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REPORTS

Analysis of Labour Force Survey Data for the Information Technology Occupations
2000–2006

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Highlights

This is the sixth in a series of regular reports prepared for the Information and Communications Technology Council (ICTC)[1] on an Analysis of Labour Force Survey (LFS) Data for the Information Technology (IT) occupations.[2] This report (called the "2006 Update Report") extends the analysis to include data from 2006.

As in the past, this Update Report covers the IT occupations associated with the production of software. ICTC is working on defining the hardware occupations to be included in its Occupational Skills Profile Model (OSPM) and the associated occupational groupings to be included in this LFS report. However, this work is not yet complete; consequently, the 2006 Update Report focuses on the software occupations, utilizing the same six occupational groupings as the 2005 Update Report. These groupings encompass 21 individual occupations in the IT labour market associated with software functions.

Here are some highlights from this latest report:

— There has been strong growth in the **IT labour force** since March of 2005. By the end of 2006, it had reached a total of about 620,000 workers, almost equal to historic highs experienced in 2002 and 2003. The IT labour force exhibits cyclical variations; this is the third major growth spurt since 2000.

— Since the Fall of 2004, three occupational groups have shown signs of convergence in size: the **Analyst** labour force, the **Programmer** labour force and the **Technician** labour force. Their labour forces at the end of 2006 were 134,000, 133,000 and 127,000 workers respectively. At the beginning of the study period, the Technician labour force was by far the largest and the Analyst labour force was by far the smallest of these three groups.

— The **Engineer** labour force has shown considerable volatility around a long-term growth trend. The trend has been clear: at the beginning of 2000, there were about 55,000 Engineers; by the end of 2006, there were over 90,000 workers in this labour force.

— The **Manager** labour force has been consistently the smallest, typically around 40,000 workers. However, there has been considerable variability over the study period, including a recent peak in the Summer of 2006 at 52,000 workers. At the end of 2006, the Manager labour force was 45,000 workers.

— During the Spring of 2006, the labour force for **Other IT** workers (consisting of Technical Writers and Graphic Designers and Illustrators) almost reached its historic high of 90,000 workers achieved in 2002. This labour force has shown variability over time, with a low of 50,000 workers in 2000. At the end of 2006, this labour force stood at almost 80,000 workers.

— The **unemployment rate for all IT workers** was consistently below the national average for the labour force as a whole. It has also been more volatile. The dot-com boom and bust in the early 2000s appears to be evident as the unemployment rate soared from a low of 2 percent in the Fall of 2000 to a high of 5.8 percent in the Summer of 2002. Between the Spring of 2003 and the end of 2005, there was a trend downwards in the unemployment rate for all IT workers. At the end of 2005, the rate stood at 1.9 percent, a very tight labour market indeed! By the end of 2006, the rate had risen somewhat to 2.8 percent, still more than three percentage points below the national average.

— The **unemployment rate for the individual IT occupational groups** was consistently below the national average throughout the study period. Only in a very few exceptional months did an individual occupational group exhibit a higher unemployment rate than the national average.

— As noted in previous reports, there is remarkable stability in the **profile data** across the time period under review. That is to say, many of the characteristics of the IT labour force (gender, education, location, etc.) remain essentially the same year after year.

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[1] Previously named the Software Human Resource Council (SHRC).

[2] The first report, released in November 2002, covered 31 months from January 2000 to July 2002. The second report, issued in May 2003, covered the same time period, but reflected a more complete database of IT workers. The third report, issued in February 2004, extended the coverage to 48 months, from January 2000 to December 2003. The fourth report, issued in April 2005, added an additional year to December 2004. The fifth report, issued in April 2006, covered a six-year period from 2000 to 2005 and extended the number of occupations under study. This 2006 Update Report covers a seven-year period from 2000-2006. See Appendix A for more details.

— Here are some findings regarding the profile of the IT labour force:

- It is relatively young, with 46 percent of workers less than 35 years old. However, the IT labour force is ageing, with the proportion of younger workers under 35 falling and the proportion of older workers over 44 rising.

- Males predominate, at 75 percent of the labour force.

- It is highly educated, with more than three-quarters of the labour force having a post-secondary degree.

- Central Canada (Ontario and Quebec) has almost three-quarters of the labour force.

- Jobs in IT are predominately full-time, at 95 percent of the total.

- Jobs in IT are predominately permanent, at 92 percent of the total.

- Job tenure appears to becoming more secure as the proportion of workers with short tenure (less than three years) has been falling and the proportion with long tenure (more than four years) has been rising.

- Five Industry sectors account for slightly over 80 percent of IT jobs: Professional, Scientific and Technical Services; Manufacturing; Information and Cultural Industries; Public Administration; and Finance and Insurance.

- Only one in five workers is covered by a collective bargaining agreement.

- The regular workweek (excluding paid overtime) is 31 to 40 hours for most IT workers (83 percent of workers).

- The wage rate for IT occupations follows a natural progression, from Managers and Engineers at the top end, through Programmers and Analysts in the middle range, to Technicians and Other IT workers at the low end. Over the study period, the proportion of lower wage workers (up to $1,000 per week) has been falling and the proportion of higher wage workers (more than $1,400 per week) has been rising, suggesting that the average wage rate (in nominal terms) in the IT labour market has been rising.

Background

The Labour Force Survey (LFS) is a survey of about 54,000 households carried out monthly by Statistics Canada. The results of the survey are used to divide the working age population into three mutually exclusive categories: employed, unemployed and not in the labour force, and to provide descriptive data on each group.

The information technology (IT) occupations were not well captured in the LFS survey. Accordingly, in 2002, the Software Human Resource Council embarked on a special project to generate a dataset that could provide more meaningful results for its use. The Appendix provides details on the background of these efforts and the evolution over time of the occupational definitions and data sources used in the Update Reports.

This 2006 Update Report contains the results of the analysis of 21 IT software-related occupations, compiled into six occupational groups, as shown in Table 1 below.

This report is divided into two parts:

- An *Overview of Labour Force Activity* that describes the trends in the size of the labour force and the unemployment rate for the entire IT workforce and each of the six occupational groups; and

- A *Profile of the IT Occupations* that details the characteristics and labour market experiences of the workers in the entire IT workforce and each occupational group.

> ***Note to Readers:*** *In this document, the terms "Total IT" as in Total IT Labour Force, and "All IT" as in All IT Occupations are used. In titles to Charts and Figures, the term "IT Occupations" can be found. All these terms refer to the sum of the six occupational groups comprising the 21 occupations listed above in Table 1.*

Table 1: Analysis of the LFS Data for the IT Occupations, 2000–2006, Occupational Groupings

Group	NOC[3]	Occupation
Managers	0112	HR Managers
	0213	Computer and Information System Managers
	6115	e-Commerce Managers
Engineers	2133	Electrical and Electronics Engineers
	2147	Computer Engineers (excluding Software)
	2173	Software Engineers
Analysts	21711	Information Systems Business Analysts
	21712	Systems Security Analysts
	21713	Information Systems Quality Assurance Analysts
	21714	Systems Auditors
	21721	Database Administrators
	21722	Database Administration Analysts
Programmers	21741	Computer Programmers
	21742	Interactive Media Developers
	2175	Web Design Developers
Technicians	22811	Computer Network Technicians
	22812	Web Technicians
	2282	User Support Technicians
	2283	Systems Testing Technicians
Other IT	51212	Technical Writers
	5241	Graphic Designers and Illustrators

[3]   This column contains the occupational code within the National Occupational Classification System (NOC).

1. Overview of Labour Force Activity

This section contains an analysis of trends[4] in the labour force and the unemployment rate, starting in January 2000 and ending in December 2006, for the Total IT Labour Force and each of the six occupational groups (Managers, Engineers, Analysts, Programmers, Technicians, Other IT workers). As monthly data are often erratic, a three-month rolling average has been used to smooth the data series.

1.1 The Total IT Labour Force: 620,000 Workers At the End of 2006, Almost An Historic High

As shown in Figure 1, the Total IT labour force has exhibited strong growth since March of 2005, reaching a level of just over 620,000 workers at the end of 2006, almost equal to the historic highs at the end of 2002 and the Summer of 2003.

The cyclical nature of the IT labour market is quite evident from the graph. Earlier in the study period, the IT labour force had two major time-periods of expansion followed by contraction:

— from a low of about 535,000 workers in the Summer of 2000 to a high of almost 600,000 workers in mid-2001 back to a level of 565,000 workers at the end of the year; and

— from 560,000 workers at the end of 2001 to a high of 625,000 in the Fall of 2002 (and reached again in the Summer of 2003) back to a "steady state" level of 600,000 workers for all of 2004, followed by a decline to about 550,000 workers in March of 2005.

From that cyclical low in March of 2005, the labour force started to grow. This growth was maintained through all of 2006, without any evidence of a downturn.

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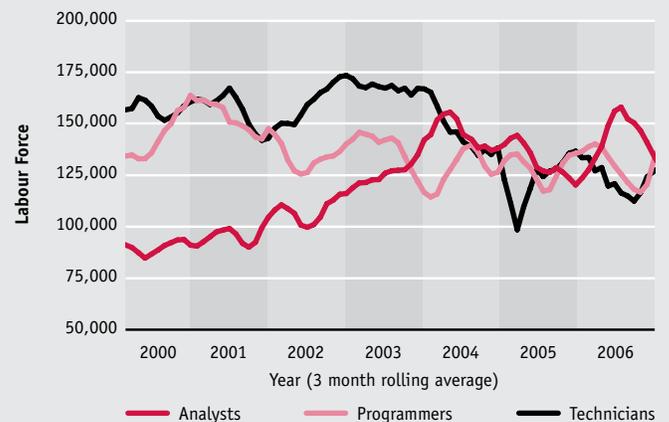
[4] What has caused these trends to occur cannot be discerned from the LFS dataset alone, and consequently is beyond the scope of this report. In the language of economists, the demand for IT workers is a "derived demand". That is to say the demand is driven by the output of goods and services that require IT workers in their production. This demand can be related to two factors: the flow of investment in new technologies requiring IT workers and the stock of current IT applications requiring IT support. The LFS dataset provides no information on these drivers of demand.

1.2 Occupational Labour Forces: Three Occupations Have More Than 100,000 Workers, Three Have Less

There is a clear split between the occupational groups having more than 100,000 workers and those groups that have fewer workers. Figure 2 below shows trends in the labour force for the three occupations that have more than 100,000 workers: Technicians, Programmers and Analysts.

At the beginning of the study period in 2000, there were very distinct differences in the sizes of the labour forces for these three occupational groups, but these differences disappeared by the end of the period.

From the beginning of 2000 to the Spring of 2004, Technicians and Programmers were the two largest occupational groups. For almost all of that period, the Technician labour force was the largest, with a peak of almost 175,000 workers at the beginning of 2003. Programmers reached a peak of almost 165,000 at the beginning of 2001. Both these occupations exhibited declines from these peaks to a level of about 140,000 workers in 2004 and 130,000 workers in 2005. (The Technician labour force experienced a cyclical decline to about 100,000 workers in the Spring of 2005, but quickly recovered.)

Simultaneously, over the 2000-2003 period, the Analyst labour force showed strong and steady growth from a low of 85,000 workers to a high of 155,000 workers in the Spring of 2004 when it first became the largest IT occupational group. The Analyst labour force has also declined since that peak was reached.

As can be seen in the diagram, these three labour forces (Technicians, Programmers, Analysts) converged in size by the end of 2004. That convergence has, with the occasional short-term exception, remained the case since then: at the end of 2006, their labour forces were 127,000, 133,000 and 134,000 respectively.

Figure 3 below shows trends in the labour force for the three remaining occupations that have fewer than 100,000 workers: Other IT workers, Engineers and Managers.

Figure 3:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Labour Force for the Three IT Occupational Groups <100,000 Workers

Throughout most of the study period, Other IT workers had the largest labour force among these three occupational groups, although not much larger in most years than the Engineer labour force. Since the beginning of 2005, the Engineer labour force has been the larger of the two. By the end of 2006, these two occupational groups had labour forces of 91,000 workers (Engineers) and 83,000 workers (Other IT).

The Engineer labour force exhibited a long-term growth trend over the seven-year period from about 55,000 workers to 90,000 workers. The Other IT labour force exhibited greater volatility with a low of 50,000 workers in the Fall of 2000 and a high of 90,000 workers in the Fall of 2002. It almost reached that historic peak again in the Spring of 2006, when the labour force briefly hit a level of 89,000 workers.

The Manager labour force has been consistently the smallest, typically around 40,000 workers. However, there has been considerable variability from a low of about 30,000 workers in early 2000 to a high of 55,000 workers in the Summer of 2002, then to a low of 27,000 in the Summer of 2005 to a high of 52,000 in the Summer of 2006. By the end of 2006, the Manager labour force was back at about 45,000 workers.

1.3 Unemployment Rate For All IT Occupations: Consistently Below The National Average

As shown in Figure 4 below, the unemployment rate for all the IT occupations has been consistently below the national average of all occupations in the economy.[5]

Furthermore, the unemployment rate for IT workers has been more volatile than the rate for the labour force as a whole, particularly during the first half of the study period. The "dot-com" boom appears to be evident in 2000 when the unemployment rate was at a low of 2 percent. The following bust in 2001 and 2002 also appears to be evident as the unemployment rate soared almost three-fold over that period and reached a high of 5.8 percent by the Summer of 2002.

From the Spring of 2003 to the end of 2005, there was a trend downwards in the unemployment rate. At the end of 2005, the rate stood at 1.9 percent, indicating a very tight labour market. The labour market eased in 2006, and by the end of the year, the unemployment rate stood at 2.8 percent, still more than three percentage points below the national average. As can be seen from the diagram, there have been some modest cycles around the downward secular trend between 2003 and 2005, but the amplitude of those cycles has been far less than the cycles experienced in the 2000-2002 time period. Note, for instance, that the increase in the unemployment rate in 2001 was 3.5 percentage points whereas the tick up at the beginning of 2005 was only 0.6 points.

In 2006, the IT unemployment rate increased between January and October while the national rate declined. This tick up of 1.5 percentage points was somewhat higher than the previous one, but the evidence at the end of the year suggested the unemployment rate was moving back down again. At the end of 2006, the IT unemployment rate was 2.8 percent, more than three percentage points below the national average.

1.4 Unemployment Rates For IT Occupations: Some Differences Evident

The analyses and graphs below are based on a comparison between the unemployment rate for all IT occupations and the unemployment rate for each of the occupational groups.

The **Manager** unemployment rate was typically (but not always) below the average for all IT occupations, and the two rates moved in most time periods in the same direction.

Figure 4:
Analysis of the LFS Data for the IT Occupations, 2000–2006
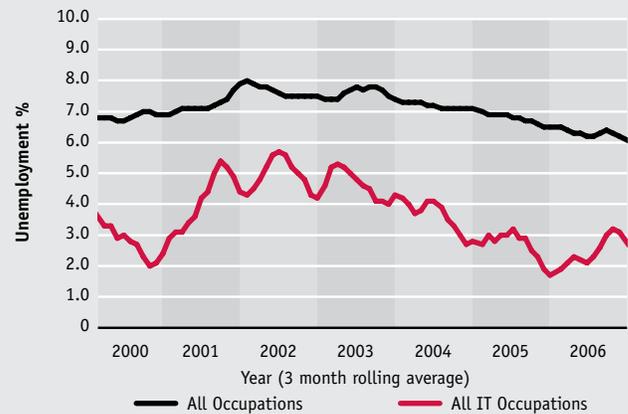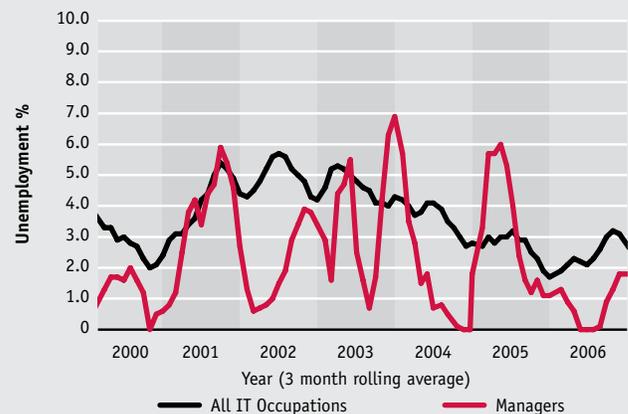**Unemployment Rate: All IT Occupations vs. All Occupations**

Figure 5:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Unemployment Rate: Managers

The notable exception was the spike in the Manager unemployment rate that occurred in late 2003. Also notable are the very low unemployment rates reported, reaching as low as under 0.5 percent at certain points, including some months in 2006. At the end of 2006, the Manager unemployment rate stood at 1.8 percent.

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5   Indeed, except for Engineers (in certain months in 2002 and 2003) and Other IT workers (in certain months in 2006), every IT occupational group has experienced a lower unemployment rate than the national average for the entire study period.

The **Engineer** unemployment rate was consistently below the average for all IT occupations except for one notable period from mid-2002 to mid-2003, during the fallout from the "dot-com" boom and bust. During that time period, the Engineer unemployment rate spiked to 12 percent, 6.4 points above the average for all IT occupations (and almost 5 points above the national average for all occupations).

The Engineer unemployment rate has been less than the average of all IT occupations for 37 of the 39 months since September 2003; in the two months that were exceptions, the rate was barely above the average, by a miniscule 0.1 percentage point. At the end of 2006, the rate was 1.4 percent.

The **Analyst** unemployment rate mirrored the movement of the average for all IT occupations, albeit at a marginally lower rate (within one percentage point) for many months in the seven-year period. Two periods of exception stand out where the difference in rates, although not the direction, was considerably more than one percentage point:

— In 2002, the gap was more than three percentage points.

— In the Fall of 2003 and the Spring of 2004, there were months where the gap was growing and exceeded 1.5 percentage points.

For the last two years, the traditional difference (within one percentage point) was seen again. At the end of 2006, the Analyst unemployment rate was 2.9 percent.

Figure 6*:
Analysis of the LFS Data for the IT Occupations, 2000–2006
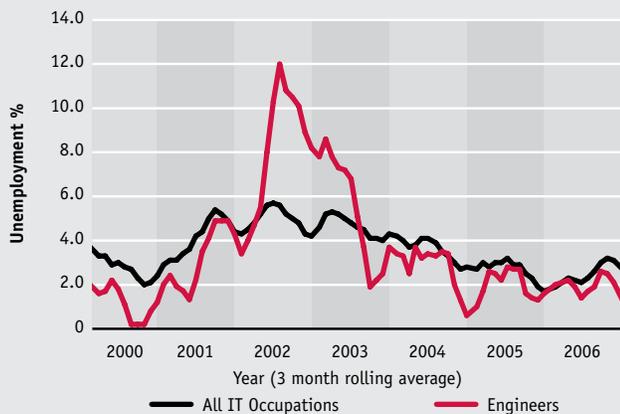**Unemployment Rate: Engineers**

Figure 7:
Analysis of the LFS Data for the IT Occupations, 2000–2006
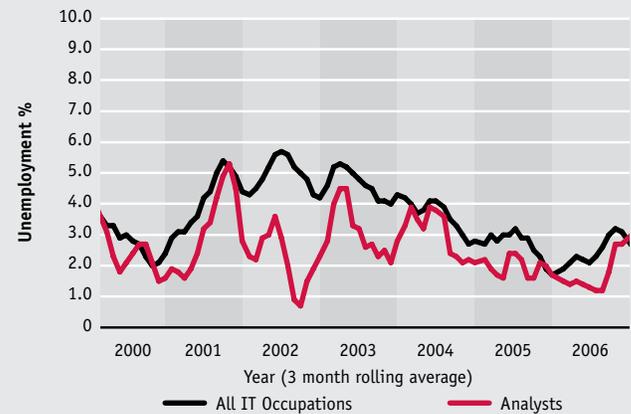**Unemployment Rate: Analysts**

Figure 8: Analysis of the LFS Data for the IT Occupations, 2000–2006
Unemployment Rate: Programmers
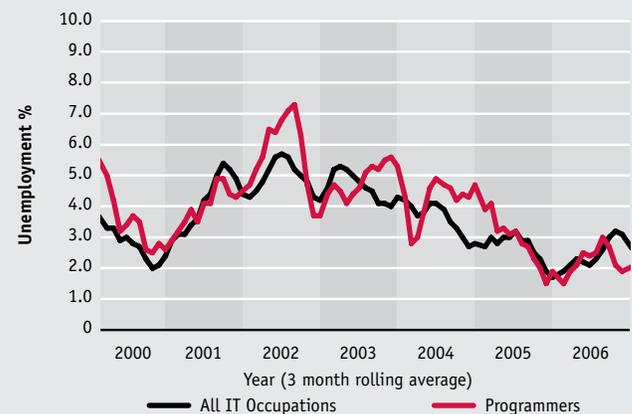
In the eighty-two months of the data series shown in Figure 7, the Analyst unemployment rate exceeded the average on only four occasions (October, 2000; November, 2001; December, 2005; December, 2006). In the first case, the difference was 0.3 percentage point; in the latter three cases, the difference was 0.1 percentage point.

* In Figure 6, the scale on the vertical axis has a maximum value of 14%; for six other figures depicting unemployment rates (Figures 4, 5, 7, 8, 9 and 10), the scale has a maximum value of 10%.

The **Programmer** unemployment rate also mirrored the average for all IT occupations. However, it exhibited somewhat greater volatility as about two-thirds of the time the unemployment rate was above the average for all IT occupations and for the remaining one-third it was below the average. At the end of the study period, the unemployment rate for Programmers was below the average for all IT occupations, at 2.0 percent vs. 2.8 percent.

The **Technician** unemployment rate mirrored the average for all IT occupations, but remained above the average of all IT occupations for almost the entire period. The gap was quite close in most months, at about 1 percentage point. However, there was a spike in the Technician unemployment rate during the Spring and Summer of 2006; by August, the unemployment rate reached 5.3 percent, a level 2.7 percentage points above the average for all IT occupations. There was a swift decline in the Fall; by the end of the year, the unemployment rate had fallen to 3.0 percent, only 0.2 percentage point above the average.

The **Other IT** workers unemployment rate was also above the average for all IT occupations for most of the period. However, there were a number of time periods where the unemployment rate for this group was considerably above the average. The most recent occurred during the Fall of 2006, as the rate spiked to 7.5 percent in November; this level was 4.4 percentage points above the average for all IT occupations.

Figure 10 below illustrates the volatility in the unemployment rate. Although there were time periods when the Other IT unemployment rate surged above the average, the gap subsequently closed within a few months. Consider, for instance, these two periods of spikes that were subsequently reversed:

— In the Summer of 2002, the unemployment rate reached 9.5 percent, over 5 points above the average; by the Fall of 2002, the gap had closed.

— In the Fall of 2003, the unemployment rate reached 7 percent, about 3 points above the average; by early 2004, the rates had converged.

In the case of the most recent spike in the Fall of 2006, the data for December 2006 showed a decline in the gap, but it remains to be seen whether this decline will be sustained.

Figure 9:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Unemployment Rate: Technicians

Figure 10:
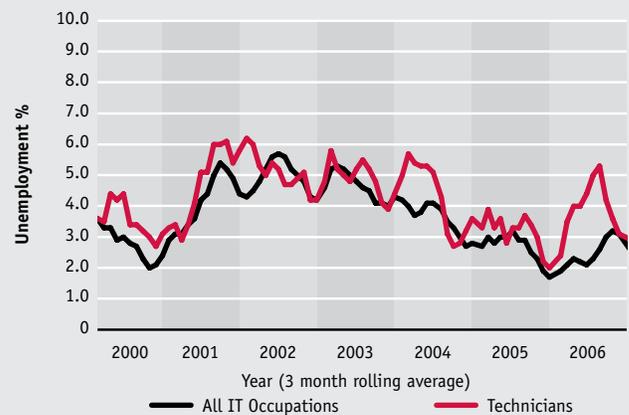Analysis of the LFS Data for the IT Occupations, 2000–2006
Unemployment Rate: Other IT Workers
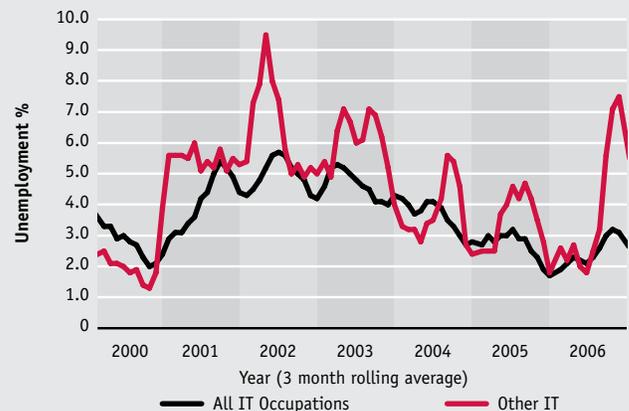
2. Profile of the IT Labour Force

This section of the report presents an analysis of the characteristics of the IT labour force (age, gender, education, location, etc.) with particular emphasis on comparisons among the six occupational groups.

The first finding of some note is that, for almost all profile items, there is very little variation in the results over the seven-year period.[6] Consequently, the profile results are presented in this section as the average of the seven years. With so little variability over time, there is essentially no information loss created thereby; when, in rare cases, some trend in the data is clearly evident, it is noted below.

> **Note to Readers:** *The responses to some questions in the LFS survey are coded into categories (e.g., salary ranges, age ranges) as established by Statistics Canada. Consequently, it is not possible to calculate an accurate average figure (e.g., average salary or average age). Instead, the results are presented in ranges.*

2.1 Age:*The IT Labour Force Is Young But Getting Older*

IT is a young occupation, with 44 percent of workers under 35 years of age. Another 33 percent of workers are in the 35 to 44 age group, leaving just 23 percent in the older worker category, from age 45 onwards.[7]

A further analysis of the age profile by IT occupational groups as exhibited in Table 2 shows that Programmers,

Figure 11:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Age
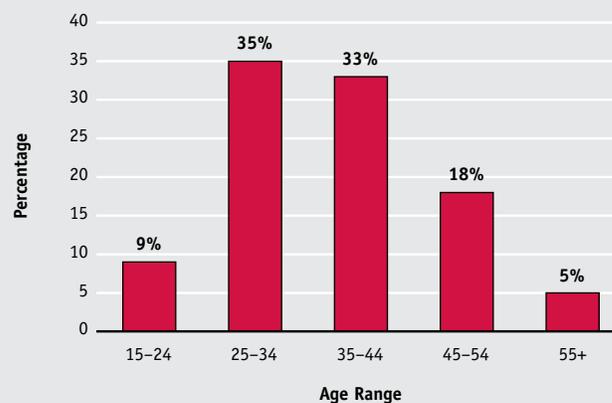
Technicians and Other IT workers are somewhat younger and that Managers and Analysts are somewhat older than the average IT worker:

— 50 percent of Programmers and Technicians are under 35 years of age and 54 percent of Other IT workers are in that age category;

— Slightly more than 30 percent of Managers and Analysts are in the older age categories, above 44 years of age.

Over the seven-year study period, the age profile of the

Table 2: Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Age

Group	15–24	25–34	35–44	45–54	55+
All IT	**9%**	**35%**	**33%**	**18%**	**5%**
Managers	2%	28%	39%	24%	7%
Engineers	5%	35%	37%	18%	6%
Analysts	4%	29%	37%	24%	7%
Programmers	10%	40%	32%	15%	3%
Technicians	14%	36%	30%	17%	4%
Other IT	14%	40%	26%	14%	5%

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[6] For instance, the percentage of the IT labour force working full-time was 95.4 percent (2000), 94.9 percent (2001), 94.3 percent (2002), 93.9 percent (2003), 94.2 percent (2004), 94.8 (2005) and 95.2 (2006). Following this document's convention of reporting integer results, these data round to 95 percent, 95 percent, 94 percent, 94 percent, 94 percent, 95 percent and 95 percent. To cite another example, the percentage of males in the IT labour force was 76 percent, 75 percent, 75 percent, 75 percent, 76 percent, 75 percent and 75 percent respectively.

[7] In this document, totals may not add to 100 percent due to rounding of cell data.

IT labour force shifted, as shown in Figure 12 below. The proportion of younger workers under 35 years of age fell from 47 percent of the IT labour force to 40 percent and the proportion of older workers above 44 years of age grew from 19 percent to 27 percent. While the labour force can still be described as youthful, the average age is rising.

2.2 Gender: *The IT Labour Force Is Predominately Male*

As shown in Figure 13, the IT occupations are predominately staffed by male workers. Only one-quarter of workers are female.

As shown in Table 3 below, males have even greater dominance in the Engineering occupation, where they comprise 89 percent of the workforce. Females have above average[8] representation in two occupational groups: Analysts and Other IT. However, only the Other IT group approaches a 50-50 split with 41 percent of that occupation being female.

Table 3: Analysis of the LFS Data for the IT Occupations, 2000–2006
   Profile: Gender

Group	Male	Female
All IT	**75%**	**25%**
Managers	76%	24%
Engineers	89%	12%
Analysts	72%	29%
Programmers	78%	22%
Technicians	78%	22%
Other IT	59%	41%

2.3 Education Level: *The IT Labour Force Is Well Educated*

The IT workforce is well educated, with more than three-quarters having attained a post-secondary degree in all occupations except Technicians and Other IT workers.

Figure 12:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Age Trends
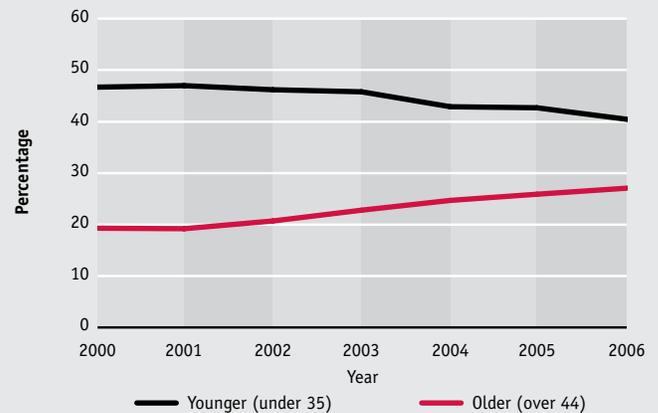
Figure 13:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Gender
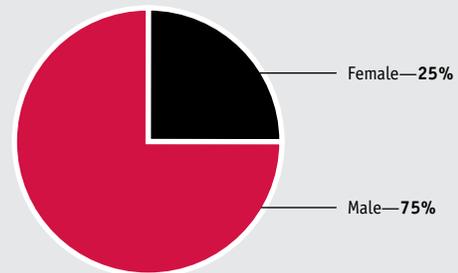
Engineers are particularly highly educated, as one would expect, with almost 90 percent having a post-secondary degree.

Table 4 below provides additional detail on the high levels of educational attainment. Particularly noteworthy is the high percentage of post-graduate degrees in three occupations: Engineers (26 percent), Managers (17 percent), and Analysts (15 percent). The percentage of Programmers with a post-graduate degree is lower, at 13 percent. Only Technicians and Other IT workers are below 10 percent.

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8   "Above average" refers to a comparison to all IT occupations; females in these two occupations are still below the 50 percent required for an even split between genders.

Figure 14:
Analysis of the LFS Data for the IT Occupations, 2000–2006
**Educational Profile: Post-Secondary Graduate
(College, University, Post-Graduate)**
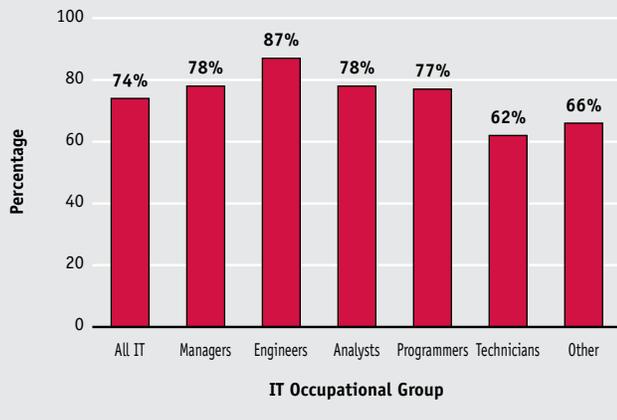
We turn now to the "typical" level of educational achieve-ment, as measured by the modal level.[9] For IT workers as a whole, the modal level is a Bachelor's degree. This is the case for all occupational groups, except Technicians and Other IT workers, where the modal level is a College diploma. See Table 5.

For all occupational groups, the next modal level is a post-secondary degree.[10] For Engineers, it is higher than Bachelor's i.e., a post-graduate degree.

Table 5: Analysis of the LFS Data for the IT Occupations, 2000–2006
Educational Profile: Modal Achievement Level

Group	Modal Education Level	Next Modal Level
All IT	Bachelor	College
Managers	Bachelor	College
Engineers	Bachelor	Post Graduate
Analysts	Bachelor	College
Programmers	Bachelor	College
Technicians	College	Bachelor
Other IT	College	Bachelor

Table 4: Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Educational Attainment

Group	1 Sec/Trade	2 College	3 Some U	4 Bachelor	5 Post-Grad
All IT	**16%**	**28%**	**11%**	**34%**	**12%**
Managers	12%	21%	10%	40%	17%
Engineers	6%	11%	6%	50%	26%
Analysts	12%	24%	10%	39%	15%
Programmers	12%	25%	10%	39%	13%
Technicians	25%	37%	13%	19%	6%
Other IT	23%	37%	12%	24%	5%

1 Secondary School Completion or Less, plus Trade Certificate / Diploma
2 Community College, CEGEP
3 Some Post-Secondary, University Diploma Below Bachelors
4 Bachelors Degree
5 MA or PhD

9   The educational category with the highest percentage of workers is the modal level.
10   In the case of Other IT workers, there is a virtual tie for next modal level between a Bachelor's degree and a Trade Certificate/Diploma.

March, 2007
**Analysis of Labour Force Survey Data for the
Information Technology Occupations**
2000–2006

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2.4 Location: *The IT Labour Force Is Concentrated in Central Canada*

Almost three-quarters of IT workers are located in Ontario and Quebec. Ontario alone has almost one-half of the workforce.

Ontario's predominance in the IT sector is further exhibited by the high percentage of Engineers (54 percent) located in that province. See Table 6 below. Indeed, for every occupational group except Technicians and Other IT workers, Ontario has nearly half or more of the labour force. Even for those two occupational groups, Ontario's share is about 45 percent.

Figure 15:
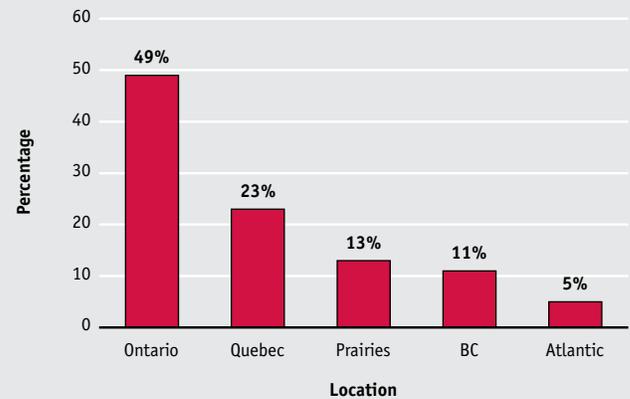Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Location

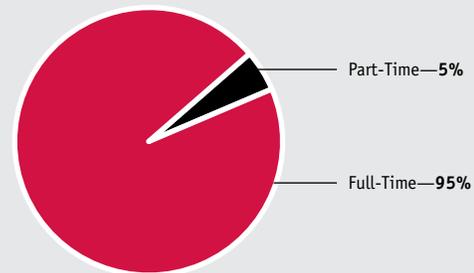Table 6: Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Location

Group	Atlantic	Quebec	Ontario	Prairies	BC
All IT	**5%**	**23%**	**49%**	**13%**	**11%**
Managers	4%	23%	50%	12%	11%
Engineers	3%	20%	54%	10%	12%
Analysts	3%	24%	51%	13%	9%
Programmers	4%	23%	49%	12%	12%
Technicians	7%	21%	46%	15%	11%
Other IT	4%	25%	45%	12%	14%

2.5 Job Status: *Employment in IT Is Predominately Full-Time*

Full-time work is defined by Statistics Canada as working more than 30 hours per week. Almost all workers in the IT labour force are full-time, with only 5 percent working less than 30 hours per week.

As would be expected, Managers are almost exclusively full-time workers, with only 2 percent stating they work part-time. Engineers are also almost exclusively (99 percent) full-time workers. Of the remaining occupations, only the Other IT occupational group has a significant number working on a part-time basis, with 13 percent in that category. See Table 7.

Figure 16:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Full-Time vs. Part-Time

Part-Time—**5%**

Full-Time—**95%**

Table 7: Analysis of the LFS Data for the IT Occupations 2000–2006
   Profile: Full-Time vs. Part-Time

Group	Full-Time	Part-Time
All IT	**95%**	**5%**
Managers	98%	2%
Engineers	99%	1%
Analysts	95%	5%
Programmers	96%	4%
Technicians	94%	6%
Other IT	87%	13%

2.6 Job Permanency: *Most IT Jobs Are Permanent*

The Labour Force Survey asks respondents the following question: "Is your job permanent, or is there some way that it is not permanent? (e.g., seasonal, temporary, term, casual, etc.)" Readers will note that the question does not prompt for the possibility of contract employment. However, Statistics Canada provided data for the following non-permanent categories:

- seasonal;
- temporary, term or contract;
- casual;
- work done through a temporary help agency; and
- other.

As shown in Figure 17, seven percent of the IT workforce in the LFS survey indicated that they were temporary, term or contract employees (labelled as "contract").

According to the Labour Force Survey, Managers and Engineers describe themselves almost exclusively as permanent employees. Some Programmers, Technicians and Other IT workers are on contract or other non-permanent arrangements; however, these account for 10 percent or less of the labour force in each case. See Table 8.

Table 8: Analysis of the LFS Data for the IT Occupations, 2000–2006
   Profile: Permanent vs. Contract

Group	Permanent	Contract	Other
All IT	**92%**	**6%**	**2%**
Managers	98%	2%	
Engineers	95%	4%	
Analysts	94%	5%	1%
Programmers	91%	7%	2%
Technicians	90%	8%	2%
Other IT	90%	8%	2%

2.7 Job Tenure Trend: *Fewer Short Tenure IT Workers and More Long Tenure IT Workers*

Job tenure is defined as the number of consecutive months a person has worked for the current employer (or, if employed within the previous twelve months, the most recent employer). The LFS data were provided in annual categories (i.e., 1–12 months; 13–24 months; etc.) Unlike the other profile items, job tenure for the entire IT workforce does show some trends over time, as shown in Table 9.

Figure 17:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Permanent vs. Contract

Contract—**6%**
Other—**2%**
Permanent—**92%**

Table 9: Analysis of the LFS Data for the IT Occupations, 2000–2006
         Profile for All IT Occupations: Job Tenure

	1–12 Months	13–24 Months	25–36 Months	37–48 Months	49–60 Months	>60 Months
2000	24%	15%	13%	8%	5%	36%
2001	25%	15%	11%	9%	6%	34%
2002	19%	16%	12%	9%	7%	37%
2003	18%	12%	12%	10%	8%	40%
2004	18%	10%	9%	10%	8%	45%
2005	20%	11%	8%	9%	7%	45%
2006	20%	12%	9%	7%	7%	46%
7 Yr Trend	Falling[11]	Falling[12]	Falling	Stable[13]	Rising	Rising
	Falling			Stable		Rising

Another way to perceive the trends is shown in Figure 18 below. The percentage with one to three years (up to 36 months) of job tenure has fallen from above 50 percent in 2000 to about 40 percent by the end of the study period. On the other hand, the percentage with longer tenure, more than four years, has increased from about 40 percent in 2000 to over 50 percent.

With the shorter duration categories falling by about 10 percentage points over the study period and the longer tenure categories rising by 10 percentage points, it is not surprising to see that the middle category of tenure from three to four years remained stable.

The pattern shown in the table and figure above suggest that the longer an IT worker is in a job, the more likely the worker is to stay in it, particularly after reaching tenure of four years.

In 2004 and 2005, every occupational group had (almost)[14] 40 percent or more of its members in the longest tenure category (over 60 months). In 2006, this observation was repeated for all groups except Other IT workers (with only 35 percent of workers in the long tenure category), perhaps a reflection of the spike in that group's unemployment rate in 2006.

The three highest wage groups[15] exhibit even stronger evidence of long-term tenure: Managers, Engineers and Analysts. In every year except one (2001), Managers had over 50 percent of members in this longest tenure category. In the last three years, about one-half of Analysts

Figure 18:
Analysis of the LFS Data for the IT Occupations 2000–2006
Profile: Tenure Trends

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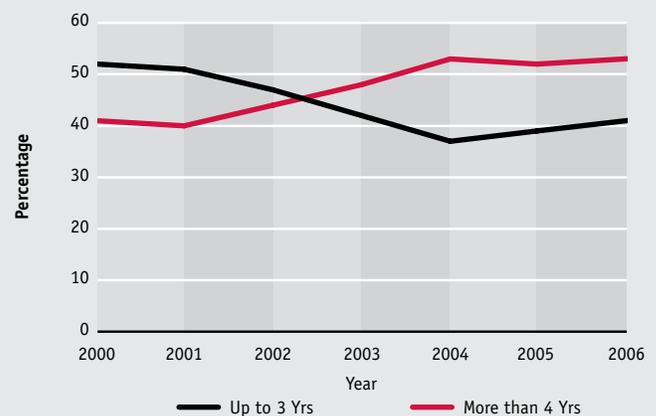
11   There was a slight rise to 20 percent in this short-tenure category in 2005; however, there has been no further increase in 2006. The best descriptor for the seven-year period is "falling".
12   A similar consideration applies to this tenure category.
13   Prior to 2003, the percentage in this tenure category had been rising. Since 2003, the percentage has been falling. However, when comparing the first two years in the period with the last two years, the best descriptor over the entire period is "stable".
14   In 2005, the figure for Technicians and Other IT workers was 39 percent.
15   The analysis of wage data can be found in Section 2.11 below.

Table 10: Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Industry Sectors

Group	Prof Sci Tech	Manuf	Info & Culture	Public Admin	Fin & Ins	Total
All IT	**44%**	**13%**	**9%**	**8%**	**7%**	**81%**
Managers	44%	10%	11%	11%	9%	85%
Engineers	36%	32%	11%	3%	3%	85%
Analysts	53%	6%	6%	12%	9%	86%
Programmers	52%	10%	7%	8%	8%	85%
Technicians	27%	9%	11%	10%	7%	64%
Other IT	56%	15%	12%	2%	1%	87%

have also reached this level of tenure. In two of the last three years—2006 being the exception—Engineers have shown a similar pattern. Even in 2006, when the percentage of long tenure workers fell to 47 percent of Engineer labour force, the proportion of workers in this tenure category exceeded that for the lower wage Programmers, Technicians and Other IT workers.

2.8 Industry Sectors: *Five Industries Account For Most IT Employment*

As shown in Table 10, five Industry sectors account for over 80 percent of IT jobs. They are:

• Professional, Scientific and Technical Services;

• Manufacturing;

• Information and Culture Industries;

• Public Administration; and

• Finance and Insurance.

Professional, Scientific and Technical Services is the largest industry sector for all IT occupations. Engineers have a significant percentage (32 percent) of their employment in Manufacturing. Technicians are more broadly distributed across the economy, as these five industry sectors account for only 64 percent of their employment.

## 2.9 Unionization: *One in Five IT Workers Is Covered by a Union CBA*

Twenty percent of the IT labour force is covered by a union's collective bargaining agreement (CBA). However, only 17 percent are actually union members, with the remainder covered by a CBA even though they themselves are not members.

As indicated in Table 11, Managers, Engineers, Programmers and Other IT workers show relatively lower rates of unionization, whereas Analysts and Technicians show higher rates. As noted in the previous Table, the latter two occupational groups show a somewhat higher proportion employed in the public administration where unionization is more prevalent; this may help to explain their higher rates of unionization.

Table 11: Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Union Membership

Group	Union Member	Not, But Covered	Not Covered
All IT	**17%**	**3%**	**80%**
Managers	11%	3%	86%
Engineers	13%	2%	85%
Analysts	20%	2%	78%
Programmers	15%	3%	83%
Technicians	22%	2%	75%
Other IT	14%	2%	85%

Figure 19:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Union Membership

Union Member—**17%**

Not Union, But Covered—**3%**

Not Covered—**80%**
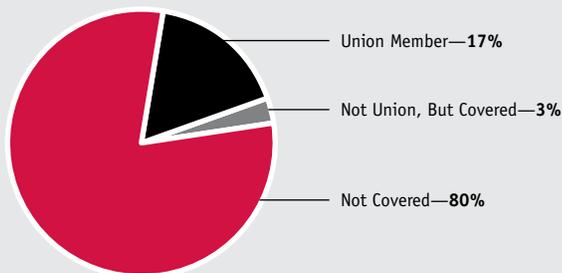
2.10 Regular Hours Worked Per Week[16]: *Most Work 31 to 40 Hours Weekly*

We saw earlier that most workers in the IT labour force are employed full-time. It is not surprising therefore that only 7 percent have a regular workweek of less than 30 hours per week. By far the majority of workers, 83 percent, indicate a regular workweek between 31 and 40 hours. Only 10 percent of the IT labour force has a workweek of more than 40 hours per week.

Figure 20:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Hours In Regular Workweek

More Than 40 Hours—**10%**

0–30 Hours—**7%**

31–40 Hours—**83%**
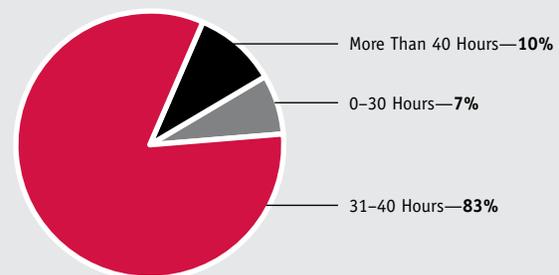
[16] The terms "regular hours worked per week" and "regular workweek" refer to the number of paid hours worked weekly, **excluding paid overtime**.

A long workweek (defined here as more than 40 hours per week with no additional pay) is most heavily concentrated among Managers, 20 percent of whom report working beyond 40 hours. See Table 12. The remaining IT occupations show a consistent pattern at about 10 percent of workers exceeding a regular workweek of 40 hours, with Analysts and Other IT workers being somewhat higher than that figure, and Technicians somewhat lower.

Analysts, Programmers and Technicians also show slightly higher percentages of workers who have a regular workweek of 30 hours or less, a reflection of the higher proportion of part-time workers in those occupations. The Other IT group stands out, with 18% reporting a workweek of less than 30 hours; as shown earlier in Table 7, this group has the highest proportion of part-time workers. On the other hand, Engineers, almost all of whom work full-time, are most likely to have a regular workweek between 31 and 40 hours.

2.11 Wages Paid Per Week: *The Wage Rate Varies By IT Occupation According to a Natural Progression*

There is a clear progression in nominal wages paid, with Managers drawing the highest, followed by Engineers, Analysts, Programmers, Technicians and Other IT workers in that order.

One way to illustrate the ranking is through the modal salary range, as shown in Table 13. As further evidence of the wage ranking, the last column indicates the percentage of workers in the ranges above the modal one. Although Analysts and Programmers have the same modal category, there are more Analysts in the higher salary ranges, putting them ahead of Programmers in the ranking. A similar analysis places Technicians above Other IT workers in the wage progression.

Table 12: Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Hours In Regular Workweek

Group	0–30	31–40	41–50	51–60	60+
All IT	**7%**	**83%**	**7%**	**2%**	**1%**
Managers	3%	78%	11%	7%	2%
Engineers	2%	89%	7%	2%	1%
Analysts	7%	81%	8%	3%	1%
Programmers	6%	86%	6%	2%	1%
Technicians	7%	87%	5%	1%	1%
Other IT	18%	69%	9%	3%	1%

Table 13: Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Weekly Wages

Group	Modal Salary Range	Modal Category as a % of Total Group	% in Higher Salary Ranges
All IT	**$801–$1000**	**20%**	
Managers	> $1600	31%	NA
Engineers	>$1600	22%	NA
Analysts	$801–$1000	20%	59%
Programmers	$801–$1000	24%	45%
Technicians	$601–$800	24%	48 %
Other IT	$601–$800	27 %	35 %

The data on weekly wages, unlike most of the other profile elements, do exhibit some evidence of trends, as would be expected over a seven-year period in which the IT unemployment rate was consistently below the national average.

Figure 21 below shows the wage trends for all IT workers over the study period. Lower wage workers (defined as those earning up to $1,000 per week) fell from 63 percent of the IT labour force to 47 percent of the labour force. Higher wage workers (defined as those earning more than $1,400 per week) doubled from 12 percent of the IT labour force to 24 percent. There was a modest increase of 3 percentage points for middle wage workers (defined as those earning between $1,001 and $1,400 per week). From these trends, it is evident that the average wage (in nominal terms) of the IT labour force has risen over the study period.

A more detailed analysis suggests that the wage progression (in nominal terms) has been strongest in the last few years for Managers, Engineers and Analysts. Increases for Programmers and Technicians have been more modest. There seems to have been little or no progression for Other IT workers.[17]

Figure 21:
Analysis of the LFS Data for the IT Occupations, 2000–2006
Profile: Trends In The Wage Rate

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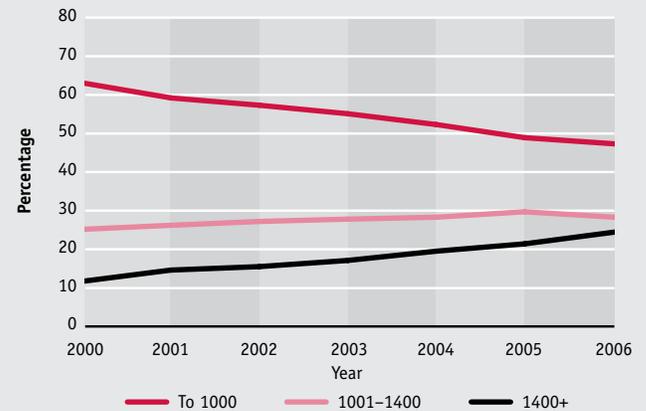
[17] The profile data exhibited earlier showed that this occupational group held fewer full-time posts, worked shorter hours per week, had a lower rate of unionization and was comprised of a higher proportion of female workers. Which, if any, of these factors explain the lack of evident wage progression cannot be determined from the dataset.

Appendix: Some Notes Regarding Previous Reports on the Analysis of LFS Data for the IT Occupations

The Council Spearheaded The First Report In 2002

The substantial increase in information technology (IT) in the last two decades of the Twentieth Century had significant impacts on the labour market. New IT occupations emerged such as e-Commerce Managers, Software Engineers, Systems Security Analysts, Web Design Developers and Web Technicians. However, until a few years ago, the occupational classification system for the LFS and for the Census did not reflect the emergence of these new occupations; instead, it used three groups: computer engineers, systems analysts and computer programmers.

In 2002, Human Resources Development Canada (HRDC)[18] and the Software Human Resource Council (SHRC) identified 21 occupations within the new National Occupational Classification System (NOC) that comprise the IT labour force. SHRC supported this initiative through the development of its Occupational Skills Profile Model. SHRC contracted with Statistics Canada to recode the LFS data from January 2000 onwards using the 21 IT classifications. The recoding involved a review of the three occupations cited above, plus a number of others where it was thought IT workers might be found e.g., Electrical and Electronics Engineers, Telecommunications Carriers Managers, and Computer Operators. This recoding produced a new database describing the IT labour force.

In the fall of 2002, SHRC engaged Mr. William G. Wolfson of WGW Services Ltd. to prepare a report analyzing the IT labour force, utilizing this database for the period from January 2000 to July 2002. A first report was released in November 2002. Statistics Canada continued its work to identify additional IT workers from a variety of occupations for inclusion in the database.

Further Refinements Contained In Subsequent Reports From 2003 To 2006

A revised database of the IT labour force was developed in the Spring of 2003. A second report dated May 2003 was prepared for SHRC using this more complete database for that same January 2000 to July 2002 time period. A third report for the four-year period from January 2000 to December 2003 was released in the Spring of 2004. A fourth report for the five-year period from January 2000 to December 2004 was released in the Spring of 2005.

The fifth report (called the "2005 Update Report") provided a further update to the end of 2005, a six-year period. SHRC had by then completed an internal review of the IT occupational categories used within its various reports and decided to bring greater conformity across studies by including all 21 occupations in the 2005 Update Report. (In the previous four reports, only 17 occupations were included).

Here is Table 1 describing the occupational groupings, as it appeared in the 2005 Update Report. The four additional occupations are clearly marked below: two of them extended the definitions of existing groups (HR Managers in the Manager group; Systems Auditors in the Analysts group) and two of them constituted a new group titled "Other IT" (Technical Writers; Graphic Designers and Illustrators).

ICTC is working on defining the hardware occupations to be included in its Occupational Skills Profile Model (OSPM) and the associated occupational groupings to be included in this LFS report. However, this work is not yet complete; consequently, the 2006 Update Report focuses solely on the 21 occupations as described above.

Table 1: Analysis of the LFS Data for the IT Occupations, 2000–2005
        Occupational Groupings

Group	NOC	Occupation
Managers	0112	HR Managers *
	0213	Computer and Information System Managers
	6115	e-Commerce Managers
Engineers	2133	Electrical and Electronics Engineers
	2147	Computer Engineers (excluding Software)
	2173	Software Engineers
Analysts	21711	Information Systems Business Analysts
	21712	Systems Security Analysts
	21713	Information Systems Quality Assurance Analysts
	21714	Systems Auditors *
	21721	Database Administrators
	21722	Database Administration Analysts
Programmers	21741	Computer Programmers
	21742	Interactive Media Developers
	2175	Web Design Developers
Technicians	22811	Computer Network Technicians
	22812	Web Technicians
	2282	User Support Technicians
	2283	Systems Testing Technicians
Other IT	51212	Technical Writers *
	5241	Graphic Designers and Illustrators *

* These occupations added for the first time in the 2005 Update Report.

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[18] Now Human Resources and Skills Development Canada (HRSDC).

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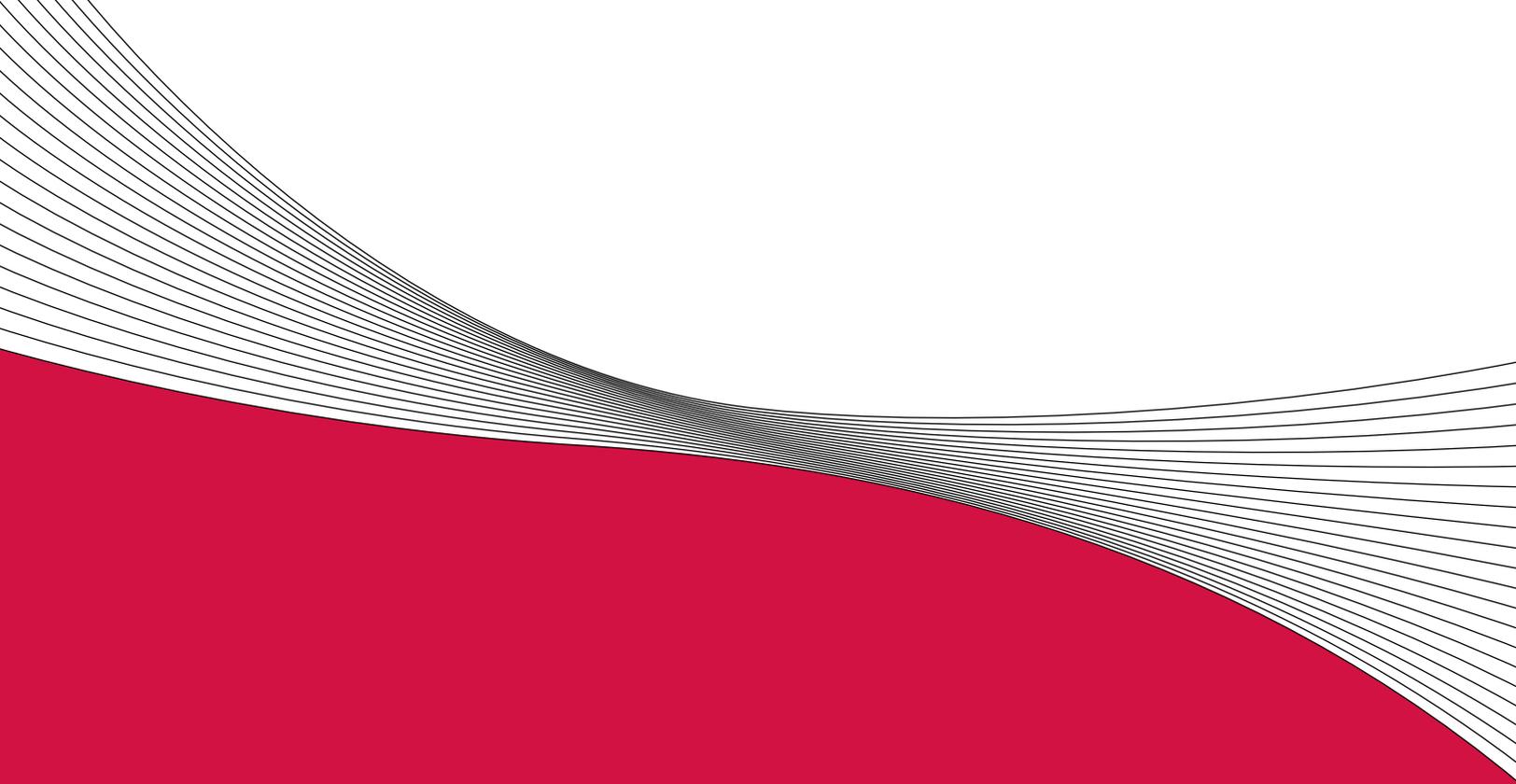
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