGE I - In-Depth Interviews

STAGE II - First Mail Questionnaire

STAGE III- Second Mail Questionnaire

STAGE I

Discussion of the In-Depth Interviews

The in-depth interviews were primarily designed to establish the vocabulary and scope of the first mail questionnaire. Nonetheless, certain findings became clear even from this first qualitative stage and were to be confirmed in the later quantified phases. In particular, it was evidently necessary to establish a commonly understood list of information sources and to determine how these sources are appreciated and regarded by the user. Further, these interviews revealed that STI, and information in general, is regarded most often as an integral part of the business situation. That is, business executives were seen to be using STI continuously, but they seldom thought of it as a separate entity.

STAGE II

Discussion of First Mail Questionnaire

The second stage of the survey was the first use of the self-completion mail-delivered questionnaire in this project. The questionnaire was mailed to prospective respondents selected as described in Section I of this report. The tables following (pages 17 to 30) display the key information which resulted from the first questionnaire.*

The purpose of this first questionnaire was to obtain an overview of existing information sources as they are presently regarded and used by Canadian business.

The term 'Scientific and Technical Information' in the context of this survey was defined as the scope of effort and body of knowledge derived from the natural and physical sciences. However, since the mail survey included many non-technical executives and managers, the context for STI was expanded to include the relationship between scientists, technologists and managers when using or requiring access to STI.

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* The tables throughout this report will not always total to 100%, mainly due to rounding or sometimes to multiple mentions. Caution in interpretation is recommended where small bases are indicated.

The respondents to this survey appear to represent a good cross-section of executive functions within industry in Canada. The highest participation in the study of any of the groups was that of the Presidents and Chief Executive Officers. Their response accounted for 18% of the study sample. The second highest response was amongst engineers (17%) with the finance function ranked third with 12% of survey respondents. The majority of participants were university trained. A complete presentation of the response by position title is shown in Table 2-2 (page 18). These appear as competent and knowledgeable persons to comment on the sources and uses of STI in Canada for now and in the future.

The listing of sources in Table 2-1 is a rank order representation of the data reported from the respondents to the first questionnaire. A main objective of this stage of the study was to determine the level of agreement among the respondents for recognizing STI sources. The highest level of agreement in source recognition was 96% for 'experts, colleagues' as STI sources. Magazines were regarded as the second ranking source of STI. (Magazines cited as examples of STI sources ranged from learned journals to popular and trade magazines which are usually found in the Canadian business environment.) Seminars received mention as the third ranking source of STI.

Another objective of this stage of the study was to obtain a measure, in terms of use frequency, of the relevance of the STI sources to business. The Table 2-1 helps to illustrate how the sources are regarded and used as a channel for STI. The frequency of usage of the several STI sources has some interesting patterns.

In terms of frequency of use, the top mention was that suppliers were used by 100% of the respondents at least monthly or more frequently. There was a 93% agreement that suppliers were a source of STI, although suppliers ranked only fifth as a source of STI. Magazines were ranked second in terms of use frequency with 87% of the respondents using magazines at least once per month.

The third most frequently used source was newspapers with 86% of the respondents reporting a use frequency of greater than once per month. A daily use of 57% was reported for newspapers. However, only 64% agreed that newspapers were a source of STI. This is the lowest ranking received by any of the sources in agreement as to the source of STI.

In surveying the data for the top five sources, it is noticeable that government agencies are absent. The government agencies collectively were ranked eighth as a source of STI. The usage of government agencies was ranked as tenth. Thirty-four per cent stated that they used government agencies less than once in three months and 62% use government agencies less than once per month to obtain STI for business.

The agencies most frequently mentioned by the respondents were, in order of mention:

Statistics Canada
Industry Trade and Commerce
National Research Council
Energy, Mines and Resources

A major objective of the first mail questionnaire was to ascertain what change, if any, was to be expected in the next five years in regard to change in use of presently acknowledged STI sources.

The question concerning the expectation about the future changes in use of STI sources witnessed about a one-third drop in respondent participation. Only about two-thirds of the participants made projections to estimate source usage five years from now.

As illustrated in Tables 2-3 through 2-14, there is little, if any, anticipated change expected in the next five years for the use of STI sources.

Other presentations of these data by company size, type of industry, education, etc. were made available to MOSST in EDP output entitled Business Information Survey, Re: Scientific and Technical Information, First Mail-out Data, June 1977.

The first mail questionnaire was quite broad in scope and contained a wide range of statements and questions covering the subject of STI. Some of the questions were not answered in sufficient numbers to provide a valid input for this report. The areas where most respondents did not complete the questionnaire were those which required a narrative or essay response to the statement or question.

TABLE 2-1

PERCENT AGREEMENT ON STI SOURCES AND FREQUENCY OF USE

SOURCES	AGREEMENT		SOURCE USEAGE %			REMARKS
	%	Rank	Monthly or More Often	Rank	Less Than Monthly	
Experts, Colleagues	96	1	78	4	22	35% use daily
Magazines	95	2	87	2	13	49% use once or more per week
Seminars, etc.	95	3	9	12	91	53% use less than once in 3 months
Libraries	94	4	48	8	52	5% use once or more per week
Suppliers	93	5	100	1	-	100% use once a week or more
Trade Association	92	6	47	9	53	9% use once or more per week
Research Organization Consultants, etc.	90	7	23	11	77	57% use less than once in three months
Gov't Agencies	89	8	38	10	62	34% use less than once in three months
Company Sales Force	80	9	68	5	32	33% use once a week or more
Clients/Customers	79	10	52	6	48	19% use once a week or more
Reference Services	78	11	51	7	49	19% use less than once in three months
Newspapers	64	12	86	3	14	57% use daily

TABLE 2-2

SURVEY RESPONSE TO FIRST MAIL OUT BY POSITION HELD BY RESPONDENT

POSITION	RESPONSE		UNIVERSITY	NO UNIVERSITY
	#	%	%	%
Pres., CEO, Chairman	73	18	84	16
Corp Planning	24	6	88	12
Res Development	47	11	96	4
Finance	50	12	72	28
Administration	42	10	76	24
Engineering	69	17	91	9
*Medical	5	1	100	-
*Purchasing	8	2	62	38
Production	36	9	78	22
Sales Marketing	41	10	76	24
*Info Marketing/Research	15	4	92	8
*EDP	6	1	84	16

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-3

LIBRARIES AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE		REMARKS
	** RESPONSE RATE	MEAN SOURCE USE	** RESPONSE RATE	MEAN SOURCE USE	
	%	%	%	%	
Pres., CEO, Chairman	① 50	7	② 36	10	-Note ①: Presently 50% of respondent obtain 7% of their STI from libraries
Corp Planning	96	12	86	12	
Res Development	83	22	93	22	-Note ②: In future 36% anticipate using libraries for 10% of STI needs
Finance	74	18	67	19	
Administration	64	9	61	11	
Engineering	71	13	68	13	
* Medical	-	-	-	-	
* Purchasing	75	9	71	10	
Production	83	9	30	11	
Sales Marketing	54	8	45	10	
* Info Marketing/Research	93	14	-	21	
* EDP	67	4	83	4	

* Indicates small response base and caution is advised when interpreting data.
** Respondent rate indicates per cent of respondents in each position viewing the source as an STI provider.

TABLE 2-4

TRADE ASSOCIATIONS AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	88	11	90	11
Corp Planning	83	10	82	11
Res Development	79	8	85	7
Finance	76	14	72	15
Administration	81	8	78	9
Engineering	65	8	62	6
*Medical	60	2	-	-
*Purchasing	100	12	-	13
Production	81	8	74	8
Sales Marketing	83	9	81	9
*Info Marketing/Research	80	8	91	8
*EDP	67	17	67	20

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-5

SEMINARS AND CONVENTIONS AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	89	12	94	13
Corp Planning	92	7	80	10
Res Development	87	9	90	9
Finance	84	12	81	15
Administration	79	9	83	10
Engineering	90	10	86	11
* Medical	100	23	-	10
* Purchasing	88	14	86	13
Production	78	12	81	10
Sales Marketing	95	12	90	11
* Info Marketing/Research	73	10	82	9
* EDP	83	12	-	10

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-6

COMPANY SALES FORCE AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	68	14	56	12
Corp Planning	59	9	59	13
Res Development	72	8	75	9
Finance	32	5	28	7
Administration	60	13	58	11
Engineering	59	11	56	11
* Medical	-	4	-	5
* Purchasing	38	13	43	12
Production	72	17	89	17
Sales Marketing	93	20	93	20
* Info Marketing/Research	60	7	63	8
* EDP	33	20	33	13

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-7

SUPPLIERS AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	89	13	88	14
Corp Planning	59	13	59	11
Res Development	81	9	85	7
Finance	44	5	42	8
Administration	81	19	72	21
Engineering	88	12	82	14
*Medical	60	2	-	-
*Purchasing	100	22	100	19
Production	72	12	78	12
Sales Marketing	88	11	81	8
*Info Marketing/Research	53	9	69	8
*EDP	100	10	67	13

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-8

CLIENTS AND CUSTOMERS AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	75	8	68	9
Corp Planning	38	5	45	6
Res Development	62	7	66	7
Finance	60	6	47	8
Administration	67	10	69	10
Engineering	51	8	54	7
*Medical	60	1	-	-
*Purchasing	50	13	59	11
Production	53	11	63	11
Sales Marketing	83	12	81	14
*Info Marketing/Research	53	12	55	15
*EDP	33	23	50	17

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-9

GOVERNMENT AGENCIES AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	67	6	68	8
Corp Planning	88	10	86	10
Res Development	72	8	83	8
Finance	66	9	67	9
Administration	62	9	56	11
Engineering	77	9	78	10
* Medical	60	1	-	1
* Purchasing	63	7	86	7
Production	70	6	59	9
Sales Marketing	76	8	77	10
* Info Marketing/Research	67	11	82	12
* EDP	67	6	67	6

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-10

COMMERCIAL REFERENCE SERVICES AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	25	4	24	5
Corp Planning	67	7	68	7
Res Development	58	6	56	6
Finance	36	13	36	11
Administration	36	5	39	5
Engineering	27	6*	28	11*
*Medical	20	5	-	-
*Purchasing	38	5	57	7
Production	28	5	45	5
Sales Marketing	41	5	45	5
*Info Marketing/Research	33	10	27	14
*EDP	33	3	33	4

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-11

RESEARCH ORGANIZATIONS/CONSULTANTS AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	56	10	58	11
Corp Planning	58	12	77	13
Res Development	66	6	73	7
Finance	50	12	39	15
Administration	55	8	53	11
Engineering	60	12	60	11
* Medical	20	20	-	20
* Purchasing	38	12	14	15
Production	59	8	70	9
Sales Marketing	46	5	39	5
* Info Marketing/Research	67	13	82	13
* EDP	83	9	-	9

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-12

EXPERTS, COLLEAGUES AND ASSOCIATES AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	75	22	76	23
Corp Planning	96	27	95	26
Res Development	89	20	93	19
Finance	92	23	86	25
Administration	93	21	92	21
Engineering	94	24	96	22
*Medical	100	24	-	50
*Purchasing	88	13	86	13
Production	86	22	85	23
Sales Marketing	85	17	87	19
*Info Marketing/Research	87	15	-	13
*EDP	100	20	-	18

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-13

MAGAZINES AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	88	13	86	13
Corp Planning	92	9	90	10
Res Development	91	11	98	11
Finance	86	14	72	16
Administration	91	13	78	12
Engineering	88	13	86	13
*Medical	100	7	-	9
*Purchasing	88	9	86	9
Production	89	19	81	13
Sales Marketing	85	9	90	8
*Info Marketing/Research	80	8	82	7
*EDP	100	14	-	15

* Indicates small response base and caution is advised when interpreting data.

TABLE 2-14

NEWSPAPERS AS STI SOURCE ACCORDING TO POSITION HELD BY RESPONDENT

POSITION	PRESENT		FUTURE	
	RESPONSE RATE	MEAN SOURCE USE	RESPONSE RATE	MEAN SOURCE USE
	%	%	%	%
Pres., CEO, Chairman	60	9	56	9
Corp Planning	59	9	59	11
Res Development	60	4	61	5
Finance	68	11	56	10
Administration	65	10	61	9
Engineering	45	5	44	7
*Medical	20	1	-	-
*Purchasing	50	15	43	18
Production	53	7	44	7
Sales Marketing	66	8	71	6
*Info Marketing/Research	60	10	64	7
*EDP	67	9	67	8

* Indicates small response base and caution is advised when interpreting data.

STAGE III

Discussion of Second Mail Questionnaire

The third stage of this study was the mailing of the second and final questionnaire. This questionnaire was designed to focus on the primary issues relating to the effective delivery of STI for industry use in Canada.

In this final questionnaire, the respondent was asked to consider STI as a commodity, as well as in terms of delivery systems which provide STI. STI as a commodity was defined as factual material used in the transfer of scientific and practical knowledge through books, tapes, films, etc. An STI system is the means for the transfer of this factual knowledge. An STI system should be able to tell a user where to find the required information; it should be able to deliver the information in the most useful form; and it should respond within the user's time requirements.

When completing the questionnaire, the respondents were asked to give their own personal opinion rather than try to reflect a professional or corporate policy.

The response to the second mail questionnaire presented an interesting contrast of participant agreement and disagreement with the statements proposed. These statements are shown in Table 3-1 (pages 34 to 35).

From these data, there appears to be a consensus that government is not providing STI as desired by business, and that businesses have an important need for confidentiality that can affect the flow of STI. Also, there has not been a major change within the past five years in the priority of STI as viewed by business. The importance of STI will remain high for the next five years. The value of STI is on a par with investment in plant and equipment and STI can be regarded as an important national resource.

Throughout the questionnaire, there was not a strong degree of disagreement with the statements. The highest level of disagreement was with the statement that 'Canada need not emphasize developing its own STI systems', with 10% strongly disagreeing and 62% disagreeing.

Other areas of high disagreement were with the premise that STI systems in Canada were adequate for the present and for the next five years into the future.

A look at the response to the second questionnaire of this survey by geographical region shows a distribution which is usually experienced in surveys of industry in Canada. The provinces of Ontario and Quebec have the most industry and firms and the predominance of response to this survey has come from these locations. The more detailed representation of response by geographical region is shown in Table 3-2.

In Table 3-3, the numbered questions are ranked in order of mean agreement. The main significance of the mean ranking of the statements in

Table 3-3 is to illustrate how the statements relate to one another, rather than how they relate numerically to the mean of 2.5. The highest degree of agreement on the four point scale is 3.22 which was the response to the statement 'STI is not always available from government agencies in a form that business can use'. The lowest measure of mean agreement was for the statement 'Because of easy access to STI from other countries, Canada's need to develop its own systems has a low priority', where the mean response is 2.18.

The portion of the second questionnaire which deals with the responses about the increased flow of STI between sector pairs of the Canadian economy is shown in Table 3-10. Eighty-five per cent of the respondents agreed that the flow of STI should increase from business to education. Seventy-five per cent indicated that the flow of STI should increase between education and business. The lowest level of agreement on where the flow should be increased was between government and education. Only 41% agreed to this notion. However, 28% indicated they either did not know or could not say that this was a good idea.

A complete tabulation of the results from the second questionnaire is in the technical appendix submitted to MOSST's Project Director entitled: Business Information Survey, Re: Scientific and Technical Information, second mail-out data, August 1977.

TABLE 3-1

COMPARISON OF STATEMENTS WITH STRONGEST RECORDED AGREEMENT/DISAGREEMENT

AGREEMENT

STATEMENT NUMBER	STATEMENT	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
		%	%	%	%
1.	STI is not always available from government agencies in a form that business can use	29	64	6	-
5.	Five years in the future the use of STI will have a major influence in business planning	27	59	10	-
12.	STI is valuable as a national resource	25	66	7	-
2.	STI can never be completely public because of business's need for confidentiality	23	60	16	2
13.	STI is equally important to business as is capital investment in plant and equipment	22	60	15	1

TABLE 3-1 (cont'd)

COMPARISON OF STATEMENTS WITH STRONGEST RECORDED AGREEMENT/DISAGREEMENT

DISAGREEMENT

STATEMENT NUMBER	STATEMENT	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
		%	%	%	%
20.	Because of easy access to STI from other countries, Canada's need to develop its own system has a low priority	3	22	62	10
3.	Five years ago STI was generally regarded as a minor influence in business planning	1	30	61	5
26.	The present methods for obtaining STI in Canada are satisfactory for current business needs	-	32	60	4
27.	The present methods for obtaining STI in Canada are satisfactory for the next five years	-	26	65	4

TABLE 3-2

SECOND MAIL-OUT RESPONDENTS BY REGION

POSITION	ATLANTIC	QUEBEC	ONTARIO	PRAIRIE	B.C.
	%	%	%	%	%
Pres., Chairman	6.4	29.8	40.4	12.8	10.6
Corp Planning	6.7	20.0	66.7	-	6.7
Res Development	-	18.8	78.1	3.1	-
Finance	6.3	21.9	56.3	15.6	-
Administration	3.4	24.1	37.9	27.6	6.9
Engineering	6.5	19.6	45.7	21.7	6.5
Medical	-	-	-	-	-
Purchasing	-	42.9	42.9	-	14.3
Production	-	18.2	40.9	31.8	9.1
Sales/Marketing	3.4	10.3	69.0	13.8	3.4
Info Marketing/Research	-	20.0	60.0	20.0	-
EDP	16.7	-	83.3	-	-

TABLE 3-3

STATEMENT RESPONSE IN RANK ORDER

Rank Order	Statement Number	Statement	Mean
1	(1)	STI is not always available from government agencies in a form that business can use	3.22
2	(5)	Five years in the future the use of STI will have a major influence in business planning	3.17
3	(12)	STI is valuable as a national resource	3.17
4	(13)	STI is equally important to business as is capital investment in plant and equipment	3.04
5	(2)	STI can never be completely public because of business's need for confidentiality	3.03
6	(4)	At the present time the use of STI has increased in importance in business planning	3.03
7	(7)	The cost of obtaining STI should be borne by users	3.01
8	(21)	The costs of obtaining STI are normal business costs	2.97
9	(29)	Canada will need an improved management of STI resources within the next five years	2.93
10	(31)	STI is under-utilized by business in Canada	2.90
11	(28)	Canada needs an improved management of STI resources to meet the needs of business now	2.84
12	(25)	Government actively should seek out the needs of business in order to provide better STI systems	2.82
13	(23)	The technical information services of government departments should play an increasing role in providing STI to satisfy industry's needs	2.77

Scoring: Strongly Agree +4 Strongly Disagree +1
Agree +3 Disagree +2

TABLE 3-3 (CONT'D)

STATEMENT RESPONSE IN RANK ORDER

Rank Order	Statement Number	Statement	Mean
14	(11)	The risks and costs of acquiring STI for technological innovation should receive more tax-funded support in Canada	2.76
15	(15)	The Canadian government should provide direct tax incentives for Canadian business to utilize STI	2.75
16	(22)	Public libraries should be encouraged to play a more significant role in providing STI to industry	2.70
17	(17)	Organizations in the private sector should be responsible for satisfying their own STI needs	2.67
18	(16)	STI is easier to get from multinational head offices than from Canadian sources in general	2.66
19	(24)	Managing (collecting, cataloguing, storage, retrieval, etc.) the increased volume of STI is a task of national libraries	2.59
20	(9)	At this time in Canada the best way to obtain new technology is to purchase it with the associated knowledge rather than risk the R. & D. investment	2.55
21	(10)	The government should foster the use and development of commercial STI systems in Canada by direct financial support to Canadian businesses who use STI	2.48
22	(8)	All latest STI should be available for business use from government sources	2.46
23	(6)	Financial support by government of commercial STI systems is necessary and desirable to increase the use of STI in business	2.45

Scoring: Strongly Agree +4 Strongly Disagree +1
Agree +3 Disagree +2

TABLE 3-3 (CONT'D)

STATEMENT RESPONSE IN RANK ORDER

Rank Order	Statement Number	Statement	Mean
24	(30)	The government should provide direct financial support to commercial STI suppliers in Canada to foster the development of systems oriented to Canadian needs	2.43
25	(18)	Financial incentives such as grants to Canadian business are the best way to assure the use and development of commercial STI systems in Canada	2.40
26	(26)	The present methods for obtaining STI in Canada are satisfactory for current business needs	2.30
27	(3)	Five years ago STI was generally regarded as a minor influence in business planning	2.28
28	(19)	The present efforts by government are adequate to cope with growth in business's need for STI	2.26
29	(14)	Federal and Provincial government departments have a responsibility to provide STI only for their own policy and planning needs	2.26
30	(27)	The present methods for obtaining STI in Canada are satisfactory for the next five years	2.23
31	(20)	Because of easy access to STI from other countries, Canada's need to develop its own systems has a low priority	2.18

Scoring: Strongly Agree +4 Strongly Disagree +1
Agree +3 Disagree +2

TABLE 3-4

RANK ORDER CONSENSUS ON STI FLOW INCREASE BETWEEN SECTORS IN THE CANADIAN ECONOMY

QUESTION	FROM		TO	RANK	YES	NO	DON'T KNOW/ CAN'T SAY	NON RESPONSE
					%	%	%	%
(d)	Business	→	Education	1	84	5	7	4
(a)	Education	→	Business	2	75	11	11	3
(i)	Business	→	Business	3	69	15	12	4
(e)	Fed. Gov't	→	Business	4	64	24	8	4
(f)	Business	→	Fed. Gov't.	5	59	28	13	4
(g)	Prov. Gov't	→	Business	6	59	28	13	4
(h)	Business	→	Prov. Gov't.	7	56	28	12	4
(j)	Gov't.	→	Govt.	8	46	15	33	6
(b)	Education	→	Gov't	9	43	21	30	5
(c)	Gov't	→	Education	10	41	26	28	5

APPENDIX

A. Use of STI by Function/Position

APPENDIX A

USE OF STI BY FUNCTION/POSITION

The data presented in this report are in fulfillment of the recognized study objectives. However, it is common for a research project to bring into focus additional questions on aspects of the problem under study. In this study, the research has given rise to the interesting question: "What per cent does each source provide of the total STI needed or used by a given function or position?".

Present limitations of time and budget do not allow for continued processing of existing data and additional fieldwork necessary to obtain more precise data to answer this question.

The attempt to estimate an answer to this question using the output data from this work to date (as shown in Tables 2-3 through 2-12) has prompted the formulation of the following algorithm.

$$\text{MEAN SOURCE USE \%} \times \frac{\text{SOURCE RESPONDENT RATE (by position)}}{\text{BASE RESPONSE RATE (by position)}}$$

In order to get comparative data for all 12 sources across all the positions it was necessary to standardize to a base response rate. Each position has its own base response rate. The base response rate is the highest response rate expressed by the position for any source. Therefore, in the

case of presidents' use of libraries, we note that only 50% of the presidents responded by agreeing that libraries are a source of STI. The highest response rate for presidents, CEO's and chairmen is 89% as expressed for seminars and conventions. This 89% is the base percentage for use in the algorithm.

A problem with this method is that it does not allow a numerical comparison between one job type and another except, of course, where the base response rate happens to be the same.

The Tables A-1 and A-1 Continued, in Appendix A, display for each job type the sources in a descending rank order of importance as determined by percentage use.

The data in these tables tend to total to greater than 100% because of the method used. These tables are for general information only, and are enclosed to allow those interested, the opportunity to make a general and very broad estimate of the amount of STI provided by each source.

APPENDIX A

TABLE A-1

PRESENT AND FUTURE ESTIMATE OF STI SOURCE USAGE

BY FUNCTION/POSITION

SOURCE	PRESIDENTS		CORP. PLANNING		RES. & DEVELOPMENT		FINANCIAL	
	PRESENT SOURCE %	FUTURE SOURCE %	PRESENT SOURCE %	FUTURE SOURCE %	PRESENT SOURCE %	FUTURE SOURCE %	PRESENT SOURCE %	FUTURE SOURCE %
Experts	19	19	27	26	20	18	23	25
Suppliers	13	12	9	7	8	6	2	4
Magazines	13	13	9	10	11	11	13	13
Seminars	12	13	7	8	9	8	11	14
Trade Associations	11	11	9	10	7	6	12	13
Sales Force	11	7	6	8	6	7	2	2
Clients	7	7	2	3	5	5	4	4
Research Organizations	6	7	7	11	4	5	5	7
Newspapers	6	5	6	7	3	3	8	7
Government	5	6	9	9	6	7	7	7
Libraries	4	4	12	11	20	21	15	15
Other	2	3	-	-	2	2	2	1
Commercial	1	1	5	5	4	3	5	5

APPENDIX A

TABLE A-1 (cont'd)

PRESENT AND FUTURE ESTIMATE OF STI SOURCE USAGE

BY FUNCTION/POSITION

SOURCE	ADMINISTRATION		ENGINEERING		PRODUCTION		SALES & MARKETING	
	PRESENT SOURCE %	FUTURE SOURCE %	PRESENT SOURCE %	FUTURE SOURCE %	PRESENT SOURCE %	FUTURE SOURCE %	PRESENT SOURCE %	FUTURE SOURCE %
Experts	21	21	24	22	21	22	15	18
Suppliers	17	16	11	12	10	11	10	7
Magazines	13	10	12	12	19	12	8	8
Seminars	8	9	10	10	11	9	12	11
Trade Associations	7	8	6	4	7	7	8	8
Sales Force	8	7	7	6	14	17	20	20
Clients	7	8	4	4	7	8	10	12
Research Organizations	5	6	8	7	5	7	2	2
Newspapers	7	6	2	3	4	3	6	5
Government	6	7	7	8	5	6	6	8
Libraries	6	7	10	9	8	4	5	5
Other	2	2	3	2	3	2	1	2
Commercial	2	2	2	3	2	3	2	2