



13 Manufacturing

OVERVIEW

Manufacturing is a central feature of Victoria's economy. For most of its history, Victoria has shared with New South Wales the position of Australia's foremost manufacturing state.

In the 1994-95 financial year, Victoria's manufacturing turnover totalled \$62,002 million or 32% of Australia's total manufacturing turnover. New South Wales accounted for 34% (\$65,772 million) and Queensland 14% of Australia's total.

During the same period, Victoria accounted for 32% of Australia's manufacturing workforce (295,800 workers) and 33% of Australia's total expenditure on wages and salaries in the manufacturing sector (\$9,745 million).

Victoria had the largest turnover of any state in the production of Food, beverages and tobacco with \$12,791 million or 31% of the national total in this category. Textiles, clothing, footwear and leather, with \$4,478 million or 46%, Machinery and equipment (\$15,462 million or 40%) and Petroleum, coal, chemical and associated products (\$10,562 million or 35%) also figured significantly in national totals.

13.1 MANUFACTURING ESTABLISHMENTS: SUMMARY OF OPERATIONS BY INDUSTRY SUBDIVISION, VICTORIA AND AUSTRALIA, 1994-95

Industry subdivision	Victoria			Australia		
	Employment at June 30 (a) '000	Wages and salaries (b) \$m	Turnover \$m	Employment at June 30 (a) '000	Wages and salaries (b) \$m	Turnover \$m
Food, beverage and tobacco	46.7	1 534	12 791	163.1	5 015	41 010
Textile, clothing, footwear and leather	35.5	912	4 478	76.6	1 913	9 786
Wood and paper product	16.5	534	3 169	63.8	1 952	11 360
Printing, publishing and recorded media	28.6	982	4 054	94.2	3 157	13 621
Petroleum, coal, chemical and associated products	35.5	1 359	10 562	91.1	3 431	30 462
Non-metallic mineral product	9.6	344	1 970	39.0	1 312	8 951
Metal product	36.4	1 189	7 784	147.4	5 129	34 691
Machinery and equipment	70.9	2 519	15 462	202.8	6 681	38 189
Other manufacturing	16.2	373	1 732	54.0	1 261	5 754
Total manufacturing	295.8	9 745	62 002	932.1	29 851	193 823

(a) Includes working proprietors.

(b) Excludes the drawings of working proprietors.

Source: *Manufacturing Industry, Australia, Preliminary, 1994-95* (8201.0)

Gross State Product

Gross State Product (GSP) is an aggregate measure of the value of economic production in Australian states and territories in a given period. 'GSP at factor cost' is produced by summing factor incomes i.e. wages, salaries and supplements, and gross operating surplus (GOS).

'GSP at factor cost' takes into account the effect of indirect taxes and subsidies. Since indirect taxes and subsidies affect the measurement of the gross product of some industries more than others, comparisons between industries are usually made at factor cost.

In the year to June 1995 the manufacturing sector accounted for a large proportion (18.7%) of Victoria's gross state product (GSP) at factor cost, while in New South Wales and South Australia it comprised 15.0% and 17.5% of GSP respectively.

From 30 June 1993 to 30 June 1995 the value of manufacturing production in Victoria grew from \$16,581 million of \$18,841 (13.6%). Over this period, manufacturing was Victoria's single greatest contributor to GSP.

13.2 GROSS STATE PRODUCT AT FACTOR COST, BY INDUSTRY AND PRINCIPAL COMPONENTS, VICTORIA

Industry division and principal components	1992-93 \$m	1993-94 \$m	1994-95 \$m	GSP (fc) 1995-96 %	1993-1995 % change
Agriculture, forestry, fishing	2 911	3 181	2 739	2.6	-5.9
Mining	3 559	3 531	3 243	3.1	-8.9
Manufacturing	16 581	17 516	18 841	18.7	13.6
Electricity, gas and water	3 757	3 867	3 690	3.6	-1.8
Construction	5 300	5 504	6 012	5.8	13.4
Wholesale trade	5 530	6 136	6 558	6.4	18.6
Retail trade	7 556	7 331	7 645	7.4	1.1
Accommodation, cafes and restaurants	1 624	1 723	1 898	1.8	16.9
Transport and storage	4 271	4 624	5 114	5.0	19.7
Communication	2 930	3 102	3 466	3.4	18.3
Finance and insurance (incl. nominal industry)	3 237	3 879	4 168	4.0	28.8
Property and business services	8 513	8 793	9 641	9.3	13.2
Government administration and defence	3 328	3 342	3 479	3.4	4.5
Education	5 238	5 364	5 464	5.3	4.3
Health and community services	6 224	6 368	6 731	6.5	8.1
Cultural and recreational services	1 535	1 675	1 841	1.8	19.9
Personal and other services	1 748	1 681	1 821	1.8	4.2
General government	1 702	1 734	1 758	1.7	3.3
Ownership of dwellings	8 623	8 637	9 069	8.8	5.2
Total	94 167	97 988	103 178	100.0	9.6

Source: Australian National Accounts: State Accounts, 1994-95 (5220.0)

Employment

In 1994-95, there were 295,800 workers employed in the manufacturing sector, with 24% (70,900) of workers employed in the production of Machinery and equipment, 16% (46,700) in Food, beverages and tobacco. Around 12% (36,400) of the manufacturing work force were employed in Metal production with similar numbers employed in Textile, clothing, footwear and leather industries and the Petroleum, coal, chemical and associated products industries (36,400 and 35,500 respectively).

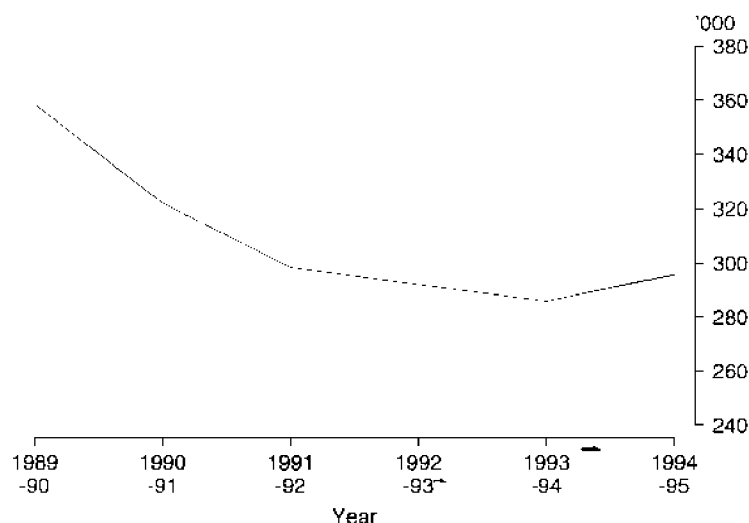
13.3 EMPLOYMENT BY MANUFACTURING SUBDIVISION

Industry subdivision	1989-90 No.	1990-91 No.	1991-92 No.	1992-93 No.	1993-94 No.	1994-95 p No.
Food, beverage and tobacco	48 844	48 190	46 267	44 243	44 051	46 700
Textile, clothing, footwear and leather	53 546	43 847	39 369	38 115	36 336	35 500
Wood and paper product	18 654	15 900	15 030	15 402	15 918	16 500
Printing, publishing and recorded media	29 868	27 353	26 146	27 157	26 333	28 600
Petroleum, coal, chemical and associated product	36 388	35 281	34 509	34 059	33 590	35 500
Non-metallic mineral product	12 074	11 114	10 198	9 961	9 874	9 600
Metal product	46 565	39 917	36 689	35 156	35 358	36 400
Machinery and equipment	94 312	84 794	75 379	72 763	69 055	70 900
Other manufacturing	18 402	15 895	14 897	15 301	15 498	16 200
Total manufacturing	358 654	322 292	298 484	292 159	286 014	295 800

Source: Manufacturing Industry, Victoria, 1993-94 (8221.2) (Preliminary data); Manufacturing Industry, Australia, Preliminary, 1994-95 (8201.0)

At 30 June 1990, total employment in the manufacturing sector was 358,654, decreasing by 18% to 295,800 at 30 June 1995. The largest falls were apparent in Textile, clothing, footwear and leather (34%), Machinery and equipment (25%), Metal products (22%) and Non-metallic mineral products (21%).

MANUFACTURING EMPLOYMENT, VICTORIA, 1989-90 TO 1994-95



Source: *Manufacturing Industry, Victoria, 1993-94* (8221.2) (Preliminary data); *Manufacturing Industry, Australia, 1994-95* (8221.0) (Preliminary data)

Wages and salaries

Total outlays of wages and salaries in the manufacturing sector increased marginally (3%) over the period from 1989-90 to 1994-95. There were however, significant increases in a number of areas including: Printing, publishing and recorded media (21%), Petroleum, coal, chemical and associated products (21%), Food, beverage and tobacco products (26%), and Wood and paper products (4%). All other subdivisions saw a fall, from between 3% and 19%. The largest decrease was apparent in Textile, clothing and footwear.

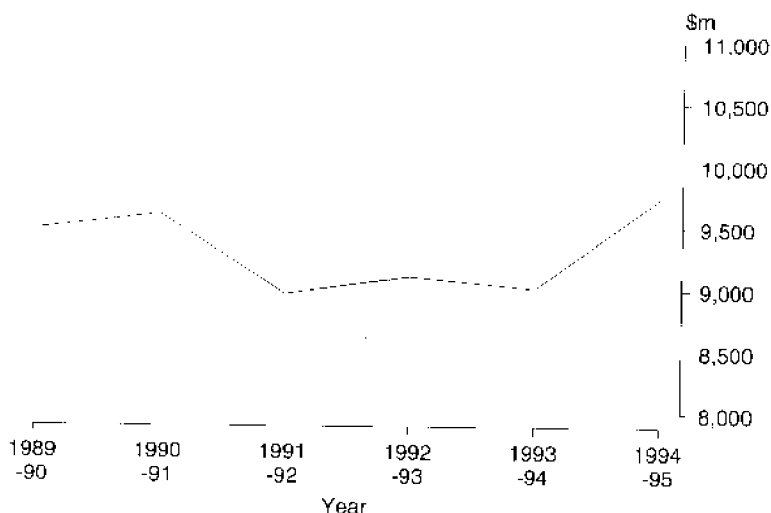
13.4 WAGES AND SALARIES (a) BY MANUFACTURING SUBDIVISION, VICTORIA

Industry subdivision	1989-90 \$m	1990-91 \$m	1991-92 \$m	1992-93 \$m	1993-94 \$m	1994-95 ^p \$m
Food, beverage and tobacco	1 221.6	1 320.9	1 358.4	1 388.4	1 402.6	1 534.0
Textile, clothing, footwear and leather	1 128.7	1 044.2	983.9	940.2	900.2	912.0
Wood and paper product	512.2	490.5	459.2	482.8	501.8	534.0
Printing, publishing and recorded media	810.5	832.1	812.6	879.1	854.1	982.0
Petroleum, coal, chemical and associated product	1 127.3	1 213.6	1 207.6	1 261.8	1 285.7	1 359.0
Non-metallic mineral product	374.1	363.9	338.3	349.6	345.3	344.0
Metal product	1 307.6	1 243.7	1 140.9	1 106.7	1 124.3	1 189.0
Machinery and equipment	2 596.5	2 741.1	2 332.9	2 353.7	2 249.5	2 519.0
Other manufacturing	404.3	353.4	333.0	345.8	351.7	373.0
Total manufacturing	9 482.7	9 603.5	8 966.6	9 108.1	9 015.2	9 745.0

(a) Excludes the drawings of working proprietors.

Source: *Manufacturing Industry, Victoria, 1993-94* (8221.2) (Preliminary data); *Manufacturing Industry, Australia, Preliminary, 1994-95* (8201.0)

MANUFACTURING WAGES AND SALARIES, VICTORIA, 1989-90 TO 1994-95



Source: *Manufacturing Industry, Victoria, 1993-94 (8221.2) (Preliminary data); Manufacturing Industry, Australia, 1994-95 (8221.0) (Preliminary data)*

Turnover

Over the same period, in contrast to the fall in manufacturing sector employment, turnover increased by 11% at current prices from \$55,747 million in 1990-91 to \$62,002 million in 1994-95. There were substantial increases in the areas of Printing, publications and recorded media (21%), Wood and paper products (18%) and Food, beverages and tobacco (19%).

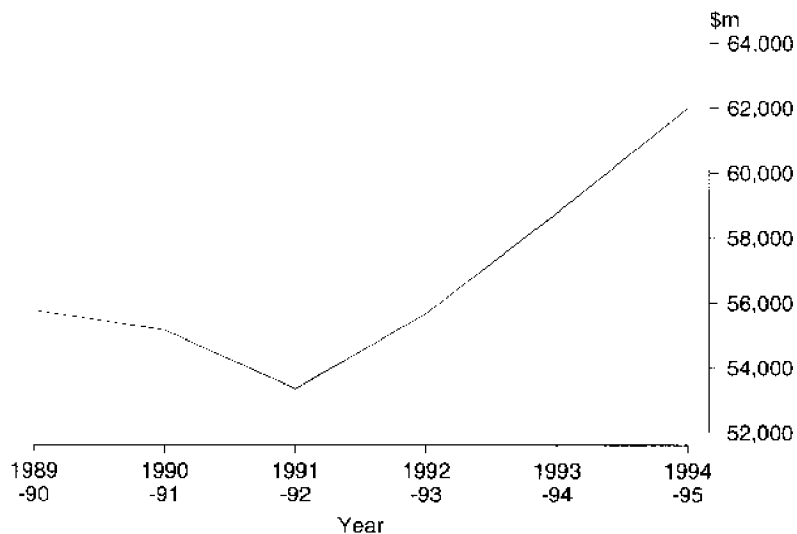
Textile, clothing, footwear and leather, Metal products and Non-metallic mineral products recorded falls in turnover over the same period, of 10%, 3% and 9% respectively.

13.5 TURNOVER BY MANUFACTURING SUBDIVISION, VICTORIA

Industry subdivision	1989-90 \$m	1990-91 \$m	1991-92 \$m	1992-93 \$m	1993-94 \$m	1994-95 p \$m
Food, beverage and tobacco	10 122.1	10 548.8	10 599.5	11 114.4	11 736.1	12 791.0
Textile, clothing, footwear and leather	4 947.3	4 755.7	4 618.9	4 444.3	4 650.3	4 478.0
Wood and paper product	2 688.6	2 626.6	2 518.7	2 825.8	3 020.7	3 169.0
Printing, publishing and recorded media	3 350.1	3 346.5	3 348.7	3 654.1	3 851.1	4 054.0
Petroleum, coal, chemical and associated product	9 492.8	9 612.9	9 516.0	9 626.2	9 998.3	10 562.0
Non-metallic mineral product	2 148.6	1 923.3	1 742.1	2 082.0	2 080.5	1 970.0
Metal product	8 024.5	7 837.3	7 484.2	7 189.0	7 427.9	7 784.0
Machinery and equipment	13 354.1	13 010.9	12 112.3	13 254.0	14 351.5	15 462.0
Other manufacturing	1 619.4	1 491.3	1 401.3	1 477.9	1 658.6	1 732.0
Total manufacturing	55 747.4	55 153.3	53 341.5	55 667.8	58 774.9	62 002.0

Source: *Manufacturing Industry, Victoria, 1993-94 (8221.2) (Preliminary data); Manufacturing Industry, Australia, Preliminary, 1994-95 (8201.0)*

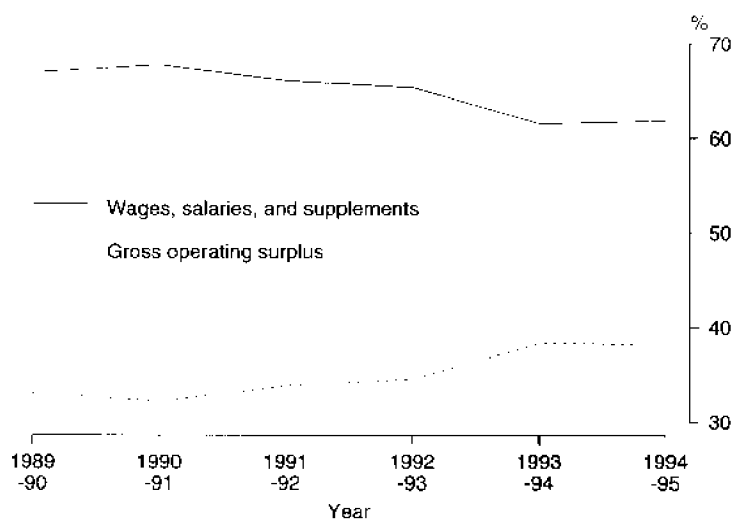
MANUFACTURING TURNOVER, VICTORIA, 1989-90 TO 1994-95



Source: *Manufacturing Industry, Victoria, 1993-94* (8221.2) (Preliminary data);
Manufacturing Industry, Australia, 1994-95 (8221.0) (Preliminary data)

In 1989-90, the contribution of wages, salaries and supplements to gross manufacturing product by factor cost was \$11,246 million (67%) while gross operating surplus contributed \$5,534 million (33%). By 1994-95, the share of gross operating surplus had grown to \$7,176 million (38%) while wages, salaries and supplements accounted for \$11,665 million (62%).

CONTRIBUTION TO GROSS STATE PRODUCT AT FACTOR COST, MANUFACTURING, VICTORIA, 1989-90 TO 1994-95



Source: *Australian National Accounts: State Accounts* (5220.0)

Operating ratios

The following table contains data on selected operating ratios for the manufacturing sector, comprising wages and salaries and turnover per employee by manufacturing subdivisions.

The largest average numbers of employees per establishment were in Food, beverage and tobacco (46 employees per establishment) and Petroleum, coal, chemical and associated products (35 employees per establishment). The smallest average number of employees per establishment was in the 'Other manufacturing' (which includes furniture manufacture, jewellery making and pre-fabricated housing materials).

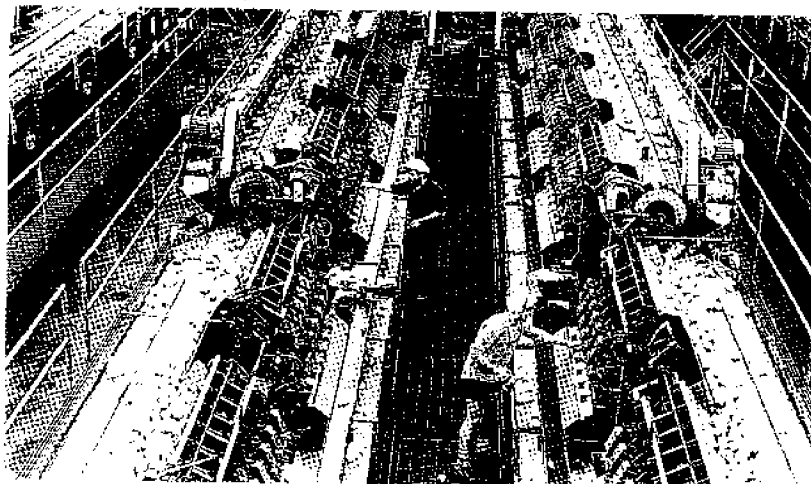
Wages and salaries were highest in the Petroleum, coal, chemical and associated products (\$38,200) and Non-metallic mineral products (\$35,000). The lowest wages and salaries were recorded in 'Other manufacturing' (\$22,600) and Textile, clothing, footwear and leather (\$24,800).

The highest turnover per employee was evident in Petroleum, coal, chemical and associated products (\$297,700) and Food, beverage and tobacco with \$266,400, while the lowest was recorded in Textile, clothing, footwear and leather, and Other manufacturing.

13.6 SELECTED OPERATING RATIOS BY MANUFACTURING SUBDIVISION, VICTORIA, 1993-94 (PRELIMINARY)

Industry subdivision	Average employees per establishment No.	Wages and salaries per employee \$'000	Turnover per employee \$'000
Food, beverage and tobacco	46	31.8	266.4
Textile, clothing, footwear and leather	21	24.8	128.0
Wood and paper product	16	31.5	189.9
Printing, publishing and recorded media	17	32.2	146.2
Petroleum, coal, chemical and associated product	35	38.2	297.7
Non-metallic mineral product	19	35.0	210.7
Metal product	18	31.5	210.1
Machinery and equipment	26	32.6	207.8
Other manufacturing	9	22.6	107.0
Total manufacturing	22	31.4	205.5

Source: Manufacturing Survey, unpublished ABS data.



Capital expenditure From 1989-90 to 1991-92 new private capital expenditure for the manufacturing sector declined by 35% from \$2,790 million to \$1,819 million. Since that period investment has grown by 20% in 1992-93, 22% in 1993-94, 14% in 1994-95 and 10% in 1995-96.

In 1995-96, the largest amounts of investment were in Machinery and equipment, Petroleum, coal, chemical and associated products and Food, beverages and tobacco.

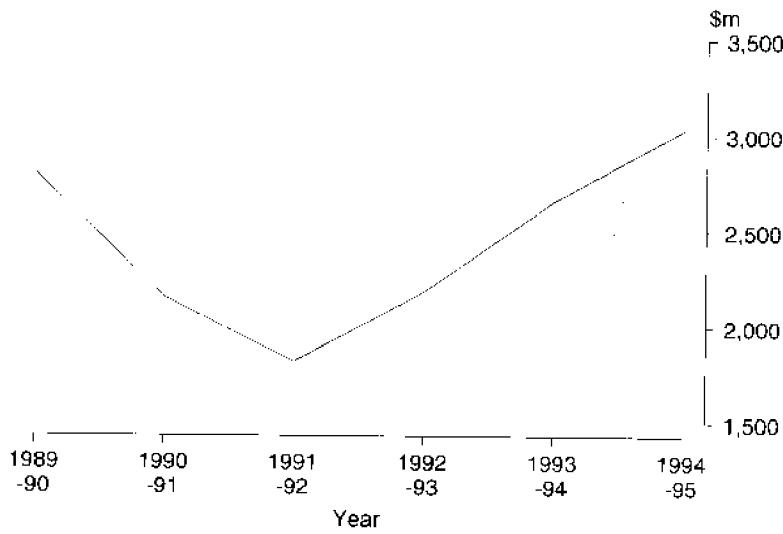
13.7 NEW CAPITAL EXPENDITURE BY MANUFACTURING SUBDIVISION, VICTORIA

Industry subdivision	1990-91 \$m	1991-92 \$m	1992-93 \$m	1993-94 \$m	1994-95 \$m	1995-96 \$m
Food, beverages and tobacco	339.3	354.8	468.4	553.5	576.6	568.3
Textile, clothing, footwear and leather	67.5	67.3	92.5	114.1	184.1	135.8
Wood and paper product	111.0	63.7	85.0	139.1	213.7	375.2
Printing, publications and recorded media	100.2	124.8	250.5	167.9	240.2	236.7
Petroleum, coal, chemical and associated product	375.8	377.4	329.9	456.2	625.1	673.7
Non metallic mineral product	191.0	83.7	119.1	173.6	279.4	162.0
Metal product	251.7	247.8	245.7	299.5	256.4	434.0
Machinery and equipment	693.3	485.7	554.1	700.3	613.1	710.2
Other manufacturing	18.8	14.2	37.6	52.7	45.8	49.8
Total manufacturing	2 148.7	1 819.2	2 182.8	2 656.9	3 034.1	3 348.3

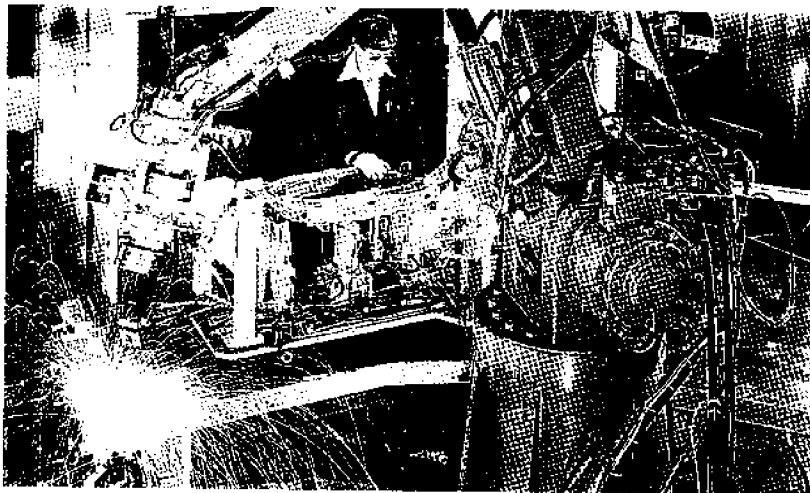
Source: State Estimates of Private New Capital Expenditure (5646.0); Private New Capital Expenditure and Expected Expenditure, Australia (5625.0)



MANUFACTURING, NEW PRIVATE CAPITAL EXPENDITURE, VICTORIA,
1989-90 TO 1994-95



Source: State Estimates of Private New Capital Expenditure (5646.0)



**Innovation in
manufacturing**

The capacity of the manufacturing sector to develop innovative techniques in product design, technology use and service delivery is a major factor in the sectors ability to sustain future growth. In recent years, attempts have been made to collect data on innovation in the manufacturing sector, to gauge the extent, the direction and the costs of innovation for Australian and Victorian industry.

The concept of 'innovation' encompasses all manner of activities both non-technological and technological. Technological innovation itself encompasses such activities as research and development, the acquisition of new technologies, industrial engineering and tooling up and the marketing of new products. Innovation can also be related to either the process of production or the product itself.

13.8 PERCENTAGE OF MANUFACTURERS UNDERTAKING TECHNOLOGICAL INNOVATION BY MANUFACTURING SUBDIVISION, VICTORIA, JUNE 1994 (a)

Industry subdivision	Product innovation type			Process innovation %	Total technological innovation %
	New %	Changed %	Subtotal %		
Food, beverage and tobacco	29.4	27.0	30.6	20.4	34.5
Textile, clothing, footwear and leather	26.5	21.0	30.0	13.5	34.1
Wood and paper product	*16.1	*10.5	*16.1	*15.9	25.6
Printing, publishing and recorded media	16.9	28.4	30.8	22.1	38.9
Petroleum, coal, chemical and associated products	40.5	30.0	40.8	34.2	52.0
Non-metallic mineral product	33.8	27.7	35.0	26.7	46.0
Metal product	27.6	20.8	31.6	25.3	42.2
Machinery and equipment	38.4	25.7	40.6	24.5	45.7
Other manufacturing	29.9	19.8	34.7	18.9	40.0
Total Victoria	29.0	22.8	32.9	21.7	40.0
Total NSW	30.9	20.8	33.0	25.1	42.5
Total Qld.	28.9	22.9	32.5	25.2	43.5
Total remainder of Australia	30.6	27.6	37.6	25.8	47.7
Total Australia	27.4	23.3	29.9	23.1	33.7

(a) Relates to technological innovation undertaken during the period July 1991 to June 1994.

Source: *Innovation in Australian Manufacturing, 1994* (8116.0)

Compared to New South Wales and Queensland, Victorian manufacturing businesses had a lower rate of technological and process innovation.

Manufacturing businesses involved in Petroleum, coal, chemical and associated products showed the highest proportion of innovation with 52%. Significant levels of innovative practices were also evident in manufacturing businesses in Non-metallic mineral products (46%) and Machinery and equipment (46%).

Product related innovation was undertaken by 33% of Victorian manufacturers compared to 22% involved in process related innovation.

On average, Victorian businesses expended more on innovation than businesses in other states. The total amount spent in Victoria was \$2,276.6 million compared with \$1,956.7 million in NSW and \$426.7 million in Queensland. The average cost per innovator was \$682,400 in Victoria, \$578,000 in NSW and \$274,900 in Queensland.

More than 50% of innovation spending in Victoria was associated with tooling up, a total of \$1,200.2 million, while a further third was dedicated to research and development (\$782.1 million).

The most significant investment in innovation was in machinery and equipment, which accounted for 44% of expenditure on tooling up, 46% of research and development, and 45% of total expenditure on innovation.

Food, beverage and tobacco accounted for 35% of expenditure on marketing based innovation and had the highest average expenditure of \$2,326,500.

13.9 EXPENDITURE ON INNOVATION BY TECHNOLOGICAL INNOVATORS (a) BY MANUFACTURING SUBDIVISION, VICTORIA, 1993-94

Industry subdivision	R&D \$m	Acquis- ition \$m	Training \$m	Tooling up \$m	Marketing \$m	Total \$m	Average cost per innovator \$'000
Food, beverage and tobacco	47.5	0.4	6.1	215.6	49.2	318.8	2 326.5
Textile, clothing, footwear and leather	29.0	2.2	5.2	34.0	8.6	79.0	179.6
Wood and paper product	108.3	1.1	2.0	60.5	5.7	177.7	1 509.0
Printing, publishing and recorded media	14.6	2.6	6.1	67.2	9.7	100.2	274.5
Petroleum, coal, chemical and associated products	148.1	11.8	5.5	110.6	14.0	289.9	938.9
Non-metallic mineral product	33.1	4.3	2.0	117.9	1.9	159.2	1 397.1
Metal product	35.5	3.8	4.4	54.9	6.3	104.9	197.5
Machinery and equipment	357.4	56.3	36.0	524.2	42.0	1 015.9	1 194.2
Other manufacturing	8.6	0.4	2.5	15.2	4.2	31.0	65.7
Total Victoria	782.1	83.0	69.8	1 200.2	141.5	2 276.6	682.4
Total NSW	693.3	89.2	86.6	902.8	184.7	1 956.7	578.5
Total Qld.	130.4	29.5	14.1	227.2	25.5	426.7	274.9
Total remainder of Australia	207.6	12.2	19.1	219.9	41.2	500.0	215.1
Total Australia	1 810.3	213.5	189.1	2 547.2	392.6	1 152.8	486.4

(a) Those manufacturers which undertook product and/or process innovation during the three year period July 1991 to June 1994.

Source: *Innovation in Australian Manufacturing, 1994 (8116.0)*

Production

In 1995-96, Victorian enterprises accounted for more than half the national production of whole milk (63%), butter and butteroil (83%), cheese (64%), cotton yarn (60%), wool yarn (86%) and plastics in primary forms (65%).

Victorian enterprises also accounted for a large proportion of national production in cotton and wool woven fabric (41% and 46% respectively), vehicles for goods and materials (44%) and the production of lamb (43%).

13.10 QUANTITIES OF SELECTED ARTICLES PRODUCED BY MANUFACTURING ESTABLISHMENTS (a), 1995-96

Item	Unit	Victoria	Australia	Vic as % of Aust
Meat (carcass weight) -				
Beef and veal	'000 tonnes	361	1 701	21.2
Mutton	'000 tonnes	51	295	17.3
Lamb	'000 tonnes	111	260	42.7
Pig meats	'000 tonnes	83	329	25.2
Dairy products -				
Whole milk	mil in litres	5 482	8 715	62.9
Butter and butteroil	tonnes	118 830	142 827	83.2
Cheese	tonnes	168 365	264 438	63.7
Wheat flour (other than self-raising)	tonnes	182 517	1 413 530	12.9
Yarns -				
Cotton	tonnes	22 148	36 955	59.9
Wool	tonnes	17 198	20 063	85.7
Woven fabric				
Cotton	'000 sq m	26 449	63 886	41.4
Wool	'000 sq m	3 006	6 523	46.1
Vehicles for goods and materials	'000	11	25	44.0
Plastics in primary forms	'000 tonnes	788	1 222	64.5
Building materials				
Clay bricks for structural purposes	million	260	1 455	17.9
Ready mix concrete	'000 cu metres	3 023	14 556	20.8

Source: *Manufacturing Production, Australia (8301.0)*

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- Australian National Accounts: Concepts, Sources and Methods* (5216.0)
- Private New Capital Expenditure and Expected Expenditure, Australia* (5625.0)
- State Estimates of Private New Capital Expenditure* (5646.0)
- Manufacturing Industry, Australia, Preliminary* (8201.0)
- Innovation in Australian Manufacturing* (8116.0)
- Manufacturing Industry, Victoria* (8221.2) (*Preliminary data*)
- Manufacturing Production, Australia* (8301.0)

Photographs

- Tomato processing line*
 - Fruit processing line*
 - Steel foundry*
 - Robotic welding*
-