RESULTS OF THE SURVEY ON HUMAN RESOURCE ISSUES IN THE INFORMATION TECHNOLOGY INDUSTRY

Results of the Survey on Human Resource Issues in The Information Technology Industry

EXECUTIVE SUMMARY

The Survey on Human Resource Issues in the Information Technology Industry was undertaken by Statistics Canada on behalf of Industry Canada during the Spring and Summer of 1997. Its purpose was to examine the issues confronting small and large Canadian information technology (IT) companies across the country, in terms of their recruitment, retention and training of highly-skilled workers. The survey was also intended to determine how and to what extent IT companies are responding to these issues, as well as to provide a profile of their labour force.

In terms of methodology, a random sample of 1,174 IT companies was drawn. 826 companies responded to the survey, through telephone interviews, resulting in a response rate of 70.4%.

The report below serves to present the findings of the survey. The main findings can be summarized as follows:

- 46% of all IT workers in Canada are considered by companies to be "highly-skilled". 85% of these highly-skilled workers are full-time employees, while 12% are contract employees and 3% are part-time employees.

- 55% of highly-skilled IT workers in Canada have some form of university education. 34% have a college education.

- 49% of all recent new hires of highly-skilled workers by IT companies come from within the IT industry.

- 65% of surveyed IT companies reported no current vacant positions for highly-skilled workers. The average vacancy rate for highly-skilled positions in Canadian IT companies is 5.2%.

- Over the past two years, 85% of Canadian IT companies have hired highly-skilled workers. Over the next two years, 77% foresee that their demand for highly-skilled workers will grow, and 88% feel that requirements for highly-skilled workers by the IT sector as a whole will increase.

- 43% of Canadian IT companies recruit in other provinces and 21% recruit in other countries.

- The most common methods of recruiting highly-skilled workers are advertising in newspapers, employee referrals, and informal networking. The least common methods include Canada Employment Centres, job fairs and the National Graduate Registry.

- Canadian IT companies have a greater degree of difficulty in recruiting highly-skilled workers to fill professional level positions, than for entry level positions.

- Canadian IT companies find the lack of applicants with relevant work experience, and the lack of applicants with educational or technical qualifications, to be the most significant factors, relative to others, contributing to difficulties in recruiting highly-skilled workers. Ranked much lower as factors were other countries or other industries offering better salaries and compensation.

- When confronted with difficulties recruiting highly-skilled workers, Canadian IT companies tend to extend the recruitment period, train existing personnel, encourage overtime and reorganize the work.

- 35% of Canadian IT companies feel that it will be more difficult to recruit highly-skilled workers in the next two years. 65% feel that it will either remain the same or be easier.

- 29% of Canadian IT companies feel that difficulties in recruiting highly-skilled workers is having a significant effect on their ability to take advantage of growth opportunities. 71% identify either moderate or no effect.

- 54% of Canadian IT companies are having no difficulty retaining their highly-skilled workers. 44% are having either a moderate or high degree of difficulty.

- 84% of Canadian IT companies provide formal training to their highly-skilled workers. The majority of companies pay all or part of course fees and training material and send employees to conferences, seminars and trade shows.

- Over the past year, 50% of Canadian IT companies have increased the amount of formal training they provide to highly-skilled workers. 49% of companies feel that training has had a significant effect on the job performance of highly-skilled workers, and 48% feel that it has had a moderate effect.

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PART 1. PURPOSE AND METHODOLOGY

There is widespread concern in the Canadian information technology (IT) industry that the demand for IT workers is outstripping supply, and that this deficit is disproportionately comprised of the highly-skilled, educated and trained. The industry feels that shortages of highly-skilled workers has deleterious effects on their capacity to conduct aggressive R&D programs and to grow rapidly enough to seize upon emerging market and product opportunities.

For these reasons, the Information and Communications Technologies (ICTS) Branch of Industry Canada   'racted with Statistics Canada for a survey examining the key human resource (HR) issues co   onting companies in the Canadian IT industry. The survey was intended to address such issues as the recruitment, retaining and training of highly-skilled workers, and the measures that companies are adopting to overcome difficulties in these areas. As well, the survey provides a profile of the industry's labour force.

The survey was undertaken n the spring and summer of 1997. Telephone interviews were conducted, involving a random sample of 1,174 IT enterprises. The sample was stratified by geographic region and by company size, the latter in terms of number of employees at the enterprise level. Two company sizes were chosen: those with ≥10 and ≤100 employees ('small' companies), and those with >100 employees ('large' companies). 826 enterprises (689 small, 137 large) responded to the survey, resulting in a response rate of 70.4% (please see Part 7, Technical Notes, for further details on the survey methodology).

The report below serves to present the results of the survey (aussi disponible en français). It will also be made available electronically, at http://strategis.ic.gc.ca/networks, and at http://strategis.ic.gc.ca/reseaux.

For further information, please contact Tom Wudwud (613-952-8415) or Andrew Parker (613-952-9115) of the ICTS Branch of Industry Canada.

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PART 2. IT LABOUR FORCE PROFILE

A. Overall Worker Status

Based on survey data. Statistics Canada estimates that total employment among IT companies with 10 or more employees and annual revenues over $250,000 is 192,225. Of this total, 88,413 (or 46%) can be classified as 'highly-skilled'. For the purposes of the survey, a highly-skilled worker refers to a person who uses advanced technical training, education or knowledge to develop IT-related products or services.

The vast majority of highly-skilled workers in the Canadian IT sector are full-time employees (85%). 12% are contract workers and 3% are part-time workers.

During the reporting period (i.e. companies' most recently completed fiscal years), 16,993 full-time and part-time highly-skilled workers were hired, while 8,893 departed, resulting in a net inflow of 8,100 workers (data on new hires and departures of contract workers is not available).

1. Full-Time Workers

Table 1

Background on full-time workers in the Canadian IT sector				
	% of workers who are full-time	% of full-time workers who are highly-skilled	% of fths* workers who were hired during reporting period	% of fths workers who left during reporting period
Canada	**90%**	**44%**	**22%**	**11%**
Atlantic	91%	53%	27%	17%
Ontario	90%	39%	21%	11%
Pacific	93%	53%	22%	12%
Prairies	88%	47%	25%	11%
Quebec	92%	51%	22%	11%
Small Companies (Canada)	87%	50%	28%	14%
Large Companies (Canada)	93%	39%	15%	7%
Note: fths = full-time highly-skilled workers				

Table 1 shows that approximately 90% (173,192) of employees in the Canadian IT sector are full-time employees. 44% (75,703) are considered by the IT sector to be 'highly-skilled'. Of the full-time highly-skilled workers, 22% (16,357) were hired during the reporting period and 11% (8,376) departed, resulting in a net increase of 7,981 full-time jobs.

In the Atlantic region, there was a higher turnover of full-time highly-skilled workers; 27% were hired during the reporting period and 17% departed.

A slightly greater percentage of workers employed with large IT companies are full-time, as

compared to small IT companies (93% vs. 87%). However, 50% of full-time workers in small IT companies are highly-skilled. compared to 39% in large IT companies.

Small IT companies have a higher turnover of full-time highly-skilled workers than large IT companies; 28% were hired during the reporting period and 14% departed.

2.   Part-Time Workers

Table 2

Background on part-time workers in the Canadian IT sector				
	% of workers who are part-time	% of part-time workers who are highly-skilled	% of pths* workers who were hired during reporting period	% of pths workers who left during reporting period
Canada	5%	27%	27%	22%
Atlantic	5%	18%	67%	44%
Ontario	4%	35%	22%	17%
Pacific	4%	20%	31%	17%
Prairies	8%	6%	27%	25%
Quebec	3%	24%	58%	52%
Small Companies (Canada)	5%	34%	19%	14%
Large Companies (Canada)	4%	17%	49%	44%
Note: pths = part-time highly-skilled workers				

As seen in Table 2. approximately 5% (8.652) of workers in the Canadian IT sector are part-time employees. Of those, 27% (2.327) are considered highly-skilled. 27% (635) were hired during the reporting period, and 22% (516) departed.

There are some noticeable differences between part-time, highly-skilled workers employed in small IT companies and those employed in large IT companies in Canada. There is a greater percentage of part-time workers in small IT companies who are highly-skilled than those in large IT companies (34% vs. 17%). Conversely. there is a higher turnover of part-time highly-skilled workers in large IT companies than in small IT companies.

Turnover of part-time highly-skilled workers is also most pronounced in the Atlantic region and Quebec.

3.   Contract Workers

Table 3

Percent of total IT employees who are contract workers	
Canada	5%
Atlantic	4%
Ontario	6%
Pacific	3%
Prairies	4%
Quebec	5%
Small Companies (Canada)	8%
Large Companies (Canada)	3%

Table 3 shows that 5% (10.382) of employees in the IT sector are contract workers.   The percentage varies from 8% (7.098) for small companies to 3% (3.283) for large companies. As can be seen from the table, there are very minor differences in the numbers regionally.

B. Education and Work Experience of Highly-Skilled Workers

43% of highly-skilled workers in Canada have a B.A. or B.Sc. as their highest level of education. followed by 34% who hold college or vocational certificates. There are 12% who possess graduate degrees. either a M.A./M.Sc. or Ph.D. (Figure 1).

Figure 1

Highest level of education among highly-skilled workers in Canada
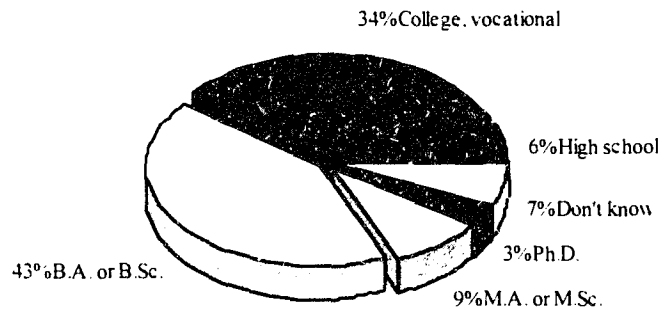
34%College. vocational

6%High school

7%Don't know

3%Ph.D.

9%M.A. or M.Sc.

43%B.A. or B.Sc.

Table 4

Highest level of education among highly-skilled workers in the Canadian IT sector						
	B.A. or B.Sc.	College, vocational	M.A. or M.Sc.	High school diploma	Ph.D.	Don't know
Canada	**43%**	**34%**	**9%**	**6%**	**3%**	**7%**
Atlantic	42%	43%	5%	3%	2%	5%
Ontario	42%	31%	9%	6%	4%	9%
Pacific	40%	37%	9%	4%	3%	7%
Prairies	44%	37%	6%	7%	2%	4%
Quebec	44%	36%	10%	6%	2%	4%
Small Companies (Canada)	42%	34%	9%	6%	3%	7%
Large Companies (Canada)	46%	34%	9%	6%	3%	3%

There is very little difference in the education level of highly-skilled workers between sma' ⁻d large companies, and amongst regions, in Canada. The largest difference relates to highly-skilled workers in Ontario having college or vocational school as their highest . education, as opposed to 43% for the Atlantic region (Table 4).

Table 5

Of the highly-skilled workers that were hired during the reporting period, immediately prior to joining your company, what percentage were...					
	Employed in IT	Recent Graduates	Not Employed in IT	Unemployed	Don't know
Canada	**49%**	**28%**	**10%**	**4%**	**9%**
Atlantic	32%	42%	13%	7%	6%
Ontario	52%	25%	10%	4%	10%
Pacific	53%	25%	9%	4%	9%
Prairies	44%	30%	13%	4%	9%
Quebec	49%	32%	8%	3%	8%
Small Companies (Canada)	50%	28%	9%	4%	9%
Large Companies (Canada)	44%	27%	17%	3%	9%

As observed in Table 5, 49% of the highly-skilled workers hired during the reporting period were previously employed within the IT industry in Canada, while 28% were recent graduates and 10% were employed in an industry other than IT.

Regional differences are most pronounced for workers previously employed in IT (accounting for 53% of new hires in the Pacific region and 32% in the Atlantic region) and for recent graduates (accounting for 42% of new hires in the Atlantic region and 25% in Ontario and the Pacific region).

It is also evident that large IT companies had a greater tendency than small IT companies to hire workers who were not previously employed in the IT sector (17% vs. 9%).

C. Current and Projected Demand for Highly-Skilled Workers

Of the 826 IT companies surveyed, 65% (535) currently have no vacant highly-skilled positions. 69% of small IT companies reported no vacancies, compared to 46% for large IT companies (Table 6). It is estimated that the average vacancy rate for highly-skilled positions in Canadian IT companies is 5.2%. The average vacancy rate varies from 9.9% in the Atlantic region to 4.5% in the Prairie region.

Table 6

What percentage of highly-skilled positions in your company is currently vacant?			
	Canada	Small Companies	Large Companies
No vacant positions (0%)	65%	69%	46%
1% - 5%	12%	9%	25%
6% - 10%	9%	8%	17%
11% - 20%	8%	7%	8%
21% - 50%	5%	5%	4%
> 50%	1%	1%	1%

As shown in Figure 2, 77% of Canadian IT companies feel that their demand for highly-skilled workers will grow in the next two years, while 21% predict that it will remain stable. Only 2% of Canadian IT companies view that their demand for highly-skilled workers will decline.
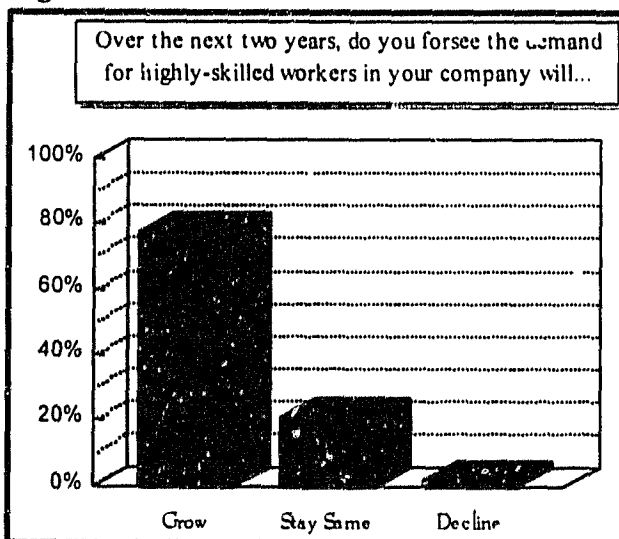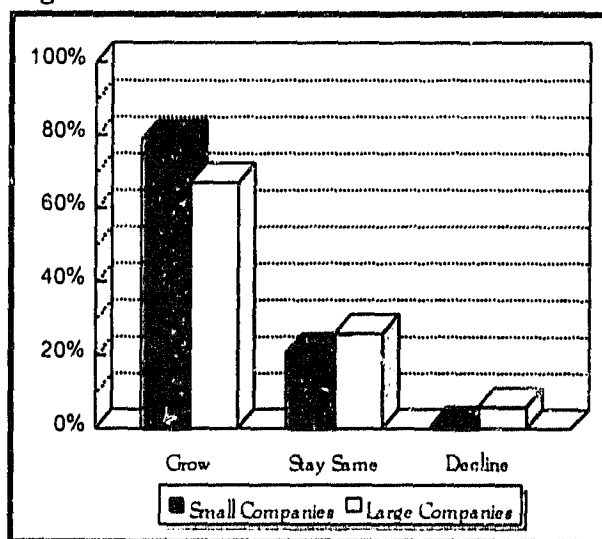
Figure 2

Figure 3

Figure 3 shows that 79% of small IT companies in Canada feel that their demand for highly-skilled workers will grow in the next two years. The corresponding figure for large companies

is 67%.

88% of companies foresee an increase in the demand for highly-skilled workers by the IT sector as a whole. 11% foresee the demand by the industry staying the same, and 1% predict it will decrease (Figure 4).

A higher percentage (90%) of small companies feel that future demand by the IT sector for highly-skilled workers will increase, as opposed to large companies (81%) (Figure 5).
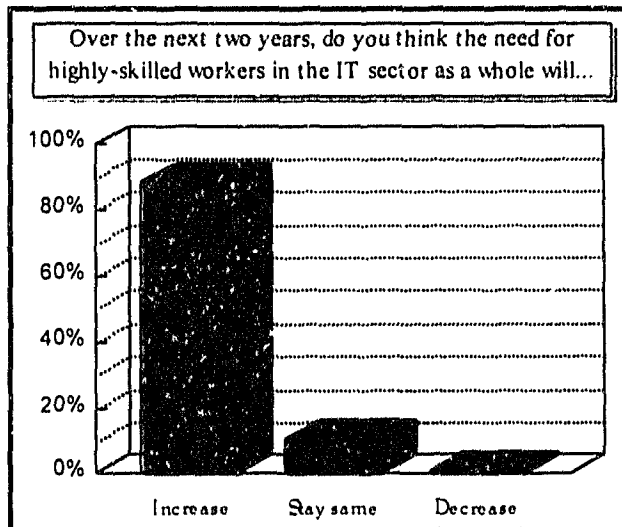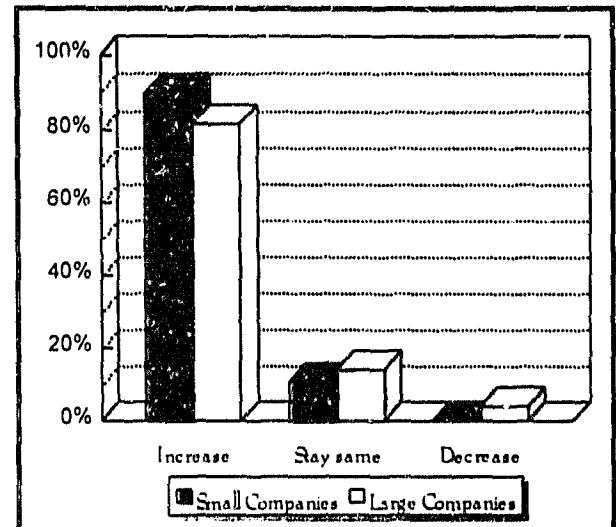
Figure 4

Figure 5

Over the next two years, do you think the need for highly-skilled workers in the IT sector as a whole will...

PART 3. DESIRED ATTRIBUTES OF HIGHLY-SKILLED WORKERS

IT companies perceive all of the characteristics listed in Table 7 as having a great deal of importance in terms of assessing highly-skilled workers. The factor identified as being of lesser importance, relative to the other factors, is 'strong business skills'. There are very small differences between large and small companies in terms of the relative ranking of the factors. Regional differences in the relative ranking of the factors are also small; only the Prairie region ranks the 'willingness to learn' as having the greatest importance. It should be noted as well that Ontario's ranking of each of the factors is higher than that for Canada as a whole, while Quebec's is lower.

Table 7

How much weight do you place on the following factors when assessing highly-skilled workers? (mean score on a scale of 1 to 5, where 1 is 'very little importance' and 2 is 'a great deal of importance')								
	Canada	Small Companies (Canada)	Large Companies (Canada)	Atlantic	Ontario	Pacific	Prairies	Quebec
Positive attitude	**4.57**	4.58	4.51	4.57	4.62	4.63	4.58	4.41
Willingness to learn	**4.55**	4.56	4.50	4.53	4.61	4.55	4.61	4.39
Possession of technical knowledge	**4.37**	4.35	4.49	4.47	4.39	4.31	4.37	4.33
Ability to work with others	**4.32**	4.31	4.40	4.37	4.36	4.32	4.40	4.18
Ability to work independently	**4.23**	4.25	4.07	4.18	4.27	4.30	4.19	4.13
Creativity	**4.14**	4.16	4.07	4.22	4.20	4.10	4.15	4.04
Communication skills	**4.13**	4.15	3.99	4.18	4.26	4.06	4.05	3.90
Strong business skills	**3.09**	3.07	3.22	3.14	3.20	3.00	3.09	2.89

In Table 8, it can be seen that 63% of IT companies feel that 'none' or 'few' of their applicants have the technical skills that they are looking for, while 37% feel that 'most' or 'all' possess the skills. A greater percentage of IT companies in the Atlantic region, and to a lesser extent Quebec, feel that 'few' applicants have the technical skills they are seeking, as opposed to other regions; conversely, a smaller percentage of IT companies in the Atlantic region and Quebec feel that 'most' people have necessary skills. There is little disparity of findings amongst large and small IT companies, irrespective of region.

Table 8

How many people applying for positions in your company have the technical skills you are seeking?				
	None	Few	Most	All
Canada	5%	58%	32%	5%
Atlantic	4%	73%	20%	4%
Ontario	6%	56%	32%	4%
Pacific	4%	55%	36%	6%
Prairies	4%	57%	36%	3%
Quebec	3%	64%	28%	6%
Small Companies (Canada)	5%	59%	31%	5%
Large Companies (Canada)	4%	56%	37%	2%

PART 4. RECRUITING / HIRING PRACTICES

Figure 6 shows that over the past two years, 85% of Canadian IT companies recruited highly-skilled workers. A higher percentage of large IT companies have recruited highly-skilled employees than small IT companies (91% vs. 84%).

Figure 6

Over the past two years, did your company recruit any highly-skilled workers?

Canada 85%   Small Companies 84%   Large Companies 91%
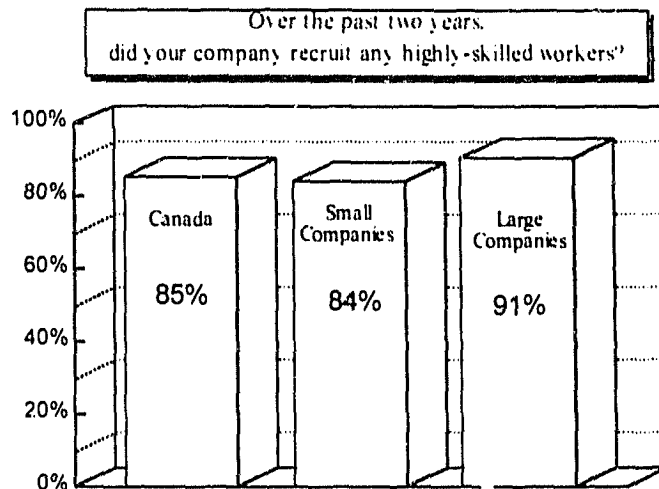
Of the IT companies that recruited highly-skilled workers over the past two years, the most common methods used were advertising in newspapers (77%), employee referral (76%) and informal networking (70%). Some of the lesser-used methods were employment agencies (48%), university/college recruitment (47%) and recruitment using the Internet (39%) (Table 9).

Table 9

Did your company use any of the following methods to recruit highly-skilled workers?									
	Advertising in Newspapers	Employee Referral	Informal Networking	Employment Agencies	Univ./College Recruitment	Recruit using Internet	Canada Employment Centre	Job Fairs	National Grad. Registry
Canada	77%	76%	70%	48%	47%	39%	15%	10%	9%
Atlantic	78%	78%	74%	33%	52%	48%	35%	15%	4%
Ontario	75%	78%	75%	52%	45%	45%	11%	12%	12%
Pacific	82%	70%	72%	48%	50%	40%	12%	10%	6%
Prairies	85%	76%	79%	40%	48%	29%	14%	9%	12%
Quebec	74%	74%	54%	46%	46%	32%	23%	6%	6%
Small Companies (Canada)	75%	74%	69%	45%	44%	38%	15%	8%	8%
Large companies (Canada)	92%	86%	79%	62%	61%	48%	17%	26%	18%

Methods used by IT companies for recruiting highly-skilled workers vary across Canada. A few key observations are that: informal networking is used much less frequently in Quebec than in other regions of the country (54%); employment agencies are most commonly used in Ontario, and least commonly used in the Atlantic region (52% vs. 33%); recruiting over the Internet is more common in the Atlantic region than in the Prairie region and Quebec (48% vs. 29% and 32%, respectively); and the use of Canada Employment Centres is more common in the Atlantic region than in any other region (35%). With the exception of Canada Employment Centres, Quebec IT companies use each of the recruiting methods to a lesser extent than Canada as a whole.

From Table 9, it is also clear that a greater percentage of large IT companies are inclined to use all of the methods cited, than are small IT companies.

Figure 7 shows that across Canada, IT companies have some degree of difficulty in recruiting highly-skilled workers to fill experienced professional positions. The mean response for Canada (based on a scale of 1 to 5, where 1 is 'no difficulty' and 5 is 'high degree of difficulty') was 2.64 for entry level positions and 3.55 for experienced professional positions.

In the Atlantic region in particular, there is difficulty in hiring highly-skilled workers to fill experienced professional positions, as the mean response was 3.96.

As seen in Table 10, factors contributing to some extent to difficulties in recruiting highly-skilled workers, according to mean scores based on a scale of 1 to 5, are: 'lack of applicants with relevant work experience' (3.43) and 'lack of applicants with educational or technical qualifications' (3.12). Factors found to have the least effect on a company's ability to recruit are: 'companies in other countries offer better salaries' (1.80) and 'applicants have negative perceptions about the industry' (1.53).

Figure 7

Does your company have difficulty recruiting highly-skilled workers to fill entry level and experienced level positions?

There are some relatively minor regional and company size differences in terms of the ranking of the factors. For example, the Atlantic region cited 'companies in other countries offer better salaries' to a greater extent than other regions. The Atlantic region's ranking of each of the factors also equalled or exceeded that of Canada as a whole. Large IT companies cited 'other industries offer better salaries' to a greater extent than small IT companies.
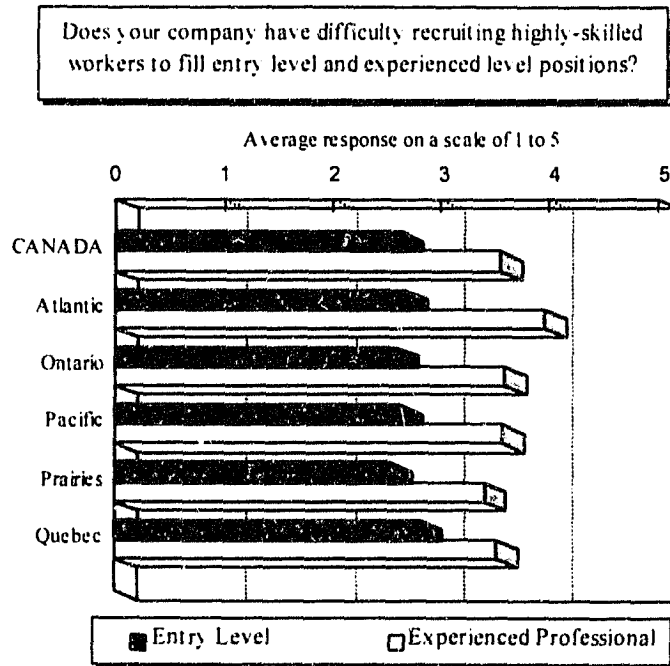
Table 10

To what extent do any of the following factors contribute to difficulties in recruiting highly-skilled workers? (On a scale of 1 to 5, where 1 is 'Not at all' and 5 is 'A great deal')								
	Canada	Atlantic	Ontario	Pacific	Prairies	Quebec	Small Companies (Canada)	Large Companies (Canada)
Lack of applicants with relevant work experience	**3.43**	3.70	3.38	3.49	3.36	3.53	3.47	3.24
Lack of applicants with educational or technical qualifications	**3.12**	3.39	3.05	3.09	3.14	3.21	3.13	3.06
Other companies in the industry offer better salaries	**2.53**	2.65	2.58	2.44	2.63	2.41	2.50	2.69
High costs associated with hiring	**2.22**	2.39	2.19	2.32	2.0$\Box$	2.34	2.25	2.04
Lack of information on sources of available employees	**2.22**	2.22	2.27	2.14	2.10	2.25	2.25	2.06
Other industries offer better salaries	**2.04**	2.13	1.97	2.06	2.23	2.03	1.98	2.37
Competitors offer better non-salary compensation (e.g. stock options)	**2.03**	2.13	1.99	1.98	2.08	2.07	2.01	2.12
Companies in other countries offer better salaries	**1.80**	2.26	1.76	2.07	1.75	1.73	1.79	1.84
Applicants have negative perceptions about industry	**1.53**	1.54	1.58	1.40	1.62	1.46	1.50	1.63

In terms of methods that IT companies used to overcome difficulties in recruiting highly-skilled workers, some of the more common responses were: extending the recruitment period (67%), training existing personnel (65%), using overtime (63%) and reorganizing the work (63%). Also used by over one-half of the companies were increasing the salary level (55%) and sub-contracting (53%) (Table 11).

There are some noticeable regional and company size differences in methods used to overcome recruitment difficulties. The Pacific region extended the recruitment period to a greater extent than did the Atlantic region (74% vs. 57%). The Atlantic region trained personnel to a greater extent than did the Pacific region (78% vs. 59%). The Atlantic region used overtime to a greater extent than other regions, such as the Prairies (78% vs. 55%). The postponement of projects was more common in the Pacific region than in the Atlantic region (49% vs. 33%). Hiring unqualified workers was a more common practice in the Atlantic region than in the Prairie region (50% vs. 31%). Finally, in the Atlantic region, the use of temporary workers was more prevalent than in other regions (50%).

There are some company size differences in terms of the extent to which the various measures are used, the most pronounced of which relates to the extension of the recruitment period (78% for large IT companies and 65% for small IT companies) and the use of temporary workers (48% for large IT companies and 31% for small IT companies).

Table 11

Did your company use any of the following methods to overcome difficulties with recruiting highly-skilled workers?

	Extend recruitment period	Train existing personnel	Overtime	Reorganize	Increase salary	Sub-contract	Postpone projects	Hired unqualified workers	Use temp. workers	Relocate
Canada	67%	65%	63%	63%	55%	53%	44%	37%	33%	15%
Atlantic	57%	78%	78%	67%	57%	57%	33%	50%	50%	17%
Ontario	67%	67%	64%	62%	53%	55%	42%	40%	35%	16%
Pacific	74%	59%	61%	62%	54%	54%	49%	37%	23%	10%
Prairies	69%	66%	55%	66%	50%	50%	47%	31%	32%	15%
Quebec	64%	64%	67%	63%	61%	51%	46%	34%	33%	13%
Small Companies (Canada)	65%	64%	63%	62%	55%	53%	44%	38%	31%	13%
Large Companies (Canada)	78%	75%	62%	71%	50%	55%	41%	30%	48%	22%

Figure 8 shows the extent to which recruiting difficulties affect the ability of IT companies to take advantage of growth opportunities. 29% of Canadian companies identified a 'significant effect', 46% a 'moderate effect' and 25% 'no effect'.

In Quebec, 45% of IT companies feel that recruiting difficulties have a 'significant' effect on their capability to grow while 36% feel there is a 'moderate' effect and 19% feel there is 'no effect'.

In terms of company size differences, 30% of small IT companies feel that recruiting difficulties have a significant effect on their ability to grow; the figure for large IT companies is 23%.

As seen in Figure 9, 35% of IT companies feel it will be 'more difficult' to recruit highly-skilled workers in the next two years, while 50% feel it will 'remain the same' and 15% predict it will be 'easier'.

In the Prairie region, a similar number of IT companies (44%) feel that recruiting will either be 'more difficult' or 'the same' over the next two years.
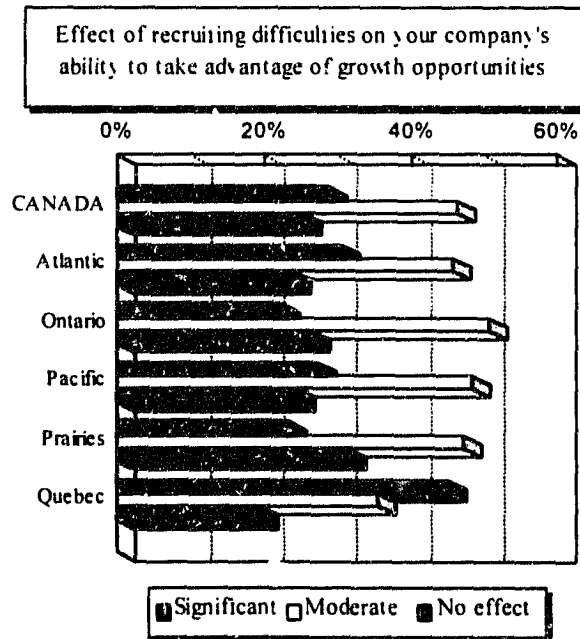
Figure 8

Effect of recruiting difficulties on your company's ability to take advantage of growth opportunities

■Significant □Moderate ■No effect
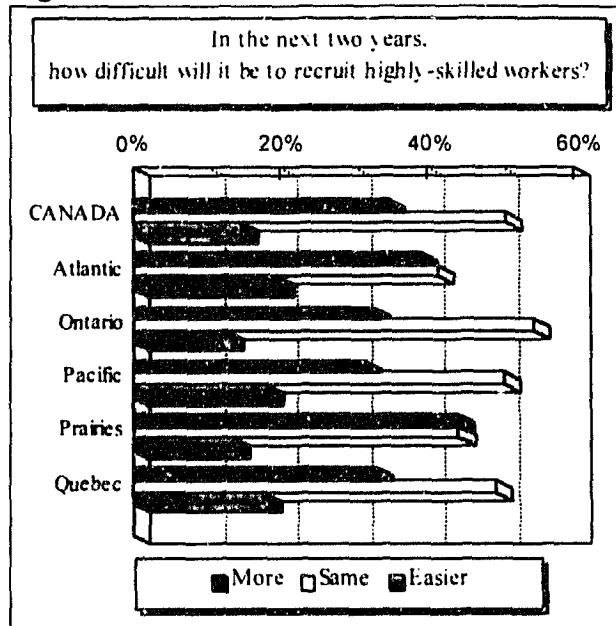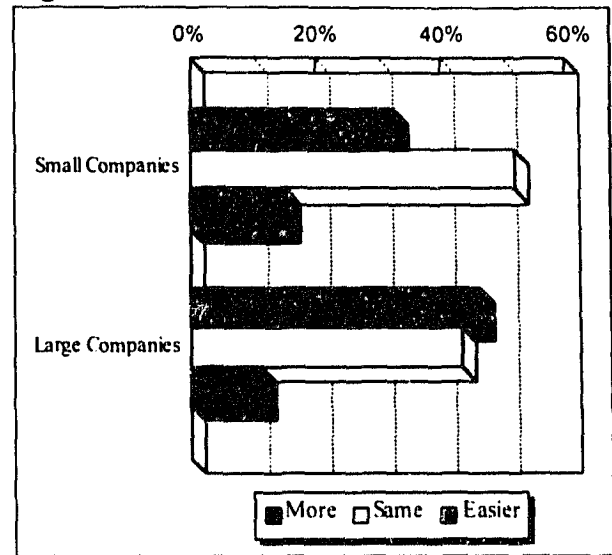
Figure 9

Figure 10

When comparing small to large IT companies in terms of their outlook on recruiting difficulties over the next two years, 46% of large companies feel that it will be 'more difficult' to recruit, compared to 33% for small companies (Figure 10).

A. Recruiting in Other Provinces and Countries

43% of IT companies recruit highly-skilled workers in other provinces and 21% recruit in other countries. In the Atlantic region, companies are more likely to recruit in other provinces and other countries than is the case with other regions; in the Atlantic region, 67% of IT companies recruit in other provinces and 28% recruit in other countries (Figure 11).

A higher percentage of large IT companies recruit highly-skilled workers in other provinces and other countries than small IT companies; 63% recruit in other provinces and 28% recruit in other countries. The corresponding figures for small IT companies are 39% for other provinces and 20% for other countries (Figure 12).

Figure 11

Percent of companies who recruit highly-skilled workers in other Provinces and Countries
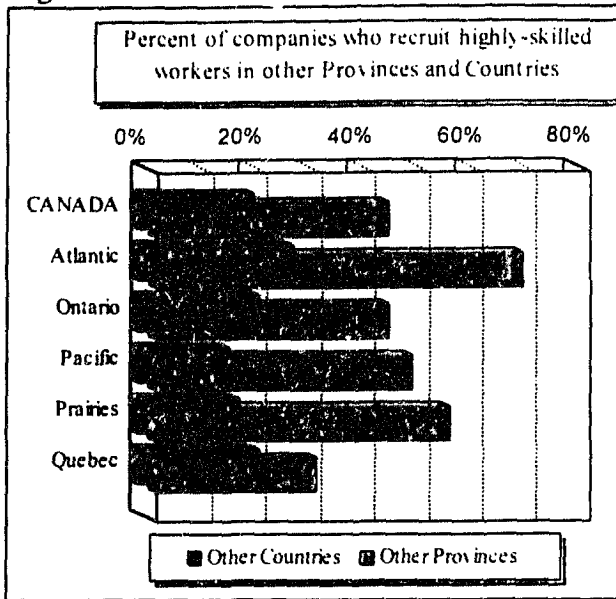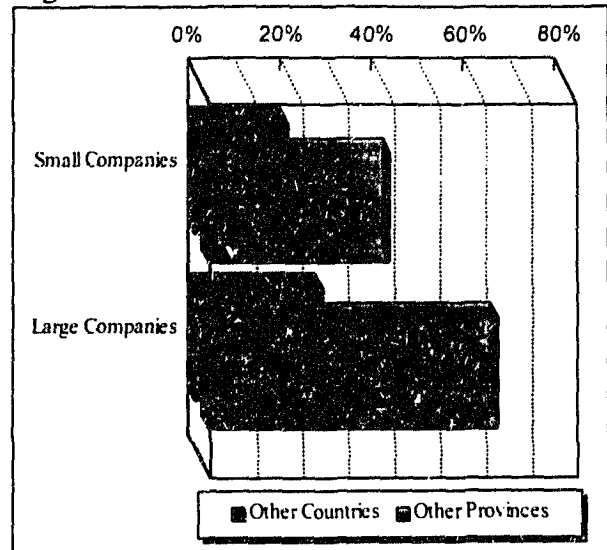
Figure 12

Of the surveyed companies who recruit in other countries, 55% recruit from the United States, 32% from the United Kingdom and 24% from France (Figure 13).

IT companies that recruit highly-skilled workers from other countries were asked to rate the extent to which they experienced difficulties in doing so, according to a range of factors. The factor found to be the most difficult with which to deal, relative to others, was 'complex and time consuming immigration rules and procedures' (mean score of 3.16) (Table 12).
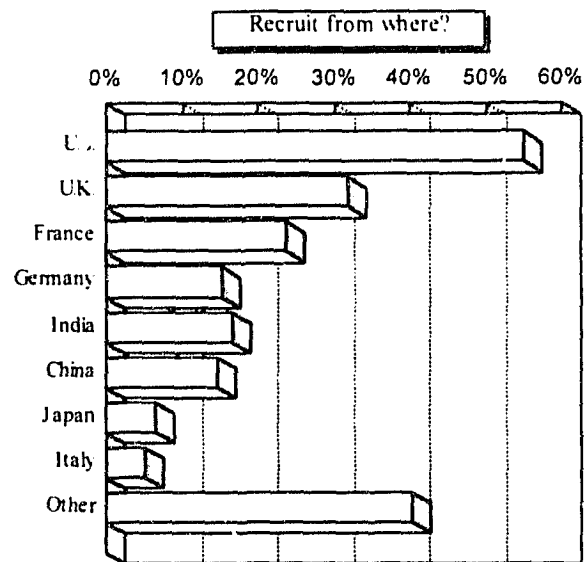
IT companies in the Atlantic region feel that 'high costs associated with hiring' is the greatest obstacle, relative to other factors (3.54). In the Pacific region, there is a greater concern regarding the 'perceived higher cost of living in Canada' than in other regions of the country (3.23). The Pacific region ranks each of the factors higher, in terms of their

Figure 13

Recruit from where?

significance, than Canada as a whole, while Quebec ranks the factors lower. As well, small IT companies rank each of the factors lower, relative to Canada, while large IT companies rank the factors higher.

Table 12

To what extent do you experience difficulty with the following factors when recruiting highly-skilled workers from other countries? (Mean score on a scale of 1 to 5, where 1 is 'no difficulty' and 5 is 'a great deal of difficulty')	Canada	Small Companies (Canada)	Large Companies (Canada)	Atlantic	Ontario	Pacific	Prairies	Quebec
Complex and time-consuming immigration rules and procedures	**3.16**	3.07	3.52	3.38	3.12	3.64	3.57	2.80
Lack of information about qualified workers in Canada	**2.65**	2.62	2.77	2.85	2.71	2.94	2.67	2.39
High costs associated with hiring	**2.58**	2.53	2.78	3.54	2.59	2.73	2.50	2.40
Perceived higher cost of living in Canada (e.g. taxation, real estate)	**2.28**	2.19	2.63	2.00	2.31	3.23	2.17	2.00
Potential immigrants do not have adequate information about employment opportunities in Canada	**2.17**	2.07	2.56	2.23	2.15	2.46	2.23	2.05

PART 5. RETENTION OF HIGHLY-SKILLED WORKERS

Figure 14 shows that 54% of Canadian IT companies are having 'no difficulty' retaining highly-skilled workers, while 37% are having 'moderate difficulty' and 7% a 'high degree' of difficulty.
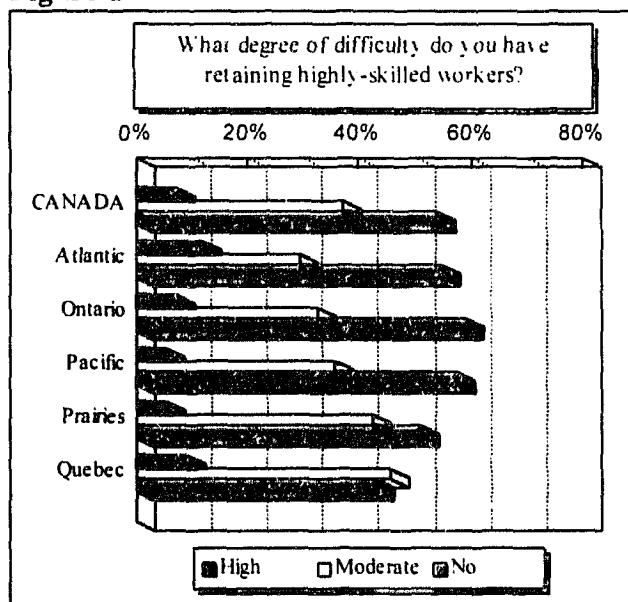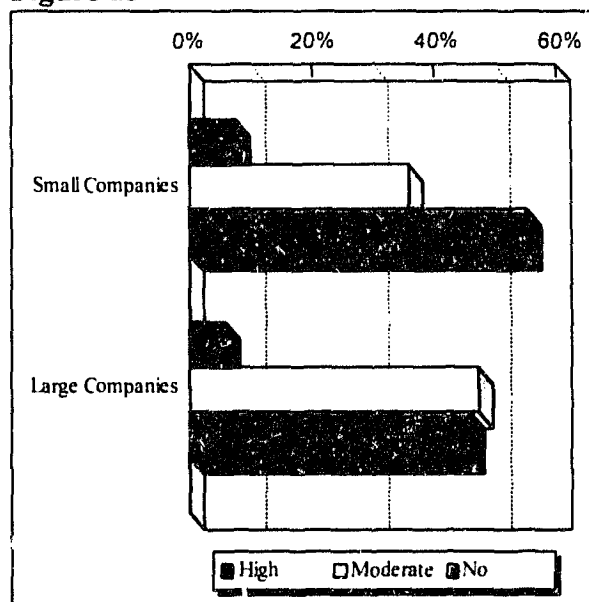
Figure 14

Figure 15

A higher percentage of IT companies in Quebec find the degree of difficulty in retaining highly-skilled workers to be moderate, than IT companies in other regions.

55% of small IT companies feel that they have 'no difficulty' retaining highly-skilled workers; in

large IT companies, the corresponding figure is 46% (Figure 15).

IT companies that are experiencing difficulties retaining highly-skilled workers rate 'other companies in the industry offer better salaries' as the most significant factor, relative to others. 'Raiding by other companies' was also cited as being significant, compared to others (Table 13).

Table 13

To what extent do any of the following factors contribute to difficulties in retaining highly-skilled workers? (mean score on a scale of 1 to 5, where 1 is 'not at all' and 5 is 'a great deal')								
	Canada	Small Companies (Canada)	Large Companies (Canada)	Atlantic	Ontario	Pacific	Prairies	Quebec
Other companies in the industry offer better salaries	3.04	3.00	3.29	3.30	3.21	2.97	3.07	2.78
Raiding by other companies	2.69	2.62	3.04	2.87	2.56	2.36	2.84	2.89
Lack of advancement opportunities	2.31	2.23	2.72	2.35	2.40	2.32	2.32	2.16
Few opportunities for career development	2.29	2.23	2.61	2.39	2.37	2.35	2.30	2.11
Other industries offer better salaries	2.24	2.15	2.74	2.26	2.31	2.12	2.44	2.05
Competitors offer better non-salary compensation (e.g. stock options)	2.22	2.18	2.43	2.09	2.15	2.41	2.19	2.29
Companies in other countries offer better salaries	1.86	1.79	2.19	2.00	1.87	2.01	2.00	1.70
Perceived higher cost of living in Canada	1.68	1.62	1.98	1.52	1.69	2.02	1.53	1.64

There are some regional differences in terms of the relative rankings of the significance of the retention difficulties. For example, Quebec ranks 'raiding by other companies' as the most significant factor. The Pacific region and Quebec rank 'competitors offer better non-salary compensation' more highly than do the other regions. The Pacific region also attaches more significance to 'perceived higher cost of living in Canada' than other regions.

Large IT companies view each of the listed factors as more of a problem to retaining highly-skilled workers than small IT companies.

PART 6. TRAINING OF HIGHLY-SKILLED WORKERS

For the purposes of this survey, formal training refers to all structured activities intended to develop the capabilities and skills of employees. Examples of formal training include on-the-job training to develop or upgrade specific skills, workshops, lectures, conferences, courses, training sessions and similar activities designed to improve employees' job performance and skills.

84% of Canadian IT companies provided formal training for their highly-skilled workers during the reporting period (Figure 16).
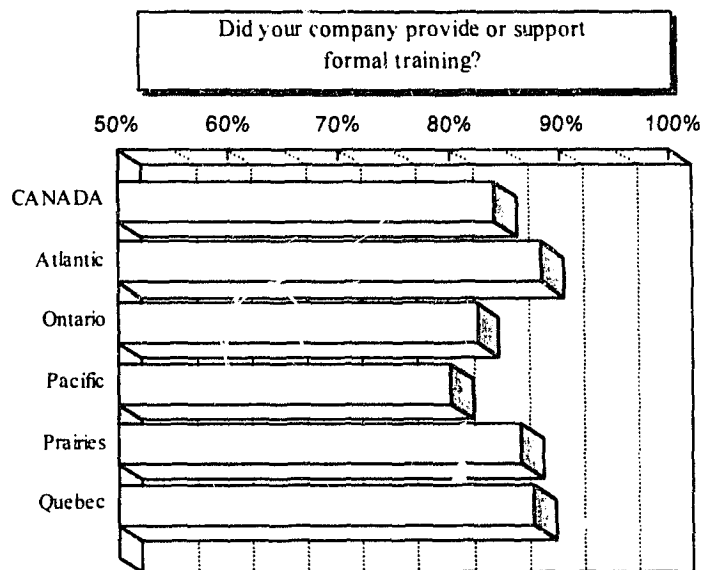
Large IT companies are more likely to provide or support formal training than are small IT companies (92% vs. 83%).

IT companies in the Atlantic region and Quebec are more likely to offer formal training (88%), while IT companies in the Pacific region are less likely (80%).

Of the surveyed companies who did not provide or support formal training, 70% felt it was not needed, and 28% felt that informal training satisfied their training needs (Figure 17).

Figure 16

Did your company provide or support formal training?

Figure 17

Why did you not provide formal training?
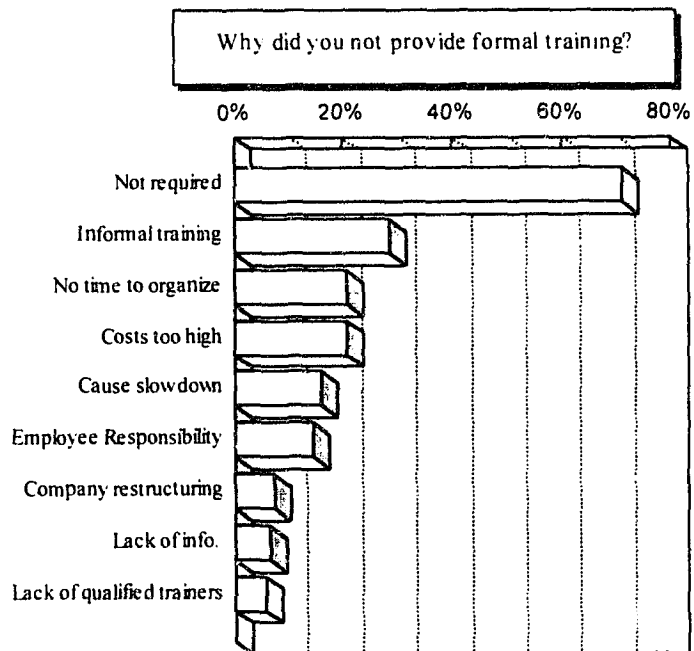
A. Types and Methods of Training

Of the IT companies that provided or supported formal training for their highly-skilled workers, 94% encouraged coaching by experienced staff, 93% used workshops, seminars or training courses. 71% used self-paced learning and 60% used computer-based training (Figure 18).

70% of large companies supported computer-based training, while for small companies, the number was 58%.

As seen in Table 14, almost all IT companies that provided or supported formal training pay all or part of course fees for their workers. IT companies also tended to send their workers to conferences, seminars and trade shows, and pay all or part of the cost of training material.

Figure 18

What methods were used to deliver training to your highly-skilled workers?

- Coaching by experienced staff
- Workshops, seminars, training courses, etc.
- Self-paced learning
- Computer based training
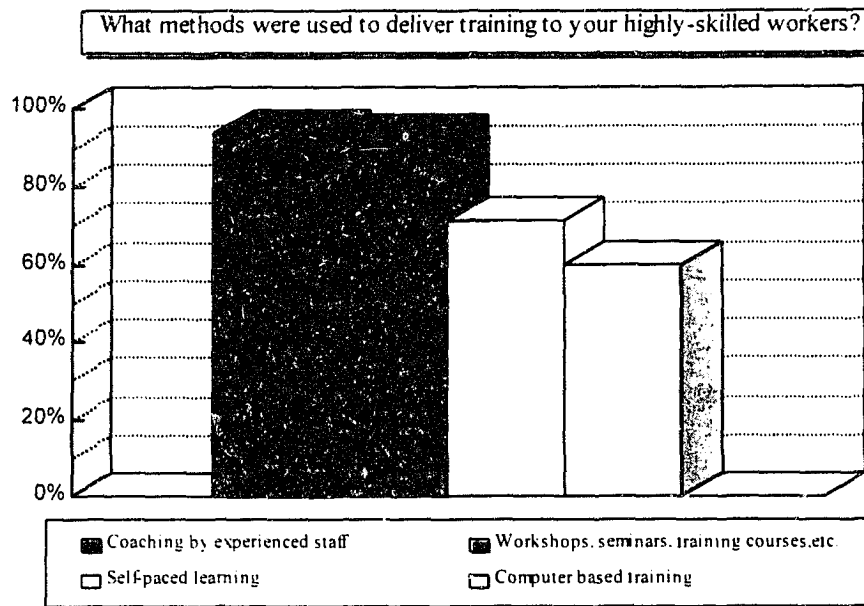
Table 14

Did your company provide any of the following types of support for training highly-skilled workers?					
	Paying all or part of course fees	Send employees to conferences, seminars, trade shows	Paying all or part of the cost of training material	Authorise paid leave for training purposes	Authorise unpaid leave for training purposes
Canada	**97%**	**94%**	**92%**	**80%**	**27%**
Atlantic	96%	100%	93%	82%	31%
Ontario	98%	93%	94%	82%	26%
Pacific	93%	96%	92%	80%	29%
Prairies	96%	94%	90%	82%	30%
Quebec	97%	95%	90%	72%	26%
Small Companies (Canada)	96%	94%	92%	80%	25%
Large Companies (Canada)	100%	99%	90%	81%	37%

There are relatively minor differences amongst regions as pertains to types of training support. The most noticeable difference is that a smaller percentage of IT companies in Quebec authorized

paid leave for training purposes (72%). In terms of company size differences, a greater percentage of large IT companies provided support for each of the training methods than did small IT companies, except for payment of training material.

Of the possible sources of formal training for highly-skilled workers, the use of 'company staff' was the most common, particularly in Quebec. Regional differences related to: Quebec using private training consultants or companies to a greater extent than the Pacific region (65% vs. 49%); the Atlantic region using people who sell or supply equipment to a greater extent than Quebec (67% vs. 53%); the Atlantic region using universities and colleges to a greater extent than Ontario (60% vs. 46%); and the Pacific region using private business or commercial schools more than Quebec (52% vs. 38%). Large IT companies were more likely to use each of the listed sources for training than were small IT companies (Table 15).

Table 15

Were any of the following sources used to provide formal training?					
	Company Staff	Private training consultants or companies	People who sell or supply equipment	Universities, colleges or CEGEPs	Private business or commercial schools
Canada	**88%**	**59%**	**57%**	**51%**	**44%**
Atlantic	91%	62%	67%	60%	47%
Ontario	85%	57%	55%	46%	45%
Pacific	84%	49%	55%	47%	52%
Prairies	90%	61%	65%	56%	44%
Quebec	95%	65%	53%	57%	38%
Small Companies (Canada)	87%	56%	54%	47%	43%
Large Companies (Canada)	96%	73%	72%	75%	48%

B. Effects of Training

Over the reporting period, 50% of IT companies increased the amount of formal training provided to their highly-skilled workers compared to a year earlier, while only 4% decreased their training. There are only minor differences along regional and company size lines (Table 16).

Table 16

Has the amount of formal training received by highly-skilled workers in your company changed compared to a year ago?			
	Increased	Remained the same	Decreased
Canada	**50%**	**46%**	**4%**
Atlantic	53%	42%	4%
Ontario	50%	4C%	4%
Pacific	53%	44%	3%
Prairies	50%	46%	4%
Quebec	49%	49%	3%
Small Companies (Canada)	50%	46%	4%
Large Companies (Canada)	51%	47%	2%

As shown in Table 17, small and large IT companies and the five regions show little differences regarding their perceptions of the effects on job performance of highly-skilled workers who received training. Almost one-half of all regions, and of small and large IT companies alike, feel that there is either a significant or moderate effect associated with training.

Table 17

Effects on job performance of highly-skilled workers who received training			
	Significant effect	Moderate effect	No effect
Canada	49%	48%	3%
Atlantic	51%	47%	2%
Ontario	49%	48%	3%
Pacific	42%	54%	4%
Prairies	49%	49%	2%
Quebec	50%	46%	4%
Small Companies (Canada)	49%	48%	3%
Large Companies (Canada)	48%	50%	1%

PART 7. TECHNICAL NOTES

The Survey on Human Resource Issues in the Information Technology Industry involved a random sample of enterprises drawn from the Business Register of Information Technology Enterprises (BRITE). The BRITE database was developed by Statistics Canada on behalf of Industry Canada. It was created by selecting from the Central Frame Data Base (CFDB) of Statistics Canada all enterprises classified to be an in-scope Standard Industrial Classification Enterprise (SIC-E) in 1990, 1992 or 1994. Enterprises with fewer than 10 employees and annual revenues under $250,000 were not included in the database. The database was then supplemented with a listing of firms that, although not included in the CFDB selection, were known by Industry Canada to be in-scope IT producers.

The database for the purposes of the HR survey consisted of all enterprises listed on the BRITE database, with the exception of 250 Internet service providers and 125 multimedia firms. These firms were deleted from the HR survey database because employment and revenue data, the two variables on which the sample was stratified, were not available. After these companies were removed, a total of 3,081 establishments were listed in the database. An additional 390 enterprises were coded as 'out of scope','unable to locate' 'out of business', etc. for the HR survey, and were deleted from the frame. This resulted in a database or universe for the survey of 2,691 enterprises.

Based on the data collection results of the survey, a further 187 enterprises were identified as 'out of scope', 'out of business' or otherwise not properly considered part of the universe for the survey. This resulted in a final total of 2,504 IT enterprises in Canada that have more than 10 employees and revenues in excess of $250 thousand per year, and that were considered the universe for the survey.

A sample of 1,428 enterprises was drawn from the database. The 'effective' sample was 1,174 enterprises, when one further excludes companies that were found, in the course of the telephone interviews, to be 'out of scope', 'out of business', etc. Table I gives a breakdown of the frame, sample and responses by company size and region, Table II a breakdown of the sample by IT industry and Table III the overall survey collection results.

With the exception of the Atlantic region, the sample was stratified by geographic region and number of employees at the enterprise level. The Atlantic region was not stratified by employee count because of an insufficient number of large firms. The geographic stratification was as follows: Atlantic region (Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland); Ontario; Quebec; Prairie region (Manitoba, Saskatchewan and Alberta); and Pacific region (British Columbia and the two Territories). As mentioned, the company size stratification was 'small' companies (companies with ≥ 10 and ≤ 100 employees) and 'large' companies (companies with greater than 100 employees).

As noted above, 826 companies (70 4%) responded to the survey. Response rates ranged from 76% for IT enterprises of more than 100 employees in the Pacific Region, to 53% for IT enterprises of more than 100 employees in Quebec.

It should be noted here that in some instances, totals in the report may not add to 100% due to rounding.

Table I: Breakdown of Frame, Sample and Responses by Company Size and Region		Frame	Sample	Respondents
Atlantic	Total	82	82	51
Quebec	< 100 employees	545	282	163
	> 100 employees	82	81	33
	Total	627	363	196
Ontario	< 100 employees	1,164	364	218
	> 100 employees	175	147	75
	Total	1,339	511	293
Prairies	< 100 employees	309	212	131
	> 100 employees	30	30	13
	Total	339	242	144
Pacific	< 100 employees	280	206	126
	> 100 employees	24	24	16
	Total	304	230	142
TOTAL		2,691*	1,428*	826

* Before exclusions for companies found to be 'out of scope', 'out of business', etc.

Table II: Breakdown of Sample by Industries

Activity	Count
Computer Services	673
Computer and Related Machinery, Equip. & Packaged Software, Wholesale	272
Electronic Parts and Components Industry	85
Other Communication and Electronic Equipment Industries	75
Indicating, Recording and Controlling Instruments Industry	74
Electronic Computing and Peripheral Equipment Industry	70
Other Instruments and Related Products Industry	61
Telecommunications Equipment Industry	27
Computer Equipment Maintenance and Repair	23
Other Office, Store and Business Machine Industry	15
Record Player, Radio and Television Receiver Industry	10
Electronic Office, Store and Business Machine Industry	8
Business Forms Printing Industry	3
Telecommunication Carriers Industry	2
Other	30
TOTAL	1,428*

* Before exclusions for companies found to be 'out of scope', 'out of 'business', etc.

		Atl.	Quebec		Ontario		Prairies		Pacific		CAN.
	Table III: Survey Collection Results										
			< 100	> 100	< 100	> 100	< 100	> 100	< 100	> 100	
1	**Completed**	**51**	**163**	**33**	**218**	**75**	**131**	**13**	**126**	**16**	**826**
2	Refusal	6	26	7	26	10	13	5	18	0	111
3	Unresolved	13	50	22	51	34	30	6	26	5	237
4	Out of scope	2	8	3	15	4	8	1	7	0	48
5	Out of business	0	2	2	3	2	1	0	2	0	12
6	Can't locate	5	8	3	23	6	18	1	13	0	77
7	Duplicate	1	3	2	2	1	1	1	2	0	13
8	Miscellaneous	4	22	9	26	15	10	3	12	3	104
9	Total Companies in frame	82	282	81	364	147	212	30	206	24	1,428
10	Revised Frame - Total Companies in frame less #4-8	70	239	62	295	119	174	24	170	21	1,174
11	Response Rate (%) 1 ÷ 10	72.8	68.2	53.2	73.9	63.0	75.3	54.2	74.1	76.2	70.4