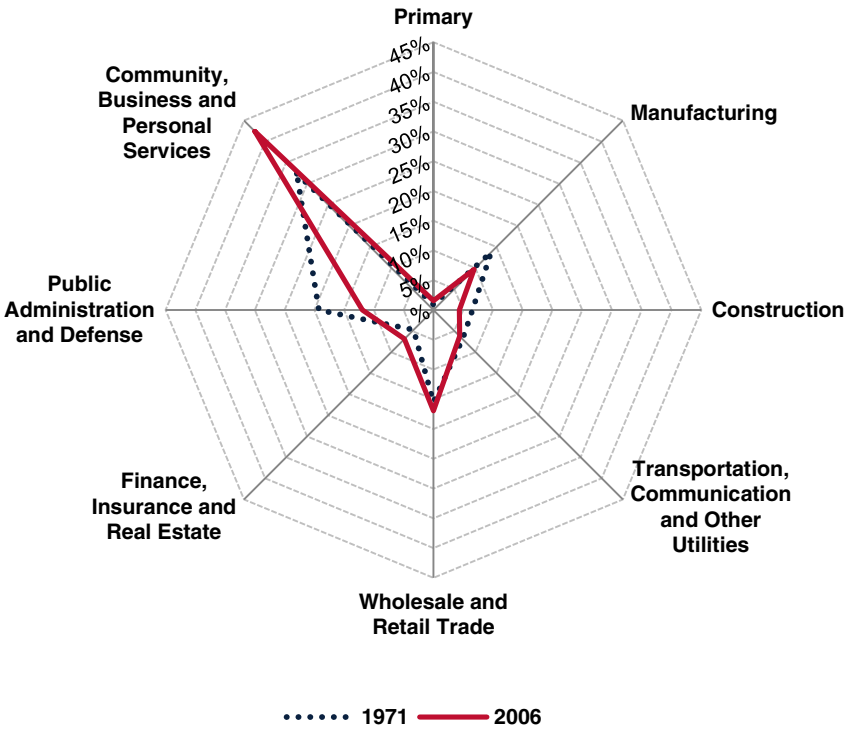
Changing Industrial Structure
Québec City

Figure 1 shows the broad shifts in the industrial composition of the regional economy. Most notably, service-based industries continue to be the dominant industrial sector in Québec City, increasing its share of the workforce from 32.4% in 1971 to 42.4% in 2006. By contrast, employment in public administration and defense declined from 19.2% to 11.9% between 1971 and 2006. Manufacturing also witnessed a decline from 13.7% of the workforce to 9.7% by 2006. However, as Table 1 shows, even though the overall proportion of employment in manufacturing has declined in relative terms, between 1971 and 2006, in absolute terms, the region added just over 16,000 jobs in the manufacturing industries.

Other sectors, such as trade and the FIRE industries, have only witnessed moderate changes through this time. Employment in wholesale and retail trade increased slightly from 15.5% of the region's workforce to 16.9% by 2006. Likewise, FIRE employment increased from 4.7% to 6.9% in the same period.

Moderate decline has been seen in the construction and utilities sectors. Primary industries experienced strong relative growth despite accounting for only a small proportion of employment in the regional economy (1.5% in 2006).

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	1,470	3,015	4,870	6,035	6,083	4,613	4.1%
Manufacturing	21,910	29,370	31,235	36,167	38,127	16,217	1.6%
Construction	10,545	14,020	18,160	14,059	17,270	6,725	1.4%
Transp., Comm. & Other Utilities	11,075	17,190	19,285	22,549	24,603	13,528	2.3%
Wholesale & Retail Trade	24,730	44,085	56,640	61,673	66,613	41,883	2.9%
Finance, Insurance & Real Estate	7,510	16,705	24,705	22,132	27,022	19,512	3.7%
Public Administration & Defense	30,710	50,620	54,475	47,144	47,019	16,309	1.2%
Community, Business & Personal Services	51,770	97,505	131,730	150,608	167,166	115,396	3.4%
Total	**159,720**	**272,510**	**341,100**	**360,368**	**393,904**	**234,184**	**2.6%**

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
Québec City

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

Figure 2 shows that the share of employment accounted for by manufacturing has fluctuated over the period between 1987 and 2010. However, for most of this period, the trend in manufacturing employment mirrored the growth of the economy as a whole.

After a sharp downturn reflecting the early 1990s recession, manufacturing employment increased through the 1990s and 2000s. Notwithstanding this general increase, the growth in manufacturing was also inherently volatile in that period. Beginning in 2007, manufacturing employment began a sharp decline even as the regional workforce continued to grow.

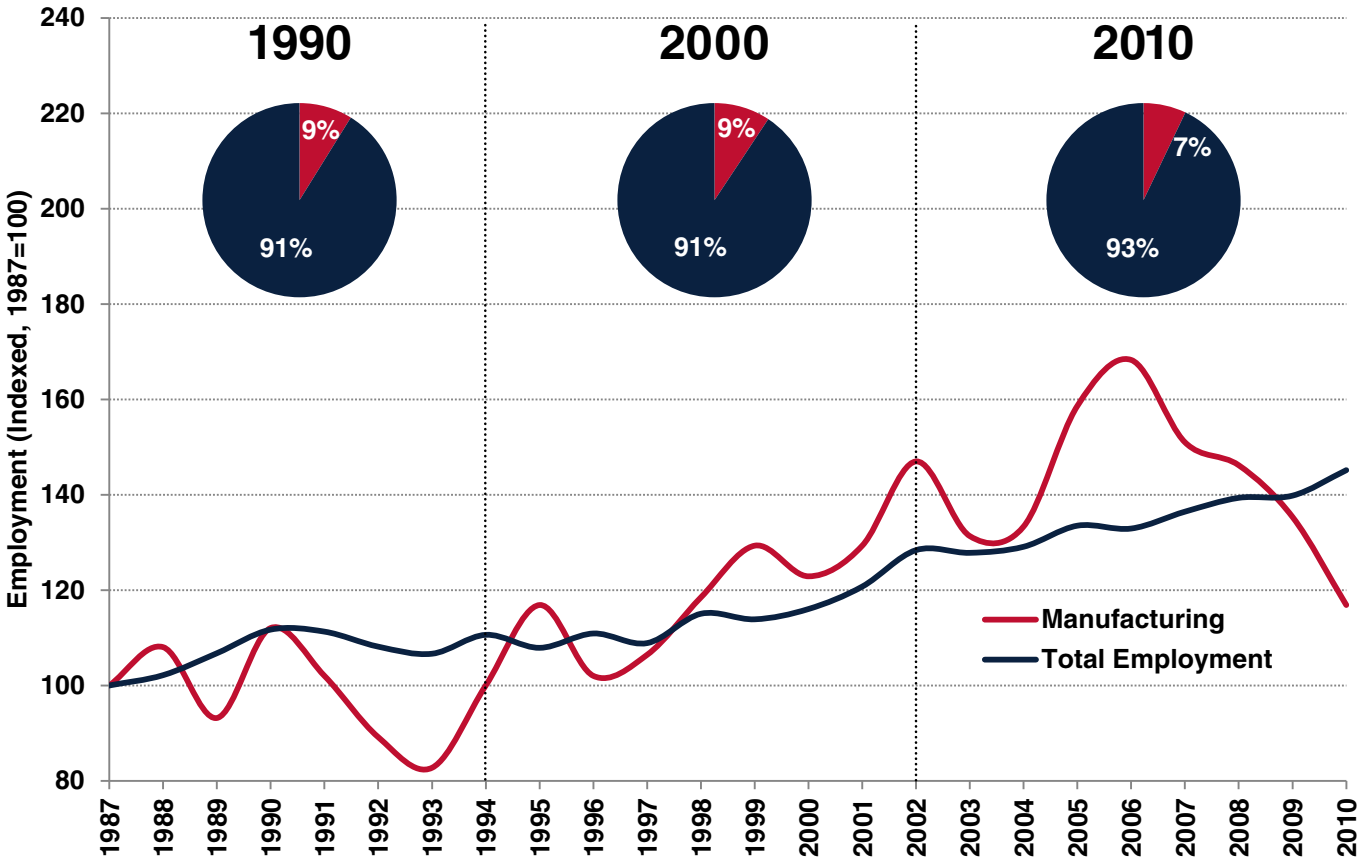
Given the diversification outside of manufacturing, a more detailed examination of the regional economy is warranted. Table 2 shows employment in eighteen industrial groups in 2001 and 2006. While there is an increasing level of employment in food industries, growth performance and levels of specialization 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	7,600	8,200
Mining	2,560	2,995
Oil and Gas	1,015	1,100
Wood & Wood Products	5,270	4,550
Maritime	2,500	2,545
Textiles & Apparel	2,755	2,045
Food	9,480	10,205
Steel	4,680	5,700
Automotive	4,515	5,225
Plastics & Rubber	6,575	7,550
Biomedical	4,470	4,640
ICT Manufacturing	4,660	4,465
ICT Services	15,410	22,050
Finance	21,415	29,385
Business Services	32,570	40,740
Creative & Cultural	9,515	14,820
Higher Education	12,265	17,525
Logistics	14,120	14,705

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
Québec City

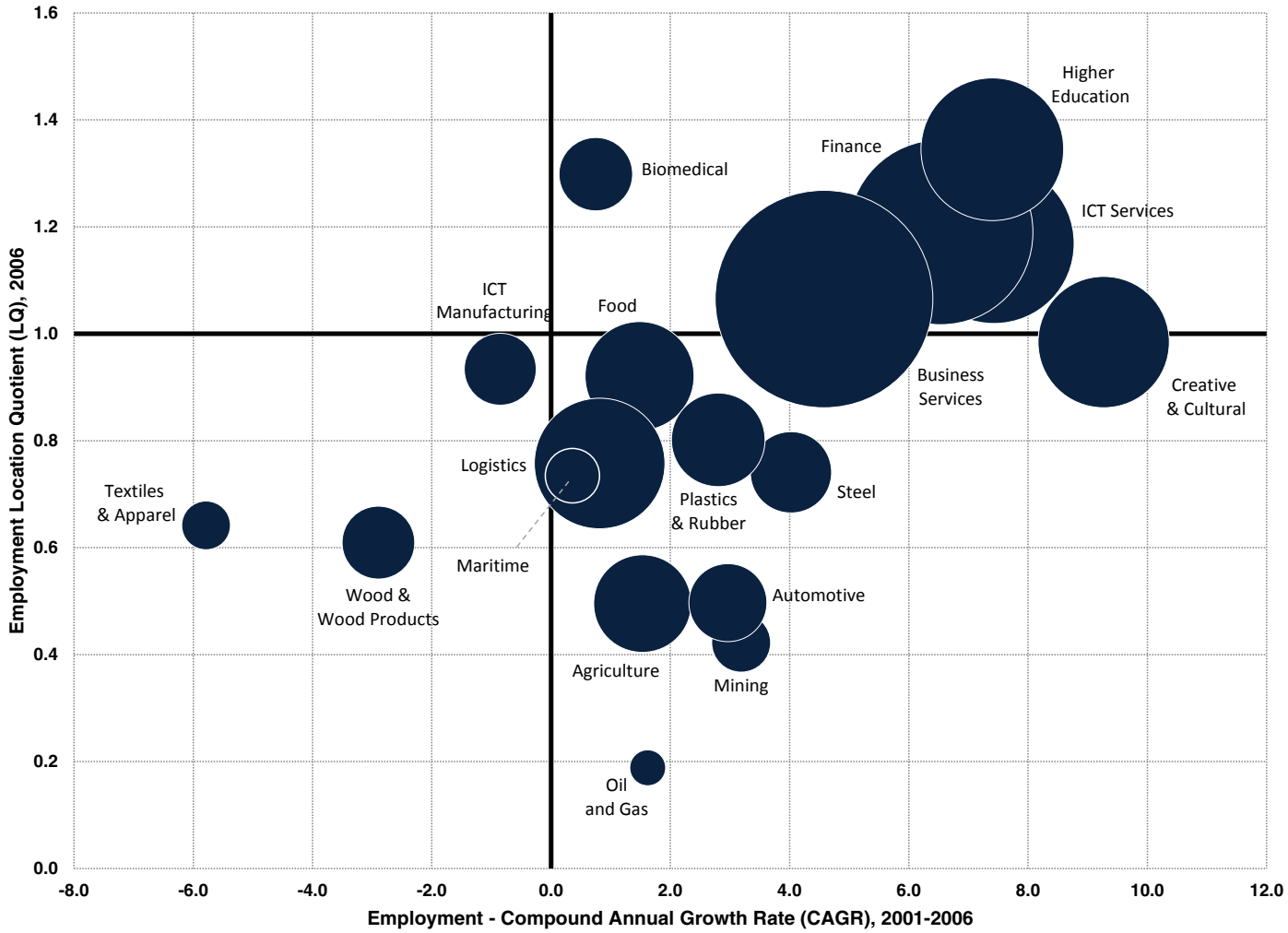
Figure 3 depicts a 'bubble chart' comparing the performance eighteen industrial groups (or clusters) in Québec City. The horizontal axis shows the employment growth rate between 2001 and 2006. The vertical axis shows the employment location quotient comparing the proportion of Québec City's employment 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.[1]

According to these criteria, in 2006, there were three clusters in Québec City region: biomedical, ICT services, and higher education. All three of these clusters exhibited employment growth between 2001 and 2006. In addition, the finance and business services industrial groups also demonstrated high levels of growth between 2001 and 2006, highlighting the growth and dynamism of the region as a whole.

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
Québec City

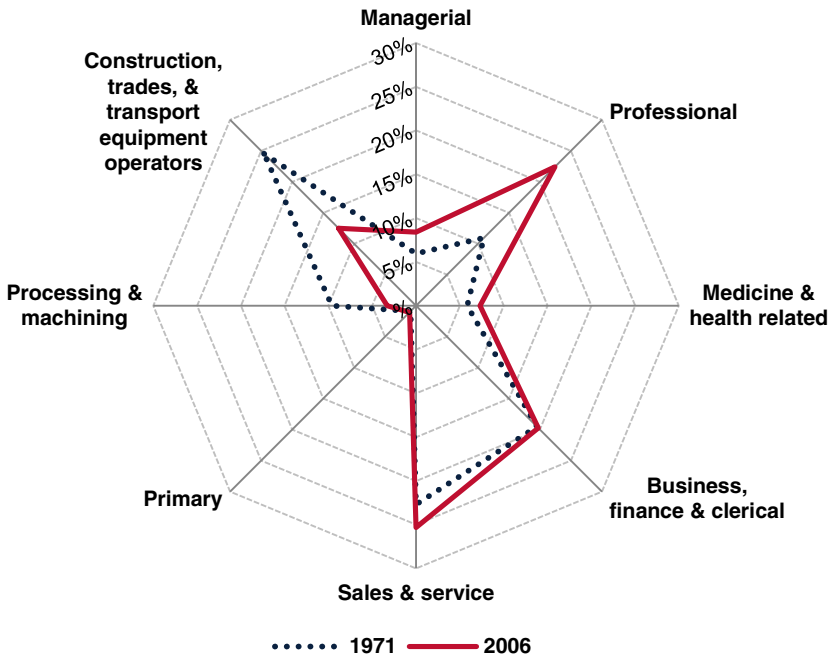
In addition to a broad shift in the industrial composition of the regional economy, Québec City's workforce has undergone a substantial transition in the forms of work over the past 25 to 30 years. Figure 4 shows the broad shifts in the occupational composition of the regional economy.

Most notably, the proportion of employment accounted for by construction, trades and other related occupations has decreased from 24.6% of the workforce in 1971 to 12.5% in 2006. Similarly, employment in processing and machining occupations decreased from 9.6% to 3.3% in the same time period. By contrast, employment in professional occupations increased from 11% to 22.4% between 1971 and 2006.

Modest increases have also been seen in the proportion of employment accounted for by sales and service occupations (25.3%), managerial occupations (8.4%), and medicine and health related occupations (7.3%).

Table 4 provides more detail of these changes. It is clear that Québec City's regional workforce has experienced a transition away from production-oriented labour towards more knowledge-based, professional forms of labour.

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	10,590	28,945	48,130	32,655	33,315	22,725	3.3%
Professional	19,480	40,280	55,915	78,110	88,785	69,305	4.4%
Medicine & health related	10,395	17,990	23,550	25,125	28,920	18,525	3.0%
Business, finance & clerical	34,730	61,755	69,010	71,600	78,115	43,385	2.3%
Sales & service	40,330	63,355	80,000	92,920	100,240	59,910	2.6%
Primary	1,580	2,975	3,810	3,955	4,190	2,610	2.8%
Processing & machining	17,105	25,515	25,250	13,490	13,050	- 4,055	-0.8%
Constr., trades, & transport equip. operators	43,685	31,690	35,425	42,455	49,530	5,845	0.4%
Total	**177,895**	**272,505**	**341,090**	**360,310**	**396,145**	**218,250**	**2.3%**

CAGR = Compound Annual Growth Rate
Source: Statistics Canada, Census of Population, 1971-2006

Emerging Knowledge Economy
Québec City

Figure 5 shows how the occupational composition of Québec City has changed between 1987 and 2010. The regional economy exhibits a mirror-image relationship between the relative decline of employment in service-oriented occupations and the relative growth of knowledge-based occupations. Service-oriented occupations accounted for a high proportion of employment in Québec City in the early 1990s, peaking at 50% in 1993. By 2010, this type of work had declined moderately to account for 45% of employment. By contrast, knowledge-based work grew in tandem, peaking at 40% of the workforce in 2010.

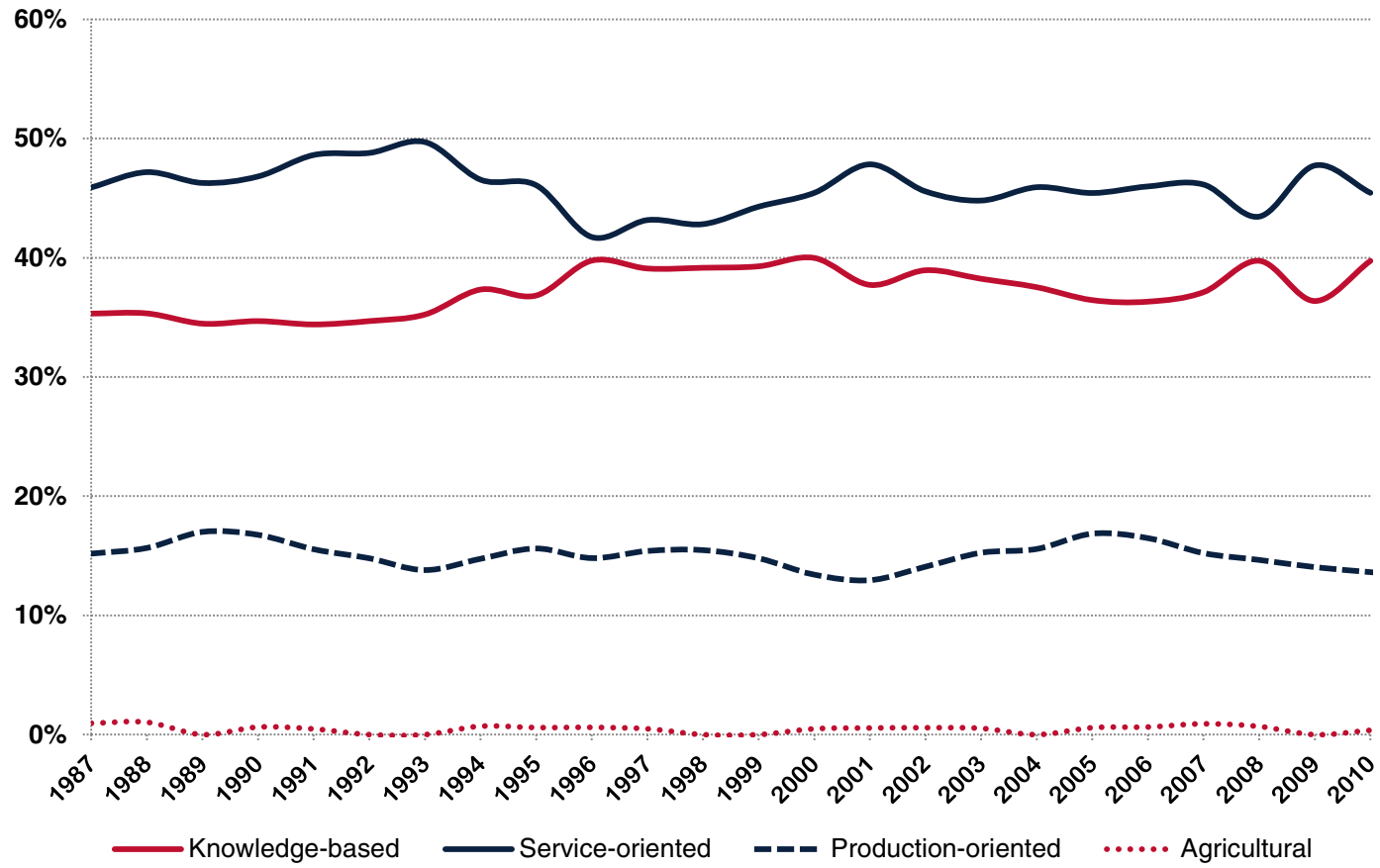
As Table 5 shows, employment in knowledge-based occupations increased at 1.5% per year between 1991 and 2006, only moderately outpacing the region's overall employment growth rate of 1% per year. Also noteworthy is the steady proportion of employment accounted for by routine, production-oriented work. Employment in production-oriented jobs stayed close to between 15% throughout the period between 1987 and 2010. Not surprisingly, agricultural work accounted for only a fraction of employment.

Table 5: Employment by occupation class, 1991-2006

	Agricultural occupations	Knowledge-based	Service-oriented	Production-oriented	Total Workforce
1991	2,555	118,685	164,305	55,550	**348,165**
1996	2,660	119,755	162,425	54,505	**353,565**
2001	2,590	134,020	167,540	58,185	**371,295**
2006	2,560	148,295	181,070	64,205	**401,790**
1991-2006	5	29,610	16,765	8,655	**53,625**
CAGR	0.0%	1.5%	0.6%	1.0%	**1.0%**

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]