INDUSTRY, SCIENCE AND TECHNOLOGY CANADA

A QUALITATIVE ASSESSMENT OF TECHNOLOGY TRANSFER INFORMATION FLOWS IN SELECTED INDUSTRIAL GROUPS

October 18, 1989

Submitted to: **Elizabeth Payne**
Director, Technology Liaison
Planning, Coordination and Control
Industry, Science and Technology Canada

Submitted by: **Douglas W. Meredith**
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EXECUTIVE SUMMARY

The Coopers & Lybrand Consulting Group was commissioned by ISTC to conduct a qualitative assessment of current practices regarding the use of information on new technology in selected industrial groups. A key component of the study was to assess the reaction to potential products and services which ISTC could offer to promote greater access to and use of technology information.

The study involved focus groups of representatives from selected industry sectors. In total, four groups were conducted; two in Toronto and two in Winnipeg. The groups in Toronto included representatives of the electrical equipment industry (EE) who were chosen from the standard industrial classification (SIC) 3600. The second Toronto group took a vertical integration approach and included manufacturers, designers and installers of windows and doors (WD). These participants were selected from the Canadian Window and Doors Manufacturers Association and from the Toronto telephone directory.

Both of the Winnipeg groups included a random selection across manufacturing industries in Winnipeg. Because the recruitment method was exactly the same for both groups, these results are combined. These groups are referred to as general manufacturers (GM).

The individuals involved were generally the highest in the organization who could be recruited who could provide an overall perspective on the organization's priorities and the placement of technology in those priorities.

It should be noted that focus groups provide qualitative data that should be viewed as exploratory rather than conclusive. While some numerical results are presented, these illustrate the opinions of those in the groups and should not be construed as being representative of Canadian businesses in general.

A summary of the major findings is as follows:

Business Environment

- the EE group represented larger businesses and was more aware and concerned about global business issues such as free trade and global competition. The WD and GM groups were more concerned about local and regional issues. A major concern in Winnipeg was the difficulty

of attracting and maintaining skilled staff.

- the groups generally tended to describe their industries as "mature" with stable growth. Very few participants in any of the groups described their industries as growing rapidly or declining.

- except for the EE groups, the participants were more likely to describe their industries' international competitive position as tenable or weak rather than strong.

Importance of New Technology

- given a number of issues to rate, all groups indicated that controlling costs and customer service were their highest priorities.

- the EE groups generally gave the lowest priority of any of the groups to technology related activities such as research and development, obtaining licences, using technology to improve operations, and better technology in products and services. However, in discussion, this group was the most technology-oriented.

- some of the negative attitudes during the group discussions included comments such as "the threat of global competition is hype" and "if the boat is not being rocked, keep doing the same thing".

- the reasons given for not pursuing new technology included the fact that some businesses were subsidiaries and R&D was done elsewhere. **While most felt they knew what technology was available, they would often say that the costs were prohibitive**.

- this issue of believing that they were aware may be a major barrier. During later discussions and demonstrations many were surprised by information about technology that they were not aware of.

- most indicated that they were satisfied with their current technology in the products and services they sell. They were less satisfied in most other business areas such as research and development, manufacturing and customer service.

- the most frequently mentioned sources of information about new technology included journals, magazines, sales people and trade shows.

- the EE group also relied on engineers in the company. None of the groups viewed new graduates as an important source.

- the groups in Toronto appeared to have a somewhat negative impression of the role of government in providing information about new technology. The Winnipeg groups were more positive.

Reaction to Technology Information Products and Concepts

- a number of published products and some technology transfer concepts were discussed with the EE and WD groups in Toronto. The reactions to the concepts and products were mixed but generally not favourable. Products of interest to any given individual were generally very specific to his or her business. This presented problems for publications which tended to be broad in scope.

- the Winnipeg groups were exposed to a technology information exposition or "trade show" which was developed and conducted by ISTC. Their reactions were much more positive. Both the focus group participants and the exhibitors were very supportive of the concept. Many of their comments indicated that they had found information about technology that they were not aware of and which could potentially be beneficial to their businesses.

- Of the two G.M. groups, the first which received some interpretation and orientation from an ISTC representative appeared to have the most positive response. This would suggest that an introductory seminar or overview could be an important component of any future technology information expositions.

The report provides greater detail on the results including verbatim comments from the participants. The appendices provide detail on the evaluation of the specific booths. Supporting documentation on the study method is also provided.

SUGGESTIONS FOR FUTURE TRADE SHOWS AND WORKSHOPS

- Based on the responses of attendees, future trade shows such as the one in Winnipeg would be well received. Several suggestions for future shows have been included.

- Based on the comments of focus group participants, small workshops, of six to eight persons, would be an effective mechanism for promoting and facilitating the diffusion of technology.

1.
INTRODUCTION

Objective

The Coopers & Lybrand Consulting Group was retained by Industry, Science and Technology Canada to conduct a study of current awareness and use of sources of technology transfer information in selected sectors of Canadian industry. The study examined the attitudes, practices, problems and requirements concerning information related to new technologies among upper management in the target industry sectors. More specifically, the study objectives included:

- determining the current attitudes that prevail regarding the value of searching for new technology to be adopted;
- identifying attitudes which lead to a less than optimal use of information sources;
- assessing the requirements for information on new technology in the target industries;
- assessing the degree to which existing demand for this information is being met; and
- determining reactions to specific technology information products and concepts.

Approach

The study included a series of focus groups involving participants from the following industry sectors:

- small-to-medium enterprises (SMEs) within the electrical equipment industry in Toronto ("EE group");
- small-to-medium enterprises (SMEs) involved in the design, production and installation of windows and doors in Toronto ("WD group"); and
- a cross section of small-to-medium manufacturers in Winnipeg (General Manufacturers or "GM groups").

The EE and WD sectors were selected following a re-analysis of a survey that our firm had done for the Canadian Patent Office (see Appendix D). The GM groups were selected after the groups in Toronto had been conducted.

Focus group participants were recruited by telephone using screening guides

Exhibit 1 — Examples of Major Lines of Business

General Manufacturing (n = 19)	Electrical Equipment (n = 9)	Windows & Doors (n = 10)
Custom Woodworking	Light fixtures and covers	Architectural design
Windows and Doors	Transformers and switchgear	Storm / patio doors / windows
General machining & hydraulic repairs	Controls	Other windows
Parts service	Process equipment	Airspace bar
Precast concrete	Welding equipment and electric motors	
Aerospace subcontractor of precision machined components	High voltage electrical equipment	
Commercial printer		
Manufacture signs		
Protective coatings		
Packaging liquids and powders		

descript/c

which are included in Appendix C. A summary of the recruiting criteria for each group is as follows:

- Electronics industry participants who were chosen described their firms as being "up to date" with respect to technology as opposed to "leading-edge" or "out of date."

- Participants from the windows and doors industry were chosen using a "vertical integration approach" in which manufacturers, installers, and architects (as intermediate customers) were represented.

- There were two groups conducted in Winnipeg. Both were recruited using the same criteria. As with the electronics industry participants, all who were chosen described their firms as "up to date", rather than leading-edge. Both groups included representatives of a cross section of manufacturers in Winnipeg.

In all groups, the participants were senior managers or owner-managers of SMEs. Descriptions of the various lines of business mentioned by the participants are included in Exhibit 1.

In Toronto two focus groups, involving a total of 19 participants from industry, were held in June 1989. The first group, involving the electronics industry, consisted of 9 participants and was held at 6:00 PM. The second group, involving the windows and doors industry, consisted of 10 participants and was held at 8:00 PM. Both groups lasted approximately two hours. The groups, which were conducted in standard focus group facilities, followed a semi-structured format which was led by a moderator. In addition to discussing various topics, participants were asked to complete a questionnaire. Copies of the moderator's discussion guide and of the questionnaire are included in Appendix C. Representatives of ISTC and CLCG observed and recorded notes on the focus groups from behind a one-way mirror.

The two groups which were conducted with a cross-section of manufacturers in Winnipeg were held on September 26, 1989. Because both groups were selected to represent small to medium manufacturers in general and because the discussion in both groups followed the same format, the results for the two Winnipeg groups are combined. The format of the groups in Winnipeg was similar to those in Toronto. While the types of industries included were different, the recruiting method, the timing of the groups, their size and the responsibility level of the participants within the organizations represented were the same. The moderator's discussion guide and the questionnaires used were also similar. However, in Toronto, following the first hour of discussion the groups were asked to react to a number of publications and other concepts for transferring information about new technology.

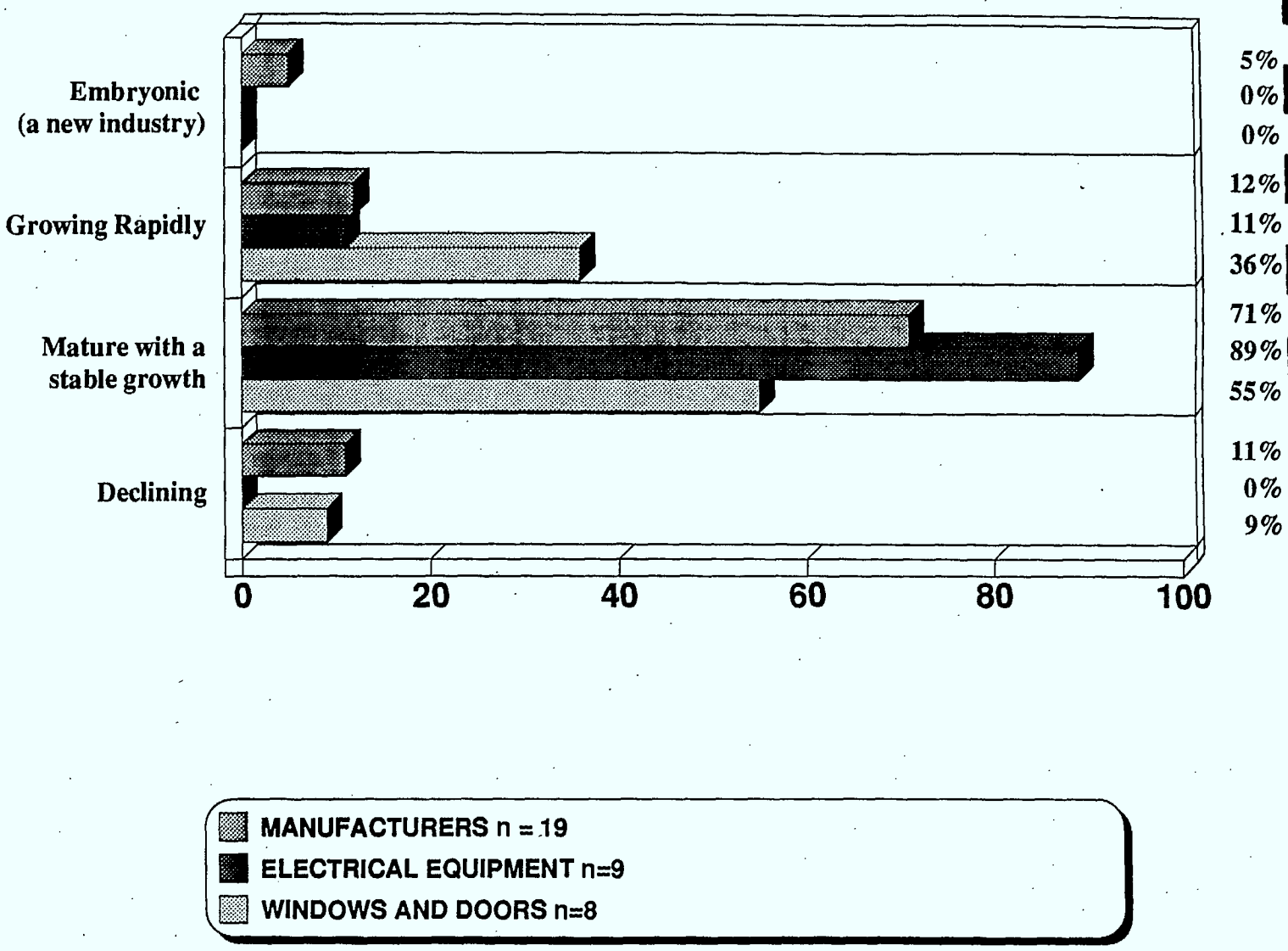
In Winnipeg, the concept for a technology information exposition or trade show, which had been developed

by ISTC, was tested. After the initial discussions the participants left the focus group to view a series of booths presenting information about new technology and ways of accessing it. After approximately three- quarters of an hour, participants returned to discuss their reactions to what they had seen. Because the trade show was held at the National Research Council building in Winnipeg, the focus groups were conducted in a meeting room in the same building. A video camera was used to enable the client representatives to follow the discussion in an adjacent area and to record the sessions.

It should be noted that focus groups are generally exploratory in nature and produce qualitative results. They do not provide hard numbers which can be used to draw conclusions about the total population of businesses in Canada. While some numerical results are presented, these should only be interpreted as representing the opinions of the group participants and should not be construed as representing the opinions of all the companies in similar businesses.

Results from this study were also compared with those of a previous study conducted by Coopers & Lybrand for the Canadian Patent Office in 1987. That study, which involved a survey of technical persons in several sectors of Canadian industry, provided information on the relative importance of different types of technical information and the sources from which they are obtained. A summary of the data from that study, and a comparison with the findings from the present study, appear in Appendix D.

Exhibit 2 — Industry Description



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2.
OVERVIEW OF BUSINESS ENVIRONMENT

General

The initial discussions in the focus groups dealt with the general business environment within participants' industry sectors, particularly the extent to which the environment is changing. There was no clear consensus among participants in the groups concerning the factors which were affecting their industries. Some participants indicated that their industries were mature and not characterized by significant change. Others pointed to changes in level of competition, consumer demand, and regulations as being important. **Technological change was not cited during the initial discussions as being a significant factor.**

Typical comments from EE group participants included:

- "the European influence is coming into fixtures";
- "as a subsidiary, we must now compete with our U.S. parent due to globalization of our industry"; and
- "the lighting equipment is quite good ... companies are catching up on their capital spending".

Some typical comments from the WD group participants included:

- "our products have been manufactured for many years.. the pace of change is slow";
- "there is a move towards more renovation work ... there are less housing starts now";
- "there is an increased emphasis on health, i.e., people want windows they can open in high-rise buildings"; and
- "manufacturers of wooden windows have "sold" the material as high quality".

Some of the comments from the GM groups were:

- "in Winnipeg we have a stagnant population base so it is difficult to grow";
- "clothing is beset by declining demand and an aging population ... our customers are increasingly being serviced by international companies, especially those from low wage countries"; and

Exhibit 3 — The Industry

	Manufacturing (%)	Electrical Equipment (%)	Windows & Doors (%)
Opportunities Facing the Industry			
Free trade — import / export	15	78 [1]	30
Expansion of Canadian market	23	33	20
Improvements in technology and materials	31	22	10
Reductions in time and cost	0	22	0
Environmental issues	0	22	0
Decreased competition	0	0	20
New applications and opportunities to design, build and/or develop	61	0	30
Number of respondents	13	9	10
Threats to the Industry			
International competition	15	67	71
Price / Product / Competition	23	44	14
Domination of competitors through mergers	15	22	0
Government regulation regarding patents / fares etc.	8	0	43
Recession and slowdown in housing market	15	11	43
Specifiers / designers who lack knowledge	8	0	14
Lack of skilled employees	46	0	0
Number of respondents	13	9	7

[1] **Reads:** 78% of those in Electrical Equipment mentioned free trade as one of the opportunities facing the industry

Note: Figures will total more than 100% due to multiple answers

- "the woodworking industry is not new with respect to the products that are produced. There are few new types of products which can be developed".

Opportunities

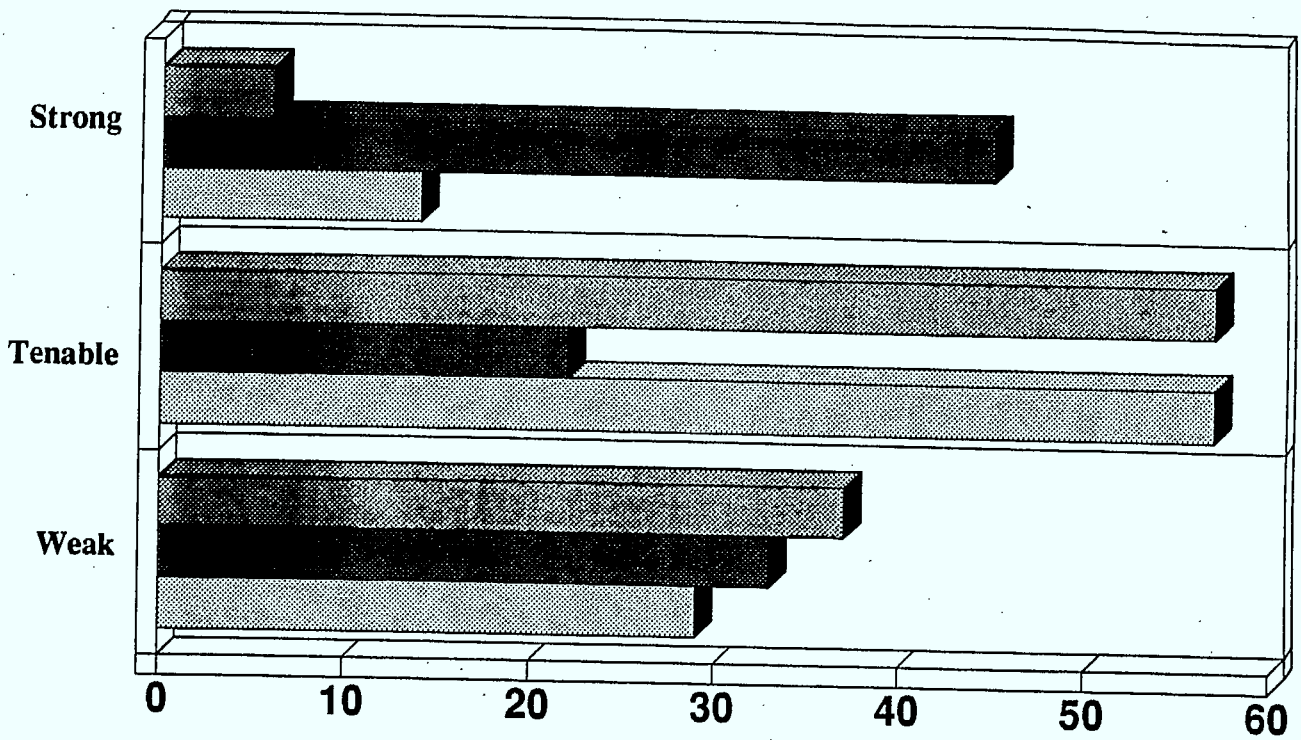
Participants were asked in the questionnaire to list major opportunities facing their industries. The responses are summarized in Exhibit 3. Responses of seven of the EE group participants indicated Free Trade as a major opportunity. Free trade was considered less important among WD participants where only three persons listed it as a major opportunity. Some members of both groups (three persons in the EE group; 2 persons in the WD group) cited expansion of the Canadian market as a major opportunity. Other opportunities listed by the EE participants were improvements in technology and materials (2 persons) and environmental issues (2 persons). Other items cited as major opportunities among the WD participants included new applications and opportunities to design, build and/or develop (3 persons); decreased competition (2 persons); and improvements in technology and materials (1 person).

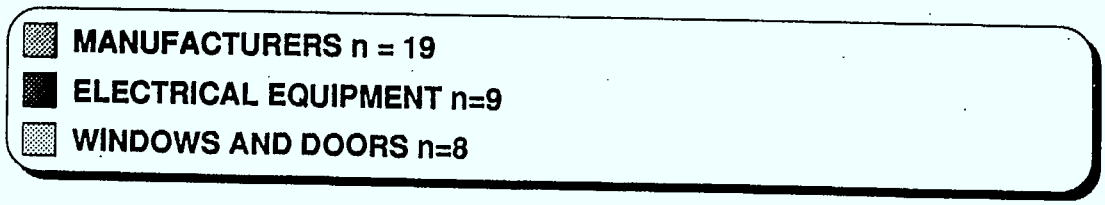
In the GM groups, the participants were also more inclined to identify new applications and opportunities to design, build or develop new products as the major opportunities (9 persons). Improvements in technology and materials were the next greatest opportunities (4 persons). Other opportunities were expansion of Canadian markets and import/export opportunities especially in the northern U.S.

Threats

Participants were asked in the questionnaire to list major threats facing their industries. Responses are summarized in Exhibit 3. In responding, several participants in both the EE group (6 persons) and the WD group (5 persons) cited international competition as a major threat facing their industries. This was only mentioned as a threat by one person in the GM group. During the discussions, foreign competition was clearly more prominent as a concern in the EE group than in the WD or GM groups. In particular, several participants cited implications of the Canada-U.S. Free Trade Agreement to the competitive environment. Specific actions being taken or considered to prepare for free trade included: rationalizing product lines, streamlining business, increasing production volume and expanding beyond the Canadian market. European competition was described as being very significant as well. Generally the EE participants were confident that Canadian companies within their industry can compete successfully, especially in low volume applications where flexible manufacturing techniques are an advantage.

Exhibit 4 — Description of the Canadian Industry's Position Regarding International Competition





Other items cited as major threats by the EE participants were price and product competition including rising domestic costs and domination through competition and mergers, and recession. Other major threats cited by the WD participants were government regulations and loss of patents, recession/housing market slowdowns, and infiltration of their market by "designers". Two WD group participants mentioned legislation which can impact on their industry such as environmental regulations concerning plating bath effluent and limitations on the percent of building exteriors which can be glass.

By far the major threat expressed by the GM groups was the difficulty of attracting and keeping skilled employees. Almost half of the group participants mentioned this as being a problem. One participant, for example, noted that there was a shortage of skilled labour and that the educational system was not producing adequately trained personnel. Some also pointed out that they often lost skilled employees that they had trained to other parts of Canada and especially Toronto. Other threats included lower priced products from large manufacturers and international competition. The relatively slow growth of the Winnipeg market was also seen as being a constraint.

Industry Growth Rates

In responding to the questionnaire, participants showed a wide variation of opinion concerning the growth rates within their industries. In all groups however, the majority described their industries as being "mature with stable growth". Among EE participants, the majority (8 persons) described their industry as "mature with stable growth" while the remaining persons described it as "growing rapidly". Responses among WD participants were similar but with three participants describing their industry as "growing rapidly". One WD participants described their industry as "declining". The wider difference of opinion among WD participants may be due to the different nature of the firms involved, i.e., architects versus manufacturing.

While there was also a wide variety of businesses in the GM group they too were most inclined to describe their industries as being mature. Two businesses said they were growing rapidly and two said they were declining.

Industry Competitiveness

Questionnaire responses indicated that there was a wide variation of opinion among participants within both groups concerning the competitiveness of Canadian industry firms in their sectors relative to international competition. As shown in Exhibit 4, the EE participants indicated that Canadian industry had a strong competitive position while 2 participants said it was tenable and 3 participants described the Canadian position as weak. Among WD participants, only one participant said the

Exhibit 5 — Priority Rating of Factors Facing Businesses

Responses based on a scale from:

3 Major Priority
2 Minor Priority
1 Not a Priority

Item	Manufacturers	Electrical Equipment	Windows & Doors
	Mean	Mean	Mean
International expansion	2.0	2.3	2.3
Base (n =)	17	7	3
Controlling costs	2.9	2.9	2.6
Base (n =)	19	9	5
Market research	2.2	2.3	2.2
Base (n =)	17	9	5
Better data / telecommunications	1.8	1.8	1.8
Base (n =)	15	9	5
Advertising	2.1	1.8	2.3
Base (n =)	18	9	6
Using technology to improve operations	2.6	2.3	2.4
Base (n =)	(19)	8	5
Greater sales efforts	2.7	2.6	2.4
Base (n =)	18	8	5
Diversifying	2.1	2	1.6
Base (n =)	(18)	8	5
Concentrating on what you do best	1.6	2.9	2.6
Base (n =)	(18)	9	5
Obtaining licenses to sell new products	1.6	2	1
Base (n =)	(14)	7	5
Better customer service	2.8	2.9	3
Base (n =)	18	9	6
Research and development	2.2	2	2.8
Base (n =)	15	9	6
Better technology in products or services	2.6	2.1	2.5
Base (n =)	18	9	6
Improving corporate image	2.2	2	2.3
Base (n =)	18	9	6
Better sales and promotion	2.5	2.4	2.7
Base (n =)	18	9	6

Canadian position was strong. About half of the WD participants (5 persons) described the Canadian position as tenable, and 2 persons stated it was weak. Those in the GM group were the most likely to describe their industries' competitive positions as being weak. Seven out of the nineteen participants said that this was the case in their industries presumably because of some of the reasons discussed above such as relatively stagnant local markets and competition from major players especially in such fields as clothing and woodworking.

Participants in all three groups stated that they are always concerned with achieving lower costs. This was particularly a concern within the EE group. One participant spoke of the need to virtually eliminate the labour component of product costs in the next few years if manufacturing in Canada is to continue.

The EE group participants were generally more concerned with the international aspects of their industry than either of the other groups. They spent considerably more time discussing international issues such as: awareness in the U.S of the Free Trade Agreement, the relative productivity levels of Canadian and U.S. firms, exports to U.S. electrical utilities, joint ventures with foreign firms, transfer of technology to Canadian subsidiaries, acquisition of Canadian plants by foreign firms and the fact that some European firms treat the Canadian and U.S. markets differently. The other groups generally focused more on local and regional issues.

Importance Of New Technology

Participants were asked in the questionnaire to indicate the importance of several business issues to help put the emphasis they place on technology in perspective. The responses (Exhibit 5) indicated that developing and acquiring new technology is at least a minor priority within all of the groups. Controlling costs, improved customer service, and greater sales efforts were consistently seen as the highest priorities among all three groups; both issues which could be addressed to some extent through the use of technology. Only concentrating "on what you do best" was rated as high as controlling costs and customer service by the EE group. This was not rated as high by the other groups and, in fact, the GM groups placed a higher priority on diversifying.

The relatively greater emphasis placed on "diversifying" over "concentrating on what you do best" by the GM group, compared to the other two groups may have resulted from the GM group having just attended the ISTC trade show prior to participating in the focus group.

Generally low ratings were given to "obtaining licenses to obtain new products", "better data/telecommunications" and "diversifying". The ratings for "Concentrating on what you do best" varied widely among the focus groups

indicating that this item tended to be more subjective.

"Research & Development" received a lower rating than "using technology to improve operations" and "better technology in products and services" among both the EE and GM groups. This is consistent with the idea that acquiring needed technology - whether developed in-house or elsewhere - is a higher priority than doing R&D. However, the WD groups gave a higher rating to "research and development". We note that whereas the EE and GM groups would be expected to be low-to-moderate level performers of applications development and quality control activities, the WD group would not be. The WD group's high rating for R&D may indicate a high priority to develop some capabilities in these areas or it may be that this group classifies innovative design work, which is important to their industry, as R&D.

Among EE group participants, items more directly related to technology, such as research and development, obtaining licences to sell new products, using technology to improve operations, and better technology in products and services were rated as being minor priorities or slightly higher. By comparison, performance factors such as controlling costs, concentrating on what you do best, and better customer service were rated closer to being major priorities indicating that technology was not seen as the only way to meet these objectives. Among the items examined, only advertising and improved communications rated below being minority priorities.

Among the WD group participants responding to the questionnaire, the technology-related issues generally received higher priority ratings than within the EE group. For example, research and development was rated as close to being a major priority (mean rating of 2.8), however, obtaining licences to sell new products was not rated as a priority. Items not explicitly dealing with new technology such as controlling costs and better sales and promotion also rated as being somewhere between major and minor priorities. The generally higher priorities given to technology-related items among some WD group participants seems surprising given that this industry sector is less technology intensive than the EE sector. It is possible that participants' responses are actually dealing with architectural design innovation. Roughly half the WD group provided questionnaire answers on priorities compared with almost all of the EE and GM groups. During the discussions, some WD group participants expressed the view that adopting new technology, particularly to meet global competition, was not a high priority. Comments included: "the threat of global competition is hype" and "if the boat is not being rocked ... keep doing the same thing".

The use of technology to improve operations received fairly high ratings in the GM groups as did the use of better technology in products and services (mean rating of 2.6 for both). Other

areas such as research and development and obtaining licenses to sell new products were seen as minor priorities at best. The low rating of research and development may not be surprising given that these were generally small enterprises (all under ten million in sales). The fact that licensing was rated as lower than a minor priority is more difficult to understand because these companies generally place a higher priority on diversifying than on concentrating on what they do best. It may be that they are simply not often exposed to licensing opportunities.

The EE group discussion generally indicated the greatest interest in adopting new technology. Comments included:

- "we need replacement products for inefficient products ... this requires R&D spending"; and
- "we are always trying to define new concepts".

There was some indication among EE group participants that the importance of technology within their firms has recently increased. Some specific comments included:

- "we have been making motors for a long time in Canada without putting any money back in. Now this is changing"; and
- "we have spent more money on new technology in the last two years than in the last twenty years".

Although the focus group discussions indicated the EE group was more technology-oriented than the other groups, their rating on technology related items in the focus group questionnaires were lower. This result, which illustrates the difficulties in comparing numerical ratings among the different focus groups, is most likely due to the fact that **the EE group is already more technology intensive than the other two groups**.

Within the EE group, the key reason for adopting new technology was generally stated to be lower costs through improved efficiency. Within the WD group, lower costs were also mentioned as a reason for adopting new technology. However, the reasons which were discussed most during the WD group discussion were:

- "reducing response times in reacting to customer needs";
- "improving design capabilities"; and
- "improving our company's workmanship".

With the exception of this last comment from a WD group participant and some similar comments from two tool and die makers in the GM groups, there was very little discussion among the groups concerning the use of technology to maintain/improve product quality.

There was also a broad range of reasons given for the adoption of new technology among the GM groups. Some were very advanced in technology such as one

Exhibit 6 — Satisfaction With Current Technology in:

Responses based on a scale from:

4 Very Satisfied
3 Somewhat Satisfied
2 Not Very Satisfied
1 Not at all Satisfied

Item	Manufacturers	Electrical Equipment	Windows & Doors
	Mean	Mean	Mean
Administration	3.0	2.7	2.8
Base (n =)	18	9	8
Marketing	2.5	2.9	2.8
Base (n =)	17	9	9
Manufacturing	2.7	2.5	2.8
Base (n =)	16	8	8
Sales	2.1	2.9	2.7
Base (n =)	18	9	9
Customer Service	2.7	2.6	2.9
Base (n =)	18	9	7
Installation	2.7	2.5	3.0
Base (n =)	11	9	4
Maintenance / repair	2.6	3.0	3.0
Base (n =)	13	4	5
Research & development	1.9	2.6	2.4
Base (n =)			
The products you sell	3.0	3.3	2.9
Base (n =)	16	9	8
The services you sell	2.7	3.4	3.4
Base (n =)	12	5	7

company in aircraft maintenance and another in processed dairy foods. The reasons ranged from the changing demands of major customers to the need to develop environmentally safe packaging and wastes. The most consistently given reason, however, was the need to maintain or reduce costs. From the discussions, it appeared that the in-house R&D/technical capabilities of the groups ranged from modest to non-existent. Several of the EE and the GM group participants stated, during the discussion, that they do not have significant in-house R&D efforts within their firms. Reasons given for this included:

- the size of companies was not large enough;
- being a "marketing organization for our U.S parent company"; and
- "playing follow the leader with the U.S market which has a two to three year time lead in adopting new technology.

However, several participants mentioned in-house activities which are closely related to R&D (and sometimes classified as R&D) such as applications engineering and process engineering. The WD group participants gave no indication that they had R&D, engineering or other technical resources in-house.

Satisfaction With Current Technology

Participants were asked in the questionnaire to indicate their satisfaction with the technology they are currently employing in ten areas of business activity ranging from the products and services being sold to marketing and administration. **Based on their responses (Exhibit 6), there is considerable scope for improvements in the technologies being employed.**

In almost all of the functional areas within companies which were included in the questionnaire, the mean level of satisfaction of participants was between "somewhat satisfied" and "not very satisfied". Participants' ratings of the technology incorporated within products and services being sold were somewhat higher, falling generally between "somewhat satisfied" (or just below) and "very satisfied".

Very few specific examples of new technologies of interest were mentioned by the participants of any of the groups during the discussions. Examples mentioned within the EE group discussion included a new alloy for transformer cores and solid state switches replacing electromechanical switches. The advantage in both cases is reduced consumption of electrical energy. Examples cited in the WD group discussion included vinyl window frames, two-way mechanisms for opening doors

(sliding and rocking), and removal of waste zinc from plating bath effluent. Examples in the GM groups included environmentally controlled chambers for plant growth and extended product shelf life for food products.

Exhibit 7 — Ratings on Information Sources for New Technology

Responses based on a scale from:

4 Very Important
3 Somewhat Important
2 Not Very Important
1 Not at all Important

Item	Manufacturers	Electrical Equipment	Windows & Doors
	Mean	Mean	Mean
Sales literature	3.3 16	3.3 9	3.6 9
Sales people	3.6 16	3.2 9	3.1 10
Journals / magazines	3.5 16	3.1 9	3.8 10
Advertising	2.9 16	2.6 9	3.3 9
Word of mouth	3.2 17	2.6 9	3.4 10
Conferences / trade shows	3.5 16	3.6 9	3.4 10
Associations	3.4 16	2.7 9	2.8 10
Technology consultants	2.8 16	2.3 9	2.6 10
Engineers in company	2.5 16	3.6 9	2.1 9
Technology Databases	2.6 16	2.1 8	2.2 10
Recent graduates who join the company	2.3 16	2.4 9	2.1 10

3.
CURRENT PRACTICES AND NEEDS CONCERNING INFORMATION ON NEW TECHNOLOGY

Identification Of New Technology

Exhibit 7 shows the relative importance of sources of information about new technology. The responses indicated some differences between the industry groups. The sources receiving the highest ratings among the EE group participants were conferences/trade shows and engineers within the company. Other sources that were rated as at least somewhat important were sales literature, sales people, journals/magazines.

The mean ratings among WD group participants were highest for sales literature and journals/magazines. Other sources receiving at least a "somewhat important" rating were conferences/trade shows, word of mouth, and advertising. Sources of new technology that received mean ratings which were less than "somewhat important" by both industry groups included:

- recent graduates joining the company;
- technology data bases;
- technology consultants; and
- associations.

WD participants indicated during discussions that, in addition to trade shows, magazines, and word-of-mouth, testing laboratories are significant sources of knowledge about new technology. Although one of the WD participants had been involved with the IRAP program, most participants were not aware of the program or of NRC's Institute for Research in Construction.

The most important sources among the GM groups were sales people, journals and magazines and conferences and trade shows.

Some EE group participants mentioned that they had been involved in jointly funded R&D programs with Canadian government and university laboratories. Comments on the usefulness of these interactions were mixed, e.g., "they do too much pure research"; "some interactions have been useful".

When asked to comment on patents as sources of new technology, several WD participants stated that patents provide little protection for inventors but did not explicitly comment on their usefulness as information sources.

Gaining Access To And Implementing New Technology

During the discussions, the groups indicated several obstacles and limitations associated with adopting new technology.

There was general agreement in all the group discussions that the lack of persons trained in new technology was a significant obstacle to successful acquisition of new technologies. It was mentioned in the EE group discussion that experienced engineers tend not to be well versed in the new computer assisted engineering techniques. Newly graduated electrical engineers have learned the techniques but lack experience. They are also attracted to other parts of the electronics industry that are currently experiencing higher growth than the electrical equipment sector. Except for one EE group participant who mentioned sending people "back to school", there was no discussion among participants on industry's current or potential role in training employees in new technologies.

Some EE group participants indicated that lack of modern production facilities in Canada seriously limits the attractiveness of doing R&D to develop new products.

Specific comments included:

- "Canada lacks the industrial capability to capitalize on ... new product innovations";
- "we should worry about fixing up our existing plants ... rather than ... doing R&D in areas like superconductivity"; and
- "R&D is a red herring".

Several EE participants stated that their approach is to obtain basic new technologies from mostly foreign sources (Europe and the U.S) and to put their efforts into applications engineering, i.e., adapting the basic technologies to their markets.

There were also reservations expressed about working with government technology groups since these groups are acting more as entrepreneurs and may therefore be potential competitors. One WD group participant mentioned that the paperwork associated with government assistance programs was prohibitive.

The GM groups did not appear to have as negative reaction to government technology groups. However, they also seemed to be quite certain that they were up-to-date on current technologies in their respective fields and the reasons for not acquiring technology had more to do with costs than it did with lack of awareness. One said "a customer said they wouldn't buy our product anymore because another supplier was offering it at $1.40.

We said that was impossible, but we decided to work with our suppliers to see if we could reduce the costs. We're now selling it for $1.10." Another said "we know whats out there but interprovincial barriers mean that we can't get the volumes we would need to make some of the new technology cost effective".

Exhibit 8 — Comparison of This Product or Concept to Others

Responses based on a scale from:

5 Much Better
4 Slightly Better
3 About the Same
2 Slightly Worse
1 Much Worse

Item	Electrical Equipment		Windows & Doors	
	Mean	# of respondents	Mean	# of respondents
Comparison of Innovation to other publications	3.0	8	1.9	9
Not Rated		1		1
Comparison of the Technology Networking Guide to other publications	3.2	6	2.6	9
Not Rated		3		2
"Opportunities Club" concept in comparison to other forums	3.6	7	2.8	8
Not Rated		2		3

4.
REACTION TO TECHNOLOGY INFORMATION PRODUCTS AND CONCEPTS

While the GM groups were exposed to the concept of a technology information trade show, the EE and WD participants were shown examples of the following four technology information product / services and asked to rate them compared to similar products with which they are familiar:

- a copy of Innovation magazine;
- a draft version of the Technology Networking Guide; and
- a possible agenda which illustrated the Opportunities Club concept.

Participants' responses to the questionnaire (Exhibit 8) and comments during the discussions indicated that none of these concepts were considered to be clearly superior to existing products. In their questionnaire responses, the EE group rated the first three items as being between "slightly better" and "about the same" as existing products. Ratings from the WD group fell between "about the same" and "much worse". Comments pertaining to the products are discussed below.

Innovation Magazine

The most frequent comments about this product written by participants in the questionnaire booklet (Exhibit 9) were that it has "good content"; it is "too broad in scope and doesn't deal directly with business"; and, it looks "too much like advertising, i.e., glossy and overdesigned". Other comments were that it is "too technical" and that it is "shallow in content".

During discussions, several of the WD participants stated that the magazine was not particularly relevant to their industry. There was support among the WD group for the idea that rather than trying to deal specifically with many different industries, the magazine should provide generic information of interest to all industries, for example, coping with regulations and financial issues. Other comments from the WD group concerning Innovation included:

- "looks too expensive and glossy";
- "seems too high-tech"; and
- "advertising for a government department".

Exhibit 9 — Publications

	Electrical Equipment	Windows & Doors
Comments about "Innovation"		
Too broad in scope and doesn't deal directly with business	50%[1]	30%
Too technical	17%	30%
Shallow in content	33%	20%
Too much like advertising, glossy and overdesigned	0%	40%
Too expensive	0%	10%
Should contain applied solutions	0%	10%
Attractive, high quality	33%	10%
Good content	67%	50%
Number of respondents	6	10
Comments about "Technology Networking Guide"		
Doesn't address relevant issues	66%	17%
Too longwinded, dry and imposing	17%	83%
General positive comments	50%	66%
Number of respondents	6	6
Comments about Draft Agenda for "Opportunities Club"		
Good interchange of ideas and information, forum for discussion	100%	100%
Vague and irrelevant	60%	80%
Number of respondents	5	5

[1] **Reads:** Half of those in the electrical equipment group said Innovation was too broad in scope

Note: Figures will total more than 100% due to multiple answers

Technology Networking Guide

In all, seven participants from both groups wrote generally positive comments about the Technology Networking Guide. Six participants indicated that it was too longwinded, dry or imposing. Five participants, four of whom were in the EE group said that it does not address relevant issues.

Several WD group participants indicated, during the discussion, that the **Networking Guide was too broad and products which focused specifically on their industry would be more useful.**

Draft Agenda For Opportunities Club

In answering the questionnaire, five participants from each group, or about **half of all participants, indicated that what they liked about the Opportunities Club was that it would provide a good interchange of ideas and information** (Exhibit 9). However, seven participants from both groups wrote that the concept was vague and irrelevant.

There was a consensus among most of the WD group participants that **small discussion groups such as the one in which they were participating could be a very effective mechanism for keeping up-to-date on new technology and exchanging business-related ideas in general.** One participant said that the small group format would be much more cost-effective than that of one-day seminars which are held in hotel conference rooms and cost several hundred dollars. Another participant stated that a workshop dealing with "windows and doors" as a main topic would be more valuable than one dealing with "technology".

Other Published Products

The WD group participants were shown periodicals dealing with new products and technology from several countries. In cases where a periodical carried information of interest to a particular individual, there was a favourable reaction. However, there was no general consensus that these periodicals were effective means for identifying new technology.

During the discussions, only two of the eleven WD group participants indicated that the government program matrix could be valuable to them. This matrix illustrates the various government programs available to address various business needs. Several participants commented that it was not apparent what it should be used for.

EXHIBIT 10

FOCUS GROUP RATINGS

AVERAGE RATINGS ACROSS ALL BOOTHS

	Mean
Liked booth	3.566
Found booth relevant to needs	3.135
Found booth informative	3.756
Sufficient information at booth	3.719
Staff helpful at booth	4.090

Ratings were given on a scale from 1 to 5, with 1="Not at all" and 5="Very much."

EXHIBITOR'S RATINGS

AVERAGE RATINGS ACROSS ALL BOOTHS

		Mean
a)	Rating of "trade show" concept	3.571
b)	Satisfaction with facilities	3.357
c)	Opportunity to obtain new clients	3.071
d)	Interest in participating in full scale trade shows	3.786

a) 5 point scale, 1="Much worse" to 5="Much better"
b) 4 point scale, 4="Very satisfied" to 1="Very dissatisfied"
c) 4 point scale, 4="Strongly agree" to 1="Strongly disagree"
d) 4 point scale, 4="Very interested" to 1"Not at all interested"

Note: Detailed Ratings of the Individual Booths are included in Appendix A.

5.
REACTION TO THE TECHNOLOGY INFORMATION TRADE SHOW CONCEPT

The GM groups in Winnipeg were exposed to a trial technology information trade show. The exposition was run on a trial basis with possible plans for a larger scale show to be held in the future depending on the results of this effort. The show was entitled The Technology Information Marketplace and was coordinated by Industry, Science and Technology Canada. The exhibitors included:

- Canadian Institute of Industrial Technology
- Canadian Patent Office
- Canadian Patents and Development Ltd.
- Canmate
- The Coopers & Lybrand Consulting Group - Advanced Manufacturing Practice
- Dr. Dvorkovitz and Associates Computer Database Services
- Industry, Science and Technology Canada
    - DISTcovery Exhibit and Computer Database of Technology Opportunities
    - Technology Applications Directorate
    - Business Services Centre
    - Technology Networking Guide
- Canadian Industrial Innovation Centre, University of Waterloo
- Licensing Executive Society
- Lomar Associates
- National Research Council
- Plastics Institute
- Technologies Brokerage Inc
- University of Manitoba, Institute for Technological Development
- Whiteshell Research

Exhibit 10, 11 and 12 summarize the reactions of GM focus group participants and other attendees concerning each of the booths. The booths which received highly favourable responses included: ISTC (14 persons) Dr. Dvorkowitz & Associates (7 persons), Lomar Associates (7 persons), the Plastics Institute (6 persons), and Coopers & Lybrand - Advanced Manufacturing Technology

Exhibit 11: Reaction of Trade Show Attendees To Booths

Booth	No. Responses Total	Neutral	Somewhat	Very Much
Canadian Institute of Industrial Technology	7	1	3	1
Canadian Patent Office	14	7	4	0
Canadian Patents and Development Ltd.	8	4	3	0
Canmate	10	1	6	0
Coopers & Lybrand Consulting Group	7	2	4	1
Dr. Dvorkowitz & Associates	13	6	3	4
Industry, Science & Technology Canada	18	4	8	6
Lomar Associates	17	8	3	4
Licensing Executive Society	9	5	2	0
Canadian Industrial Innovation Centre	18	6	7	3
National Research Council	5	1	3	1
Plastics Institute	9	2	4	2
Technologies Brokerage Inc.	5	2	1	0
University of Manitoba	17	3	11	2
Whiteshell Research	18	10	4	3

Practice (5 persons). The booths associated with patents and technology licensing did not produce a highly favourable response with any respondents, which is consistent with the low priority on information in these areas which was evidenced in the focus groups and the survey done by CPO. (see Appendix D)

Appendix B describes the booths in more detail.

While the show was opened to the public the following day, the group participants were virtually the only observers during the night of September 26, 1989. After the initial group discussion, they were allowed to visit the displays for approximately one hour. They then returned to the meeting room to discuss their reactions to what they had seen and to the overall concept.

The response to the Trade Show Concept was very positive despite the fact that viewing time was limited to about one hour.

Some of the verbatim comments were:

- "It opened up totally new vistas for me, I thought I was up-to-date".

- "I didn't know there was any way of shielding electromagnetic interference with plastics. I'm coming back to speak with someone from the plastics institute again tomorrow".

- "It was excellent ... a lot of information. It opens up a lot of doors".

- "I was amazed there were so many sources of information. That IRAP program interests me. I didn't know it was still available".

- "I spoke to someone about licensing. There is a tremendous amount of information out there".

- "There seems to be a lot of technology out there. It is just a case of figuring out what you need for your firm. There seems to be more government help then I realized".

- "We have unique processes which we developed over the years. I see we could have obtained some assistance".

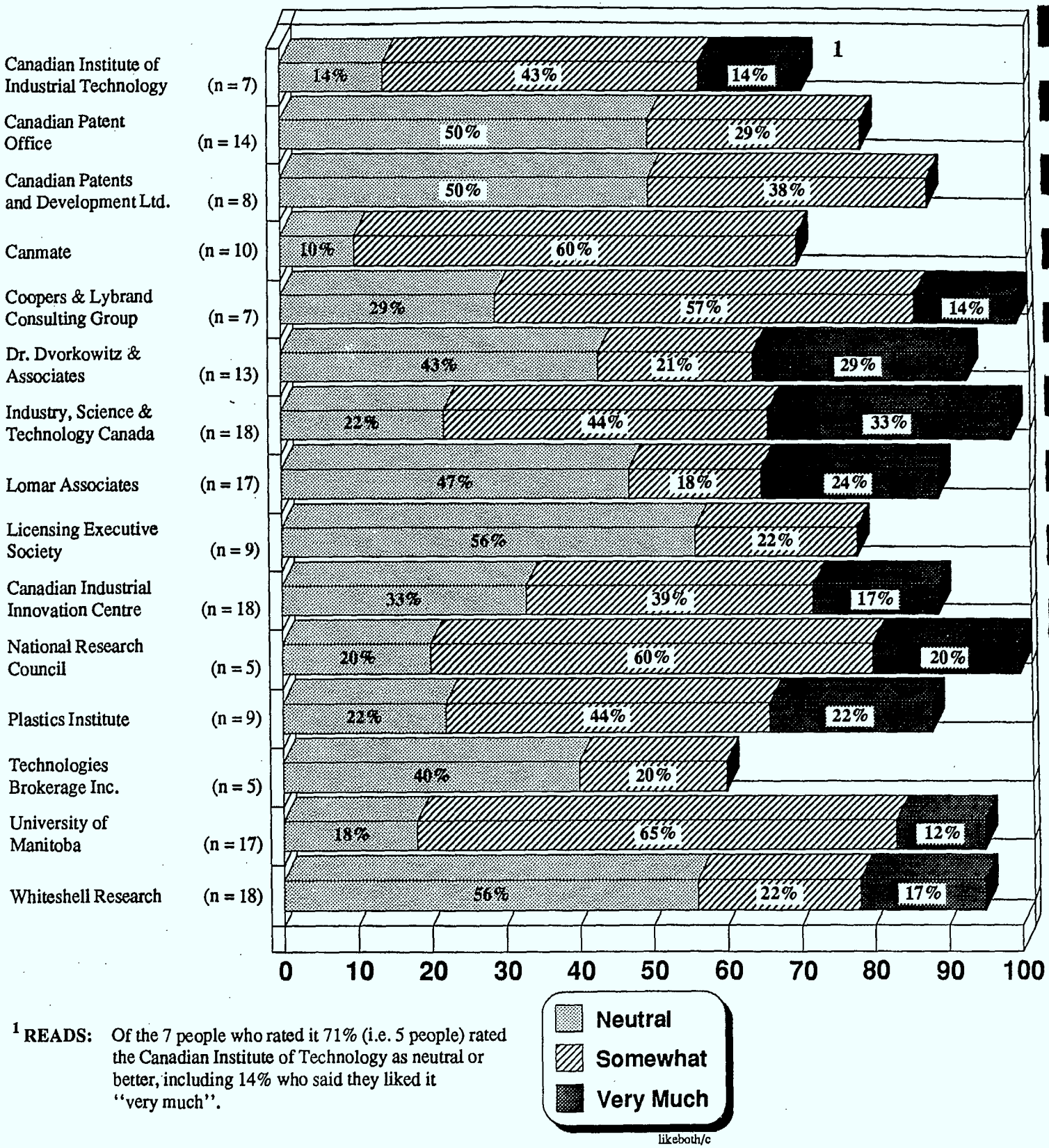
About half said that they planned to come back the following day.

Some concerns were expressed about the relatively short amount of time they had to visit the booths.

Others did not seem to accept the concept of a "trial" exposition and suggested that the marketing and promotion should have been better.

Another concern was finding what was relevant. One person said "somebody should ask up front which one you are interested in and tell you where to find it". Another said, "someone asked me some questions about what I was interested in and they punched some

Exhibit 12 — % of Respondents Who Liked Booth



[1] **READS:** Of the 7 people who rated it 71% (i.e. 5 people) rated the Canadian Institute of Technology as neutral or better, including 14% who said they liked it "very much".

words into a computer. It is that kind of interaction I'm looking for".

The first group seemed to have a more positive reaction overall and had fewer of these concerns. This may have been due to the fact that they stayed together as a group and had an ISTC representative give an overview of each booth and introduce booth representatives. The second group was left to their own devices. This may suggest that some initial orientation could be very beneficial.

Exhibit 10 shows the responses to the show of the exhibitors presenting at the booths.

Overall, the response was very positive and most exhibitors would be interested in being involved in a full fledged exposition.

Some of their comments were:

- "It provides a greater service to more companies than a one-on-one show can provide. The show in cooperation with the Advanced Manufacturing breakfast seminar is essential".

- "I'd like the principal of pulling together such participants under one roof at a number of locations coast-to-coast".

- "I found the focus group people to be the best (out of the two days) because they came to the booth knowing what we were trying to show them and the purpose of the exercise".

Recommendations for improvements included better promotions, carpeting, printed name tags, more workshops or seminars, better availability of telephones, photo-copying and fax machines. A number also suggested that the NRC work area should have been curtained off. By far the biggest complaint was the lack of parking.

Asked to indicate what the maximum number of booths should be, the answers varied considerably. Most felt there should be none, although only two said over fifty.

Most of the persons who responded to the booth questionnaire indicated that they were satisfied with a general theme for the trade show trade show, however, a few respondents indicated more specific themes including: technology transfer mechanisms (licensing, joint ventures, etc.), fianacial aspects of innovation, a business opportunities seminar, high technology, and themes based on generic technology areas.

SUGGESTIONS FOR TECHNOLOGY INFORMATION INITIATIVES

The favourable responses from the persons attending the technology information exposition indicate that this service can be effective in facilitating the technology transfer process.

Based on the responses of attendees of the Winnipeg trade show, the following guidelines should be kept in mind for future shows:

- a maximum of 50 booths is a reasonable number;
- adequate parking facilities should be provided;
- promotional activities, e.g., advertising and distribution of brochures, should be undertaken at least several weeks in advance;
- an orientation session or similar service should be offered to attendees when they first arrive; and
- every presenter should have a product or display facility to show attendees.

Based on the results of the focus group sessions, another potentially effective mechanism for promoting diffusion of technology would be workshops involving small groups of similar participants. This suggestion is based on the observation that the focus groups, which were used as a research technique during this study, produced information which was useful to the focus groups participants. Several of the participants stated that they found the discussions useful and that the small group format was good. These workshops which would facilitate contacts, information exchange, and generation of new ideas among persons with similar technology needs or among groups of technology suppliers and users. The workshops could include a specialist in the particular technology or industry involved who would inject information at appropriate times and facilitate group discussion. In addition to being of direct benefit to the workshop participants, information from the workshops could be included in reports for distribution to a wider audience.

SUGGESTIONS FOR FURTHER INFORMATION COLLECTION

This section describes three areas where further information could be collected to expand on the current study and support ISTC's trade show and workshop activities.

1. **Information to support the continued refinement of the Trade Shows and Workshops**

   Based on the results from this study, ISTC's trade show and workshop concepts are definitely worth pursuing. Information could be collected from trade show attendees and workshop participants to support the ongoing delivery of these services. In particular, information could be collected which would:

   - allow refinement of the services; and
   - provide information related to participants' requirements which would be used in developing the content of future tradeshows and workshops.

2. **Information to support rigorous conclusions on issues which arose from the focus groups.**

The focus group methodology used in this study provides an effective means of obtaining information to support qualitative conclusions regarding the industry sectors being studied. However, because of the limited sample size (38 for all four focus groups, about 10 per industry sector), it is not possible to make quantitative conclusions or to make rigorous statements concerning differences between the industry sectors. A larger number of groups involving more participants would be required to accurately conclude on the following issues:

- differences between the GM, EE and WD groups concerning the relative importance placed on business and technological priorities.
- accurately determine the importance of regional differences.
- demand (in terms of quantity demanded as a function of price) for various products and services, e.g., trade magazines, computer databases, the Technology Networking Guide.
- the cause of observed differences in attitudes between the GM groups and the WD/EE groups.

For example the GM group appeared more technology and change-oriented than the other two groups, i.e., gave higher ratings to: "using technology to improve operations" , "better technology in products and services", and "diversification" and a lower rating to "concentrating on what you do best". The apparent differences may have resulted because the GM groups had attended the ISTC technology trade show.

3. **Information concerning the attitudes, priorities and requirements of technical managers.**

Another area which could benefit from further study involves the attitudes, priorities and requirements of technical managers within Canadian industry. The current study focused on senior managers having responsibilities for a broad range of business issues including technology. By studying this group it was possible to determine the position of technology relative to other business issues within the overall corporate decision-making framework. The information requirements of CEO's concerning technology were also probed directly. However, there are often several levels of decision-making, i.e., buying influences, involved in the adoption of new technology by a firm. Senior level managers, at the general manager or VP level, in production, engineering, R&D, marketing and environmental /

regulatory affairs can play a key role in formulating requirements and assessing alternative sources of technology. The role of these executives in the decision making process varies depending on the type of technological requirements and the structure and procedures of the firm. The information needs of these various types of executives are likely to differ. For example the Technology Networking Guide, which provides detailed information on various technology sources and technology transfer agents, may be more valuable for technology-oriented managers and staff than for senior level general managers.

Information to satisfy the three types of requirements discussed above could be collected at future workshops and trade shows. A quantitative survey, of businesses in the largest area could also provide effective data for determining the requirements and relative levels of sophistication of businesses in the various markets. It should also be possible to design a sampling program which would allow ISTC to build up a data set over time which would allow resolution of these issues.

APPENDIX A

DETAILED BOOTH EVALUATIONS

Industry, Science and Technology

Canadian Institute of Industrial Technology	n	%
Liked booth #1		
Not at all	2	29
Neutral	1	14
Somewhat	3	43
Very much	1	14
Total	7	100
Found booth #1 relevant to needs		
Not at all	2	29
Neutral	2	29
Somewhat	2	29
Very much	1	14
Total	7	100
Found booth #1 informative		
Not at all	2	29
Neutral	1	14
Somewhat	3	43
Very much	1	14
Total	7	100
Sufficient information at booth #1		
Not at all	2	29
Somewhat	4	57
Very much	1	14
Total	7	100
Staff helpful at booth #1		
Not at all	2	29
Somewhat	3	43
Very much	2	29
Total	7	100

Canadian Patent Office	n	%
Liked booth #2		
Not at all	1	7
Not very much	2	14
Neutral	7	50
Somewhat	4	29
Total	14	100
Found booth #2 relevant to needs		
Not at all	2	15
Not very much	4	31
Neutral	1	8
Somewhat	5	38
Very much	1	8
Total	13	100
Found booth #2 informative		
Not at all	1	8
Not very much	1	8
Neutral	3	25
Somewhat	6	50
Very much	1	8
Total	12	100
Sufficient information at booth #2		
Not at all	1	8
Not very much	1	8
Neutral	3	25
Somewhat	6	50
Very much	1	8
Total	12	100
Staff helpful at booth #2		
Not at all	1	8
Not very much	1	8
Neutral	2	17
Somewhat	7	58
Very much	1	8
Total	12	100

Rating of Show by Booth Participant

Canadian Patent Office	n
Rating of 'trade show' concept	
Slightly better	1
Satisfaction with facilities	
Somewhat satisfied	1
Show provided opportunity to obtain new clients	
Agree	1
Interest in participating in full scale trade shows	
Very interested	1

Canadian Patents and Development Ltd.	n	%
Liked booth #3		
Not very much	1	13
Neutral	4	50
Somewhat	3	38
Total	8	100
Found booth #3 relevant to needs		
Not very much	2	25
Neutral	4	50
Somewhat	1	13
Very much	1	13
Total	8	100
Found booth #3 informative		
Not very much	1	13
Neutral	2	25
Somewhat	4	50
Very much	1	13
Total	8	100
Sufficient information at booth #3		
Not very much	1	13
Neutral	3	38
Somewhat	3	38
Very much	1	13
Total	8	100
Staff helpful at booth #3		
Not very much	1	13
Neutral	3	38
Somewhat	2	25
Very much	2	25
Total	8	100

Rating of Show by Booth Participant

Canadian Patents and Development Ltd.	n
Rating of 'trade show' concept	
About the same	1
Satisfaction with facilities	
Somewhat satisfied	1
Show provided opportunity to obtain new clients	
Agree	1
Interest in participating in full scale trade shows	
Very interested	1

Industry, Science and Technology

Canmate	n	%
Liked booth #4		
Not very much	2	20
Neutral	1	10
Somewhat	6	60
Very much	1	10
Total	10	100
Found booth #4 relevant to needs		
Not at all	1	11
Not very much	3	33
Somewhat	3	33
Very much	2	22
Total	9	100
Found booth #4 informative		
Neutral	1	13
Somewhat	6	75
Very much	1	13
Total	8	100
Sufficient information at booth #4		
Neutral	1	13
Somewhat	5	63
Very much	2	25
Total	8	100
Staff helpful at booth #4		
Neutral	1	13
Somewhat	3	38
Very much	4	50
Total	8	100

Industry, Science and Technology

Coopers & Lybrand Consulting Group	n	%
Liked booth #5		
Neutral	2	29
Somewhat	4	57
Very much	1	14
Total	7	100
Found booth #5 relevant to needs		
Not very much	1	14
Neutral	2	29
Somewhat	3	43
Very much	1	14
Total	7	100
Found booth #5 informative		
Neutral	1	14
Somewhat	5	71
Very much	1	14
Total	7	100
Sufficient information at booth #5		
Neutral	2	29
Somewhat	2	29
Very much	3	43
Total	7	100
Staff helpful at booth #5		
Somewhat	5	71
Very much	2	29
Total	7	100

Rating of Show by Booth Participant

Coopers & Lybrand Consulting Group	n
Rating of 'trade show' concept	
About the same	1
Satisfaction with facilities	
Very satisfied	1
Show provided opportunity to obtain new clients	
Agree	1
Interest in participating in full scale trade shows	
Very interested	1

Dr. Dvorkowitz and Associates	n	%
Liked booth #6		
Neutral	6	43
Somewhat	3	21
Very much	4	29
No response	1	7
Total	14	100
Found booth #6 relevant to needs		
Not at all	2	14
Not very much	4	29
Neutral	3	21
Somewhat	2	14
Very much	2	14
No response	1	7
Total	14	100
Found booth #6 informative		
Not very much	1	7
Neutral	2	14
Somewhat	6	43
Very much	4	29
No response	1	7
Total	14	100
Sufficient information at booth #6		
Not very much	3	21
Neutral	5	36
Somewhat	1	7
Very much	4	29
No response	1	7
Total	14	100
Staff helpful at booth #6		
Somewhat	5	36
Very much	8	57
No response	1	7
Total	14	100

Rating of Show by Booth Participant

Dr. Dvorkovitz and Associates	n
Rating of 'trade show' concept	
About the same	1
Satisfaction with facilities	
Somewhat satisfied	1
Show provided opportunity to obtain new clients	
Agree	1
Interest in participating in full scale trade shows	
Very interested	1

Industry, Science and Technology

Industry, Science and Technology Canada	n	%
Liked booth #7		
Neutral	4	22
Somewhat	8	44
Very much	6	33
Total	18	100
Found booth #7 relevant to needs		
Neutral	4	22
Somewhat	9	50
Very much	5	28
Total	18	100
Found booth #7 informative		
Neutral	2	11
Somewhat	10	56
Very much	6	33
Total	18	100
Sufficient information at booth #7		
Neutral	4	22
Somewhat	8	44
Very much	6	33
Total	18	100
Staff helpful at booth #7		
Neutral	4	22
Somewhat	8	44
Very much	6	33
Total	18	100

Rating of Show by Booth Participant

Industry, Science and Technology Canada	n
Rating of 'trade show' concept	
About the same	1
Slightly better	2
Satisfaction with facilities	
Very satisfied	1
Somewhat satisfied	1
Somewhat dissatisfied	1
Show provided opportunity to obtain new clients	
Agree	3
Interest in participating in full scale trade shows	
Very interested	2
Somewhat interested	1

Lomar Associates	n	%
Liked booth #8		
Not very much	2	12
Neutral	8	47
Somewhat	3	18
Very much	4	24
Total	17	100
Found booth #8 relevant to needs		
Not at all	2	12
Not very much	6	35
Neutral	6	35
Somewhat	2	12
Very much	1	6
Total	17	100
Found booth #8 informative		
Not very much	1	6
Neutral	5	29
Somewhat	8	47
Very much	3	18
Total	17	100
Sufficient information at booth #8		
Not very much	2	12
Neutral	5	29
Somewhat	8	47
Very much	2	12
Total	17	100
Staff helpful at booth #8		
Somewhat	8	50
Very much	8	50
Total	16	100

Rating of Show by Booth Participant

Lomar Associates	n
Rating of 'trade show' concept	
About the same	1
Satisfaction with facilities	
Very satisfied	1
Show provided opportunity to obtain new clients	
Agree	1
Interest in participating in full scale trade shows	
Very interested	1

Licensing Executive Society	n	%
Liked booth #9		
Not at all	1	11
Not very much	1	11
Neutral	5	56
Somewhat	2	22
Total	9	100
Found booth #9 relevant to needs		
Not at all	1	13
Not very much	2	25
Neutral	4	50
Somewhat	1	13
Total	8	100
Found booth #9 informative		
Not at all	1	13
Not very much	2	25
Neutral	3	38
Somewhat	1	13
Very much	1	13
Total	8	100
Sufficient information at booth #9		
Not at all	1	13
Not very much	1	13
Neutral	3	38
Very much	3	38
Total	8	100
Staff helpful at booth #9		
Neutral	4	50
Somewhat	2	25
Very much	2	25
Total	8	100

Canadian Industrial Innovation Centre	n	%
Liked booth #10		
Not very much	2	11
Neutral	6	33
Somewhat	7	39
Very much	3	17
Total	18	100
Found booth #10 relevant to needs		
Not at all	2	12
Not very much	4	24
Neutral	5	29
Somewhat	4	24
Very much	2	12
Total	17	100
Found booth #10 informative		
Not very much	1	6
Neutral	6	35
Somewhat	6	35
Very much	4	24
Total	17	100
Sufficient information at booth #10		
Neutral	8	47
Somewhat	7	41
Very much	2	12
Total	17	100
Staff helpful at booth #10		
Neutral	3	17
Somewhat	11	61
Very much	4	22
Total	18	100

Rating of Show by Booth Participant

Canadian Industrial Innovation Centre	n
Rating of 'trade show' concept	
About the same	1
Satisfaction with facilities	
Somewhat satisfied	1
Show provided opportunity to obtain new clients	
Agree	1
Interest in participating in full scale trade shows	
Very interested	1

Industry, Science and Technology

National Research Council	n	%
Liked booth #11		
Neutral	1	20
Somewhat	3	60
Very much	1	20
Total	5	100
Found booth #11 relevant to needs		
Neutral	2	40
Somewhat	3	60
Total	5	100
Found booth #11 informative		
Somewhat	5	100
Total	5	100
Sufficient information at booth #11		
Somewhat	5	100
Total	5	100
Staff helpful at booth #11		
Neutral	1	20
Somewhat	3	60
Very much	1	20
Total	5	100

Rating of Show by Booth Participant

National Research Council	n
Rating of 'trade show' concept	
About the same	1
Satisfaction with facilities	
Somewhat satisfied	1
Show provided opportunity to obtain new clients	
Agree	1
Interest in participating in full scale trade shows	
Somewhat interested	1

Industry, Science and Technology

Plastics Institute	n	%
Liked booth #12		
Not very much	1	11
Neutral	2	22
Somewhat	4	44
Very much	2	22
Total	9	100
Found booth #12 relevant to needs		
Not at all	1	11
Neutral	2	22
Somewhat	4	44
Very much	2	22
Total	9	100
Found booth #12 informative		
Neutral	1	11
Somewhat	4	44
Very much	4	44
Total	9	100
Sufficient information at booth #12		
Neutral	1	11
Somewhat	6	67
Very much	2	22
Total	9	100
Staff helpful at booth #12		
Neutral	2	25
Somewhat	2	25
Very much	4	50
Total	8	100

Rating of Show by Booth Participant

Plastics Institute	n
Rating of 'trade show' concept	
Slightly better	1
Satisfaction with facilities	
Very satisfied	1
Show provided opportunity to obtain new clients	
Agree	1
Interest in participating in full scale trade shows	
Very interested	1

Industry, Science and Technology

Technologies Brokerage Inc.	n	%
Liked booth #13		
Not very much	2	40
Neutral	2	40
Somewhat	1	20
Total	5	100
Found booth #13 relevant to needs		
Not very much	1	25
Neutral	1	25
Somewhat	2	50
Total	4	100
Found booth #13 informative		
Not very much	1	25
Neutral	1	25
Somewhat	2	50
Total	4	100
Sufficient information at booth #13		
Not very much	1	25
Neutral	1	25
Somewhat	2	50
Total	4	100
Staff helpful at booth #13		
Neutral	1	25
Somewhat	2	50
Very much	1	25
Total	4	100

Rating of Show by Booth Participant

Technologies Brokerage Inc.	n
Rating of 'trade show' concept	
Much better	1
Satisfaction with facilities	
Very satisfied	1
Show provided opportunity to obtain new clients	
Strongly agree	1
Interest in participating in full scale trade shows	
Very interested	1

Industry, Science and Technology

University of Manitoba	n	%
Liked booth #14		
Not very much	1	6
Neutral	3	18
Somewhat	11	65
Very much	2	12
Total	17	100
Found booth #14 relevant to needs		
Not at all	1	6
Not very much	1	6
Neutral	6	35
Somewhat	7	41
Very much	2	12
Total	17	100
Found booth #14 informative		
Neutral	4	24
Somewhat	11	65
Very much	2	12
Total	17	100
Sufficient information at booth #14		
Neutral	4	25
Somewhat	9	56
Very much	3	19
Total	16	100
Staff helpful at booth #14		
Somewhat	12	75
Very much	4	25
Total	16	100

Rating of Show by Booth Participant

University of Manitoba	n
Rating of 'trade show' concept	
Much better	1
Satisfaction with facilities	
Very satisfied	1
Show provided opportunity to obtain new clients	
Agree	1
Interest in participating in full scale trade shows	
Very interested	1

Industry, Science and Technology

Whiteshell Research	n	%
Liked booth #15		
Not very much	1	6
Neutral	10	56
Somewhat	4	22
Very much	3	17
Total	18	100
Found booth #15 relevant to needs		
Not at all	3	17
Not very much	6	33
Neutral	6	33
Somewhat	3	17
Total	18	100
Found booth #15 informative		
Not very much	3	17
Neutral	7	39
Somewhat	5	28
Very much	3	17
Total	18	100
Sufficient information at booth #15		
Not very much	2	11
Neutral	7	39
Somewhat	5	28
Very much	4	22
Total	18	100
Staff helpful at booth #15		
Neutral	6	33
Somewhat	6	33
Very much	6	33
Total	18	100

Rating of Show by Booth Participant

Whiteshell Research	n
Rating of 'trade show' concept	
About the same	1
Satisfaction with facilities	
Somewhat satisfied	1
Show provided opportunity to obtain new clients	
Agree	1
Interest in participating in full scale trade shows	
Somewhat interested	1

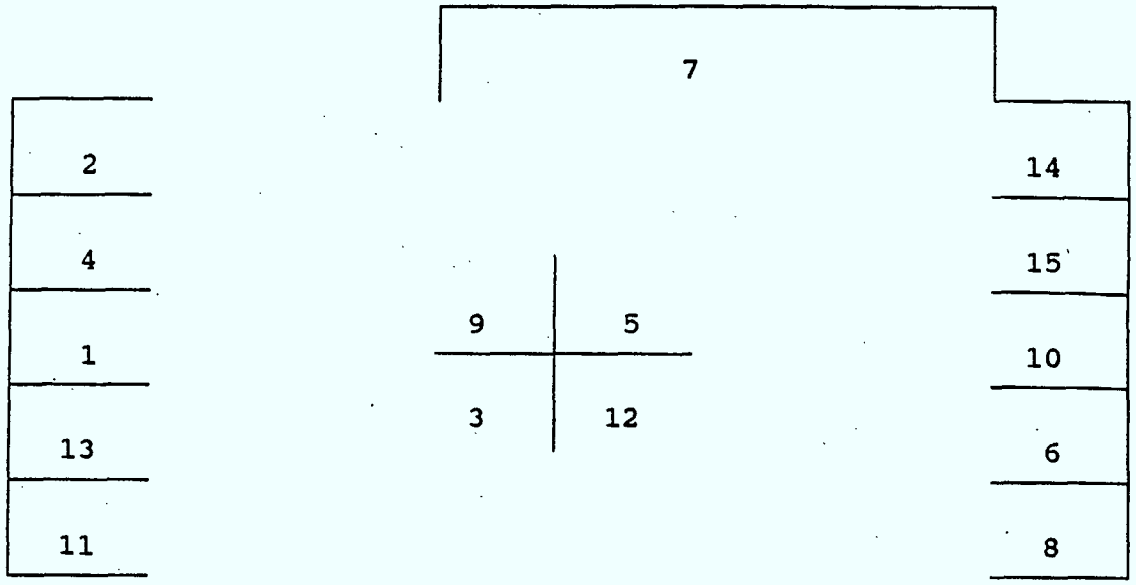
APPENDIX B

BOOTH DESCRIPTIONS

TECHNOLOGY MARKETPLACE

September 19th and 20th, 1989

Exhibitor Floor Plan



EXHIBITORS

1. Canadian Institute of Industrial Technology
2. Canadian Patent Office
3. Canadian Patents and Development Ltd.
4. Canmate
5. Coopers & Lybrand Consulting Group
6. Dr. Dvorkovitz and Associates
7. Industry, Science and Technology Canada
   - DISTcovery Exhibit and Database
   - Technology Applications Directorate
   - Business Services Centre
   - Technology Networking Guide
8. Canadian Industrial Innovation Centre, University of Waterloo
9. Licensing Executive Sociaty
10. Lomar Associates
11. National Research Council
12. Plastics Institute
13. Technologies Brokerage Inc.
14. University of Manitoba, Institute for Technological Development
15. Whiteshell Research

TECHNOLOGY MARKETPLACE

"NEW BUSINESS OPPORTUNITIES FROM TECHNOLOGIES AND INNOVATIONS"
List of Exhibitors

CANADIAN INSTITUTE OF INDUSTRIAL TECHNOLOGY (CIIT)

The CIIT in Winnipeg is a National Research Council initiative, designed as a focal point for integrated research programs. It provides a complete research environment for technical teams from industry, university and government. The CIIT fosters the formation of cooperative projects in generic areas such as artificial intelligence and expert systems, computer-integrated manufacturing, and sensor-based robotics.

The exhibit will provide information on the CIIT and on the opportunities for involvement in research and development projects in cooperation with the CIIT.

CANADIAN PATENT OFFICE

The Intellectual Property Directorate of the Department of Consumer and Corporate Affairs (the Canadian Patent Office) examines patent applications for patentability, and makes patent information accessible to business people and to research organizations across Canada. Under the Patent Information Exploitation (PIE) program, the Patent Office offers services "free of charge" in the areas of technology search and technology assessment and forecasting.

The exhibit will provide information on the technology services offered by the Patent Office. An official will be present to provide information and advice.

CANADIAN PATENTS AND DEVELOPMENT LTD. (CPDL)

CPDL is the federal government agency charged with the responsibility for selling and managing technologies and inventions developed by federal laboratories and under federal contracts.

The CPDL exhibit will consist of display of technologies and new products available for licensing and catalogues of available technologies. Specialists will be on hand to advise Manitoba firms on opportunities and the nature of licensing agreements.

CANMATE

Associated with the Canadian Manufacturers Association, CANMATE is a non-profit group which publicizes and advises on the uses of advanced manufacturing technologies, and conducts training seminars.

The CANMATE exhibit will consist of a literature display, including copies of the CANMATE newsletter and information on upcoming seminars. A senior official will be present to advise interested firms.

...2

COOPERS & LYBRAND CONSULTING GROUP, ADVANCED TECHNOLOGY CENTRE

Coopers-Lybrand Consulting Group, Mississauga, Ontario, has developed a large group of specialists to provide consulting services on advanced technologies including advanced manufacturing technologies.
The Coopers-Lybrand exhibit will consist of literature on this specialized group. A specialist will be present to advise interested firms of the group's services.

DR. DVORKOVITZ AND ASSOCIATES

The Florida-based DVORKOVITZ database, established over 20 years ago, is probably the largest database of new technologies/products available for licensing.
The Dvorkovitz exhibit will consist of promotional literature, a computer terminal which will be used for demonstration searches, print-outs by category of the contents of the database, and a specialist from Florida to advise interested Manitoba firms.

INDUSTRY, SCIENCE AND TECHNOLOGY CANADA (ISTC)

ISTC is a newly created department of the Government of Canada which is mandated to work in full partnership with the private sector, the science community, other federal departments, and other levels of government to promote international competitiveness and industrial excellence in Canada, and to renew and expand Canada's scientific, technological, managerial and production base.
The ISTC exhibit will provide a sampling of the departments services to business, including:

DISTcovery Exhibit and Database

A new service developed by ISTC in Moncton, New Brunswick to display a range of technology-driven business opportunities available from around the world, this display will include a complete database of technology opportunities, brochures, catalogues, newsletters and other sources of information for the entrepreneur looking for new technologies and business opportunities.
A Moncton-based specialist will be present to advise on the content and usage of this exhibit and database.

Technology Applications Directorate

This ISTC, Ottawa Directorate has a general objective to encourage, assist and ensure the widespread adoption of advanced information technologies. Its role is to support the effective exploitation of emerging information technology innovations as key to the efficient operation of manufacturing, natural resource and service industries. The Directorate initiates measures to promote technology awareness, technology transfer, diffusion studies, application

...3

needs analysis and joint ventures in the development of information technology applications. In technology applications, the Directorate provides program assistance to manufacturing and process industries for evaluating the feasibility of new information technology investments. A range of new financial assistance programs have been developed to meet the objectives of the Directorate, including the Advanced Manufacturing Technology Application Program (AMTAP). This program is designed to assist manufacturers with the cost of consultants to apply advanced manufacturing technologies to their manufacturing operations. An Ottawa-based program specialist will be available for consultation with interested firms.

Business Services Centre (BSC)
A service provided by ISTC Manitoba, the BSC provides a one-stop information service to the Manitoba business community on the range of government programs and services to business. The BSC will display the various ISTC program and service literature and other material of interest to technology-focused businesses.

Technology Networking Guide
A new information publication under development by ISTC, the Technology Networking Guide is designed to assist businesses and their technology advisers in locating technology-driven business opportunities/technologies/new products. Copies of the guide will be available together with "source" information publications. An Ottawa-based specialist will be present to advise on its content and usage.

CANADIAN INDUSTRIAL INOVATION CENTRE- UNIVERSITY OF WATERLOO

The Innovation Centre is a nationally mandated centre serving the needs of individuals and firms engaged in the development of innovative new products, including assistance with market research and business planning.
The exhibit will reflect the capabilities and services of the Innovation Centre. An official will be present to discuss the Centre's services.

LICENSING EXECUTIVES SOCIETY (LES)

LES is a large and respected international organization of legal and other professionals engaged in the transfer of technology. The society has a regular series of domestic and international seminars and meetings.
A local society member, Mr. Lester Glantz, will be available to inform and advise interested firms. The exhibit will consist of literature on LES, upcoming domestic and international seminars and meetings.

...4

LOMAR ASSOCIATES

Lomar is probably the longest-established technology broker in Canada. Based in Hamilton, Ontario, Lomar has many years of experience in marketing and purchasing technology.
Mr. Lou Eckerbrecht of Lomar will be in attendance to answer questions. The exhibit will consist of samples and brochures of new technologies/products available for licensing and the Lomar catalogue of available new technologies and products.

NATIONAL RESEARCH COUNCIL (NRC)

The NRC is the Government of Canada's premiere research and technology transfer agency with over 65 years of experience working hand in hand with Canadian industry.
Specialists will be on hand to explain the range of services and programs provided by NRC including IRAP (Industrial Research Assistance Program), TIP (Technology Inflow Program) and NRC laboratory services. Technology searches using the powerful CAN-OLE database operated by CISTI library personnel will be available.

PLASTICS INSTITUTE

The Plastics Institute, based in Toronto, is a nationally mandated institute serving the needs of industry involving all aspects of the use of plastics. The institute provides consulting services, maintains an extensive technical library, publishes a newsletter which lists new international business opportunities/technologies/products, and operates the PLASCAMS Database, under contract from England, for determining the type of plastic needed for specific applications and a source list for various plastics.
The exhibit will reflect the various capabilities and services of the institute. A senior official will be present to discuss the institute's services with interested Manitoba firms.

TECHNOLOGIES BROKERAGE INC. (TBI)

TBI is a Winnipeg-based company which assists companies to acquire technology.
Mr. Michael P. Lau of TBI will be available to discuss the firm's technology services.

UNIVERSITY OF MANITOBA, INSTITUTE FOR TECHNOLOGICAL DEVELOPMENT

The Institute for Technological Development (ITD) is a cooperative venture of the Manitoba Research Council, the National Research Council, the University of Manitoba, and industry. The ITD encourages cooperative research between industry, government and the university and facilitates the transfer of technology and information.
The exhibit will include information of the range of activities of the ITD, including:

...5

-**Technology Resource Information Management: A computerized information management system which profiles the capabilities and technological developments of science and technology oriented faculty of the University of Manitoba, University of Winnipeg, Brandon University and Red River Community College. This system has been developed to identify areas of specialization and industry-specific experience within the faculty of these institutions.**

-Technology Networking Program (Technet): Established to make the University of Manitoba's resources more relevant and responsive to the needs of Manitoba industry, Technet is designed to improve the technology transfer process, to facilitate the commercialization of technological developments from the University, to access government support programs, and to encourage technological entrepreneurship.

-Technical Information Service: ITD can help qualified private sector firms obtain scientific and technological knowledge, advice and assistance on a confidential basis.

-Liaison Service: ITD acts as the University of Manitoba's intermediary to such organizations as the Canadian Industrial Innovation Centre, the Canadian Institute of Industrial Technology, the Canadian Space Program and the Intellectual Property Directorate of Consumer and Corporate Affairs (Patent Office).

-Outreach: ITD publishes a quarterly newsletter ("Connections"), sponsors open houses, seminars and workshops with such themes as technology and innovation, commercialization of technological innovations, and collaborative R&D programs; and participates in exhibits and trade shows.

WHITESHELL RESEARCH

The Whiteshell Nuclear Research Establishment of Atomic Energy of Canada Limited is the largest research organization in Western Canada. Located at Pinawa, Manitoba, Whiteshell Research employs approximately 1,200 persons.

The Whiteshell exhibit will provide information on its research and development capabilities, which cover a broad spectrum of technological capability. A senior official will be present to explain Whiteshell's capabilities to interested organizations and to discuss possible joint initiatives or collaborative projects.

APPENDIX C

DISCUSSION GUIDE AND QUESTIONNAIRES

DISCUSSION GUIDE - FOR "INDUSTRY" FOCUS GROUP

A. INTRODUCTION

1. Objectives of the focus group discussion
2. Nature of the focus group
   - voluntary
   - open/honest opinions
   - no right/wrong questions
   - encourage discussion between participants
3. Context
   - audio/video recorded
   - mirror/observation
4. Round-table introductions of participants/ companies/sectors

B. REMAINING COMPETITIVE AND PURSUING NEW OPPORTUNITIES

5a. Is the business that you are in very competitive? Is it likely to become more competitive? If so, why?

b. What's the long-term outlook; how will you be doing in 10 years?

c. If quite or very competitive,
   - what's important in keeping up or ahead of your competition?
   - how do you keep up or ahead of your competition?

d. How are you doing relative to firms in the U.S. and elsewhere in the world?

6a. Do you put much emphasis on looking for new business opportunities? If so, why and how?

b. What would you do if the market for your major product line was decreasing as new or more enhanced products became available? Would you, e.g.:

- enhance the product
- maximize profits for the short term
- look for new business opportunities

C. IMPORTANCE OF NEW TECHNOLOGY

7a. In your overall business strategy, what role does technology play? e.g.

- for improving your competitive position?
- for increasing your market share?
- for developing improved or new products or services?
- for identifying new business opportunities?
- for protecting market share?

D. IDENTIFICATION OF NEW TECHNOLOGY (assumes a positive response to at least one part of question #7)

8. Do you actively search for new technology? If so,
   - to what extent do you search for new technology?
   - where do you look and how do you go about it?
   - do you consider joint ventures or licensing?

9. Do you find new technology by "bumping" into it (i.e., finding it by accident)? If so, do you have ways by which to increase the odds of "bumping" into it?
10. What are the main constraints to finding out about improved, new or different (from what your currently using) technology?
11. Do you encounter difficulties in knowing whether a particular technology will meet your needs? If so, what are the difficulties and how do you overcome them?
12. Do you do any specific risk or cost analyses? What other methods are used to evaluate the potential opportunity?

E. GAINING ACCESS AND IMPLEMENTING NEW TECHNOLOGY

13. Once you find the technology that you want/need, how do you go about:
   - gaining access, or the rights to access, it?
   - transferring it to your company?
   - implementing and using it

14. What are the major constraints or barriers to obtaining and implementing technology that you know exists and that you want?

F. CASE STUDY/EXAMPLE OF TECHNOLOGY IDENTIFICATION/TRANSFER

15. Have you acquired any new technology recently?
    - How did you find it?
    - How did you gain access to it?
    - What has been the impact on your business?
    - Did it meet expectations?

G. SUGGESTIONS CONCERNING IMPROVED IDENTIFICATION OF TECHNOLOGY

16. Is there any need to think about ways to help companies like your identify or find out about new technologies? If so, do you have any suggestions?

17. Do you have sufficient access to information about new technology? What additional types of services do you want? (discuss any specific concepts) Who should provide these?

H. CONCLUSION

18. Any closing comments?

Thank you

INDUSTRY, SCIENCE AND TECHNOLOGY

TRADE SHOW STUDY

BOOTH QUESTIONNAIRE

SEPTEMBER 20, 1989

PLEASE DO NOT OPEN UNTIL INSTRUCTED TO DO SO

INDUSTRY, SCIENCE AND TECHNOLOGY
TRADE SHOW STUDY

QUESTIONNAIRE
September 20, 1989

1. Please complete the following information:

   Booth Name: _____

2. Compared to other forums you have used to provide information about new technology, how would you rate this "trade show" concept? (PLEASE CIRCLE ONE NUMBER)

Much better	5
Slightly better	4
About the same	3
Slightly worse	2
Much worse	1

3. What do you like about it?

   _____

   _____

   _____

4. What changes would you like to see?

   _____

   _____

   _____

5. What other types of concepts would more effectively communicate your information?

_____

_____

_____

6. How satisfied are you with the facilities?

Very satisfied	1
Somewhat satisfied	2
Somewhat dissatisfied	3
Very dissatisfied	4

7. What changes would you suggest?

_____

_____

_____

8. Do you agree that this trade show provided an adequate opportunity to obtain new clients?

Strongly agree	1
Agree	2
Disagree	3
Strongly disagree	4

9. How interested would you be in participating in full scale trade shows of this nature?

Very interested	1
Somewhat interested	2
Not very interested	3
Not at all interested	4

10. Do you feel that there is a limit on the number of booths that should be included in a trade show? If so, how many?

_____

_____

_____

11. Do you feel that such trade shows would be more successful if more focused themes were adopted? If so, what themes?

_____

_____

_____

THANK YOU FOR YOUR TIME AND ASSISTANCE

INDUSTRY, SCIENCE AND TECHNOLOGY

FOCUS GROUP STUDY

QUESTIONNAIRE

SEPTEMBER 19, 1989

PLEASE DO NOT OPEN UNTIL INSTRUCTED TO DO SO

INDUSTRY, SCIENCE AND TECHNOLOGY
FOCUS GROUP STUDY

QUESTIONNAIRE
September 19, 1989

1. Please complete the following information:

   Name: _____

   Group: _____ _____
   Date Time Started

2. In order of importance, please list three or four of the major opportunities and threats facing your industry.

   Opportunities: _____

   _____

   _____

   Threats: _____

   _____

   _____

3. Which of the following best describes your industry in Canada (PLEASE CIRCLE ONE NUMBER)

*	embryonic (a new industry)	4
*	growing rapidly	3
*	mature with stable growth	2
*	declining	1

Why do you say this: _____

_____

_____

4. How would you describe the international competitive position of the Canadian industry? (PLEASE CIRCLE ONE ANSWER)

*	strong	4
*	tenable	2
*	weak	1
*	not sure	9

Why do you say this: _____

_____

_____

PLEASE DO NOT TURN THE PAGE UNTIL REQUESTED TO DO SO

5. In your business, would you say each of the following is a major priority, a minor priority or not a priority. (PLEASE CIRCLE ONE NUMBER ON EACH LINE)

		Major Priority	Minor Priority	Not a Priority	Doesn't Apply
*	International expansion	3	2	1	9
*	Controlling costs	3	2	1	9
*	Market research	3	2	1	9
*	Improved Telecommunications and data communications	3	2	1	9
*	Advertising	3	2	1	9
*	Using technology to improve your operations	3	2	1	9
*	Improving organizational clientele	3	2	1	9
*	greater sales efforts	3	2	1	9
*	diversifying	3	2	1	9
*	Concentrating on what you do best	3	2	1	9
*	obtaining licenses to sell new products	3	2	1	9
*	better customer service	3	2	1	9
*	using more/better technology in your products or services	3	2	1	9

		Major Priority	Minor Priority	Not a Priority	Doesn't Apply
*	research and development	3	2	1	9
*	improving corporate image	3	2	1	9
*	better sales and promotion	3	2	1	9
*	Other (please specify)	3	2	1	9
	_____	3	2	1	9
	_____	3	2	1	9
	_____	3	2	1	9

PLEASE DO NOT TURN PAGE UNTIL REQUESTED TO DO SO

6. How satisfied are you with your current technology in the following areas (CIRCLE ONE NUMBER ON EACH ITEM)

		Very Satisfied	Somewhat Satisfied	Not very Satisfied	Not at all Satisfied	Does not Apply
*	administration	5	4	3	2	1
*	marketing	5	4	3	2	1
*	manufacturing	5	4	3	2	1
*	sales	5	4	3	2	1
*	customer service	5	4	3	2	1
*	installation	5	4	3	2	1
*	maintenance/repair	5	4	3	2	1
*	research and development	5	4	3	2	1
*	the products you sell	5	4	3	2	1
*	the services you sell	5	4	3	2	1
*	Others (please specify)					
	_____	5	4	3	2	1
	_____	5	4	3	2	1
	_____	5	4	3	2	1

7. How important are the following sources of information about new technology in your company. (CIRCLE ONE NUMBER ON EACH LINE)

		Very Important	Somewhat Important	Not Very Important	Not at all Important
*	sales literature	4	3	2	1
*	sales people	4	3	2	1
*	journals/magazines	4	3	2	1
*	advertising	4	3	2	1
*	word of mouth	4	3	2	1
*	conferences/ trade shows	4	3	2	1
*	associations	4	3	2	1
*	technology consultants	4	3	2	1
*	engineers in your company	4	3	2	1
*	technology databases	4	3	2	1
*	recent graduates who join your company	4	3	2	1

		Very Important	Somewhat Important	Not Very Important	Not at all Important
*	others (please specify)				
	_____	4	3	2	1
	_____	4	3	2	1
	_____	4	3	2	1

PLEASE DO NOT TURN PAGE UNTIL INSTRUCTED TO DO SO

8. EVALUATION OF BOOTH #1

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #2

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #3

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #4

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #5

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #6

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #7

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #8

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #9

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #10

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #11

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #12

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #13

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #14

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

8. EVALUATION OF BOOTH #15

NAME: _____

Please circle the number that indicates your impression concerning each of the following statements.

	1 Not At All	2	3 Neutral	4	5 Very Much
Did you like this booth?	1	2	3	4	5
Did you find it relevant to your needs?	1	2	3	4	5
Did you find it informative?	1	2	3	4	5
Did you find the information sufficient?	1	2	3	4	5
Did you find the staff helpful?	1	2	3	4	5

Comments:

_____

_____

_____

9. Please write in the name or number of your favourite 3 booths in order of preference.

1st _____ 2nd _____ 3rd _____

9. PRINTED MATERIAL

Overall, compared to other publications that provide information about new technology, how would you rate this publication? (PLEASE CIRCLE ONE NUMBER)

Much better	5
Slightly better	4
About the same	3
Slightly worse	2
Much worse	1

What do you like about it?

_____

_____

_____

What do you not like about it?

_____

_____

_____

PLEASE DO NOT TURN THE PAGE UNTIL INSTRUCTED TO DO SO

11. BACKGROUND INFORMATION

What approximately are the total annual sales of your company?

$ _____

What percent of these sales are in Canada?

% _____

What is your major line of business?

_____

_____

_____

What is your current occupation?

_____

THANK YOU FOR YOUR TIME AND ASSISTANCE

RECRUITMENT SCREENER
DEPARTMENT OF INDUSTRY SCIENCE AND TECHNOLOGY
FOCUS GROUP: MANUFACTURING

Hello may I please speak with the C.E.O.?

[After contact is made]

Hello my name is _____, I am calling from the Coopers & Lybrand Consulting Group. We are currently conducting a study for the Department of Industry, Science and Technology. Do you have a minute to answer a few questions ?

[Attempt to arrange a time for a callback if the respondent is busy. If they refuse ask if there is a Senior-vice president responsible for strategic or business planning that may have time]

Are you responsible for strategic or new business planning in your firm?

1. Yes 1 No 2 **[If no ask to speak to the person who is]**

2. Would you consider your firm to be using technology that is on the leading edge, up to date, or out of date?

Leading edge	1 - Thank and Terminate
Up to date	2
Out of date	3

We are inviting representatives of technology intensive industries to an small informal group discussion in order that we may better understand how new technology is acquired and disseminated. As part of this process we will conduct one of these groups with senior executives to find out how their companies stay up-to-date concerning new advances in technology.

The group discussion is being commissioned by the Department of Industry, Science and Technology and your participation is voluntary. The session is scheduled for 6:00 or 6:45 p.m., and will take about 2 hours. you will receive $50.00 for your time. Would you be willing to participate in this group discussion ?

YES...CONTINUE NO...THANK AND TERMINATE

Group 1: 6:00 pm [ ]
Group 2: 6:45 pm [ ]

The group discussion will be held at _____. **{insert directions}**

NAME: _____

PHONE #: BUS: _____
RES: _____

RECRUITER: _____ DATE:_____

CONFIRMED BY: _____ DATE:_____

RECRUITMENT SCREENER
DEPARTMENT OF INDUSTRY SCIENCE AND TECHNOLOGY
FOCUS GROUP - SME's - ELECTRONICS

Hello may I please speak with the CEO?

[After contact is made]

Hello my name is _____, I am calling from the Coopers & Lybrand Consulting Group. We are currently conducting a study for the Department of Industry, Science and Technology. Do you have a miniute to answer a few questions ?

[Attempt to arrange a time for a callback if the respondent is busy. If they refuse ask if there is a Senior Vice-president responsible for strategic or business planning that may have time]

Are you responsible for strategic or new business planning in your firm ?

Yes 1 No 2 **[If no ask to speak to the person who is]**

We are inviting representatives of technology intensive industries to an small informal group discussion in order that we may better understand how new technology is acquired and disseminated. As part of this process we will conduct one of these groups with senior executives to find out how their companies stay up-to-date concerning new advances in technology.

The group discussion is being commissioned by the Department of Industry, Science and Technology and your participation is voluntary. The session is scheduled for 6:00 or 6:45 p.m., and will take about 2 hours. you will receive $100.00 for your time. Would you be willing to participate in this group discussion ?

YES...CONTINUE NO...THANK AND TERMINATE

Group 1: 6:00 pm [ ]

The group discussion will be held at _____. **{insert directions}**

NAME: _____

PHONE #: BUS: _____
RES: _____

RECRUITER: _____ DATE:_____

CONFIRMED BY: _____ DATE:_____

RECRUITMENT SCREENER
DEPARTMENT OF INDUSTRY SCIENCE AND TECHNOLOGY
FOCUS GROUP - ENGINEERS

Hello may I please speak with one of your senior engineers ?

[After contact is made]

Hello my name is _____, I am calling from the Coopers & Lybrand Consulting Group. We are currently conducting a study for the Department of Industry, Science and Technology. Do you have a miniute to answer a few questions ?

[Attempt to arrange a time for a callback if the respondent is busy. If they refuse ask if there is any other senior engineer that may have time]

How many years have you been a professional engineer?

_____ **[If less than five thank and terminate]**

We are conducting focus groups with technology intensive industries in order that we may better understand how new technology is aquired and disseminated. As part of this process we will conduct one of these groups with professional engineers to find out how they stay up-to-date concerning new advances after they have completed their formal schooling.

The group discussion is being commissioned by the Department of Industry, Science and Technology and your participation is voluntary. The session is scheduled for _____ , and will take about 2 hours. you will receive $50.00 for your time. Would you be willing to participate in this group discussion ?

YES...CONTINUE NO...THANK AND TERMINATE

Group 2: 8:00 pm [ ]

The group discussion will be held at _____. **{insert directions}**

NAME: _____

PHONE #: BUS: _____
RES: _____

RECRUITER: _____ DATE:_____

CONFIRMED BY: _____ DATE:_____

APPENDIX D

RE-ANALYSIS OF DATA FROM PATENT OFFICE STUDY

The study done for the Canadian Patent Office (CPO) surveyed mostly technical persons, i.e., scientist and engineers, working in a broad range of industry sectors in Canada. In making comparisons between the results of the two studies, it should be kept in mind that they used different respondent populations. The concerns of this group of respondents would be expected to deal primarily with technical issues whereas the respondents in the present study would be expected be concerned about a broader range of issues of importance to their companies. Tables 1 through 5 present some of the results from the CPO study concerning importance of different types of technical information and the sources used to obtain them. Results are shown for two particular industry segments, construction and electrical/electronics, as well as for the total respondent population, i.e., all industries. These three groups are roughly equivalent to the WD, EE, and GM groups who took part in the focus groups of the present study.

Table 1 shows the relative importance of different types of technical information. Information types related to improved processing operations, e.g., new production equipment, new materials/supplies, technical problem solving, and new production techniques, were rated as at least somewhat important by the greatest percentage of respondents. The least rated types of information were: basic scientific information and information associated with patents and licensing. Product related information, i.e., monitoring competitors and new product opportunities, were intermediate between the previous two types. The relatively high importance placed on improved processing operations by respondents to the CPO study are consistent with the importance placed on , "Controlling Costs", "Using Technology to Improve Operations" and "Better Technology in Products & Services" by focus groups participants in the present study.

Table 2 indicates the percentage of respondents who access different sources of technical information on a monthly basis or more often. The use of technical/trade journals, suppliers' brochures, and magazines for small business were all mentioned by the majority of respondents. Computer databases and patents were reported as being used less often. These results are consistent with the focus groups discussions and participants' ratings shown in Exhibit 7, i.e, sales literature, journals/magazines, and technology databases. The relatively low importance placed on licensing opportunities and patents in Tables 1 and 2 respectively is consistent with the low rating given to licensing opportunities seen in Exhibit 5, and with the focus group discussions.

Table 3 shows the relative importance of various types of individual as sources of technical information among the CPO survey respondents. The relatively higher rating for "suppliers", "professional contacts", and "customers/funding agencies" is consistent with the high rating for "sales people", and "word of mouth" by focus group participants. The lower ratings given to consultants, researchers, patent agents, and government agencies is consistent with the low rating given to "technology consultants" by focus group participants (Exhibit 7).

Table 4 shows the relative importance of various sources of technical information to

the respondents of the CPO study. The low ratings given to discussions concerning joint ventures and technology licensing are consistent with the current study results, both in the rating of "obtaining licenses to sell new products" shown Exhibit 5 and in the focus group discussions. About a quarter of the CPO study respondents indicated that they attend "Conferences and Seminars" at least monthly. This lends support to the importance of conferences/trade shows indicated by focus group participants (Exhibit 7).

Table 5 shows the percentages of CPO study respondents who indicated an increased use of various sources of technical information. The results support the findings of the current study that indicated an increased awareness and importance being attached to technology, and technical information.

About a quarter of the CPO study respondents indicated that they have increased their use of patents. The use of On-line computer databases is growing more rapidly than the other sources of technical information, albeit from a small base. Technical/trade journals and supplier literature show less growth in use, however, they are already among the most frequently used sources. The use of patents as sources of technical information is growing slower than other sources and, as seen from Table 1, it is growing from a relatively smaller base.

The remaining tables in this appendix provide detailed data which was collected from the CPO study.

TABLE 1

IMPORTANCE OF DIFFERENT TYPES OF ORGANIZATIONS / INDIVIDUALS AS SOURCES OF TECHNICAL INFORMATION TO SELECTED INDUSTRIES

(% Respondents Who Access Information Source At Least Monthly)

Source of Information	Electrical & Industry Sector		All Industries
	Construction	Electronics	
Suppliers	48	82	73
Professional Contacts	56	70	71
Customers, Funding Agencies	52	71	64
Consultants	26	28	28
University/College Researchers	12	35	24
NRC	17	29	21
Other Federal Gov. Depts	4	25	21
Patent Agents	4	26	16
Provincial Research Centre	8	20	16
DRIE	0	19	9

TABLE 2

IMPORTANCE OF VARIOUS SOURCES OF TECHNICAL INFORMATION TO SELECTED INDUSTRIES

(% Respondents Who Access Information Source At Least Monthly)

Source of Information	Electrical & Industry Sector		All Industries
	Construction	Electronics	
In-house Library	43	69	57
Outside Library	17	45	31
Conferences & Seminars	21	29	27
Site Visits	17	20	21
Discussions re. Joint Ventures	8	17	18
Discussions re. Technology Licencing	4	11	11

TABLE 3

IMPORTANCE OF DIFFERENT TYPES OF TECHNICAL INFORMATION TO SELECTED INDUSTRIES

(% Respondents For Whom Information Is At Least Somewhat Important)

Electrical & Industry Sector

Types of Information	Construction	Electronics	All Industries
New Production Equipment	75	83	93
New Materials/Supplies	92	95	93
Technical Problem Solving	67	96	85
New Production Techniques	71	87	84
Monitoring Competitors	73	92	80
New Product Opportunities	83	86	75
Basic Scientific Information	54	84	74
Avoiding Patent Infringement	50	88	66
Licencing Opportunities	52	71	60

TABLE 4

IMPORTANCE OF DIFFERENT TECHNICAL INFORMATION PRODUCTS TO SELECTED INDUSTRIES

(% Respondents Who Access Information Source At Least Monthly)

Electrical & Industry Sector

Source of Information	Construction	Electronics	All Industries
Technical and Trade Journals	74	96	88
Suppliers' Brochures	83	90	81
Magazines for Small Business	74	67	63
Patents	9	44	29
Computer Databases (Direct Access)	4	23	17
Computer Databases (via Intermediaries)	8	16	17

TABLE 5

CHANGES IN LEVEL OF USE OF VARIOUS INFORMATION SOURCES IN SELECTED INDUSTRIES

(% Respondents Who Have Increased Use of Information Source)

Electrical & Industry Sector

Source of Information	Construction	Electronics	All Industries
On-line Computer Databases	50	68	65
Technical & Trade Journals	35	50	37
Supplier Literature	14	34	31
Patents	11	35	26

Importance of Different Types of Information

Info for Staying Current	Industry Sector																					
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Basic Scientific Information																								
Very important.....	17	39	13	62	2	8	52	58	14	29	3	10	15	33	37	46	63	32	9	27	49	43	274	3
Somewhat important.....	13	30	6	29	11	46	26	29	11	22	14	48	17	38	30	38	77	39	13	39	41	36	259	3
Not very important.....	12	27	2	10	5	21	10	11	13	27	9	31	12	27	11	14	40	20	9	27	17	15	140	1
Not at all important.....	2	5	0	0	6	25	1	1	11	22	3	10	1	2	2	3	18	9	2	6	7	6	53	
Total.....	44	100	21	100	24	100	89	100	49	100	29	100	45	100	80	100	198	100	33	100	114	100	726	10
Technical Problem Solving Information																								
Very important.....	19	43	11	52	9	38	52	59	11	22	9	31	23	52	48	60	94	47	15	45	60	53	351	4
Somewhat important.....	12	27	8	38	7	29	30	34	24	48	11	38	16	36	29	36	78	39	12	36	40	35	267	3
Not very important.....	10	23	2	10	5	21	6	7	11	22	7	24	4	9	3	4	22	11	2	6	10	9	82	1
Not at all important.....	3	7	0	0	3	13	0	0	4	8	2	7	1	2	0	0	6	3	4	12	4	4	27	
Total.....	44	100	21	100	24	100	88	100	50	100	29	100	44	100	80	100	200	100	33	100	114	100	727	10
Examples of New Products in My Field																								
Very important.....	28	64	14	67	12	50	66	74	27	54	18	62	33	73	63	79	145	72	15	45	55	48	476	6
Somewhat important.....	9	20	5	24	8	33	16	18	16	32	10	34	11	24	16	20	46	23	14	42	39	34	190	2
Not very important.....	4	9	2	10	3	13	7	8	3	6	0	0	1	2	1	1	9	4	1	3	15	13	46	
Not at all important.....	3	7	0	0	1	4	0	0	4	8	1	3	0	0	0	0	1	0	3	9	6	5	19	
Total.....	44	100	21	100	24	100	89	100	50	100	29	100	45	100	80	100	201	100	33	100	115	100	731	10

Importance of Different Types of Information

Info for Staying Current	Industry Sector																					
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Info. to Identify Opportunities for Licensing New Products																								
Very important	11	24	7	35	6	26	25	28	10	21	10	34	16	36	26	33	67	34	6	19	25	22	209	29
Somewhat important	9	20	4	20	6	26	31	35	17	35	7	24	20	44	30	38	64	32	5	16	30	26	223	31
Not very important	14	31	5	25	7	30	25	28	15	31	9	31	8	18	18	23	47	24	13	42	35	30	196	27
Not at all important	11	24	4	20	4	17	7	8	6	13	3	10	1	2	5	6	22	11	7	23	25	22	95	13
Total	45	100	20	100	23	100	88	100	48	100	29	100	45	100	79	100	200	100	31	100	115	100	723	100
Info. Indicating State-of-the-Art in Areas of Technology																								
Very important	23	51	9	43	11	48	58	65	16	33	16	53	24	53	57	71	115	58	14	42	64	56	407	56
Somewhat important	10	22	9	43	8	35	25	28	18	38	8	27	17	38	15	19	64	32	13	39	37	32	224	31
Not very important	5	11	3	14	3	13	6	7	13	27	3	10	3	7	8	10	18	9	4	12	7	6	73	10
Not at all important	7	16	0	0	1	4	0	0	1	2	3	10	1	2	0	0	3	2	2	6	6	5	24	3
Total	45	100	21	100	23	100	89	100	48	100	30	100	45	100	80	100	200	100	33	100	114	100	728	100
Info. to Identify New Product Opportunities																								
Very important	11	25	7	33	8	35	48	54	15	31	9	30	24	55	42	53	100	50	7	23	40	35	311	43
Somewhat important	14	32	3	14	11	48	31	35	17	35	12	40	15	34	26	33	66	33	6	20	31	27	232	32
Not very important	13	30	8	38	3	13	6	7	12	25	6	20	5	11	10	13	25	12	8	27	25	22	121	17
Not at all important	6	14	3	14	1	4	4	4	4	8	3	10	0	0	2	3	10	5	9	30	19	17	61	8
Total	44	100	21	100	23	100	89	100	48	100	30	100	44	100	80	100	201	100	30	100	115	100	725	100

Importance of Different Types of Information

Competitiveness Info	Industry Sector																					
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Information to Monitor New Products of Competitors																								
Very important	21	48	5	24	7	30	58	65	26	52	17	59	30	67	51	64	112	56	11	33	40	34	378	52
Somewhat important	4	9	7	33	10	43	20	22	16	32	7	24	13	29	22	28	61	31	9	27	33	28	202	28
Not very important	15	34	7	33	4	17	8	9	3	6	5	17	2	4	7	9	19	10	8	24	27	23	105	14
Not at all important	4	9	2	10	2	9	3	3	5	10	0	0	0	0	0	0	7	4	5	15	16	14	44	6
Total	44	100	21	100	23	100	89	100	50	100	29	100	45	100	80	100	199	100	33	100	116	100	729	100
Descriptions of Current Competitive Products																								
Very important	18	41	9	45	7	29	51	57	25	50	17	59	31	69	52	65	122	61	10	30	51	44	393	54
Somewhat important	14	32	6	30	14	58	29	33	16	32	9	31	14	31	26	33	60	30	10	30	30	26	228	31
Not very important	8	18	4	20	0	0	5	6	3	6	3	10	0	0	2	3	15	8	10	30	24	21	74	10
Not at all important	4	9	1	5	3	13	4	4	6	12	0	0	0	0	0	0	2	1	3	9	10	9	33	5
Total	44	100	20	100	24	100	89	100	50	100	29	100	45	100	80	100	199	100	33	100	115	100	728	100
Descriptions of Forthcoming Competitive Products																								
Very important	17	40	9	43	12	50	55	62	27	54	20	69	31	69	59	74	130	65	15	45	50	43	425	58
Somewhat important	18	42	4	19	7	29	29	33	17	34	5	17	11	24	19	24	57	28	5	15	37	32	209	29
Not very important	5	12	6	29	2	8	2	2	3	6	4	14	3	7	2	3	12	6	10	30	19	16	68	9
Not at all important	3	7	2	10	3	13	3	3	3	6	0	0	0	0	0	0	2	1	3	9	10	9	29	4
Total	43	100	21	100	24	100	89	100	50	100	29	100	45	100	80	100	201	100	33	100	116	100	731	100

Frequency of Use of Different Sources of Information

Written Material	Industry Sector																					
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	
Info. to Avoid Infringements of Patents																								
Very important	14	32	8	40	5	23	37	42	18	36	9	31	20	44	40	50	82	41	10	30	26	23	269	
Somewhat important	8	18	5	25	6	27	29	33	12	24	10	34	15	33	30	38	58	29	3	9	34	30	210	2
Not very important	13	30	4	20	6	27	17	19	11	22	6	21	7	16	5	6	39	20	10	30	28	25	146	2
Not at all important	9	20	3	15	5	23	6	7	9	18	4	14	3	7	5	6	19	10	10	30	25	22	98	1
Total	44	100	20	100	22	100	89	100	50	100	29	100	45	100	80	100	198	100	33	100	113	100	723	10
Magazines for Small Business																								
Day	4	9	3	14	0	0	5	6	3	6	1	3	8	18	8	10	15	7	2	6	11	10	60	
Week	10	22	4	19	9	39	19	21	14	29	8	27	10	22	23	29	63	31	8	24	31	27	199	1
Month	15	33	5	24	8	35	24	27	19	39	13	43	12	27	22	28	46	23	8	24	35	31	207	2
Occ	15	33	5	24	3	13	27	30	8	16	6	20	12	27	16	21	52	26	6	18	32	28	182	2
Never	1	2	4	19	3	13	14	16	5	10	2	7	3	7	9	12	26	13	10	29	5	4	82	1
Total	45	100	21	100	23	100	89	100	49	100	30	100	45	100	78	100	202	100	34	100	114	100	730	10
Technical, Engineering or Trade Journals																								
Day	11	25	9	43	3	13	30	34	6	13	3	10	12	26	26	33	46	23	7	21	33	29	186	2
Week	14	32	7	33	6	26	36	40	12	25	7	24	16	35	36	46	73	37	16	47	34	30	257	3
Month	11	25	3	14	8	35	15	17	22	46	10	34	18	39	13	17	54	27	6	18	33	29	193	2
Occ	6	14	2	10	4	17	8	9	6	13	6	21	0	0	2	3	24	12	3	9	12	10	73	1
Never	2	5	0	0	2	9	0	0	2	4	3	10	0	0	1	1	3	2	2	6	3	3	18	
Total	44	100	21	100	23	100	89	100	48	100	29	100	46	100	78	100	200	100	34	100	115	100	727	10

Frequency of Use of Different Sources of Information

Written Material	Industry Sector																							
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Written Brochures of Equipment/Material Suppliers																								
Day	4	9	3	14	3	13	14	16	5	10	2	7	11	24	20	26	22	11	4	12	11	10	99	14
Week	18	40	8	38	8	35	21	24	13	27	3	10	16	36	25	32	77	39	13	38	48	42	250	34
Month	15	33	8	38	8	35	32	37	14	29	15	50	12	27	25	32	68	34	8	24	36	31	241	33
Occ	7	16	2	10	4	17	18	21	17	35	9	30	4	9	7	9	31	16	6	18	17	15	122	17
Never	1	2	0	0	0	0	2	2	0	0	1	3	2	4	1	1	2	1	3	9	3	3	15	2
Total	45	100	21	100	23	100	87	100	49	100	30	100	45	100	78	100	200	100	34	100	115	100	727	100
Patent Information																								
Day	2	5	0	0	0	0	7	8	1	2	1	3	1	2	1	1	3	2	0	0	3	3	19	3
Week	2	5	4	19	0	0	15	17	3	6	0	0	2	4	9	12	12	6	1	3	2	2	50	7
Month	6	14	5	24	2	9	22	25	6	12	2	7	11	24	24	31	38	19	2	6	17	15	135	19
Occ	13	30	9	43	7	32	34	38	22	45	20	69	24	52	31	40	92	46	15	44	51	44	318	44
Never	21	48	3	14	13	59	11	12	17	35	6	21	8	17	12	16	54	27	16	47	42	37	203	28
Total	44	100	21	100	22	100	89	100	49	100	29	100	46	100	77	100	199	100	34	100	115	100	725	100
Internal Organization Library																								
Day	9	20	6	30	2	9	16	18	2	4	1	3	11	24	12	15	31	16	9	26	21	18	120	17
Week	5	11	8	40	4	17	27	30	8	16	2	7	9	20	21	27	33	17	7	21	28	24	152	21
Month	11	24	3	15	4	17	20	22	5	10	4	13	4	9	21	27	35	18	7	21	21	18	135	19
Occ	7	16	1	5	6	26	20	22	14	29	7	23	12	27	17	22	62	31	6	18	28	24	180	25
Never	13	29	2	10	7	30	6	7	20	41	16	53	9	20	7	9	36	18	5	15	17	15	138	19
Total	45	100	20	100	23	100	89	100	49	100	30	100	45	100	78	100	197	100	34	100	115	100	725	100

Frequency of Use of Different Sources of Information

Written Material	Industry Sector																					
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector		Total	
																					Services		n	%
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%		
Other Library																								
Day	1	2	1	5	0	0	2	2	1	2	0	0	0	0	1	1	2	1	0	0	4	3	12	
Week	3	7	4	19	0	0	11	13	1	2	0	0	5	11	6	8	8	4	6	19	19	17	63	
Month	8	18	3	14	4	17	20	23	2	4	3	10	7	16	28	36	35	18	5	16	32	28	147	2
Occ	17	38	13	62	10	43	44	50	19	40	9	30	24	53	35	45	113	57	14	44	47	41	345	4
Never	16	36	0	0	9	39	11	13	25	52	18	60	9	20	8	10	42	21	7	22	13	11	158	2
Total	45	100	21	100	23	100	88	100	48	100	30	100	45	100	78	100	200	100	32	100	115	100	725	10
Feedback from Customers or Funding Agencies																								
Day	7	16	2	10	2	9	19	21	5	10	5	17	12	26	9	12	37	18	4	12	22	19	124	1
Week	12	27	3	14	6	26	20	22	11	22	3	10	10	22	22	28	51	25	5	15	28	25	171	2
Month	8	18	9	43	4	17	21	24	10	20	3	10	16	35	24	31	49	24	8	24	25	22	177	2
Occ	13	29	5	24	9	39	21	24	17	35	15	50	7	15	19	24	52	26	9	26	33	29	200	2
Never	5	11	2	10	2	9	8	9	6	12	4	13	1	2	4	5	12	6	8	24	6	5	58	
Total	45	100	21	100	23	100	89	100	49	100	30	100	46	100	78	100	201	100	34	100	114	100	730	10
Contact with Patent Agent																								
Day	0	0	0	0	0	0	0	0	1	2	1	3	1	2	0	0	2	1	0	0	1	1	6	
Week	0	0	1	5	0	0	6	7	0	0	1	3	1	2	7	9	6	3	0	0	1	1	23	
Month	6	13	2	10	1	4	13	15	6	12	1	3	9	20	13	17	24	12	4	12	11	10	90	1
Occ	13	29	7	33	6	26	40	45	15	31	10	33	23	50	39	50	84	42	10	29	36	32	283	3
Never	26	58	11	52	16	70	30	34	27	55	17	57	12	26	19	24	86	43	20	59	65	57	329	4
Total	45	100	21	100	23	100	89	100	49	100	30	100	46	100	78	100	202	100	34	100	114	100	731	10

Frequency of Use of Different Sources of Information

Personal Contacts	Industry Sector																					
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Conversations with Equipment/Material Suppliers																								
Day	7	16	2	10	5	22	8	9	8	16	2	7	14	31	13	17	36	18	6	18	14	12	115	1(
Week	10	22	6	29	5	22	18	20	13	27	7	23	11	24	28	36	60	30	7	21	30	26	195	2
Month	20	44	6	29	1	4	33	37	13	27	9	30	13	29	23	29	56	28	8	24	35	31	217	3(
Occ	6	13	7	33	11	48	23	26	14	29	10	33	7	16	13	17	47	23	7	21	31	27	176	2
Never	2	4	0	0	1	4	7	8	1	2	2	7	0	0	1	1	3	1	5	15	4	4	26	4
Total	45	100	21	100	23	100	89	100	49	100	30	100	45	100	78	100	202	100	33	100	114	100	729	10(
Conversations with Friends/Colleagues in Other Firms																								
Day	8	18	5	24	4	17	10	11	10	20	3	10	7	15	8	10	27	13	8	24	16	14	106	1
Week	13	29	7	33	6	26	27	30	10	20	5	17	14	30	25	32	62	31	8	24	36	31	213	2
Month	14	31	4	19	3	13	27	30	17	35	6	20	14	30	22	28	60	30	5	15	34	30	206	2
Occ	8	18	5	24	9	39	24	27	8	16	15	50	11	24	21	27	49	24	10	29	27	23	187	2
Never	2	4	0	0	1	4	1	1	4	8	1	3	0	0	2	3	4	2	3	9	2	2	20	
Total	45	100	21	100	23	100	89	100	49	100	30	100	46	100	78	100	202	100	34	100	115	100	732	10(
Conferences and Seminars																								
Day	0	0	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Week	1	2	1	5	0	0	7	8	0	0	1	3	1	2	2	3	3	1	3	9	2	2	21	
Month	13	29	6	29	5	21	23	26	8	16	1	3	16	35	20	26	50	25	7	21	28	25	177	2
Occ	28	62	11	52	16	67	55	62	34	69	25	86	27	59	51	65	138	68	21	62	77	68	483	6
Never	3	7	2	10	3	13	4	4	7	14	2	7	2	4	5	6	11	5	3	9	6	5	48	
Total	45	100	21	100	24	100	89	100	49	100	29	100	46	100	78	100	202	100	34	100	113	100	730	10(

Frequency of Use of Different Sources of Information

Personal Contacts	Industry Sector																							
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Contact with University/College Researchers																								
Day	0	0	0	0	0	0	1	1	0	0	0	0	2	4	0	0	4	2	0	0	0	0	7	1
Week	7	16	3	14	1	4	3	3	3	6	1	3	1	2	6	8	8	4	3	9	11	10	47	6
Month	6	13	6	29	2	8	21	24	1	2	3	10	6	13	21	27	32	16	4	12	24	21	126	17
Occ	24	53	9	43	10	42	44	49	25	51	12	40	30	65	36	47	108	54	16	47	54	47	368	50
Never	8	18	3	14	11	46	20	22	20	41	14	47	7	15	14	18	49	24	11	32	26	23	183	25
Total	45	100	21	100	24	100	89	100	49	100	30	100	46	100	77	100	201	100	34	100	115	100	731	100
Contact with Consultants																								
Day	0	0	1	5	2	9	0	0	0	0	0	0	2	4	1	1	2	1	0	0	4	3	12	2
Week	4	9	3	14	1	4	3	3	2	4	0	0	6	13	6	8	11	5	3	9	16	14	55	8
Month	7	16	4	19	3	13	16	18	6	13	2	7	8	17	15	19	35	17	8	24	28	24	132	18
Occ	25	56	12	57	13	57	50	57	30	63	23	77	25	54	45	58	117	58	14	41	53	46	407	56
Never	9	20	1	5	4	17	18	21	10	21	5	17	5	11	10	13	37	18	9	26	14	12	122	17
Total	45	100	21	100	23	100	87	100	48	100	30	100	46	100	77	100	202	100	34	100	115	100	728	100
Visits to Other Plants/Research Sites																								
Day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0	0	1	1	4	1
Week	2	4	2	10	1	4	4	5	2	4	0	0	2	4	3	4	6	3	1	3	4	4	27	4
Month	9	20	5	24	3	13	18	20	4	8	0	0	7	15	12	15	36	18	5	15	15	13	114	16
Occ	31	69	10	48	16	67	59	67	38	78	24	80	32	70	53	68	138	69	20	59	75	66	496	68
Never	3	7	4	19	4	17	7	8	5	10	6	20	5	11	9	12	19	9	8	24	19	17	89	12
Total	45	100	21	100	24	100	88	100	49	100	30	100	46	100	78	100	201	100	34	100	114	100	730	100

Frequency of Use of Different Sources of Information

Government Contacts	Industry Sector																					
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Contact with DRIE																								
Day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	.1	1	0
Week	1	2	0	0	0	0	0	0	2	4	0	0	0	0	3	4	2	1	0	0	2	2	10	1
Month	1	2	3	14	0	0	3	3	2	4	1	3	5	11	12	15	13	7	4	12	12	10	56	8
Occ	19	43	10	48	10	42	29	33	21	43	16	53	27	59	37	47	84	42	8	24	39	34	300	41
Never	23	52	8	38	14	58	57	64	24	49	13	43	14	30	26	33	100	50	22	65	61	53	362	50
Total	44	100	21	100	24	100	89	100	49	100	30	100	46	100	78	100	199	100	34	100	115	100	729	100
Contact with Provincial Research/Innovation Centre																								
Day	0	0	0	0	0	0	0	0	1	2	0	0	2	4	0	0	1	1	0	0	1	1	5	1
Week	2	4	1	5	0	0	1	1	2	4	0	0	0	0	4	5	4	2	1	3	4	4	19	3
Month	7	16	3	14	2	8	7	8	2	4	0	0	7	15	12	15	28	14	3	9	16	14	87	12
Occ	23	51	13	62	7	29	45	51	25	51	13	43	32	70	36	46	100	50	14	41	53	46	361	49
Never	13	29	4	19	15	63	36	40	19	39	17	57	5	11	26	33	67	34	16	47	40	35	258	35
Total	45	100	21	100	24	100	89	100	49	100	30	100	46	100	78	100	200	100	34	100	114	100	730	100
Contact with NRC or CISTI																								
Day	1	2	0	0	0	0	2	2	0	0	0	0	0	0	2	3	3	1	0	0	5	4	13	2
Week	2	4	1	5	0	0	6	7	2	4	0	0	2	4	6	8	7	3	5	15	2	2	33	5
Month	3	7	4	19	4	17	7	8	0	0	0	0	12	26	16	21	27	13	3	9	24	21	100	14
Occ	16	36	7	33	6	25	42	47	24	49	11	37	26	57	34	44	88	44	13	38	49	43	316	43
Never	23	51	9	43	14	58	32	36	23	47	19	63	6	13	20	26	76	38	13	38	35	30	270	37
Total	45	100	21	100	24	100	89	100	49	100	30	100	46	100	78	100	201	100	34	100	115	100	732	100

Frequency of Use of Different Sources of Information

External Sources	Industry Sector																							
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Other Federal/Provincial Government Departments																								
Day	1	2	0	0	0	0	1	1	0	0	0	0	1	2	1	1	1	1	0	0	1	1	6	1
Week	5	11	1	5	0	0	1	1	0	0	0	0	1	2	7	9	12	6	3	9	10	9	40	5
Month	6	13	8	38	1	4	17	19	4	8	1	3	10	22	12	15	13	7	7	21	27	23	106	15
Occ	22	49	10	48	15	63	46	52	31	63	14	47	28	61	38	49	121	61	11	32	49	43	385	53
Never	11	24	2	10	8	33	24	27	14	29	15	50	6	13	20	26	51	26	13	38	28	24	192	26
Total	45	100	21	100	24	100	89	100	49	100	30	100	46	100	78	100	198	100	34	100	115	100	729	100
Joint Ventures with Other Firms																								
Day	0	0	0	0	0	0	2	2	0	0	0	0	3	7	2	3	1	0	0	0	0	0	8	1
Week	2	4	4	19	0	0	2	2	1	2	0	0	3	7	5	6	10	5	3	9	5	4	35	5
Month	5	11	7	33	2	8	10	11	4	8	2	7	2	4	6	8	22	11	5	15	19	17	84	12
Occ	14	31	9	43	8	33	41	46	26	53	10	33	22	48	39	51	82	41	14	41	52	46	317	43
Never	24	53	1	5	14	58	34	38	18	37	18	60	16	35	25	32	86	43	12	35	38	33	286	39
Total	45	100	21	100	24	100	89	100	49	100	30	100	46	100	77	100	201	100	34	100	114	100	730	100
Contacts Regarding Licensing of Technology																								
Day	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2	1	0	0	0	0	4	1
Week	1	2	1	5	0	0	4	5	0	0	0	0	1	2	1	1	6	3	0	0	1	1	15	2
Month	1	2	2	10	1	4	8	9	0	0	0	0	5	11	8	10	19	9	3	9	8	7	55	8
Occ	15	33	8	38	9	38	38	43	19	40	12	40	21	46	43	55	86	43	9	26	46	40	306	42
Never	28	62	10	48	14	58	36	41	29	60	18	60	19	41	26	33	88	44	22	65	59	52	349	48
Total	45	100	21	100	24	100	88	100	48	100	30	100	46	100	78	100	201	100	34	100	114	100	729	100

Frequency of Use of Different Sources of Information

External Sources	Industry Sector																							
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Computer Databases Accessed by Someone Else																								
Day	1	2	1	5	0	0	3	3	0	0	1	3	1	2	2	3	7	3	3	9	2	2	21	
Week	3	7	2	10	0	0	7	8	4	8	1	3	1	2	3	4	6	3	1	3	1	1	29	
Month	3	7	4	19	2	8	13	15	5	10	0	0	6	13	7	9	16	8	4	12	16	14	76	1
Occ	14	31	7	33	7	29	35	39	9	19	7	23	20	44	37	48	67	33	10	29	48	42	261	3
Never	24	53	7	33	15	63	31	35	30	63	21	70	17	38	28	36	106	52	16	47	47	41	342	4
Total	45	100	21	100	24	100	89	100	48	100	30	100	45	100	77	100	202	100	34	100	114	100	729	10
Computer Databases Accessed Directly																								
Day	3	7	1	5	1	4	9	10	1	2	1	3	0	0	6	8	9	5	2	6	5	4	38	
Week	1	2	3	14	0	0	9	10	1	2	0	0	2	4	3	4	11	6	2	6	4	4	36	
Month	3	7	4	19	0	0	4	5	5	10	2	7	2	4	8	11	9	5	0	0	14	12	51	
Occ	6	13	4	19	4	17	17	19	9	19	6	20	7	16	18	24	30	15	3	9	25	22	129	1
Never	32	71	9	43	19	79	49	56	32	67	21	70	34	76	41	54	141	71	27	79	66	58	471	6
Total	45	100	21	100	24	100	88	100	48	100	30	100	45	100	76	100	200	100	34	100	114	100	725	10
Other Important Sources																								
Day	0	0	0	0	0	0	1	6	1	17	0	0	1	17	2	40	2	5	1	17	3	19	11	1
Week	1	13	1	33	0	0	3	17	2	33	0	0	2	33	0	0	11	30	4	67	2	13	26	2
Month	0	0	1	33	0	0	7	39	0	0	1	20	5	83	1	20	12	32	1	17	5	31	33	3
Occ	1	13	0	0	1	25	2	11	0	0	0	0	0	0	1	20	7	19	2	33	4	25	18	1
Never	9	113	2	67	4	100	9	50	8	133	7	140	0	0	1	20	19	51	2	33	7	44	68	6
Total	8	100	3	100	4	100	18	100	6	100	5	100	6	100	5	100	37	100	6	100	16	100	114	10

Usefulness of Different Sources Compared to 5 Years Ago

Source of Information	Industry Sector																				Industry Sector		Total	
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Services		n	%
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Supplier Literature																								
More	12	29	3	14	3	14	20	26	13	29	10	38	19	44	25	34	65	34	6	21	31	29	207	31
Same	26	63	18	86	16	76	47	62	28	62	14	54	23	53	46	62	117	61	21	75	72	67	428	63
Less	3	7	0	0	2	10	9	12	4	9	2	8	1	2	3	4	11	6	1	4	4	4	40	6
Total	41	100	21	100	21	100	76	100	45	100	26	100	43	100	74	100	193	100	28	100	107	100	675	100
Technical/Engineering or Trade Journals																								
More	13	33	6	30	7	35	26	31	12	27	11	39	15	35	38	50	72	39	9	29	41	39	250	37
Same	26	67	13	65	12	60	55	65	31	69	16	57	26	60	34	45	110	59	21	68	62	58	406	60
Less	0	0	1	5	1	5	3	4	2	4	1	4	2	5	4	5	5	3	1	3	3	3	23	3
Total	39	100	20	100	20	100	84	100	45	100	28	100	43	100	76	100	187	100	31	100	106	100	679	100
Patent Information																								
More	8	38	2	13	1	11	20	30	5	20	2	10	13	39	21	35	31	24	0	0	13	24	116	26
Same	11	52	9	60	7	78	42	63	17	68	15	75	17	52	32	53	81	63	9	64	32	59	272	61
Less	2	10	4	27	1	11	5	7	3	12	3	15	3	9	7	12	16	13	5	36	9	17	58	13
Total	21	100	15	100	9	100	67	100	25	100	20	100	33	100	60	100	128	100	14	100	54	100	446	100

Usefulness of Different Sources Compared to 5 Years Ago

Source of Information	Industry Sector																					
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Online Computer Databases																								
More	16	73	12	67	4	50	40	69	16	55	7	50	18	72	36	68	68	62	13	76	46	64	276	65
Same	5	23	5	28	4	50	17	29	9	31	4	29	6	24	15	28	36	33	3	18	19	26	123	29
Less	1	5	1	6	0	0	1	2	4	14	3	21	1	4	2	4	5	5	1	6	7	10	26	6
Total	22	100	18	100	8	100	58	100	29	100	14	100	25	100	53	100	109	100	17	100	72	100	425	100
Knowledge From New Employees																								
More	5	17	3	18	4	22	13	19	12	31	4	17	15	39	20	27	41	24	6	22	22	27	145	25
Same	22	76	13	76	13	72	48	69	24	62	18	75	22	58	46	63	106	63	17	63	50	61	379	65
Less	2	7	1	6	1	6	9	13	3	8	2	8	1	3	7	10	21	13	4	15	10	12	61	10
Total	29	100	17	100	18	100	70	100	39	100	24	100	38	100	73	100	168	100	27	100	82	100	585	100
New/Enhanced Products or Processes																								
Regularly	29	64	12	57	11	46	60	69	23	46	13	43	32	73	59	76	142	71	21	62	65	58	467	64
Occasionally	8	18	9	43	10	42	20	23	20	40	13	43	12	27	18	23	45	23	8	24	35	31	198	27
Almost Never	3	7	0	0	2	8	6	7	3	6	2	7	0	0	1	1	7	4	1	3	10	9	35	5
Never	5	11	0	0	1	4	1	1	4	8	2	7	0	0	0	0	5	3	4	12	3	3	25	3
Total	45	100	21	100	24	100	87	100	50	100	30	100	44	100	78	100	199	100	34	100	113	100	725	100

Frequency of Specific Technology Monitoring

Type of Information	Industry Sector																					
	Agr/ Forest/ Fish		Mining		Construction		Drugs/ Chemicals		Metallurgy		Textiles/ Paper		Mechanical, Heating/Cooling Equipment		Electrical/ Electronics		Other Manufacturing		Trans/ Comm/ P. Util.		Industry Sector Services		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
New Materials/Supplies																								
Regularly	23	51	8	40	16	67	49	56	21	42	16	53	26	59	57	73	135	68	18	53	57	50	426	59
Occasionally	15	33	12	60	6	25	34	39	23	46	10	33	17	39	17	22	57	29	9	26	45	40	245	34
Almost Never	4	9	0	0	1	4	2	2	3	6	4	13	1	2	3	4	5	3	2	6	7	6	32	4
Never	3	7	0	0	1	4	2	2	3	6	0	0	0	0	1	1	1	1	5	15	4	4	20	3
Total	45	100	20	100	24	100	87	100	50	100	30	100	44	100	78	100	198	100	34	100	113	100	723	100
New Production Tools/Machinery																								
Regularly	18	40	6	29	10	42	26	30	23	46	15	50	19	43	30	38	99	50	11	32	29	26	286	39
Occasionally	20	44	13	62	8	33	37	43	20	40	11	37	22	50	35	45	79	40	13	38	46	41	304	42
Almost Never	3	7	2	10	4	17	18	21	6	12	4	13	3	7	10	13	15	8	2	6	28	25	95	13
Never	4	9	0	0	2	8	6	7	1	2	0	0	0	0	3	4	6	3	8	24	10	9	40	6
Total	45	100	21	100	24	100	87	100	50	100	30	100	44	100	78	100	199	100	34	100	113	100	725	100
New Techniques for Producing Existing Products																								
Regularly	24	53	11	52	9	38	40	46	23	46	17	57	19	43	36	46	108	54	9	26	33	29	329	45
Occasionally	14	31	8	38	8	33	39	45	21	42	9	30	25	57	32	41	72	36	12	35	42	37	282	39
Almost Never	5	11	2	10	4	17	8	9	4	8	4	13	0	0	7	9	13	7	6	18	23	20	76	10
Never	2	4	0	0	3	13	0	0	2	4	0	0	0	0	3	4	6	3	7	21	15	13	38	5
Total	45	100	21	100	24	100	87	100	50	100	30	100	44	100	78	100	199	100	34	100	113	100	725	100