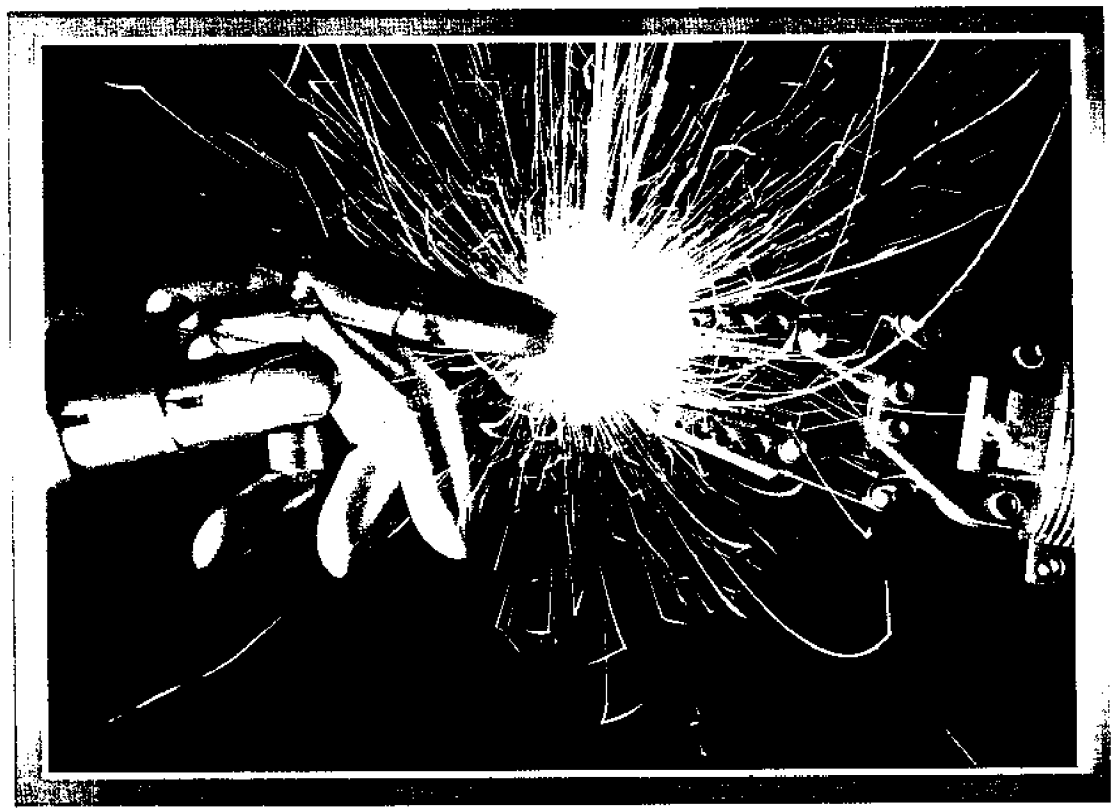


1994

INNOVATION IN AUSTRALIAN MANUFACTURING

ABS Catalogue No. 8116.0

EMBARGOED UNTIL 11.30 A.M. 1 SEPTEMBER 1995

NEW ISSUE

INNOVATION IN AUSTRALIAN MANUFACTURING 1994

W. McLennan
Australian Statistician

AUSTRALIAN BUREAU OF STATISTICS

CATALOGUE NO. 8116.0

Produced by the Australian Government Publishing Service

CONTENTS

INQUIRIES

- *for further information about the statistics in this publication and the availability of unpublished statistics*, contact John Ovington on (06) 252 5189 or Bill Pattinson on (06) 252 5019.
- *for information about other statistics and services*, please refer to the back page of this publication.

INTRODUCTION

This publication presents the results of the first comprehensive survey by the Australian Bureau of Statistics (ABS) of innovation in the Manufacturing Sector. The survey collected details of innovative activities undertaken by manufacturers between July 1991 and June 1994. It was based on concepts and standard questions developed jointly by the Organisation for Economic Co-operation and Development (OECD) and Eurostat. The concepts have been published in *OECD Proposed Guidelines for Collecting and Interpreting Technological Innovation Data* (OECD, Paris, 1992), known as the Oslo Manual.

In the manual, technological innovation is defined to '...comprise new products and processes and significant technological changes of products and processes. An innovation has been implemented if it has been introduced on the market (product innovation) or used within a production process (process innovation). Innovations therefore involve a series of scientific, technological, organisational, financial and commercial activities...'.

The manual indicates that technological innovation can comprise any of the following activities:

- design;
- research and development;
- acquisition of technology in the form of patents, licences and trademarks;
- acquisition of technology in the form of machinery and equipment;
- tooling-up and industrial engineering;
- manufacturing start-up and pre-production development; and
- marketing for new products.

As well as collecting data in a form comparable with the international standards for technological innovation, the ABS also included an additional question on non-technological innovation. The results are also presented in this publication.

This publication presents statistics on the level of innovation in Australian manufacturing and characteristics of innovators, the impact of innovation, qualitative aspects of innovative manufacturers and characteristics of main innovations. The ABS will also shortly release the results of a less detailed survey of innovative activities conducted for other industries.

Comments on the statistics presented in this publication and suggestions for further improvement would be most welcome and should be forwarded to:

The Director
Small Business and Science and Technology Section
Australian Bureau of Statistics
PO Box 10
BELCONNEN ACT 2616

MAIN FEATURES

INNOVATION

BY LEVEL

43% of Australian manufacturing businesses undertook one or more innovative activities in the three year period July 1991 to June 1994.

BY TYPE

34% of Australian manufacturing businesses undertook technological innovation and 24% undertook non-technological innovation.

BY INDUSTRY

The most innovative businesses within the manufacturing sector were in the Petroleum, coal, chemical and associated products industry, with 53% of businesses undertaking one or more innovative activities during the three year period to June 1994.

BY SIZE

The propensity to undertake innovative activities increased with the size of the business. The proportion of businesses that were innovative ranged from 30% for businesses with employment of less than five up to 96% for businesses with employment of 1,000 or more.

TECHNOLOGY DIFFUSION

Technology was acquired by 38% of businesses and sold or transferred by 6% of businesses during 1993–94.

IMPACT OF TECHNOLOGICAL INNOVATION

SALES BY TECHNOLOGICALLY INNOVATIVE BUSINESSES

Technologically innovative businesses had sales of $142.7 thousand million — 81% of the total sales, reported in this survey, by Australian manufacturing businesses in 1993–94.

EXPORTS BY TECHNOLOGICALLY INNOVATIVE BUSINESSES

Technologically innovative businesses had exports of $23.3 thousand million — 87% of the total exports of Australian manufacturing businesses in 1993–94.

EMPLOYMENT

In 1993–94 technologically innovative businesses employed 633,000 people — nearly 70% of the manufacturing workforce.

EXPENDITURE ON INNOVATION

The average amount spent on technological innovation per business during 1993–94 was $486,000.

QUALITATIVE ASPECTS

OBJECTIVES OF INNOVATION

Improving product quality was the most important objective for technologically innovative businesses.

SOURCES OF IDEAS AND INFORMATION

Clients or customers were the most important source of ideas and information for technologically innovative businesses.

PROTECTING INNOVATIONS

Being ahead of the market was the most important method of protecting both product and process innovations.

FACTORS HAMPERING INNOVATION

The factor which hampered businesses the most was lack of appropriate sources of finance.

PROFILE OF MAIN INNOVATIONS

BUSINESSES WITH LESS THAN 20 EMPLOYEES

The median time to reach commercialisation was six months to one year. The median cost recovery period was one to two years. The median cost of the innovation was between $10,000 and $50,000. The innovations were mainly new to the business.

BUSINESSES WITH 20–99 EMPLOYEES

The median time to reach commercialisation was six months to one year. The median cost recovery period was one to two years. The median cost of the innovation was between $50,000 and $100,000. The innovations were mainly new to the business.

BUSINESSES WITH 100–499 EMPLOYEES

The median time to reach commercialisation was one to two years. The median cost recovery period was two to five years. The median cost of the innovation was greater than $100,000. The innovations were mainly new to the business.

BUSINESSES WITH 500 OR MORE EMPLOYEES

The median time to reach commercialisation was one to two years. The median cost recovery period was two to five years. The median cost of the innovation was greater than $100,000. The innovations were mainly new to the industry in Australia.

SECTION 1 THE LEVEL OF INNOVATION IN AUSTRALIAN MANUFACTURING AND CHARACTERISTICS OF INNOVATORS

This section presents the level of innovation in the Manufacturing Sector classified by industry (subdivisions of the Australian and New Zealand Standard Industrial Classification, ANZSIC), employment size and sales. Other characteristics of innovative and non-innovative businesses — age, ownership of the business and of its main competitor — are also examined, as is technology transfer.

This section includes the following tables and charts:

- Table 1 Proportion of Businesses Undertaking Innovative Activities by Manufacturing Subdivision
- Table 2 Proportion of Businesses Undertaking Technological Innovation by Manufacturing Subdivision
- Table 3 Proportion of Businesses Undertaking Innovation by Employment Size
- Table 4 Proportion of Businesses Undertaking Innovation by Sales Size
- Table 5 Age of Business by Innovative Status
- Table 6 Ownership and Main Competitor by Innovative Status of Business
- Table 7 Innovative Status of Business by Ownership and Main Competitor
- Table 8 Acquisition of Technology by Origin of Technology and Form of Acquisition
- Table 9 Transfer of Technology by Destination of Technology and Form of Transfer

- Chart 1 Proportion of Businesses Undertaking Innovation by Manufacturing Subdivision
- Chart 2 Proportion of Businesses Undertaking Technological Innovation by Manufacturing Subdivision
- Chart 3 Proportion of Businesses Undertaking One or More Innovative Activities by Employment Size

INNOVATION

IN TOTAL

Of the estimated 38,000 manufacturing businesses in Australia, 43% had undertaken one or more innovative activities in the three year period from July 1991 to June 1994.

BY INDUSTRY

Within the Manufacturing Sector, the Petroleum, coal, chemical and associated product businesses were the most innovative; 53% of these businesses undertook one or more innovative activities.

In terms of businesses which undertook one or more innovative activities, the next most innovative industries were the Non-metallic mineral product (48%), Machinery and equipment (47%), and Metal product (46%) industries.

The Wood and paper product industry had the lowest overall level of innovation at 27%, which was approximately half the level for the Petroleum, coal, chemical and associated product industry.

BY TYPE

Technological innovation was the most prevalent type of innovation in the Manufacturing Sector. It occurred in 34% of businesses. Non-technological innovation was also a significant innovative activity. It occurred in 24% of manufacturing businesses.

Technological innovation occurred more frequently than non-technological innovation in all industries except the Wood and paper product industry.

The Petroleum, coal, chemical and associated product industry was the most innovative in terms of both technological and non-technological innovation (46% and 35%, respectively).

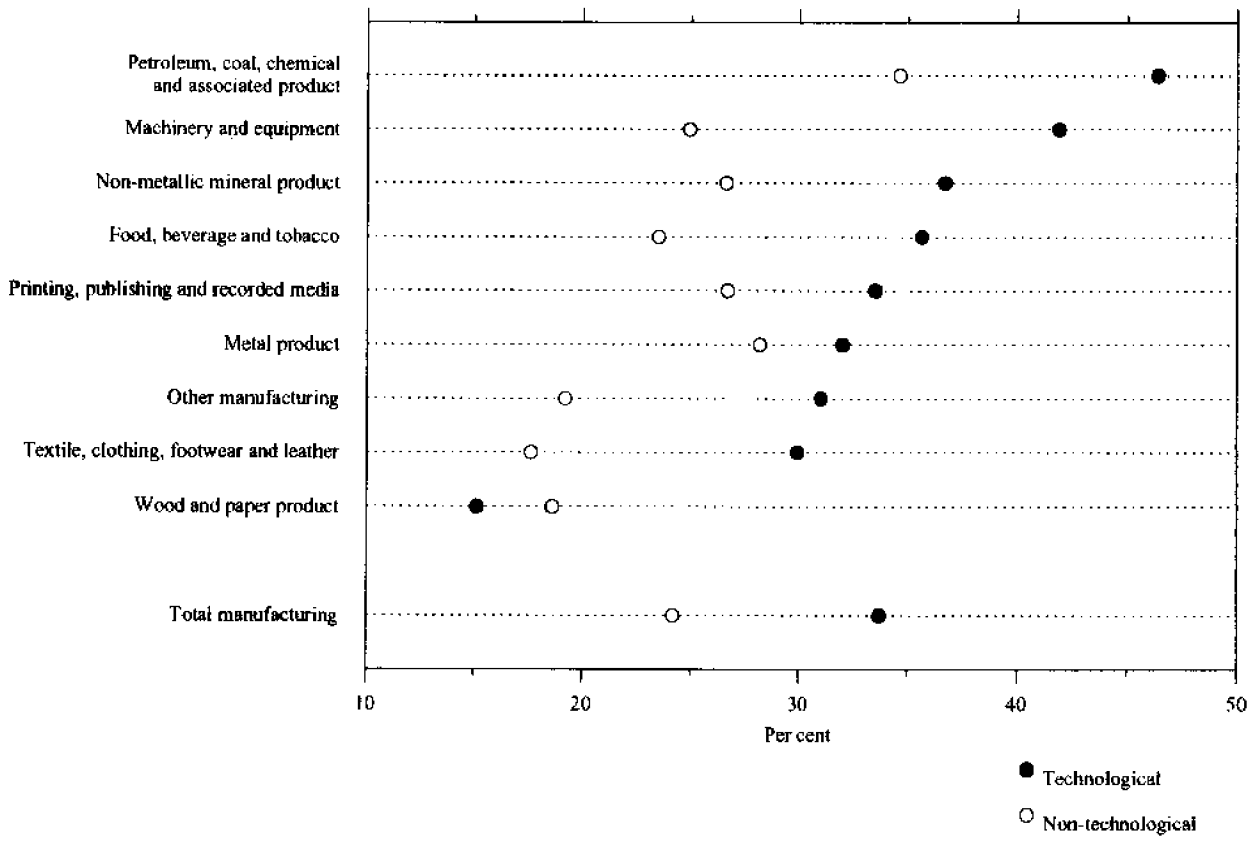
The Wood and paper product industry recorded the lowest level of technological innovation (15%) and also had a low level of non-technological innovation (19%).

1 PROPORTION OF BUSINESSES UNDERTAKING INNOVATIVE ACTIVITIES[1], JUNE 1994

Manufacturing subdivisions		Innovation type		
		Technological[2] %	Non-technological %	One or more %
21	Food, beverage and tobacco	35.6	23.5	45.2
22	Textile, clothing, footwear and leather	29.9	17.6	36.5
23	Wood and paper product	15.1	18.6	26.9
24	Printing, publishing and recorded media	33.5	26.7	45.3
25	Petroleum, coal, chemical and associated product	46.4	34.6	53.0
26	Non-metallic mineral product	36.7	26.6	47.5
27	Metal product	32.0	28.2	45.6
28	Machinery and equipment	41.9	24.9	47.2
29	Other manufacturing	31.0	19.2	38.2
21–29	**Total manufacturing**	**33.7**	**24.2**	**42.8**

[1] Relates to innovation undertaken during the period July 1991 to June 1994
[2] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

CHART 1 PROPORTION OF BUSINESS UNDERTAKING INNOVATION BY MANUFACTURING SUBDIVISION, JUNE 1994



TECHNOLOGICAL INNOVATION

IN TOTAL

On average one in three manufacturing businesses in Australia undertook technological innovation.

BY INDUSTRY

Technological innovation was most prevalent in the Petroleum, coal, chemical and associated product industry (46%) followed closely by the Machinery and equipment industry (42%).

The Wood and paper product industry contained the smallest proportion of technologically innovative businesses; only 15% of businesses undertook any technological innovation.

BY TYPE

30% of manufacturing businesses undertook product innovation between July 1991 and June 1994. 23% undertook process innovation.

For most manufacturing industries the major type of technological innovation was product innovation. Process innovation predominated only in the Printing, publishing and recorded media industry.

A slightly greater proportion of businesses undertook new product innovation (27%) than changed product innovation (23%). Generally businesses undertook both new product and changed product innovation.

Process innovation was mainly undertaken by businesses along with product innovation. In only 4% of businesses did process innovation occur without product innovation.

The Petroleum, coal, chemical and associated product industry was the most innovative in terms of product innovation. New product innovation occurred in 45% of businesses and changed product innovation in 35%.

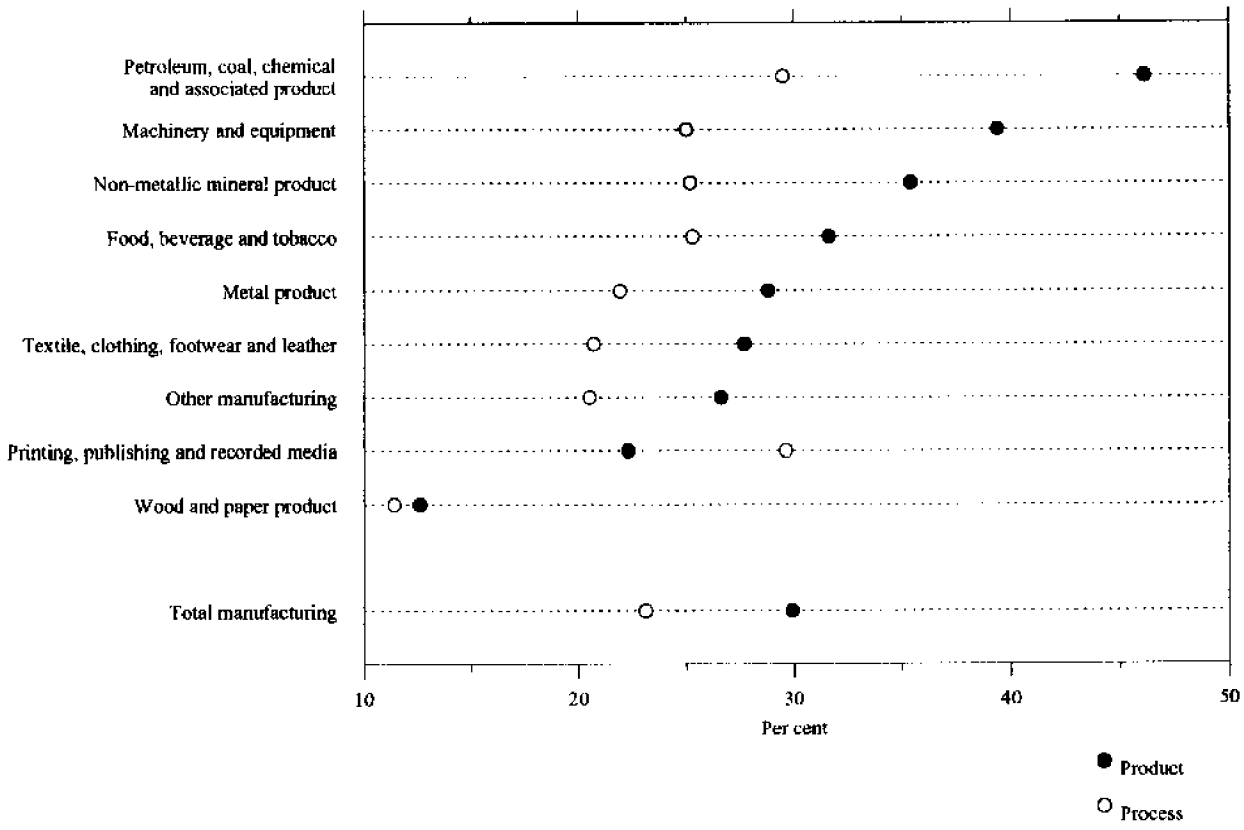
The Petroleum, coal, chemical and associated product and Printing, publishing and recorded media industries were the most innovative for new or changed processes. These occurred in about 30% of businesses for both industries.

2 PROPORTION OF BUSINESSES UNDERTAKING TECHNOLOGICAL INNOVATION[1], JUNE 1994

Manufacturing subdivisions		Product innovation type			Process innovation %	Technological innovation[2] %
		New %	Changed %	Subtotal %		
21	Food, beverage and tobacco	29.2	24.1	31.6	25.3	35.6
22	Textile, clothing, footwear and leather	25.7	22.0	27.6	20.6	29.9
23	Wood and paper product	11.6	9.0	12.6	11.4	15.1
24	Printing, publishing and recorded media	19.8	16.3	22.3	29.6	33.5
25	Petroleum, coal, chemical and associated product	44.9	35.2	46.1	29.5	46.4
26	Non-metallic mineral product	32.8	24.7	35.4	25.2	36.7
27	Metal product	26.7	21.0	28.8	21.9	32.0
28	Machinery and equipment	35.2	33.8	39.4	25.0	41.9
29	Other manufacturing	23.8	20.6	26.6	20.5	31.0
21–29	**Total manufacturing**	**27.4**	**23.3**	**29.9**	**23.1**	**33.7**

[1] Relates to technological innovation undertaken during the period July 1991 to June 1994
[2] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

CHART 2 PROPORTION OF BUSINESSES UNDERTAKING TECHNOLOGICAL INNOVATION BY MANUFACTURING SUBDIVISION, JUNE 1994



INNOVATIVE ACTIVITIES BY SIZE OF BUSINESS

BY EMPLOYMENT

The propensity of a manufacturing business to innovate was directly related to its level of employment. The extent of innovation ranged from 30% for businesses with employment of less than five, to 96% for businesses with employment of 1,000 or more.

Technological innovation occurred in a quarter of manufacturing businesses with employment of less than five. In contrast, the level of technological innovation increased to 90% of businesses with employment of 1,000 or more.

Non-technological innovation was also generally more prevalent in larger businesses. Businesses undertaking non-technological innovation ranged from 12% of businesses with employment of less than five, to 86% of businesses with employment of 1,000 or more.

In all business employment size groups, technological innovation was more prevalent than non-technological innovation.

BY SALES

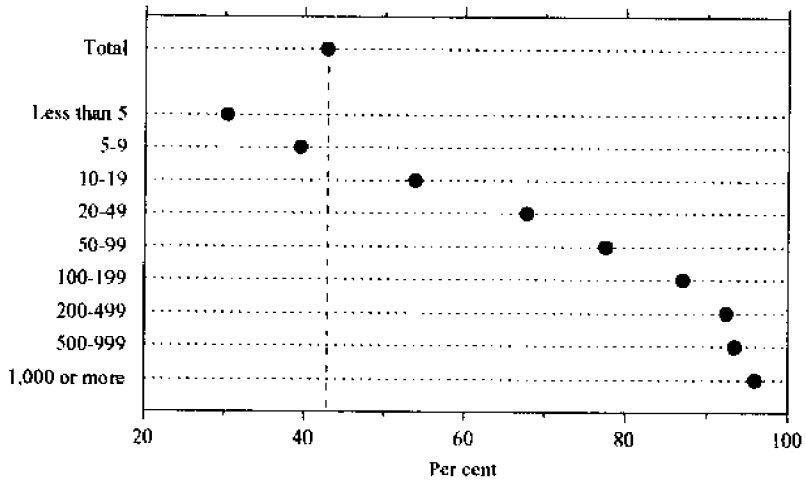
The propensity of a business to innovate appeared to be related to value of sales. Generally, as sales of businesses increased, so did the incidence of innovation. Businesses undertaking innovation ranged from 24% of businesses with sales of between $50,000 and $199,000 to 86% of businesses with sales greater than $10 million.

Businesses in the smallest sales size group (less than $50,000) were slightly more likely to innovate than those in the next size group ($50,000 to $199,000).

Technological innovation occurred more frequently than non-technological innovation in all sales size categories.

Product innovation occurred more frequently than process innovation in all sales size categories.

CHART 3 PROPORTION OF BUSINESSES UNDERTAKING ONE OR MORE INNOVATIVE ACTIVITIES BY EMPLOYMENT SIZE, JUNE 1994



3 PROPORTION OF BUSINESSES UNDERTAKING INNOVATIVE ACTIVITIES[1] BY EMPLOYMENT, JUNE 1994

	Innovation type				
Employment	*Product* %	*Process* %	*Technological*[2] %	*Non-technological* %	*One or more* %
Less than 5	22.6	14.5	25.0	12.1	30.3
5–9	25.3	20.4	29.6	21.4	39.5
10–19	36.1	27.2	41.3	32.1	53.8
20–49	44.9	40.8	50.7	48.2	67.7
50–99	54.4	50.7	60.9	59.1	77.5
100–199	67.2	61.3	74.8	70.7	87.1
200–499	73.1	64.2	81.2	78.3	92.5
500–999	75.8	76.5	83.7	81.1	93.5
1000 or more	83.0	87.0	90.3	86.2	96.0
Total	**29.9**	**23.1**	**33.7**	**24.2**	**42.8**

[1] Relates to innovation undertaken during the period July 1991 to June 1994
[2] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

4 PROPORTION OF BUSINESSES UNDERTAKING INNOVATIVE ACTIVITIES[1] BY TOTAL SALES, JUNE 1994

	Innovation type				
Total sales	*Product* %	*Process* %	*Technological*[2] %	*Non-technological* %	*One or more* %
Less than $50,000	19.5	8.6	22.3	7.9	26.8
$50,000–$199,000	16.8	11.2	18.1	8.7	23.5
$200,000–$999,000	24.6	18.6	28.7	18.8	37.5
$1,000,000–$10,000,000	47.9	38.9	53.2	43.5	66.5
More than $10,000,000	64.1	59.8	71.3	70.7	86.4
Total	**29.9**	**23.1**	**33.7**	**24.2**	**42.8**

[1] Relates to innovation undertaken during the period July 1991 to June 1994
[2] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

AGE, OWNERSHIP AND OWNERSHIP OF MAIN COMPETITORS

BY AGE

For businesses that had been conducting their present range of activities for less than two years, there was a higher percentage of non-innovators than of innovators. This difference decreased for businesses that had been conducting their present range of activities for 2–5 years. For businesses in that category, the percentage of innovators was slightly less than of non-innovators.

Of businesses that had been conducting their present range of activities for 6–19 years, approximately 50% were innovative.

Of the businesses that had been conducting their present range of activities for 20–49 years, 57% were non-innovative. For businesses that had been conducting their present range of activities for 50 years or more, more than twice as many of these businesses were non-innovators.

BY OWNERSHIP

33% of majority Australian owned businesses were innovative; this was lower than the percentage for majority foreign owned businesses (41%).

Most (94%) of the innovative manufacturing businesses in Australia were majority Australian owned businesses. Similarly, 96% of the non-innovative businesses were also majority Australian owned.

BY OWNERSHIP OF MAIN COMPETITOR

For both innovative and non-innovative businesses the main competitor was a majority Australian owned business.

More innovative businesses had majority foreign owned competitors than the non-innovative businesses.

Of the innovative businesses, 20% did not know whether their main competitor was majority Australian or foreign owned. In contrast, 41% of the non-innovative businesses did not know the ownership of their main competitor.

5 AGE OF BUSINESS[1] BY INNOVATIVE STATUS[2], JUNE 1994

	Age of business (years)					
Innovative status	*Less than 2* %	*2–5* %	*6–9* %	*10–19* %	*20–49* %	*50 or more* %
Innovators	37.9	46.5	50.2	49.0	43.2	32.9
Non-innovators	62.1	53.5	49.8	51.0	56.8	67.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

[1] Age of business refers to the number of years the business has undertaken its present range of activities
[2] Relates to innovation undertaken during the period July 1991 to June 1994

6 OWNERSHIP AND MAIN COMPETITOR BY INNOVATIVE STATUS[1] OF BUSINESS, JUNE 1994

	Ownership		*Main competitor*		
Innovative status	*Foreign* %	*Australian* %	*Foreign* %	*Australian* %	*Unknown* %
Innovators	41.2	33.4	56.9	36.7	20.3
Non-innovators	58.8	66.7	43.1	63.3	79.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

[1] Relates to innovation undertaken during the period July 1991 to June 1994

7 INNOVATIVE STATUS[1] OF BUSINESS BY OWNERSHIP AND MAIN COMPETITOR, JUNE 1994

	Ownership		*Main competitor*			
Innovative status	*Foreign* %	*Australian* %	*Foreign* %	*Australian* %	*Unknown*[2] %	***Total*** %
Innovators	6.0	94.0	23.0	56.8	20.2	**100.0**
Non-innovators	4.3	95.7	8.9	49.8	41.4	**100.0**

[1] Relates to innovation undertaken during the period July 1991 to June 1994
[2] Includes the categories 'Unknown' and 'Not applicable'

TECHNOLOGY ACQUISITION/TRANSFER

ACQUISITION

Technology was acquired by 38% of technologically innovative businesses during 1993–94. This was more than six times the number of technologically innovative businesses that transferred technology (6%).

More technology was acquired from Australia than overseas for every form of technology acquisition surveyed.

The most common forms of acquisition by technologically innovative businesses within Australia were the purchase of equipment (12%) and acquisition from within the business group (11%). The two most common forms of acquisition from overseas were purchase of equipment (7%) and patent pooling and contractual arrangements (6%).

The least common form of technology acquisition within Australia was R&D contracted out (1%). In contrast, the least common form of technology acquisition from overseas was take-over of another company in full or in part (0.3%).

Acquisition of technology by technologically innovative businesses is highest in the Printing, publishing and recorded media industry at nearly 59%, and lowest in the Textile, clothing, footwear and leather industry at just over 33%.

TRANSFER

Of the 6% of technologically innovative businesses that transferred technology during 1993–94, the destination was more commonly within Australia than overseas.

The most common form of transfer by technologically innovative businesses within Australia was through the loss of skilled employees (1.5%). The most common form of transfer overseas was through consultancy services for other companies (0.8%).

The least common form of transfer by technologically innovative businesses, both within Australia and to overseas, was through the sale of part of the business, which occurred in 0.7% and 0.1% of cases, respectively.

The transfer of technology by technologically innovative businesses was highest in the Machinery and equipment industry at nearly 9%, and lowest in the Food, beverage and tobacco industry at 2%.

8 ACQUISITION OF TECHNOLOGY[1], JUNE 1994

Form of acquisition	Origin of technology: Australia %	Origin of technology: Overseas %
From within your business group	10.8	2.7
Obtaining rights or licences of invention from other organisations	2.8	2.2
Results of R&D contracted out	1.3	0.7
Use of consultants	4.1	0.4
Take-over of another company, either in full or part	3.1	0.3
Purchase of equipment	11.7	6.8
Patent pooling, contractual arrangements, etc.	9.3	5.7
Hiring skilled employees	6.3	0.5
One or more acquisitions	32.4	15.0

[1] Includes businesses that undertook product and/or process innovation during the period July 1991 to June 1994

9 TRANSFER OF TECHNOLOGY[1], JUNE 1994

Form of transfer	Destination of technology: Australia %	Destination of technology: Overseas %
Offering invention rights or licences to other companies	0.9	0.5
R&D performed for others	1.2	0.5
Consultancy services for other companies	1.3	0.8
Transfer of technology through the sale of part of your business	0.7	0.1
Sale of equipment	1.3	0.5
Transfer of technology through patent pooling, contractual arrangements, etc.	1.4	0.7
Loss of skilled employees	1.5	0.3
One or more transfers	4.9	2.5

[1] Includes businesses that undertook product and/or process innovation during the period July 1991 to June 1994

SECTION 2 THE IMPACT OF TECHNOLOGICAL INNOVATION ON AUSTRALIAN MANUFACTURING

In this section the performance of technological innovators is compared to that of other businesses. This comparison has been done to allow comparability with information for other OECD countries.

The ABS intends to undertake further analysis of the impact of innovation on business performance using profitability and labour productivity data based on other ABS collections for 1993–94.

Users should note that businesses which have conducted their present range of activities for less than three years have been omitted from Tables 10, 11, 12 and 13, since the majority of these businesses would have had no sales in 1991–92 and would show abnormally large growth over the survey period.

The tables and charts in this section are as follows:

- Table 10 Sales of Manufacturers by Innovative Status
- Table 11 Sales Growth by Innovative Status of Business
- Table 12 Exports of Manufacturers by Innovative Status
- Table 13 Exports Growth by Innovative Status of Business
- Table 14 Expenditure on Innovation Activities by Technological Innovators by Manufacturing Subdivision
- Table 15 Expenditure on Innovation Activities by Technological Innovators by Employment Size
- Table 16 Sales and Innovation Costs of Technological Innovators
- Table 17 Innovation Intensity of Technological Innovators by Employment Size

- Chart 4 Average Sales of Manufacturers by Employment
- Chart 5 Average Exports of Manufacturers by Employment

The data on sales and exports contained in this section are as reported in the Innovation in Industry survey. These differ slightly from those published elsewhere due to the survey and sample error associated with these estimates. Users specifically interested in aggregate sales and exports statistics should refer to the data which will be published in *Manufacturing Industry, Australia* (8221.0).

SALES

IN TOTAL

Technologically innovative businesses recorded sales of $143 thousand million in 1993–94. This represented 81% of the total sales by manufacturing businesses.

On average, each technologically innovative business had sales of $12.3 million, and other businesses had sales of $1.6 million. This difference was mainly due to the greater proportion of larger businesses which were technologically innovative, but also due to the fact that technologically innovative businesses of the same employment size had greater sales than other businesses.

BY SIZE

Technological innovators with less than 20 employees had average sales of $1,045,000; other businesses of the same size had average sales of $497,000.

Technological innovators with 20–99 employees had average sales of $7,556,000; other businesses of the same size had average sales of $6,242,000.

Technological innovators with 100–499 employees had average sales of $45 million; other businesses of the same size had average sales of $34 million.

Technological innovators with 500 or more employees had average sales of $354 million; other businesses of the same size had average sales of $155 million.

BY INDUSTRY

Technological innovators had the highest average sales overall, and this was consistent for all industries. Two notable examples were the Food, beverage and tobacco industry (technological innovators had average sales of $34 million as compared with $4 million for other businesses) and the Petroleum, coal, chemical and associated product industry (average sales of $21 million as compared with $3 million).

SALES GROWTH

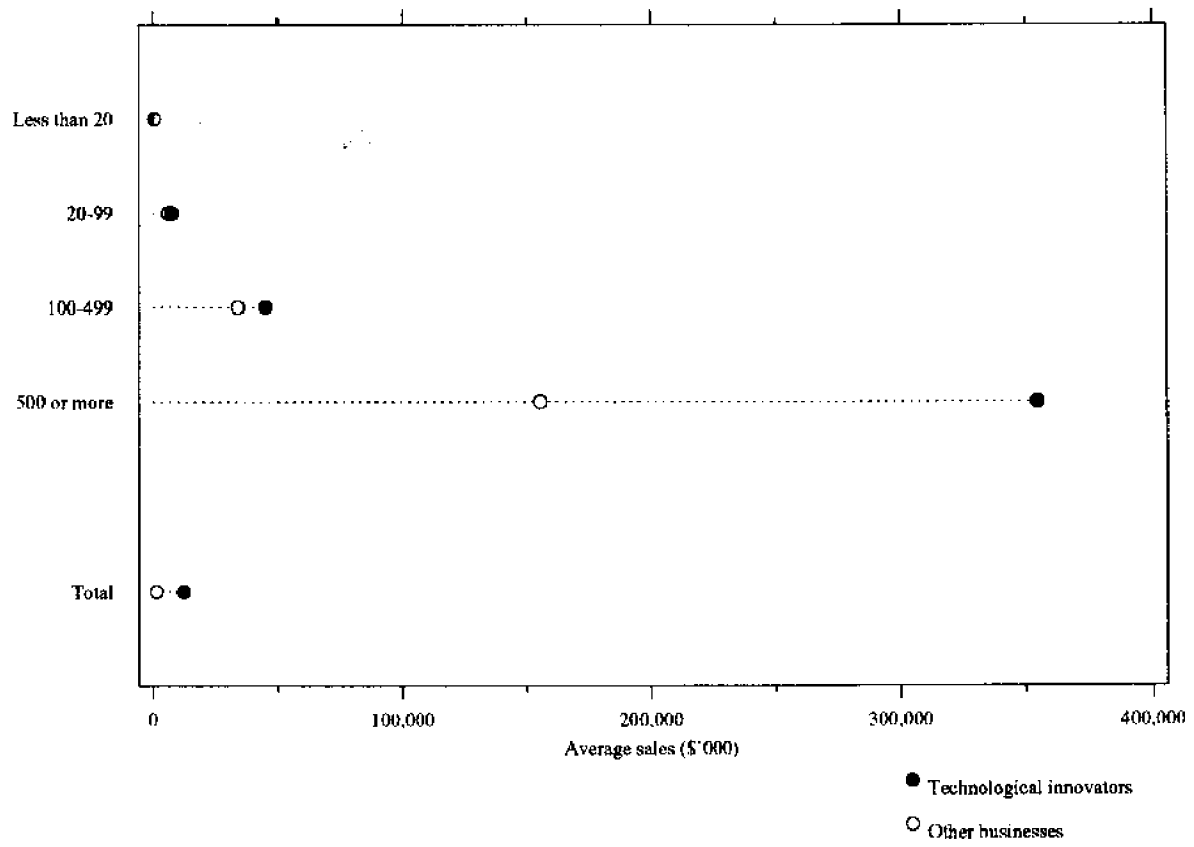
On average, technologically innovative businesses increased their sales between 1991–92 and 1993–94 by 17%. In comparison other businesses increased their sales over the same period by 13%.

10 SALES OF MANUFACTURERS[1], 1993–94

Category	Technological innovators[2]		Other businesses[3]	
	Total sales $m	Average sales $'000	Total sales $m	Average sales $'000
Employment size				
Less than 20	8 702.1	1 044.7	9 835.6	497.2
20–99	17 404.0	7 556.2	12 232.3	6 242.0
100–499	33 895.8	44 981.4	7 372.9	34 020.7
500 or more	82 694.0	353 673.7	5 119.0	155 257.3
Manufacturing subdivision				
21 Food, beverage and tobacco	32 775.9	34 137.2	5 898.8	3 647.2
22 Textile, clothing, footwear and leather	6 305.9	6 438.9	3 549.7	1 581.5
23 Wood and paper product	7 541.3	16 591.4	2 630.6	1 102.9
24 Printing, publishing and recorded media	7 565.8	5 316.1	3 910.8	1 462.3
25 Petroleum, coal, chemical and associated product	22 378.3	21 166.2	3 379.5	2 973.7
26 Non-metallic mineral product	7 398.0	16 068.1	1 393.5	1 672.0
27 Metal product	25 112.0	13 323.5	5 190.3	1 318.6
28 Machinery and equipment	30 705.0	10 505.3	6 420.9	1 644.2
29 Other manufacturing	2 913.8	1 971.1	2 185.8	670.7
Total 1993–94	**142 696.0**	**12 279.5**	**34 559.8**	**1 571.5**
Total 1991–92	121 693.9	10 472.2	30 509.5	1 387.3

[1] Those businesses which operated between 1991–92 and 1993–94
[2] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994
[3] Includes non-innovators and non-technological innovators

CHART 4 AVERAGE SALES OF MANUFACTURERS BY EMPLOYMENT, 1993–94



SALES GROWTH OF INDIVIDUAL BUSINESSES

IN TOTAL

Between 1991–92 and 1993–94, 29% of technologically innovating businesses increased their sales by more than 50%. In comparison only 15% of other businesses recorded a similar increase over the same period.

BY SIZE

For businesses with less than 20 employees, 33% of technological innovators increased their sales by more than 50%. Only 15% of other businesses of the same size increased their sales to this extent.

For businesses employing 20–99 persons, 19% of technological innovators increased their sales by more than 50%, whereas 20% of other businesses of the same size experienced such an increase.

For businesses with 100–499 employees, 16% of technological innovators increased their sales by more than 50%. Only 7% of other businesses of the same size experienced the same increase.

For businesses with 500 employees or more, 9% of technological innovators increased their sales by more than 50%. 9% of other businesses of the same size increased their sales by to this extent.

BY INDUSTRY

The Machinery and equipment industry contained the greatest number of technological innovators (37%) which increased their sales by more than 50%.

The Printing, publishing and recorded media industry contained the least number of technological innovators (19%) which increased their sales by more than 50%.

The Machinery and equipment and Metal product industries contained the greatest number of other businesses (18%) which increased their sales by more than 50%.

The Non-metallic mineral product industry contained the least number of other businesses (10%) which increased their sales by more than 50%.

11 SALES GROWTH BY INNOVATIVE STATUS OF BUSINESS[1], 1991–92 TO 1993–94

Category	*Sales growth between 1991–92 and 1993–94*							
	<– 25 %	*– 25 to – 10* %	*– 10 to – 2* %	*– 2 to 2* %	*2 to 10* %	*10 to 25* %	*25 to 50* %	*>50* %
Technological innovators[2]								
Employment								
Less than 20	7	5	5	6	8	15	21	33
20–99	4	6	6	6	13	28	19	19
100–499	4	6	7	5	16	26	21	16
500 or more	2	5	7	7	21	31	17	9
Manufacturing subdivisions								
21 Food, beverage and tobacco	7	4	8	5	14	20	23	20
22 Textile, clothing, footwear and leather	4	4	8	6	16	20	17	27
23 Wood and paper product	7	5	12	9	7	10	27	23
24 Printing, publishing and recorded media	5	8	6	7	12	30	13	19
25 Petroleum, coal, chemical and associated product	10	2	2	2	10	20	26	29
26 Non-metallic mineral product	7	7	3	4	9	22	16	31
27 Metal product	5	4	6	5	7	22	20	32
28 Machinery and equipment	7	6	4	5	9	12	20	37
29 Other manufacturing	3	9	4	9	9	15	24	27
Total	**6**	**5**	**5**	**6**	**10**	**18**	**20**	**29**
Other businesses[3]								
Employment								
Less than 20	9	10	8	15	13	16	15	15
20–99	7	7	7	9	12	19	19	20
100–499	6	7	11	7	15	22	24	7
500 or more	3	9	3	21	12	24	18	9
Manufacturing subdivisions								
21 Food, beverage and tobacco	5	4	10	19	18	21	10	12
22 Textile, clothing, footwear and leather	13	17	5	15	13	13	9	16
23 Wood and paper product	11	8	7	15	15	16	13	16
24 Printing, publishing and recorded media	6	13	7	16	16	19	11	12
25 Petroleum, coal, chemical and associated product	8	8	11	7	7	15	33	12
26 Non-metallic mineral product	9	10	6	11	16	19	18	10
27 Metal product	7	8	9	14	11	14	19	18
28 Machinery and equipment	12	9	7	14	8	17	15	18
29 Other manufacturing	9	8	8	13	15	16	15	15
Total	**9**	**10**	**8**	**14**	**13**	**16**	**15**	**15**

[1] Only businesses that had sales in both 1991–92 and 1993–94 are included
[2] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994
[3] Includes non-innovators and non-technological innovators

EXPORTS

IN TOTAL

Technologically innovative businesses recorded exports of $23,313 million in 1993–94; this represented 87% of the total exports by manufacturing businesses.

On average, each technologically innovative business had exports of $2.0 million; other businesses had average exports of $0.2 million. This difference was mainly due to the greater proportion of larger businesses which were technologically innovative, but also due to the fact that technologically innovative businesses of the same employment size had greater exports than other businesses.

BY SIZE

For businesses with less than 20 employees, technologically innovative businesses had average exports of $119,000; other businesses had average exports of $20,000.

Technologically innovative businesses with 20–99 employees had average exports of $1 million; other businesses of the same size had average exports of $0.7 million.

For businesses with 100–499 employees, the average exports for technological innovators were worth $7.2 million; for other such businesses average exports were $4.7 million.

For businesses with 500 or more employees, technological innovators had average exports of $62.3 million; the average exports for others were $22.5 million.

BY INDUSTRY

Technological innovators had the higher average exports overall, and this was consistent for all industries. Two notable examples were the Wood and paper product industry (technological innovators had average exports of $1.1 million compared with $0.05 million for other businesses) and the Metal product industry ($3.8 million as compared with $0.15 million).

EXPORTS GROWTH

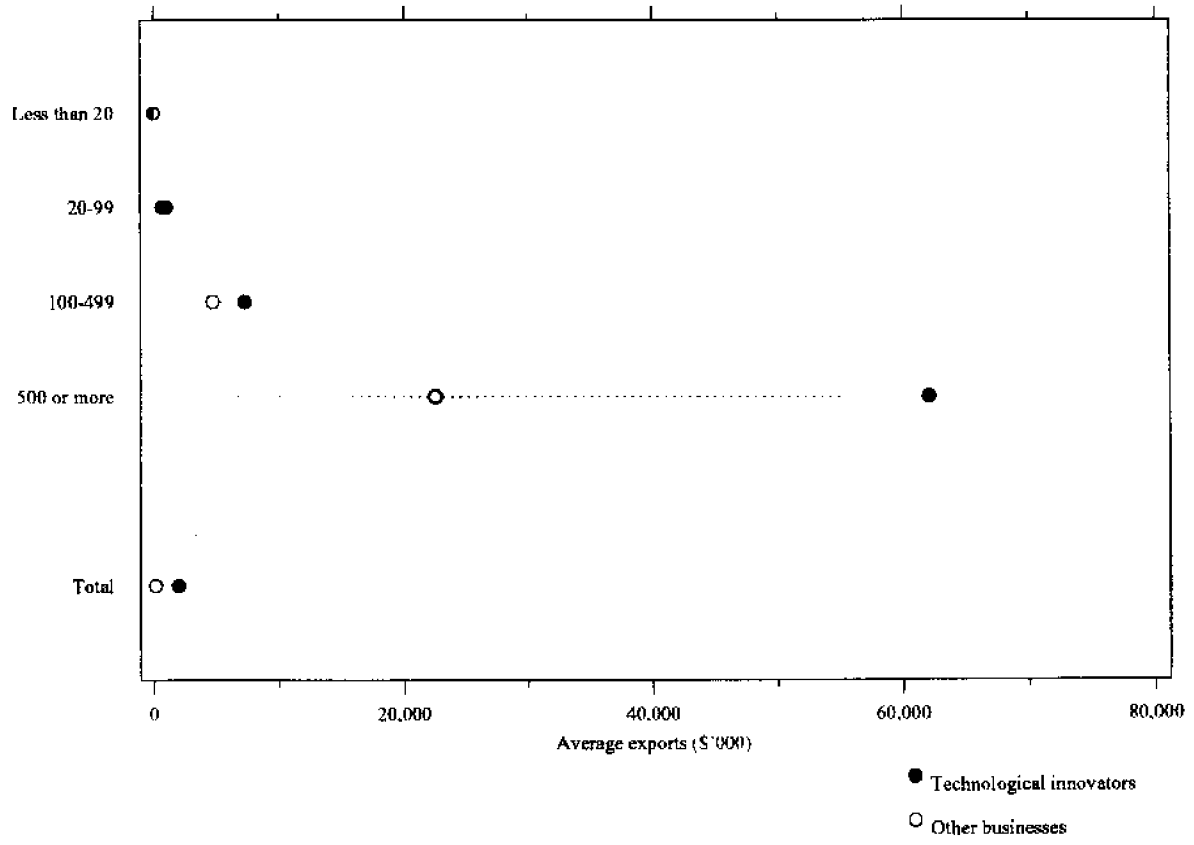
On average, technologically innovative businesses increased their exports over 1991–92 by 26%. Other businesses had increased their exports over the same period by 38%.

12 EXPORTS OF MANUFACTURERS, 1993–94

Category	Technological innovators[1]		Other businesses[2]	
	Total exports $m	Average exports $'000	Total exports $m	Average exports $'000
Employment size				
Less than 20	994.2	119.4	402.6	20.4
20–99	2 285.0	992.0	1 422.3	725.8
100–499	5 463.1	7 249.8	1 018.6	4 700.1
500 or more	14 570.8	62 317.7	741.2	22 481.2
Manufacturing subdivisions				
21 Food, beverage and tobacco	6 380.4	6 645.4	1 802.3	1 114.4
22 Textile, clothing, footwear and leather	1 368.9	1 397.8	319.3	142.2
23 Wood and paper product	509.5	1 120.9	116.4	48.8
24 Printing, publishing and recorded media	200.5	140.9	54.9	20.6
25 Petroleum, coal, chemical and associated product	2 029.5	1 919.6	135.1	118.9
26 Non-metallic mineral product	487.9	1 059.7	31.1	37.3
27 Metal product	7 246.3	3 844.6	588.1	149.4
28 Machinery and equipment	4 869.8	1 666.1	516.2	132.2
29 Other manufacturing	220.2	149.0	21.4	6.6
Total 1993–94	**23 313.0**	**2 006.2**	**3 584.7**	**163.0**
Total 1991–92	18 506.1	1 592.5	2 595.6	118.0

[1] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994
[2] Includes non-innovators and non-technological innovators

CHART 5 AVERAGE EXPORTS OF MANUFACTURERS BY EMPLOYMENT, 1993–94



EXPORTS GROWTH OF INDIVIDUAL BUSINESSES

IN TOTAL

Between 1991–92 and 1993–94, 47% of technologically innovating businesses increased their exports by more than 50%. In comparison only 32% of others recorded a similar increase over the same period.

BY SIZE

For businesses with less than 20 employees, 49% of technological innovators increased their exports by more than 50%, whereas only 30% of other businesses increased their exports to the same extent.

A similar pattern was seen for businesses employing 20–99 persons. 46% of technological innovators increased their exports by more than 50%, whereas only 37% of other businesses experienced such an increase.

For businesses with 100–499 employees, 45% of technological innovators increased their exports by more than 50%. However, only 29% of other businesses experienced such an increase.

For businesses with 500 employees or more the pattern was reversed. 32% of technological innovators increased their exports by more than 50%, whereas 37% of other businesses increased their exports to that extent.

BY INDUSTRY

The Metal product industry contained the greatest number of technological innovators (54%) which increased their exports by more than 50%.

The Wood and paper product industry contained the least number of technological innovators (18%) which increased their exports by more than 50%.

The Petroleum, coal, chemical and associated product industry contained the greatest number of other businesses (53%) which increased their exports by more than 50%.

The Wood and paper product industry contained the least number of other businesses (14%) which increased their exports by more than 50%.

13 EXPORTS GROWTH BY INNOVATIVE STATUS OF BUSINESS[1], 1991–92 TO 1993–94

	Exports growth between 1991–92 and 1993–94							
	<– 25 %	*– 25 to – 10* %	*– 10 to – 2* %	*– 2 to 2* %	*2 to 10* %	*10 to 25* %	*25 to 50* %	*>50* %
Technological innovators[2]								
Employment								
Less than 20	25	2	1	5	3	5	11	49
20–99	11	5	6	4	4	14	11	46
100–499	10	4	4	3	10	11	13	45
500 or more	10	5	7	4	9	12	21	32
Manufacturing subdivision								
21 Food, beverage and tobacco	7	8	7	1	9	7	9	52
22 Textile, clothing, footwear and leather	32	2	2	2	2	6	8	45
23 Wood and paper product	32	–	2	5	4	21	18	18
24 Printing, publishing and recorded media	4	–	6	12	9	22	6	40
25 Petroleum, coal, chemical and associated product	23	2	4	1	5	9	14	42
26 Non-metallic mineral product	33	5	–	1	5	5	8	44
27 Metal product	13	3	3	4	4	12	7	54
28 Machinery and equipment	14	3	3	5	4	7	16	48
29 Other manufacturing	24	1	3	3	4	6	15	45
Total	**18**	**3**	**3**	**4**	**5**	**9**	**12**	**47**
Other businesses[3]								
Employment								
Less than 20	22	7	8	9	2	7	14	30
20–99	16	6	8	8	5	11	8	37
100–499	9	4	10	2	11	16	19	29
500 or more	–	**6**	–	**19**	**6**	**13**	**19**	**37**
Manufacturing subdivision								
21 Food, beverage and tobacco	9	2	1	24	1	27	20	16
22 Textile, clothing, footwear and leather	18	6	6	2	8	1	28	31
23 Wood and paper product	–	9	9	20	1	30	16	14
24 Printing, publishing and recorded media	19	17	13	–	11	8	–	31
25 Petroleum, coal, chemical and associated product	15	20	1	6	–	4	2	53
26 Non-metallic mineral product	8	2	6	8	6	5	15	50
27 Metal product	25	–	19	1	1	7	1	46
28 Machinery and equipment	33	3	9	5	1	6	16	28
29 Other manufacturing	19	–	6	23	3	6	28	16
Total	**19**	**7**	**8**	**8**	**3**	**9**	**13**	**32**

[1] Only businesses that had exports in both 1991–92 and 1993–94 are included

[2] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

[3] Includes non-innovators and non-technological innovators

EXPENDITURE ON INNOVATION

IN TOTAL

The total amount spent by businesses on technologically innovative activities during 1993–94 was $5.2 thousand million. The average amount spent per business on innovative activities during 1993–94, by those businesses that undertook one or more forms of technological innovation, was $486,000. This was approximately 4% of the average sales of the business.

BY INDUSTRY

The Machinery and equipment industry spent the most on innovative activities ($1,836 million). This was more than twice as much as the Petroleum, coal, chemical and associated product industry which spent the second largest amount ($735 million). The Other manufacturing industry spent the least on innovative activities ($114 million).

BY TYPE

Most innovation expenditure was on Tooling up (49%), followed by R&D (35%). This pattern was consistent through most Manufacturing industries, the exception being in the Machinery and equipment industry where the order was reversed.

The least innovation expenditure was on Training associated with the introduction of new innovations. However, this was not consistent for all Manufacturing industries. For example, the Wood and paper product industry and the Metal product industry spent the least on the Acquisition of technology.

BY SIZE

Businesses with 1,000 or more employees spent the most on innovative activities, both as a group and on average. The average amount spent by these businesses was more than four times as much as for any other size category.

In aggregate, businesses with 5–9 employees spent the least on innovative activities. However, the average spending per business in this category was about the same as for businesses with less than five employees.

14 EXPENDITURE ON INNOVATION ACTIVITIES BY TECHNOLOGICAL INNOVATORS[1] BY MANUFACTURING SUBDIVISION, 1993–94

Manufacturing subdivision		Innovative activity: R&D $m	Acquisition of technology $m	Training $m	Tooling up $m	Marketing $m	Total $m	Average cost per innovator $'000
21	Food, beverage and tobacco	138.5	15.8	18.5	417.6	123.5	713.8	851.7
22	Textile, clothing, footwear and leather	53.0	16.0	10.1	68.3	30.5	177.7	206.4
23	Wood and paper product	122.4	1.5	4.5	249.7	9.1	387.3	1 152.1
24	Printing, publishing and recorded media	39.7	12.9	18.5	271.1	21.0	363.1	283.7
25	Petroleum, coal, chemical and associated product	293.8	44.3	23.3	301.0	72.7	735.1	764.9
26	Non-metallic mineral product	64.9	5.8	6.2	213.6	7.5	298.0	642.3
27	Metal product	169.6	19.1	35.5	281.7	21.3	527.1	286.2
28	Machinery and equipment	889.8	91.5	66.2	694.3	94.5	1 836.3	698.5
29	Other manufacturing	38.7	6.8	6.4	50.0	12.5	114.3	82.6
21–29	**Total manufacturing**	**1, 810.3**	**213.5**	**189.1**	**2 547.2**	**392.6**	**5 152.8**	**486.4**

[1] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

15 EXPENDITURE ON INNOVATION ACTIVITIES BY TECHNOLOGICAL INNOVATORS[1] BY EMPLOYMENT SIZE, 1993–94

Employment	Innovative activity: R&D $m	Acquisition of technology $m	Training $m	Tooling up $m	Marketing $m	Total $m	Average cost per innovator $'000
Less than 5	94.8	8.7	7.6	84.8	23.0	218.9	63.1
5–9	45.6	3.3	7.7	68.4	11.2	136.1	63.4
10–19	62.5	12.3	10.9	87.1	20.0	192.8	104.9
20–49	103.6	8.7	20.6	176.9	22.3	332.1	236.1
50–99	172.3	19.2	19.3	161.5	21.9	394.2	507.5
100–199	147.2	18.3	16.6	267.5	44.4	494.1	1 142.7
200–499	271.8	39.0	20.9	347.6	76.7	756.1	2 568.9
500–999	200.3	33.2	18.3	219.1	48.7	519.7	4 160.8
1,000 or more	712.2	70.8	67.2	1,134.2	124.5	2 108.8	19 915.9
Total	**1 810.3**	**213.5**	**189.1**	**2 547.2**	**392.6**	**5 152.8**	**486.4**

[1] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

INNOVATION INTENSITY

Businesses with less than five employees had the greatest innovation intensity (15%) i.e. innovation expenditure as a percentage of sales. This reflected the fact that a number of these businesses were newly established and were still spending to set up.

In contrast, businesses with 500–999 employees had the lowest innovation intensity (2%).

Businesses in the Machinery and equipment industry had the highest innovation intensity (6%). The Food, beverage and tobacco and the Metal product industries had the lowest innovation intensity (2%).

2% of technologically innovative businesses spent more than 100% of the value of their sales on innovative activities. These were mainly small businesses with less than five employees.

41% of technologically innovative businesses spent less than 2% of the value of their sales on innovative activities. A further 15% spent 2–4%.

16 SALES AND INNOVATION COSTS OF TECHNOLOGICAL INNOVATORS[1], 1993–94

Category	Total costs of innovation $m	Total sales $m	Innovation intensity[2] % of sales
Employment size			
Less than 5	218.9	1 448.9	15.1
5–9	136.1	2 304.4	5.9
10–19	192.8	5 287.9	3.7
20–49	332.1	7 224.7	4.6
50–99	394.2	10 508.9	3.8
100–199	494.1	12 983.0	3.8
200–499	756.1	21 361.9	3.5
500–999	519.7	21 367.7	2.4
1,000 or more	2 108.8	61 881.8	3.4
Selected ANZSIC subdivisions			
21 Food, beverage and tobacco	713.8	32 856.9	2.2
22 Textile, clothing, footwear and leather	177.7	6 450.1	2.8
23 Wood and paper product	387.3	7 550.4	5.1
24 Printing, publishing and recorded media	363.1	7 730.9	4.7
25 Petroleum, coal, chemical and associated product	735.1	22 406.5	3.3
26 Non-metallic mineral product	298.0	7 434.5	4.0
27 Metal product	527.1	25 557.0	2.1
28 Machinery and equipment	1 836.3	31 232.6	5.9
29 Other manufacturing	114.3	3 150.3	3.6
Total	**5 152.8**	**144 369.2**	**3.6**

[1] The proportion of the businesses' sales that are spent on innovation
[2] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

17 INNOVATION INTENSITY[1] OF TECHNOLOGICAL INNOVATORS[2], 1993–94

	Innovation intensity (% of sales)								
Employment size	<2	2–4	4–6	6–8	8–10	10–20	20–50	50–100	>100
Less than 5	29	14	11	5	4	13	14	5	5
5–9	41	10	8	5	8	21	4	1	–
10–19	45	20	13	6	4	8	3	–	–
20–49	48	16	12	6	3	9	5	1	–
50–99	53	16	13	5	1	8	4	–	–
100–199	58	17	7	6	1	6	3	–	–
200–499	59	19	8	4	3	5	1	–	1
500–999	58	17	11	5	1	6	1	1	–
1000 or more	54	20	5	11	5	5	1	–	–
Total	**41**	**15**	**11**	**6**	**4**	**12**	**7**	**2**	**2**

[1] The proportion of the businesses' sales that are spent on innovation
[2] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

SECTION 3 QUALITATIVE ASPECTS OF INNOVATIVE MANUFACTURING BUSINESSES

Each business which undertook technological innovation was asked to rate the importance of various possible objectives of its innovation and the sources of ideas for them. The ratings ranked from 'Not important' to 'Crucial' and have been combined using a weighting scale of one to five to derive the composite rating shown in the tables.

Businesses which used various measures to protect their innovations were also asked to rate the importance of these measures. Composite ratings were derived in a similar fashion, but the ratings were only derived from businesses which actually used a particular measure.

All businesses were asked to rate the importance of a number of factors which may hamper innovation. Composite ratings were derived the same way as for the other questions.

This section includes the following tables and charts:

- Table 18 Objectives of Technological Innovation
- Table 19 Sources of Ideas and Information for Technological Innovation
- Table 20 Measures Used to Protect Product Innovations
- Table 21 Measures Used to Protect Process Innovations
- Table 22 Factors Hampering Innovation

- Chart 6 Objectives of Technological Innovation
- Chart 7 Sources of Ideas and Information for Technological Innovation
- Chart 8 Measures Used to Protect Technological Innovation
- Chart 9 Factors Hampering Innovation

OBJECTIVES OF INNOVATION

IN TOTAL

Improving product quality was the most important objective of innovation to technologically innovative businesses, with a composite rating of 3.5. This objective was rated as Crucial by 23% of businesses, Very significant by 33% and Moderately significant by 25%.

The next most important objectives were Extending the product range within the main product field, Increasing market share and Maintaining market share, all with a composite rating of 3.1.

The least important objective of innovating was Creating new markets overseas, with a composite rating of 1.9. This objective was rated as Not important by 63% of businesses.

Reducing environmental damage was considered to be of some significance by 51% of businesses. 17% of businesses considered this to be a Very significant or Crucial objective of their innovative activities.

BY SIZE

Businesses employing less than 100 generally allocated a lower rating to each of the listed objectives. The objectives that tended to be rated markedly lower were Creating new markets overseas (composite rating of 1.8 as compared with 2.5 for businesses employing 100 or more), Reducing wage costs (2.3 compared with 2.7) and Reducing materials consumption (2.2 compared with 2.8).

For businesses with 500 or more employees, there was not much difference in rating between Creating new markets nationally and Creating new markets overseas (composite ratings of 3.0 and 2.7, respectively). However, for businesses with less than 100 employees, the difference was greater (2.8 and 1.8, respectively). This demonstrates the greater propensity of larger businesses to enter export markets.

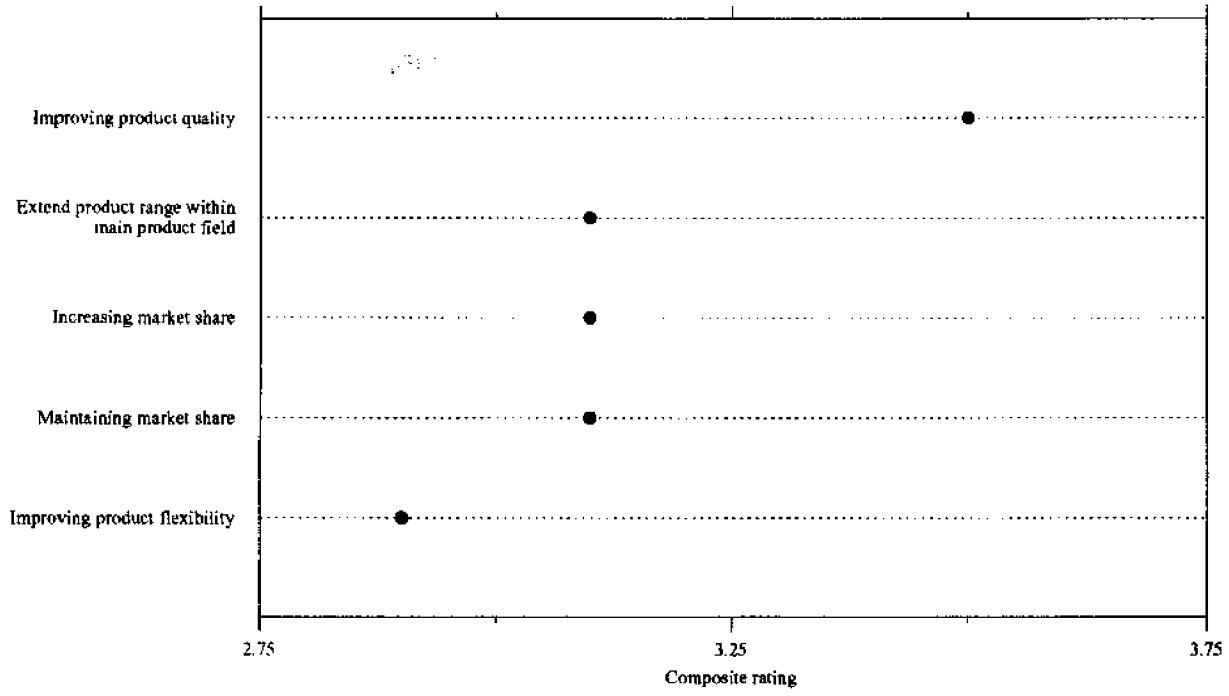
18 OBJECTIVES OF TECHNOLOGICAL INNOVATION[1] BY IMPORTANCE[2], JUNE 1994

Objective	Importance of objective: Not important %	Slightly significant %	Moderately significant %	Very significant %	Crucial %	Composite rating
Replacement products being phased out	44.0	14.1	18.5	14.4	9.1	2.3
Extend product range						
Within main product field	17.6	10.5	29.1	29.4	13.4	3.1
Outside main product field	42.8	17.9	19.7	14.8	4.9	2.2
Increasing market share	16.4	14.3	27.3	28.1	13.9	3.1
Maintaining market share	17.2	13.2	30.6	25.4	13.6	3.1
Creating new markets						
Nationally	28.6	11.7	24.2	25.3	10.3	2.8
Overseas	62.7	11.0	9.3	10.4	6.7	1.9
Improving product flexibility	20.4	13.2	34.5	23.3	8.5	2.9
Lower production costs						
Reduce production design costs	31.2	17.4	21.5	20.4	9.5	2.6
Reducing wage costs	39.1	17.7	19.7	14.8	8.7	2.4
Reducing materials consumption	39.5	21.3	18.1	14.8	6.3	2.3
Reducing energy consumption	47.4	22.0	15.0	11.3	4.3	2.0
Reducing production lead times	30.3	14.4	24.5	20.8	10.0	2.7
Reducing environmental damage	49.4	16.9	17.0	11.4	5.3	2.1
Improving product quality	12.2	6.4	25.3	33.2	23.0	3.5
Improving working conditions/safety	28.5	16.8	24.5	20.9	9.3	2.7
Meet government standards, regulations and legislation	43.3	14.4	17.7	16.0	8.7	2.3

[1] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

[2] Businesses which undertook technological innovation were asked to rate these objectives based on their experience during the period July 1991 to June 1994

CHART 6 OBJECTIVES OF TECHNOLOGICAL INNOVATION, JUNE 1994



SOURCES OF IDEAS AND INFORMATION

IN TOTAL

The source of ideas and information for innovation with the highest composite rating was Clients or customers, with a rating of 3.3. 19% of businesses which undertook technological innovation rated this source as Crucial, and 29% as Very significant, while only 14% rated it as Not important.

Research and development (R&D) areas within the business group rated 2.9, even though 20% of technologically innovative businesses rated this as Crucial and 22% as Very significant. The high proportion of businesses (30%) that ranked the source as Not important reduced its composite rating.

External market sources within your industry also received a composite rating of 2.9. This source was rated Crucial by 10% of businesses, Very significant by 25% of businesses and Not important by 17%.

Government laboratories, Private research institutes, Higher education institutions and Patent disclosures were the sources of ideas and information which were rated least important with composite ratings of between 1.2 and 1.3.

BY SIZE

The importance of the R&D area as a source of ideas for innovation grew with the size of the business. For businesses employing less than 100 this source of ideas had a composite rating of 2.9. However, for businesses employing 500 or more persons this source of ideas had a composite rating of 3.7.

A similar pattern occurred with Other areas within the business group. For businesses employing less than 100 persons this source had a composite rating of 2.3, whereas for businesses with 500 or more employees it had a composite rating of 3.2.

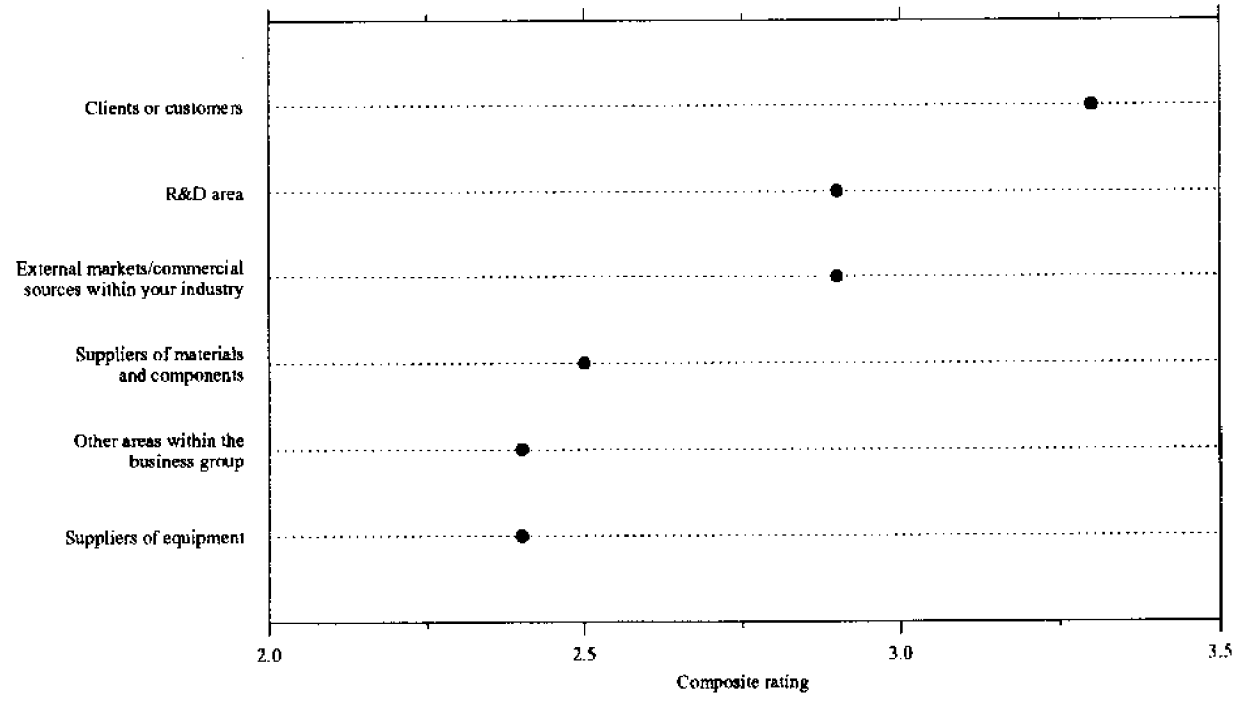
19 SOURCES OF IDEAS AND INFORMATION FOR TECHNOLOGICAL INNOVATION[1] BY IMPORTANCE[2], JUNE 1994

Source	Importance					
	Not important %	*Slightly significant* %	*Moderately significant* %	*Very significant* %	*Crucial* %	*Composite rating*
Internal sources within the business group						
R&D area	30.2	8.0	19.9	21.8	20.1	2.9
Other areas	34.8	17.1	27.4	15.8	4.8	2.4
External market/commercial sources						
Within your industry	17.4	16.3	31.3	24.8	10.3	2.9
Outside your industry	53.6	23.9	15.2	6.0	1.3	1.8
Suppliers of materials and components	27.7	20.9	28.4	15.8	7.2	2.5
Suppliers of equipment	34.7	19.9	23.4	17.0	5.1	2.4
Clients or customers	13.6	11.9	26.6	28.7	19.4	3.3
Consultancy firms	76.3	11.8	7.5	3.7	0.7	1.4
Educational/research institutions						
Higher education institutions	80.5	12.5	5.2	1.1	0.8	1.3
Government laboratories	87.5	7.6	3.9	1.0	0.1	1.2
Private research institutes	87.7	6.6	4.0	1.1	0.6	1.2
Generally available information						
Patent disclosures	85.7	7.8	3.3	1.7	1.5	1.3
Professional conferences and meetings	59.6	20.3	14.9	4.5	0.7	1.7
Professional journals	51.4	24.6	17.0	5.9	1.2	1.8
Fairs/exhibitions	40.3	24.6	20.3	11.8	3.1	2.1

[1] Those businesses which undertook product and/or process innovation during the three year period July 1991 to June 1994

[2] Businesses which undertook technological innovation were asked to rate these sources based on their experience during the period July 1991 to June 1994

CHART 7 SOURCES OF IDEAS AND INFORMATION FOR TECHNOLOGICAL INNOVATION, JUNE 1994



MEASURES TAKEN TO PROTECT INNOVATIONS

IN TOTAL

There was not much difference in the composite ratings of individual measures between product and process innovations.

FOR PRODUCT INNOVATION

Being ahead of the market was the most commonly used measure, used by 90% of businesses, and had the highest composite rating. Of the businesses that used this measure, 30% rated it as Crucial and 33% as Very significant.

Patents was the least common measure, used by only 44% of businesses, but had the second highest composite rating.

Businesses with 500 or more employees used measures to protect innovation more than other businesses. 75% of the largest businesses used Patents compared to 39% for businesses employing less than 100 persons. 67% of the largest businesses used Registration of design as a means of protecting innovation while only 43% of businesses with less than 100 employees used this measure.

FOR PROCESS INNOVATION

Being ahead of the market was the most common measure for protecting process innovations, used by 81% of businesses. This measure also had the highest composite rating. Of the businesses that used this measure, 32% rated it as Crucial and 30% as Very significant. This is similar to the trend for product innovations.

Registration of design was the least commonly used measure, used by only 25% of businesses. This measure also had the lowest composite rating.

Larger businesses used measures to protect process innovation much more than smaller businesses. For example, Patents was used by 63% of businesses with 500 or more employees, but by only 22% of businesses with less than 100 employees.

20 MEASURES USED TO PROTECT PRODUCT INNOVATIONS BY IMPORTANCE[1], JUNE 1994

	Importance						
Measure	Measure not used %	Not important %	Slightly significant %	Moderately significant %	Very significant %	Crucial %	Composite rating
Patents	56.2	3.4	4.5	9.9	12.5	13.5	3.6
Registration of design	54.2	5.9	4.0	12.6	12.2	11.1	3.4
Secrecy	25.8	4.9	11.3	20.0	15.9	22.1	3.5
Complexity of product design	30.7	7.0	10.6	22.6	17.9	11.2	3.2
Being ahead of the market	9.8	1.4	4.1	21.8	33.2	29.7	4.0

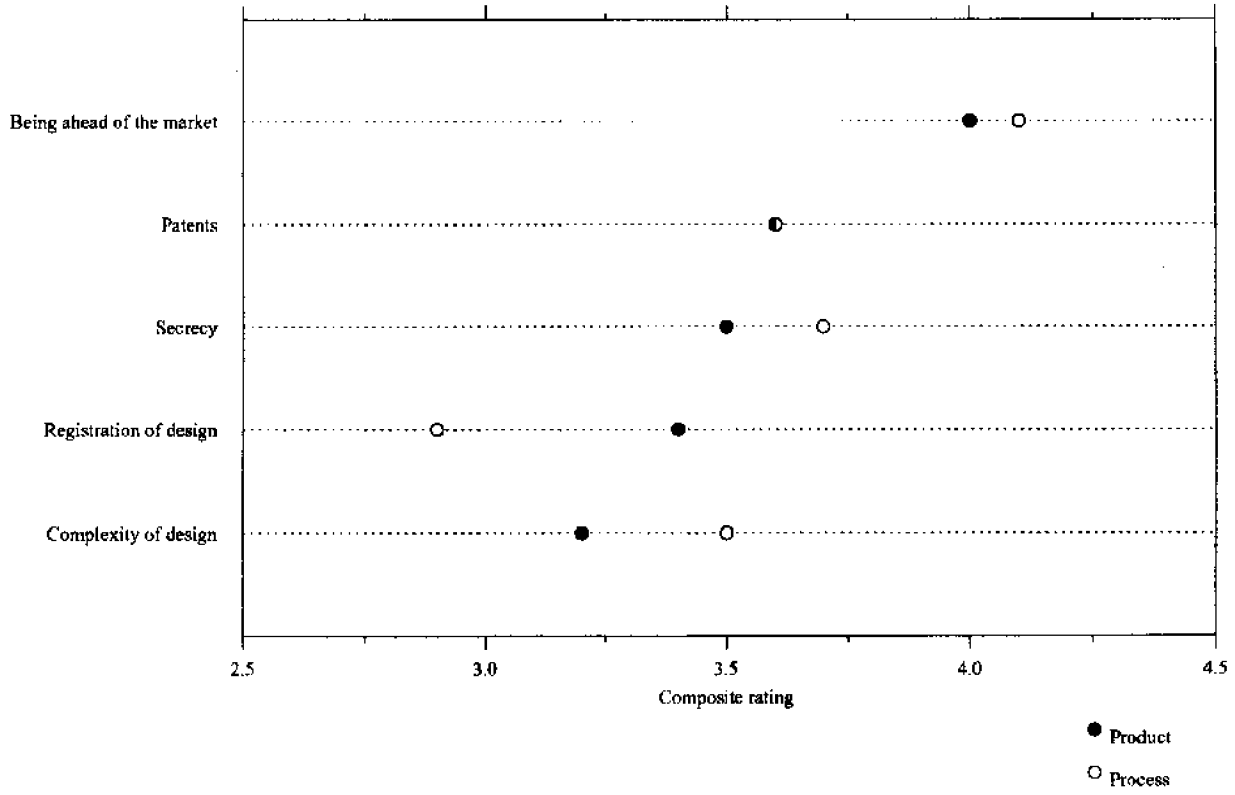
[1] Businesses which undertook technological innovation and protected their product innovations were asked to rate these measures based on their experience during the period July 1991 to June 1994

21 MEASURES USED TO PROTECT PROCESS INNOVATIONS BY IMPORTANCE[1], JUNE 1994

	Importance						
Measure	Measure not used %	Not important %	Slightly significant %	Moderately significant %	Very significant %	Crucial %	Composite rating
Patents	72.5	4.1	1.9	5.3	7.3	9.0	3.6
Registration of design	75.2	5.5	3.3	5.9	7.4	2.8	2.9
Secrecy	23.6	1.8	10.7	17.4	21.8	24.7	3.7
Complexity of process	34.5	2.9	10.9	16.8	17.6	17.4	3.6
Being ahead of the market	18.7	1.7	2.8	14.9	30.1	31.8	4.1

[1] Businesses which undertook technological innovation and protected their process innovations were asked to rate these measures based on their experience during the period July 1991 to June 1994

CHART 8 MEASURES USED TO PROTECT TECHNOLOGICAL INNOVATION, JUNE 1994



FACTORS HAMPERING INNOVATION

IN TOTAL

The factor with the highest composite rating (3.0) was Lack of appropriate sources of finance. This factor was rated as Crucial by 22% of businesses, Very significant by 21% and Moderately significant by 18%.

The factor with the second highest composite rating (2.8) was Innovation costs too high, with 12% of businesses considering it as Crucial, 20% as Very significant and 26% as Moderately significant.

These were followed by Legislation, regulations, standards, taxation with a rating of 2.5. Slightly less than half the businesses which considered there were factors hampering innovation rated this factor as Not important.

The factor with the lowest composite rating (1.4), was No need to innovate due to earlier innovations. It received a low rating because 76% of businesses considered it to be Not important, while only 1.4% considered it as Crucial and 0.9% as Very significant.

When factors hampering innovation for the innovative businesses were compared with those for the non-innovative businesses, there did not appear to be a large difference between the ratings of these factors.

BY SIZE

For most factors there did not appear to be a difference in their importance between businesses of different employment sizes.

Businesses employing 500 or more persons perceived Resistance to change in your business to be more important than businesses with less than 100 employees (composite ratings of 2.5 and 1.8, respectively).

Businesses with less than 100 employees perceived Lack of appropriate sources of finance to be more important than did businesses employing 500 or more persons (composite ratings of 3.1 and 2.0, respectively).

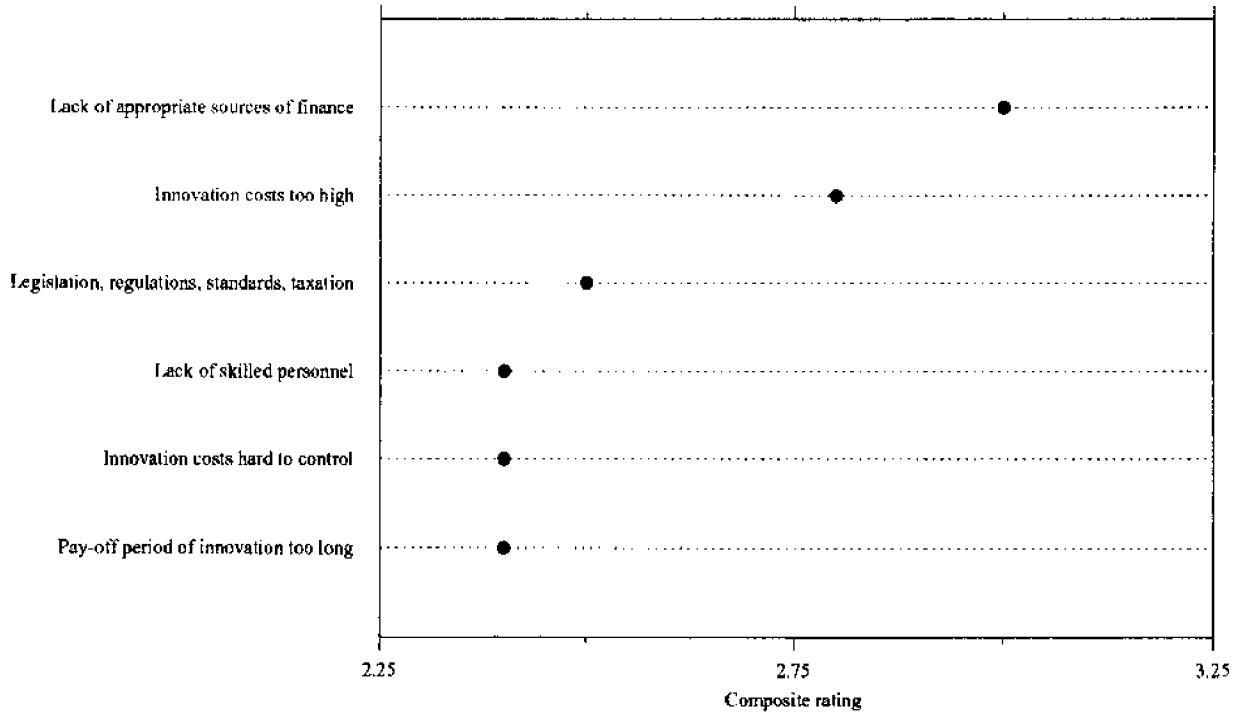
Legislation, regulations, standards, taxation was perceived to hamper innovation in businesses with less than 100 employees more than in the businesses employing 500 or more persons (2.5 and 2.1, respectively).

22 FACTORS HAMPERING INNOVATION[1] BY IMPORTANCE[2], JUNE 1994

Factors	Importance					
	Not important %	*Slightly significant* %	*Moderately significant* %	*Very significant* %	*Crucial* %	*Composite rating*
Factors specific to your business						
Lack of skilled personnel	37.0	16.8	24.3	13.5	8.5	2.4
Lack of information on technologies	46.0	21.6	16.8	10.7	4.8	2.0
Lack of information on markets	45.2	23.4	18.7	9.5	3.3	2.0
Deficiencies in the availability of external technical services	55.6	20.0	13.4	7.5	3.5	1.8
Lack of opportunities for co-operation with other companies and scientific and technological organisations	59.2	17.4	11.7	7.0	4.8	1.8
Innovation costs hard to control	38.7	17.3	19.0	18.0	7.0	2.4
Resistance to change in your business	57.0	21.3	12.4	6.3	3.0	1.8
Other factors						
Excessive perceived risk	38.7	21.3	24.7	9.9	5.4	2.3
Lack of appropriate sources of finance	28.4	11.2	17.9	21.1	21.5	3.0
Innovation costs too high	28.8	14.1	25.6	19.5	12.0	2.8
Pay-off period of innovation too long	38.9	18.4	24.1	10.9	7.6	2.4
Lack of technological opportunities	61.2	19.5	11.3	4.4	3.5	1.7
No need to innovate due to earlier innovations	76.4	14.8	6.5	0.9	1.4	1.4
Innovations too easy to copy	58.2	13.5	14.7	6.9	6.7	1.9
Legislation, regulations, standards, taxation	45.9	14.7	10.9	11.8	16.7	2.5
Lack of customer responsiveness to new products and processes	48.3	20.8	19.1	8.3	3.5	2.0
Uncertainty in timing of innovation	53.3	19.6	16.4	8.1	2.6	1.9

[1] Includes only businesses that felt there were any factors which were hampering innovation. Can include both innovating and non-innovating businesses.
[2] Businesses were asked to rate these factors based on their experience during the period July 1991 to June 1994

CHART 9 FACTORS HAMPERING INNOVATION, JUNE 1994



SECTION 4 PROFILE OF MAIN INNOVATIONS

Businesses which undertook technological innovation were asked to report on one of the most significant innovations the business had introduced in the period July 1991 to June 1994. If the business did not have one significant innovation in particular, it was asked to report on one innovation the business had introduced in that time period. The statistics in this Section reflect the characteristics of that particular innovation.

The expected cost recovery period includes a separate category, Unable to estimate. Approximately 10% of businesses were not able to estimate the expected cost recovery period of the main innovation.

The following tables and charts are included in this section:

- Table 23 Time Taken to Reach Commercialisation of Main Innovation
- Table 24 Expected Cost Recovery Period of Main Innovation
- Table 25 Cost of Main Innovation
- Table 26 Novelty of Main Innovation
- Table 27 Profile of Main Innovation

PROFILE OF MAIN INNOVATIONS BY SIZE OF BUSINESS

BUSINESSES WITH LESS THAN 20 EMPLOYEES

45% expected their innovations to reach commercialisation within six months, and a further 23% in six to 12 months. Only 2% of the main innovations were expected to take five years or more.

24% expected to recover their costs in less than six months. 14% expected to recover their costs in six to 12 months. A further 24% expected to recover their costs in one to two years, and 24% within two to five years. Only 4% expected it would take five years or more.

27% reported that their innovation cost less than $5,000. 18% reported their innovation cost $5,000 to $10,000. A further 31% reported that their innovation cost between $10,000 and $50,000.

59% of these innovations were new only to the business. 24% of these innovations were new to the industry in Australia, and 17% new to the industry worldwide.

BUSINESSES WITH 20–99 EMPLOYEES

29% expected their innovations to reach commercialisation within six months and a further 30% in six to 12 months. Only 1% of the main innovations were expected to reach commercialisation in five years or more.

12% expected to recover their costs in less than six months. 15% expected to recover their costs in six to 12 months. A further 25% expected to recover their costs in one to two years, and 35% within two to five years. Only 5% expected it would take five years or more.

9% reported that their innovation cost less than $5,000. 11% reported that their innovation cost $5,000 to $10,000. A further 26% reported that their innovation cost between $10,000 and $50,000. 23% estimated their innovation to cost between $50,000 and $100,000.

50% of these innovations were new only to the business. 36% of these innovations were new to the industry in Australia, and 15% new to the industry worldwide.

BUSINESSES WITH 100–499 EMPLOYEES

19% expected their innovations to reach commercialisation within six months. 29% expected to reach commercialisation in six to 12 months, and a further 28% in one to two years. Only 4% of businesses expected their innovations to reach commercialisation in five years or more.

10% of businesses expected to recover their costs in less than six months. 14% expected to recover their costs in six to 12 months. A further 23% expected to recover their costs in one to two years, and 37% within two to five years. Only 3% expected it would take five years or more.

5% reported that their innovation cost less than $5,000. 4% reported that their innovation cost $5,000 to $10,000. A further 17% reported that their innovation cost between $10,000 and $50,000. 20% estimated that their innovation cost between $50,000 to $100,000. 54% of businesses reported that their innovation cost more than $100,000.

49% of these innovations were new only to the business. 30% of these innovations were new to the industry in Australia, and 21% new to the industry worldwide.

BUSINESSES WITH 500 OR MORE EMPLOYEES

21% of businesses expected to reach commercialisation in 6–12 months and a further 32% in one to two years. A further 34% of businesses expected to reach commercialisation in two to five years. Only 6% of businesses expected their innovations to take five years or more to reach commercialisation.

18% expected to recover their costs within one to two years, and 49% within two to five years. Only 7% expected it would take five years or more.

9% estimated that their innovation cost $50,000 to $100,000. A further 83% of businesses reported that their innovation cost more than $100,000.

36% of these innovations were new only to the business. 41% of these innovations were new to the industry in Australia, and 23% new to the industry worldwide.

23 TIME TAKEN TO REACH COMMERCIALISATION OF MAIN INNOVATION[1], JULY 1991–JUNE 1994

Category	Time to reach commercialisation: Less than 6 months %	6 months to 1 year %	1 to 2 years %	2 to 5 years %	5 years or more %
Innovation type					
Product	37.6	27.5	20.4	13.1	1.4
Process	42.1	19.6	21.0	15.3	2.0
Employment size					
Less than 20	44.6	23.1	18.7	12.2	1.5
20–99	28.5	29.8	24.3	16.2	1.2
100–499	19.0	28.6	28.3	20.5	3.5
500 or more	7.1	20.5	32.2	33.9	6.3
Manufacturing subdivision					
21 Food, beverage and tobacco	39.7	20.2	23.1	15.7	1.3
22 Textile, clothing, footwear and leather	53.0	22.3	15.2	7.6	1.9
23 Wood and paper product	65.1	22.5	10.1	2.3	–
24 Printing, publishing and recorded media	38.0	29.1	19.6	11.2	2.1
25 Petroleum, coal, chemical and associated product	29.2	25.1	22.5	20.2	3.0
26 Non-metallic mineral product	28.7	30.7	26.2	13.4	1.1
27 Metal product	45.3	22.7	19.8	8.4	3.9
28 Machinery and equipment	30.1	24.3	23.9	21.4	0.3
29 Other manufacturing	42.9	26.8	18.3	11.4	0.7
Total	**39.2**	**24.7**	**20.6**	**13.9**	**1.6**

[1] Relates to an innovation introduced during the period July 1991 to June 1994

24 EXPECTED COST RECOVERY PERIOD OF MAIN INNOVATION[1], JULY 1991–JUNE 1994

Category	Expected cost recovery period: Less than 6 months %	6 months to 1 year %	1 to 2 years %	2 to 5 years %	5 years or more %	Unable to estimate %
Innovation type						
Product	23.9	16.0	25.0	23.5	3.0	8.6
Process	14.6	11.3	22.7	34.0	5.9	11.6
Employment size						
Less than 20	24.1	14.4	24.3	23.9	3.9	9.4
20–99	12.0	14.9	24.6	34.6	4.7	9.2
100–499	9.7	13.9	22.8	37.0	3.4	13.2
500 or more	6.3	8.0	18.4	48.5	7.1	11.7
Manufacturing subdivision						
21 Food, beverage and tobacco	22.3	10.7	28.9	25.7	4.7	7.7
22 Textile, clothing, footwear and leather	28.8	22.2	23.8	18.4	0.5	6.3
23 Wood and paper product	33.5	12.5	30.4	8.5	2.5	12.6
24 Printing, publishing and recorded media	14.6	8.8	16.1	42.2	4.9	13.5
25 Petroleum, coal, chemical and associated product	21.2	15.7	26.5	24.8	1.4	10.4
26 Non-metallic mineral product	19.4	22.2	16.8	27.4	1.9	12.3
27 Metal product	15.9	17.7	24.4	27.7	8.4	6.0
28 Machinery and equipment	19.5	9.4	24.3	30.1	5.0	11.8
29 Other manufacturing	23.4	18.5	26.7	22.0	1.0	8.4
Total	**20.6**	**14.3**	**24.2**	**27.2**	**4.1**	**9.7**

[1] Relates to an innovation introduced during the period July 1991 to June 1994

25 COST OF MAIN INNOVATION[1], JULY 1991–JUNE 1994

Category	Cost of main innovation ($'000)				
	<5 %	5–10 %	10–50 %	50–100 %	>100 %
Innovation type					
Product	26.6	17.0	27.5	14.4	14.6
Process	13.3	12.1	31.6	14.0	29.0
Employment size					
Less than 20	27.2	17.6	31.4	11.7	12.2
20–99	9.2	11.2	25.8	22.5	31.3
100–499	4.6	4.3	17.3	20.0	53.8
500 or more	0.8	1.7	5.0	9.2	83.3
Manufacturing subdivision					
21 Food, beverage and tobacco	31.0	14.3	22.9	8.4	23.4
22 Textile, clothing, footwear and leather	30.5	17.7	31.5	10.3	10.0
23 Wood and paper product	36.8	20.0	20.2	3.4	19.7
24 Printing, publishing and recorded media	11.4	11.2	32.1	16.2	29.1
25 Petroleum, coal, chemical and associated product	23.2	17.8	23.8	12.6	22.6
26 Non-metallic mineral product	26.4	9.9	29.8	12.3	21.7
27 Metal product	20.2	19.4	30.7	14.2	15.4
28 Machinery and equipment	15.8	8.9	28.7	20.7	25.9
29 Other manufacturing	26.1	22.8	32.4	11.6	7.1
Total	**21.9**	**15.2**	**28.9**	**14.2**	**19.7**

[1] Relates to an innovation introduced during the period July 1991 to June 1994

26 NOVELTY OF MAIN INNOVATION[1], JULY 1991–JUNE 1994

Category	Novelty of main innovation (No.)		
	New to the business	New to the industry in Australia	New to the industry worldwide
Innovation type			
Product	4 450	2 420	1 167
Process	2 535	958	948
Employment size			
Less than 20	5 345	2 201	1 ,554
20–99	1 177	848	349
100–499	377	230	158
500 or more	86	99	54
Manufacturing subdivisions			
21 Food, beverage and tobacco	625	304	131
22 Textile, clothing, footwear and leather	655	218	218
23 Wood and paper product	328	142	10
24 Printing, publishing and recorded media	812	317	294
25 Petroleum, coal, chemical and associated product	553	341	204
26 Non-metallic mineral product	321	159	47
27 Metal product	1 365	482	202
28 Machinery and equipment	1 351	1 011	736
29 Other manufacturing	975	404	273
Total	**6 985**	**3 378**	**2 114**

[1] Relates to an innovation introduced during the period July 1991 to June 1994

PROFILE OF MAIN INNOVATION BY SIZE OF INNOVATION

LESS THAN $5,000

The majority of innovations were products (78%). The majority of innovations were new only to the business. The median time to reach commercialisation was less than six months. The median cost recovery period was less than six months.

$5,000 TO $10,000

The majority of innovations were products (72%). The majority of innovations were new only to the business. The median time to reach commercialisation was six to twelve months. The median cost recovery period was one to two years.

$10,001 TO $50,000

The majority of innovations were products (61%). The majority of innovations were new only to the business. The median time to reach commercialisation was six to twelve months. The median cost recovery period was one to two years.

$50,001 TO $100,000

The majority of innovations were products (65%). Innovations were most commonly reported to be new only to the business. The median time to reach commercialisation was one to two years. The median cost recovery period was two to five years.

MORE THAN $100,000

The majority of innovations were processes (52%). Innovations were most commonly reported to be new only to the business. The median time to reach commercialisation was one to two years. The median cost recovery period was two to five years.

27 PROFILE OF MAIN INNOVATION[1], JULY 1991–JUNE 1994

	Characteristic							
	Innovation type		Novelty		Time to reach commercialisation		Expected cost recovery period	
Cost of main innovation ($'000)	Type	%	New to	%	Time period	%	Time period	%
Less than 5	Product	78	The business	75	Less than 6 months	72	Less than 6 months	52
	Process	22	The industry in Australia	19	6 to 12 months	10	6 to 12 months	20
					1 to 2 years	14	1 to 2 years	16
			The industry worldwide	6	2 to 5 years	3	2 to 5 years	3
					5 years or more	1	5 years or more	1
							Unable to estimate	7
5–10	Product	72	The business	57	Less than 6 months	43	less than 6 months	21
	Process	28	The industry in Australia	30	6 to 12 months	31	6 to 12 months	23
					1 to 2 years	16	1 to 2 years	30
			The industry worldwide	14	2 to 5 years	10	2 to 5 years	17
					5 years or more	-	5 years or more	4
							Unable to estimate	3
10–50	Product	61	The business	58	Less than 6 months	37	Less than 6 months	14
	Process	39	The industry in Australia	26	6 to 12 months	32	6 to 12 months	15
					1 to 2 years	22	1 to 2 years	33
			The industry worldwide	16	2 to 5 years	8	2 to 5 years	27
					5 years or more	1	5 years or more	2
							Unable to estimate	10
50–100	Product	65	The business	43	less than 6 months	17	Less than 6 months	6
	Process	35	The industry in Australia	35	6 to 12 months	29	6 to 12 months	7
					1 to 2 years	29	1 to 2 years	25
			The industry worldwide	22	2 to 5 years	22	2 to 5 years	49
					5 years or more	3	5 years or more	4
							Unable to estimate	9
More than 100	Product	48	The business	41	less than 6 months	19	Less than 6 months	5
	Process	52	The industry in Australia	30	6 to 12 months	22	6 to 12 months	6
					1 to 2 years	24	1 to 2 years	15
			The industry worldwide	29	2 to 5 years	32	2 to 5 years	46
					5 years or more	3	5 years or more	10
							Unable to estimate	17

[1] Relates to an innovation introduced during the period July 1991 to June 1994

EXPLANATORY NOTES

DESCRIPTION

1 This publication presents statistics from a survey of innovation undertaken for the Manufacturing Sector. Information was collected in respect of manufacturers' innovative activities during the period 1 July 1991 to 30 June 1994.

SURVEY METHODOLOGY

2 Approximately 4,900 management units in the manufacturing industry were sampled and information obtained in respect of the three year period ending June 1994. The sample was taken from the Australian Bureau of Statistics' Business Register. The survey was conducted by mailed questionnaires and a 93% response rate was obtained.

SCOPE AND COVERAGE

3 The survey included businesses of all sizes operating in the manufacturing industry, regardless of whether those businesses had undertaken innovative activities during the period.

STATISTICAL UNIT

4 The business unit from which the information was collected and published is the management unit, which is the highest-level accounting unit within a business, having regard to industry homogeneity. In nearly all cases it coincides with the legal entity owning the business (i.e. company, partnership, trust, sole operator, etc.). In the case of large diversified businesses, however, there may be more than one management unit, each coinciding with a 'division' or 'line of business'. A division or line of business is separately identified where separate and comprehensive accounts are maintained.

CLASSIFICATION BY INDUSTRY

5 The statistics in this publication are classified by industry in accordance with the 1993 edition of the Australian and New Zealand Standard Industrial Classification (ANZSIC, Catalogue No. 1292.0). Each business unit is classified to a single industry. The industry allocated is the one which provides the main source of income for the management unit irrespective of whether a range of activities or a single activity is undertaken by the unit.

MEDIAN

6 The median value is that value which divides the population into two equal parts — one half having values lower than the median, and one half having values above it.

SURVEY ERROR

7 The extent to which survey error affects the results of the survey is unknown. This is the first time the survey has been conducted, and it involved new concepts. This is expected to contribute to the survey error in a small way. However, a comprehensive process of pilot testing and consultation with respondents was conducted to minimise this specific source of survey error.

8 As 93% of the businesses completed forms, non-response bias can be expected to be small.

SAMPLING ERROR

9 A measure of the reliability of sample estimates is given by the standard error, which indicates the extent to which estimates might have varied by chance because only a sample of businesses was included.

10 There are about two chances in three that a sample estimate will differ by less than one standard error from the figure that would have been obtained if all units had been included in the survey, and approximately nineteen chances in twenty that the difference will be less than two standard errors.

STANDARD ERRORS ASSOCIATED WITH THE TYPES OF INNOVATION BY MANUFACTURING SUBDIVISIONS, JULY 1991 TO JUNE 1994

Manufacturing subdivision		Standard error (Percentage points)		
		Technological innovation	Non-technological innovation	One or more innovations
21	Food, beverage and tobacco	3.8	3.0	4.2
22	Textile, clothing, footwear and leather	3.2	2.4	3.3
23	Wood and paper product	2.5	2.5	3.1
24	Printing, publishing and recorded media	3.0	2.6	3.1
25	Petroleum, coal, chemical and associated product	4.4	3.9	4.5
26	Non-metallic mineral product	3.7	2.9	3.9
27	Metal product	2.5	2.4	2.7
28	Machinery and equipment	2.6	2.1	2.6
29	Other manufacturing	2.4	1.9	2.5
21–29	**Total manufacturing**	**1.0**	**0.9**	**1.1**

11 Standard errors for other estimates presented in this publication are not provided here but can be made available on request.

RELATED STATISTICS

12 Other statistics relevant to innovation are contained in the following publications:

- *Innovation in Industry, 1993–94, March 1995* (8117.0)
- *Manufacturing Technology Statistics, Australia, 31 December 1991* (8123.0)
- *Mining Technology Statistics, Australia, 30 June 1991* (8413.0)
- *Research and Experimental Development, Business Enterprises (Inter Year Survey), Australia, 1993–94* (8114.0)

13 In addition to the above, the ABS also expects, later this year, to release further statistics on innovation in non-manufacturing industries in *Innovation in Selected Australian Industries* (8118.0).

UNPUBLISHED STATISTICS

14 More detailed innovation statistics for the manufacturing sector are available, at a cost, from the ABS. Most of the statistics in this publication can be cross-classified by more detailed employment and industry categories. Also, case studies can be done for individual employment sizes or industries.

SYMBOLS

The following symbols, where shown in columns or elsewhere in tables, mean:

–	nil or rounded to zero
. .	not applicable
n.a.	not available
n.p.	not publishable (data is confidential)

Where figures have been rounded, discrepancies may occur between the sum of component items and the total.

ABBREVIATIONS

ABS	Australian Bureau of Statistics
ANZSIC	Australian and New Zealand Standard Industrial Classification
OECD	Organisation for Economic Co-operation and Development

Australian Bureau of Statistics

For more information ...

The ABS publishes a wide range of statistics and other information on Australia's economic and social conditions. Details of what is available in various publications and other products can be found in the *ABS Catalogue of Publications and Products* available at all ABS Offices (see below for contact details).

Information Consultancy Service

Information tailored to special needs of clients can be obtained from the Information Consultancy Service available at ABS Offices (see Information Inquiries below for contact details).

ABS Products

A large number of ABS products is available from ABS bookshops (see below Bookshop Sales for contact details). The ABS also provides a subscription service – you can telephone the ABS Subscription Service Australia wide toll free on 1800 02 0608.

National *Dial-a-Statistic* Line

0055 86 400

(Steadycom P/L: premium rate 25c/21.4 secs.)

This number gives 24-hour access, 365 days a year, for a range of statistics.

Electronic Services

A large range of data is available via on-line services, diskette, magnetic tape, tape cartridge and CD ROM. For more details about these electronic data services contact any ABS Office (see below) or e-mail us at:

Keylink	STAT.INFO/ABS
X.400	(C:AU,A:TELMEMO,O:ABS,SN:INFO,FN:STAT)
Internet	STAT.INFO@ABS. TELEMEMO.AU or

you can visit us on Internet at: http://www.statistics.gov.au

Sales and Inquiries

Regional Offices		**Information Inquiries**	**Bookshop Sales**
SYDNEY	(02)	268 4611	268 4620
MELBOURNE	(03)	9615 7000	9615 7829
BRISBANE	(07)	3222 6351	3222 6350
PERTH	(09)	360 5140	360 5307
ADELAIDE	(08)	237 7100	237 7582
HOBART	(002)	20 5800	20 5800
CANBERRA	(06)	252 6627	207 0326
DARWIN	(089)	43 2111	43 2111
National Office			
ACT	(06)	252 6007	008 020 608

Information Services, ABS, PO Box 10, Belconnen ACT 2616

ABS Catalogue No. 8116.0 INNOVATION IN AUSTRALIAN MANUFACTURING 1994