

Changing Industrial Structure

Vancouver

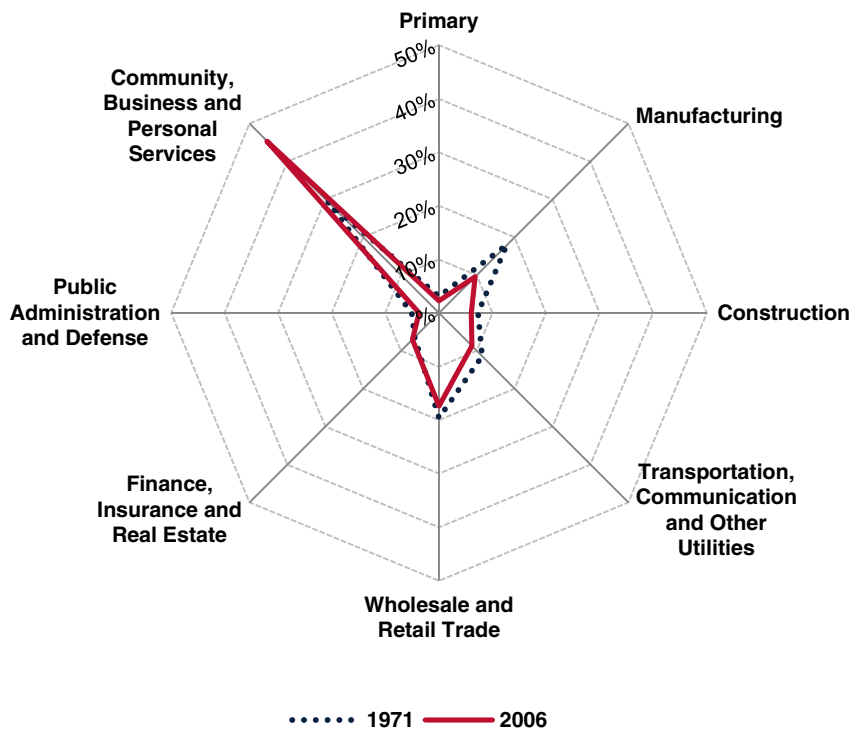
Figure 1 shows how Vancouver's regional industrial composition has changed in the past 25 to 30 years. Most notably, Vancouver's economy has become increasingly dominated by service-based industries. Employment in service-based industries increased from 29.2% in 1971 to 45.3% in 2006. Although it only accounted for 7% of the overall industrial structure by 2006, the FIRE sector had strong annual growth (3.0% per year). Similarly, community, business and personal services grew at 4.1% annually, outpacing the regional economy as a whole (Table 1).

By contrast, employment in manufacturing declined strongly from 18% to 9.6% between 1971 and 2006. Notwithstanding this decline, manufacturing industries added almost 31,000 jobs in the same period.

All other sectors experienced moderate decline. Wholesale and retail trade saw its share of employment decrease slightly from 19.6% in 1971 to 17.4%, while transportation, communication and other utilities declined from 11.4% to 8.7% in the same period. Construction experienced a similar pattern, decreasing from 7.3% to 6.1%, while public administration and defense declined from 5.1% to 3.7%.

While employment in primary industries still grew at 1.8% per year, their relative share of employment declined from 3.1% in 1971 to 2.3% by 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	13,575	18,090	21,375	21,698	25,780	12,205	1.8%
Manufacturing	78,750	99,460	98,690	110,629	109,550	30,800	0.9%
Construction	32,005	45,990	64,345	50,338	69,425	37,420	2.2%
Transp., Comm. & Other Utilities	49,900	71,905	80,000	101,454	99,679	49,779	2.0%
Wholesale & Retail Trade	85,705	130,305	165,840	184,593	198,427	112,722	2.4%
Finance, Insurance & Real Estate	28,145	48,800	66,405	73,428	79,736	51,591	3.0%
Public Administration & Defense	22,280	38,965	45,050	42,501	42,003	19,723	1.8%
Community, Business & Personal Services	127,770	222,430	341,405	457,714	517,906	390,136	4.1%
Total	438,130	675,945	883,110	1,042,354	1,142,505	704,375	2.8%

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

Vancouver

Figure 2 compares employment in the manufacturing industries to the overall employed labour force in Vancouver 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 Vancouver's labour force has grown steadily between 1987 and 2010. Until the early 2000s, employment in the manufacturing industries also grew, albeit at a slower pace and with some volatility. However, the overall share of employment accounted for by manufacturing remained at 11% in 1990 and 2000. By 2010, manufacturing employment accounted for only 7% of the labour

force, as manufacturing employment declined from the early 2000s onwards.

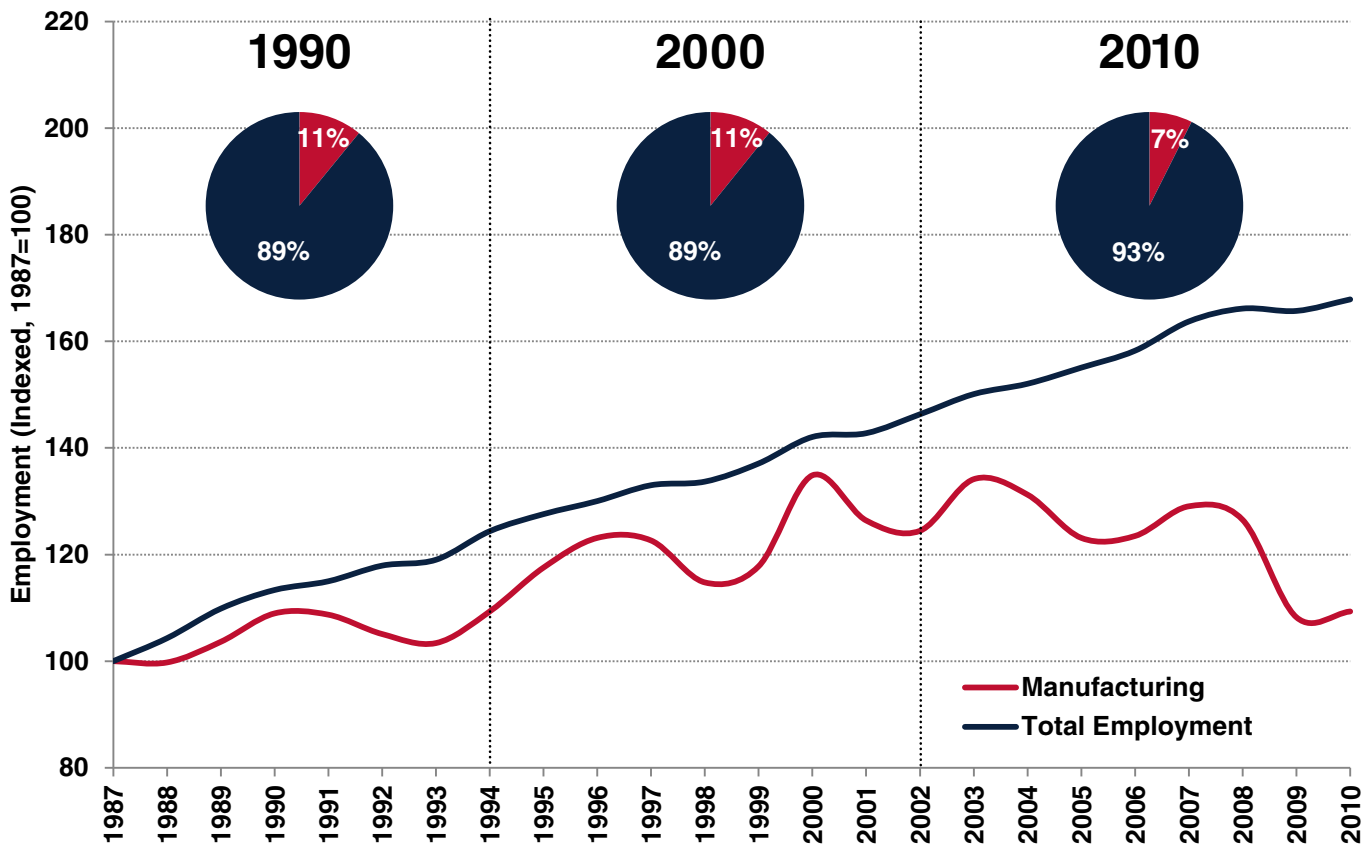
Given the diversification outside of manufacturing, a more detailed examination of the regional economy is warranted. Table 2 shows employment in eighteen industrial groups in 2001 and 2006. While there are still high levels of employment in food, plastics and rubber, and ICT manufacturing, growth performance 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	22,535	24,130
Mining	9,020	9,480
Oil and Gas	4,785	5,895
Wood & Wood Products	18,715	15,605
Maritime	14,450	13,610
Textiles & Apparel	10,860	9,030
Food	32,460	37,165
Steel	13,465	13,525
Automotive	11,510	11,700
Plastics & Rubber	21,560	21,730
Biomedical	8,835	10,955
ICT Manufacturing	15,215	14,815
ICT Services	60,255	73,690
Finance	75,690	89,050
Business Services	112,340	145,375
Creative & Cultural	50,190	69,490
Higher Education	35,900	55,505
Logistics	77,565	81,180

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

Vancouver

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

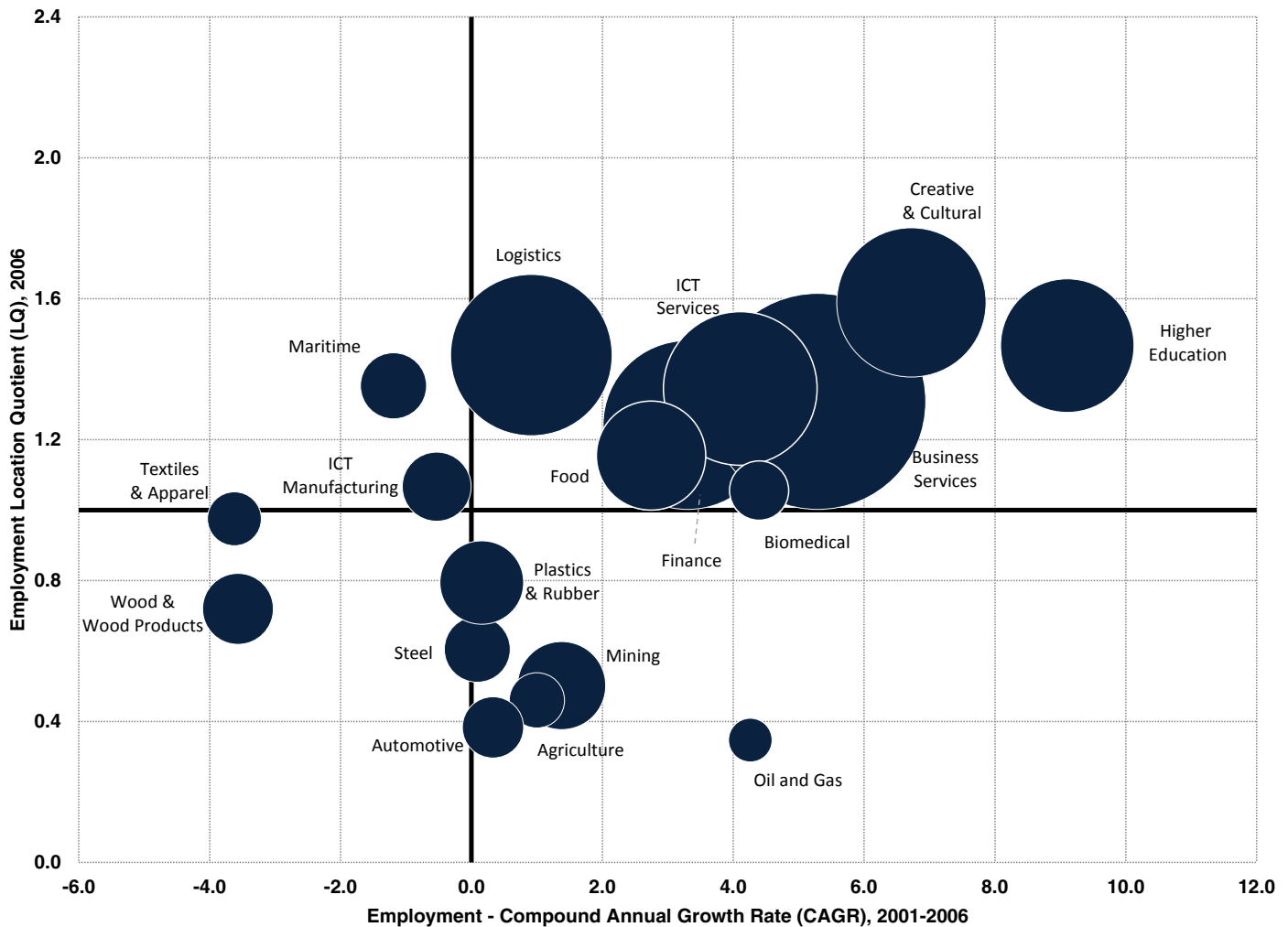
According to these criteria, in 2006, there were ten clusters in the Vancouver region: maritime industries, food,

biomedical, ICT manufacturing, ICT services, finance, business services, creative and cultural, higher education, and logistics.

With the exceptions of ICT manufacturing and the maritime industries, the remaining clusters all demonstrated high levels of growth 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

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In addition to shifts in the industrial composition of the regional economy, between 1971 and 2006, Vancouver's workforce has undergone a substantial transition in its occupational structure. Figure 4 shows the broad changes in the occupational composition of the regional economy.

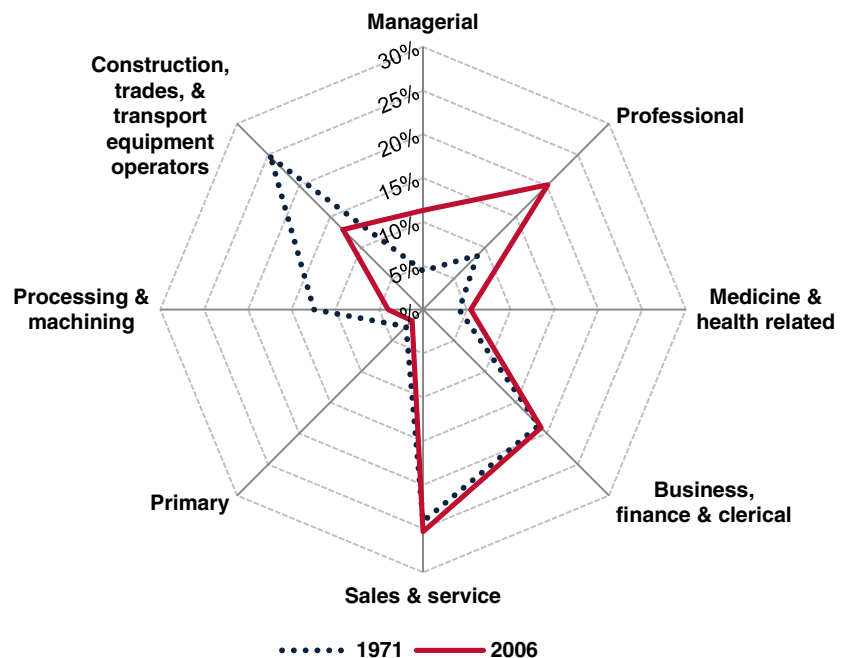
Most notably, the proportion of employment accounted for by construction, trades and other related occupations decreased from 24.6% of the workforce in 1971 to 12.9% in 2006. Similarly, employment in processing and machining occupations decreased from 12.5% to 4% in the same time period.

By contrast, employment in professional occupations more than doubled from 8.8% to 20.1% between 1971 and 2006. Growth of this occupational group (5.4% per year) was more than double the growth of the overall labour force (2.6% per year). Managerial occupations grew, increasing from 4.4% to 11.3% of the workforce between 1971 and 2006. As seen in Table 4, medicine and health-related occupations experienced strong annual growth (3.4% per year), but only accounted for 5.4% of the workforce by 2006.

Modest gains were experienced in both sales and service occupations, and business, finance and clerical occupations: the former increased from 24.2% in 1971 to 25.3% by 2006, while the latter grew slightly from 18.7% of the workforce to 19.1% in the same period.

Overall, it is clear Vancouver's economy has undergone a transition, shifting 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	20,990	65,905	102,280	124,965	130,375	109,385	5.4%
Professional	41,600	75,945	115,175	203,720	231,515	189,915	5.0%
Medicine & health related	19,510	33,885	44,480	54,895	62,450	42,940	3.4%
Business, finance & clerical	88,630	147,465	178,795	207,890	219,415	130,785	2.6%
Sales & service	114,540	156,585	222,315	263,765	291,540	177,000	2.7%
Primary	12,935	14,455	19,445	18,350	20,545	7,610	1.3%
Processing & machining	59,000	78,415	80,470	46,205	45,840	(13,160)	-0.7%
Constr., trades, & transport equip. operators	116,455	103,290	120,140	130,110	148,810	32,355	0.7%
Total	473,660	675,945	883,100	1,049,900	1,150,490	676,830	2.6%

CAGR = Compound Annual Growth Rate

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

Emerging Knowledge Economy

Vancouver

Figure 5 provides additional perspective on how the occupational composition of Vancouver has changed over time. In aggregate, the composition of Vancouver's regional workforce has changed at a moderate pace. The share of employment in production-oriented jobs has declined at the same time that an increase in knowledge-based occupations can be seen. Service-oriented occupations have consistently accounted for the highest proportion of employment in Vancouver, peaking at 46% in 1992. However, knowledge-based occupations have grown throughout the last few decades, accounting for 39% of the workforce in 2010.

As Table 5 shows, employment in knowledge-based occupations increased at 3% per year between 1991 and 2006, strongly outpacing the region's overall employment growth rate of 1.8% per year. Also noteworthy is the steady

yet slow decline in share of employment accounted for by routine, production-oriented work. The share of employment in production-oriented jobs peaked at 22% in 1989 but had declined to 16% by 2010. Not surprisingly, agricultural work accounted for a marginal amount of employment throughout the period.

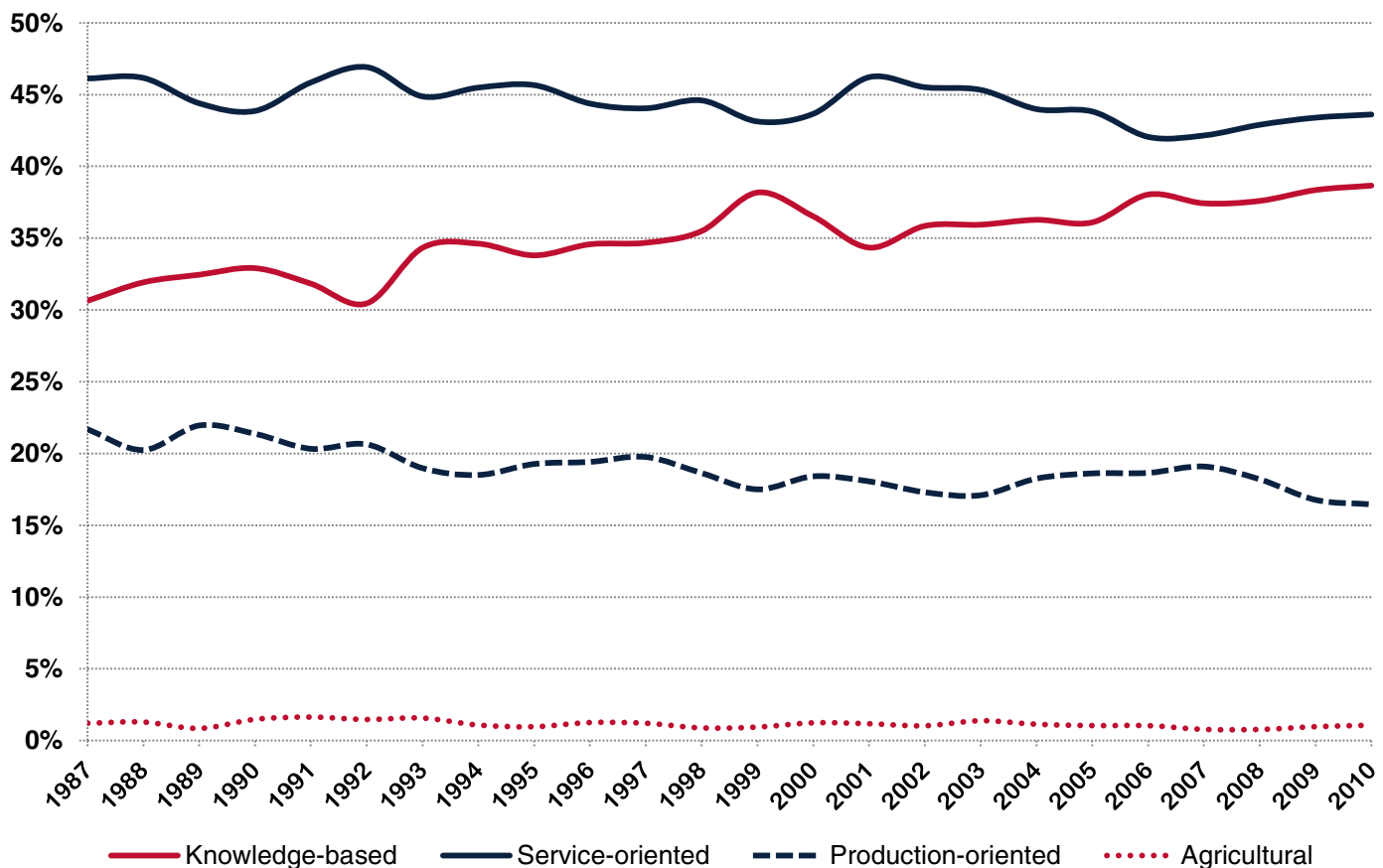
Table 5: Employment by occupation class, 1991-2006

	Agricultural occupations	Knowledge-based	Service-oriented	Production-oriented	Total Workforce
1991	13,055	281,375	407,470	181,275	896,525
1996	11,895	321,320	450,530	180,145	993,355
2001	10,890	396,010	459,215	183,785	1,073,010
2006	10,790	437,440	497,850	204,410	1,169,725
1991-2006	- 2,265	156,065	90,380	23,135	273,200
CAGR	-1.3%	3.0%	1.3%	0.8%	1.8%

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]