

# Changing Industrial Structure

## Ottawa-Gatineau

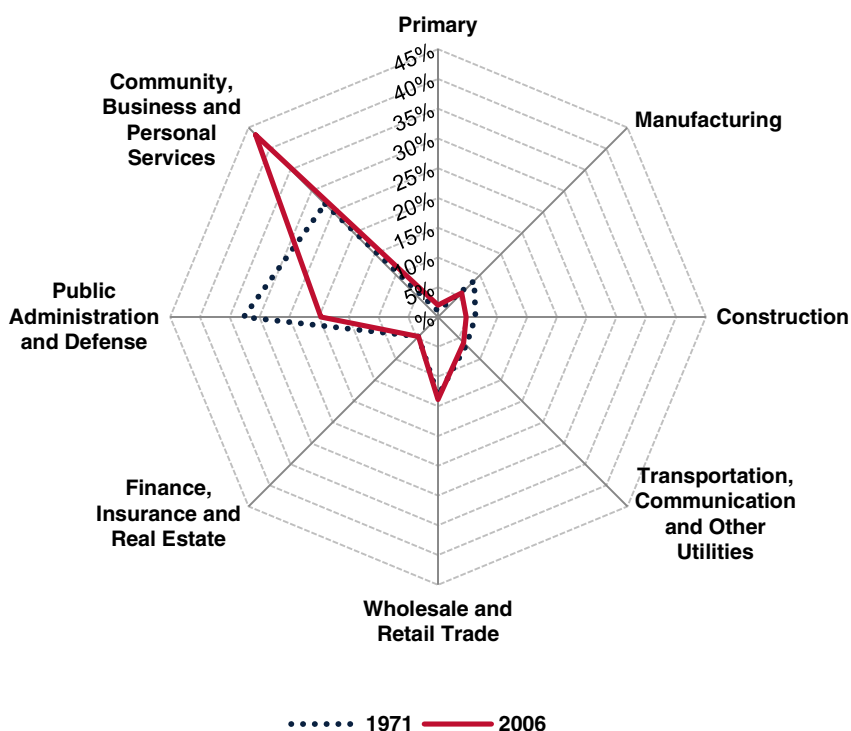
Over the past 25 to 30 years, the economy of the Ottawa region has undergone a marked shift. Figure 1 shows the broad shifts in the industrial composition of the regional economy.

Most notably, employment in public administration and defense decreased from 32.6% of the workforce in 1971 to 19.7% in 2006. However, this sector still accounts for the second highest amount of employment in the region. By contrast, employment in service-based industries increased from 26.8% to 43.3% between 1971 and 2006. This sector is now dominant in Ottawa's industrial structure.

Other sectors, such as trade, transportation and the FIRE industries have only witnessed small changes through this time. Employment in wholesale and retail trade increased slightly from 13.2% of the region's workforce to 13.9% by 2006. Likewise, transportation and communications has routinely accounted for roughly 6% of employment throughout this period.

Employment in manufacturing declined from 8.6% to 5.7%, even as the total number of jobs in that field increased from 20,670 in 1971 to 35,304 by 2006. Primary industries accounted for only a small proportion of the regional economy (2% in 2006), despite having experienced very strong growth relative to other sectors.

**Figure 1: Change in industrial structure, 1971-2006**



Source: Statistics Canada, Census of Population, 1971 and 2006

**Table 1: Employment by industry, 1971-2006**

	1971	1981	1991	2001	2006	1971-2006	CAGR
Primary	2,505	5,245	6,320	12,122	12,366	9,861	4.7%
Manufacturing	20,670	26,330	31,290	51,992	35,304	14,634	1.5%
Construction	15,200	16,930	29,620	26,036	29,658	14,458	1.9%
Transp., Comm. & Other Utilities	16,215	26,365	36,180	38,890	38,198	21,983	2.5%
Wholesale & Retail Trade	31,910	52,930	73,980	79,206	86,217	54,307	2.9%
Finance, Insurance & Real Estate	11,170	21,115	25,590	27,077	28,604	17,434	2.7%
Public Administration & Defense	78,600	105,315	126,025	102,944	122,350	43,750	1.3%
Community, Business & Personal Services	64,680	126,000	194,720	245,520	269,149	204,469	4.2%
<b>Total</b>	<b>240,950</b>	<b>380,230</b>	<b>523,725</b>	<b>583,789</b>	<b>621,846</b>	<b>380,896</b>	<b>2.7%</b>

CAGR = Compound Annual Growth Rate

Source: Statistics Canada, Census of Population, 1971-2006

### Data Sources

Due to changes in industrial and occupational classification schemes, there are analytical challenges in ensuring that the data are comparable over time. Thus, the data in this report are often presented in aggregate form and for varying time periods. Long term structural change (1971 to 2006) is evaluated using Census data using eight industrial and occupational groups to ensure consistency. *Labour Force Survey* (LFS) data are only available from 1987 onwards. These data can only be used reliably at high levels of aggregation due to the nature of the LFS sampling frame. Cluster analysis relies on detailed 4-digit codes from the North American Industrial Classification System (NAICS). Such employment data are only available from the 2001 and 2006 *Census of Population*, due to changes in the classification scheme. Detailed occupational data from the Census are comparable from 1991 onwards.

# Manufacturing Dynamics

## Ottawa-Gatineau

Figure 2 compares employment in the manufacturing industries to the overall employed labour force in Ottawa over the period between 1987 and 2010. Employment is indexed to 100 in the base year (1987) to allow for easier comparison of relative growth performance over time.

Figure 2 shows that the share of employment accounted for by manufacturing has fluctuated over time. After relatively stagnant in the early 1990s, manufacturing employment increased strongly through the late 1990s, reflecting growth in the advanced manufacturing technology sector. Between 2001 and 2003, manufacturing employment decline, attributable to the dot-com bust. After a brief recovery, manufacturing

employment continued to decline from 2007 onwards.

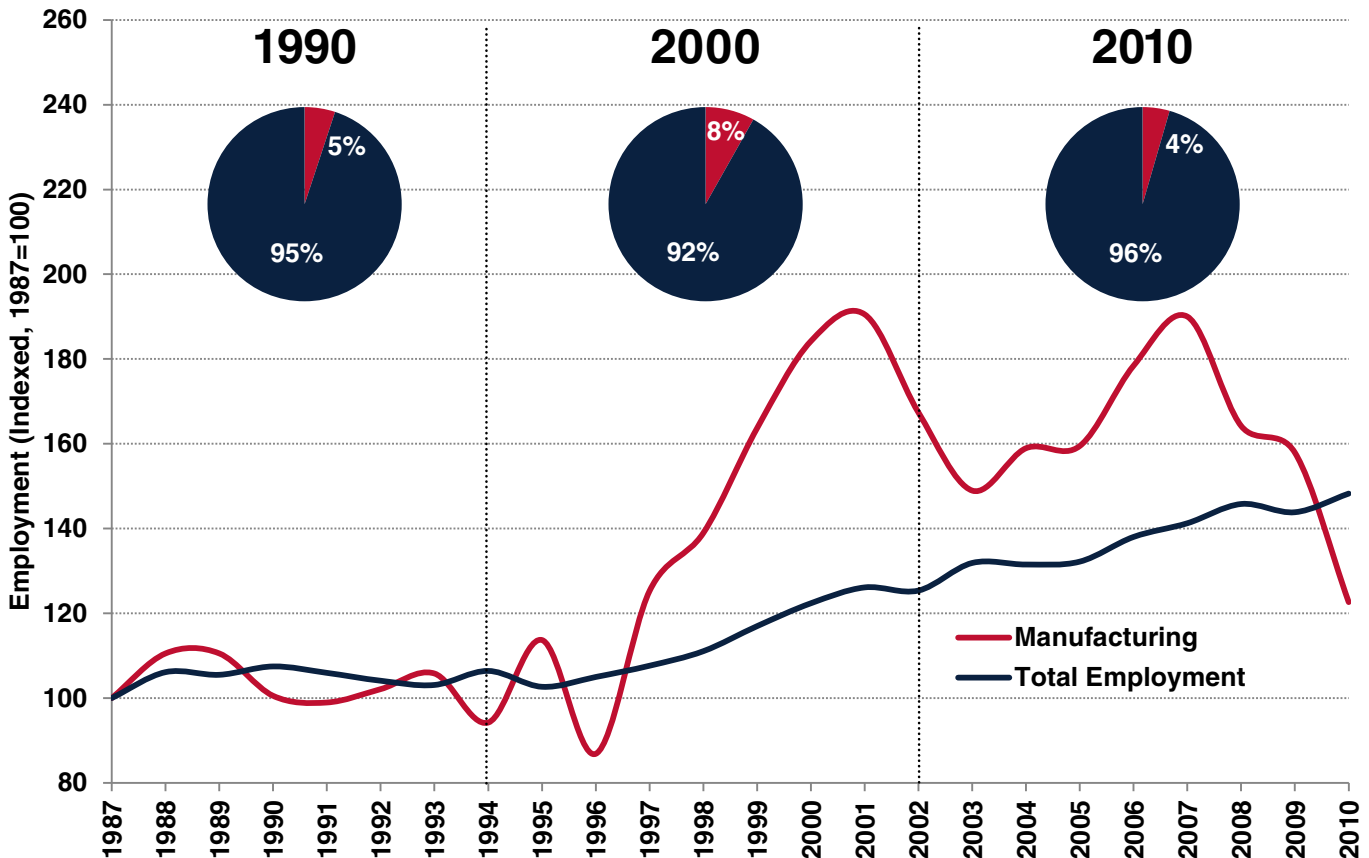
Given the diversification outside of manufacturing, a more detailed examination of the regional economy is warranted. Table 2 shows employment in eighteen industrial groups in 2001 and 2006. While there are high levels of employment and growth in the finance, creative and cultural, and higher education industries, growth performance and levels of specialization vary across sectors. These industrial groups, when demonstrating sufficient size, scope and specialization form the basis of clusters in the regional economy (see next page).

**Table 2: Employment by industrial group, 2001 and 2006**

Industrial Group	2001	2006
Agriculture	5,490	5,380
Mining	1,540	2,250
Oil and Gas	1,105	1,385
Wood & Wood Products	5,065	4,795
Maritime	2,385	2,515
Textiles & Apparel	1,280	880
Food	6,825	7,605
Steel	3,840	3,925
Automotive	2,050	1,450
Plastics & Rubber	7,350	6,040
Biomedical	4,635	5,120
ICT Manufacturing	27,880	15,405
ICT Services	45,580	45,730
Finance	27,940	33,000
Business Services	79,880	85,130
Creative & Cultural	19,350	26,330
Higher Education	25,150	30,945
Logistics	22,145	23,375

Source: Statistics Canada, Census of Population, 2001 and 2006

**Figure 2: Manufacturing Employment, 1987-2010 (1987=100)**



Source: Statistics Canada, Labour Force Survey, 1987-2010 [custom tabulations]

# Cluster Dynamics

## Ottawa-Gatineau

Figure 3 depicts a 'bubble chart' comparing the performance nineteen industrial groups (or clusters) in Ottawa-Gatineau. The horizontal axis shows the employment growth rate between 2001 and 2006. The vertical axis shows the employment location quotient comparing the proportion of Ottawa-Gatineau's employment in an industrial sector to the Canadian average. The diameter of each 'bubble' is proportional to employment in the specified industrial group in 2006. Industrial groups that appear in the upper-right quadrant have positive growth rates and have a higher-than-expected proportion of employment (specialization) in this group of industries.

A more sophisticated analysis of industrial structure involves cluster analysis. Clusters represent groups of inter-related firms and industries that gain competitive advantage by concentrating geographically in certain locations. In this report, industrial groups that meet a set of quantitative criteria are identified as clusters. Clusters are identified based on their relative size (employment), their relative specialization (location quotient), as well as the breadth or scope of activities undertaken in the region.<sup>1</sup>

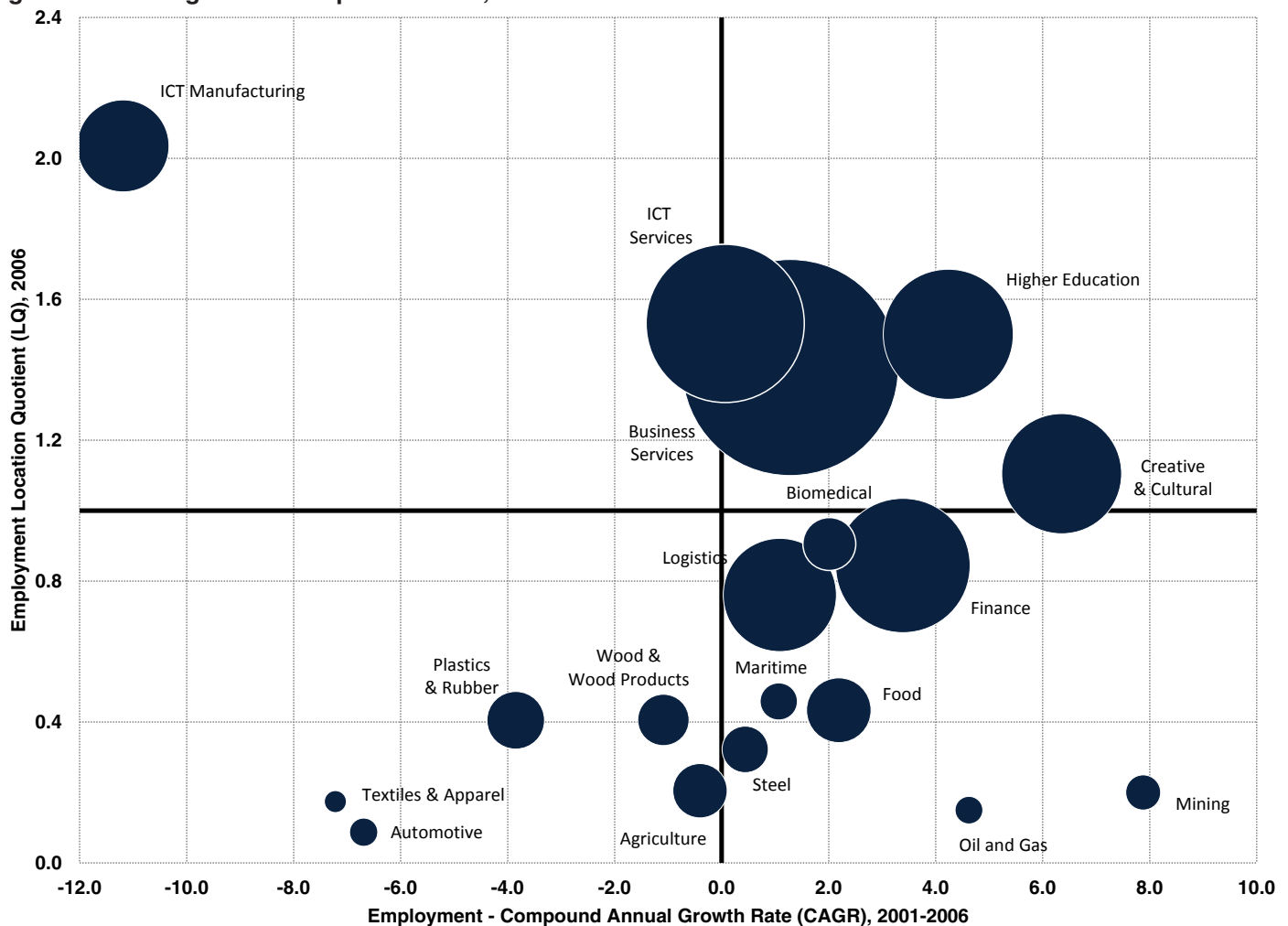
According to these criteria, in 2006, there were four clusters in the Ottawa-Gatineau region: ICT manufacturing, ICT services, business services, and

higher education. Between 2001 and 2006, only the business services cluster demonstrated growth, while ICT manufacturing and services did not fare as well.

While cluster performance was variable, other sectors grew. Notably, the creative and cultural industries demonstrated high levels of growth and specialization between 2001 and 2006.

1. For a more detailed description of the methodology, see: Spencer, G. M., Vinodrai, T., Gertler, M. S., & Wolfe, D. A. (2010). Do Clusters Make a Difference? Defining and Assessing their Economic Performance. *Regional Studies*, 44(6), 697-715.

**Figure 3: Cluster growth and specialization, 2001-2006**



Source: Statistics Canada, Census of Population, 2001 and 2006

# Changing Occupational Structure

## Ottawa-Gatineau

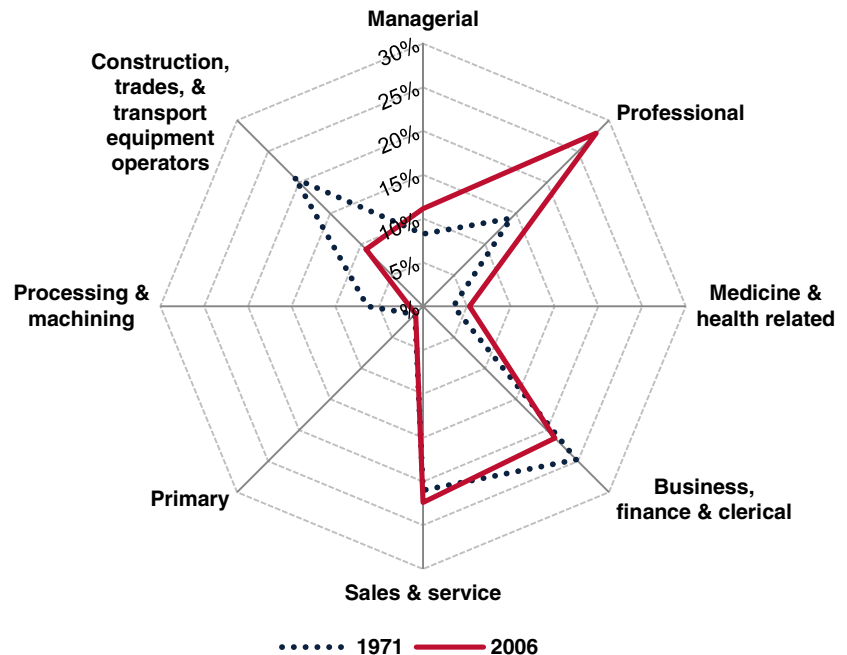
In addition to a broad shift in the industrial composition of the regional economy, Ottawa's workforce has undergone a substantial transition in the forms of work over the past 25 to 30 years. Figure 4 shows the broad shifts in the occupational composition of the regional economy.

Most notably, the proportion of employment accounted for by construction, trades and other related occupations decreased from 20.6% to 9.2% of the workforce between 1971 to 2006. Similarly, employment in processing and machining occupations has decreased from 6.4% to 1.5% in the same time period. By contrast, employment in professional occupations increased from 14.2% to 27.9% between 1971 and 2006.

Modest increases have also been seen in the proportion of employment accounted for by managerial occupations (11.1%), sales and service occupations (22.4%), and medicine and health related occupations (5.3%).

Table 4 provides more detail of these changes. It is clear that Ottawa's workforce has become more professionalized, as occupations related to routine and production-oriented labour have largely been overshadowed by the strong growth in managerial and professional occupations.

**Figure 4: Change in occupational structure, 1971-2006**



Source: Statistics Canada, Census of Population, 1971 and 2006

**Table 4: Employment by occupation, 1971-2006**

	1971	1981	1991	2001	2006	1971-2006	CAGR
Managerial	21,480	46,990	92,170	75,805	69,885	48,405	3.4%
Professional	36,905	63,440	95,075	160,475	175,110	138,205	4.5%
Medicine & health related	9,025	17,330	25,920	28,170	33,215	24,190	3.8%
Business, finance & clerical	64,315	99,890	112,515	122,405	133,405	69,090	2.1%
Sales & service	54,590	84,220	110,745	124,655	140,400	85,810	2.7%
Primary	3,405	5,960	6,865	6,575	7,605	4,200	2.3%
Processing & machining	16,580	22,475	24,910	15,850	9,630	-6,950	-1.5%
Constr., trades, & transport equip. operators	53,625	39,945	55,515	52,000	57,755	4,130	0.2%
<b>Total</b>	<b>259,925</b>	<b>380,250</b>	<b>523,715</b>	<b>585,935</b>	<b>627,005</b>	<b>367,080</b>	<b>2.5%</b>

CAGR = Compound Annual Growth Rate

Source: Statistics Canada, Census of Population, 1971-2006

# Emerging Knowledge Economy

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Figure 5 shows how the occupational composition of the capital region has changed between 1987 and 2010. One of the most interesting patterns has been the almost mirror image relationship between the decline of employment in service-oriented occupations and the growth of knowledge-based occupations. The former accounted for a high proportion of employment in Ottawa in the early 1990s, peaking at 47% in 1991. However, alongside the relative decline of manufacturing, by 2010, this type of work accounted for only 37% of employment. By contrast, knowledge-based work grew substantially, surpassing other forms of work in absolute terms by 2001.

As Table 5 shows, employment in knowledge based occupations increased at 2.1% per year between 1991 and 2006, outpacing the region's overall employment growth rate of 1.2% per year. Also noteworthy is the slow but steady decline in the proportion of

employment accounted for by routine, production-oriented work. Employment in production-oriented jobs peaked at 13% of the workforce in 1987, falling to 8% by 2010 (Figure 5). Not surprisingly, agricultural work accounted for only a fraction of employment throughout the period.

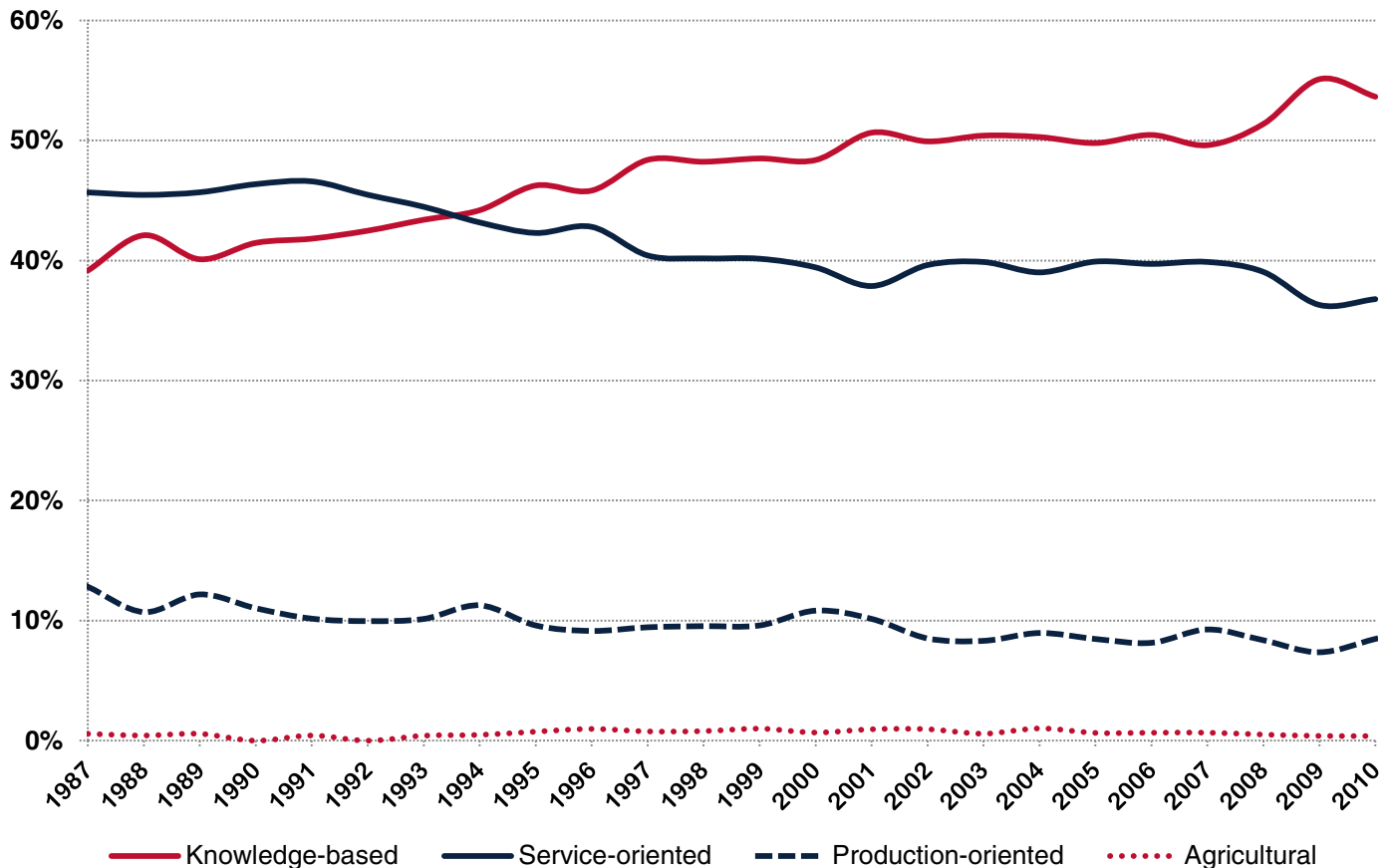
**Table 5: Employment by occupation class, 1991-2006**

	Agricultural occupations	Knowledge-based	Service-oriented	Production-oriented	Total Workforce
<b>1991</b>	4,630	208,275	245,700	70,860	<b>536,865</b>
<b>1996</b>	4,250	218,160	242,455	62,135	<b>546,240</b>
<b>2001</b>	4,060	270,735	242,260	71,050	<b>597,170</b>
<b>2006</b>	3,675	282,965	269,025	71,315	<b>638,075</b>
<b>1991-2006</b>	-955	74,690	23,325	455	<b>101,210</b>
<b>CAGR</b>	-1.5%	2.1%	0.6%	0.0%	<b>1.2%</b>

CAGR = Compound Annual Growth Rate

Source: Statistics Canada, Census of Population, 1991-2006 (custom tabulations)

**Figure 5: Changing occupational composition of the labour force, 1987-2010**



Source: Statistics Canada, Labour Force Survey, 1987-2010 [custom tabulations]