Innovation in New Zealand

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Preface

The development of the Government's Growth and Innovation Framework has reinforced the need for detailed statistics on business innovation. Innovation has been cited as a key factor in sustaining economic growth, and in developing a more flexible New Zealand economy capable of competing successfully on the international stage. This report presents a statistical picture of the current state of business innovation in New Zealand, where innovations include new or significantly different business processes, products and services.

The information presented in this report was collected in the Innovation Survey conducted by Statistics New Zealand in August 2003 sponsored by the Ministry of Research, Science and Technology. The Innovation Survey collected information on a number of aspects of innovation activity and their impact on business performance. Initial results from the survey were released in April 2004. This report contains more detailed information on results from the survey.

Brian Pink
Government Statistician

Acknowledgement

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Fax 09 920 9198

Wellington
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Changes of base

Where consecutive figures have been compiled on different bases and are not strictly comparable, a footnote is added indicating the nature of the difference.

Source

All data is compiled by Statistics New Zealand, except where otherwise stated.

Symbols

The interpretation of the symbols used throughout this report is as follows:

C	confidential
E	early estimate
P	provisional
R	revised
S	suppressed
-	nil or zero
--	figure(s) not available
..	figure too small to be expressed
...	not applicable

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Part 1

Guide to interpreting the data

The following is a summary of the issues to consider when analysing the Innovation Survey 2003 results. A full technical description of the survey is contained in the Technical Notes in Chapter 11.

1.1 Definition of innovation

The Innovation Survey is designed to collect innovation data in accordance with the definitions contained in the "OECD Oslo Manual" (1996).

(The Oslo Manual is available from: www.oecd.org/)

Innovation is defined very broadly. It includes the 'never done before' as well as changes that others have already done, but that a business is doing for the first time.

For the Innovation Survey 2003, an innovation is defined as:

- the introduction of a new or significantly improved product or service to the market, or
- the introduction of a new or significantly improved process within a business.

Innovation could be the result of the introduction, adaptation or adoption of new knowledge or technological developments. It could also be the result of the combination of existing technologies in novel ways.

Further detail can be found in the Technical Notes in Chapter 11.

1.2 Data collection

The Innovation Survey 2003 was a postal survey, sent out in late August 2003. Information collected included: whether the enterprise had been involved in any innovative activities during the previous three years; the nature of those activities and their outcomes; and any factors which hampered innovation. Information was also sought on sources of assistance and information, and any collaborative arrangements with other organisations. Financial information on expenditure and export sales was also collected for the business' last financial year.

1.3 Limitations of the data

The results presented from this survey are subject to error (sampling and non-sampling). The sample was designed to give statistics for the categorical questions with a maximum sample error of fifteen percent (at the 95 percent confidence level) and sample errors for the financial variables with a maximum of 10 percent relative sample error at the overall level. Refer to the Technical Notes in Chapter 11 for more detail.

Given the nature of the data collected, there are limitations on the level of accuracy that can be expected from the survey. Many respondents do not keep a separate account of their innovation expenditure, records may not be kept in the form required for the survey and estimation may be required.

1.4 Presentation of numeric totals

In order to preserve confidentiality, all counts in this survey used for this report were random rounded to base 3. This is very important due to the small numbers of businesses in some industry groups, particularly if broken down to a detailed level. As a result, some totals and proportions presented in this report may differ slightly from the stated totals.

Another impact of small sample sizes above is that the rates of sample error are magnified. Groupings which are particularly susceptible are marked with an asterisk (*) in the tables. Results for these groups should be treated with caution.

Throughout this report, results are presented grouped either by business size, industry or type of innovator (refer to the technical notes for more detail). Table 1.01 summarises the groups used in this report and shows the relative sizes of each grouping in terms of the total number of businesses and total number of employees in each group.

This gives an indication of their relative importance to the New Zealand economy and should be borne in mind when considering the results presented in this report.

Table 1.01

Relative Sizes of Groups Referred to in this Report

	Total Number of Businesses[1][2]	Total Number of Employees[3]
Business Size		
10 - 29 Employees	8,208	17,603
30 - 49 Employees	1,575	23,594
50 or more Employees	1,776	272,359
Industry		
Industry Sector		
Agriculture, Forestry and Fishing	1,473	15,534
Mining and Quarrying*	60	1,650
Manufacturing	3,525	120,878
Electricity, Gas and Water Supply*	12	1,160
Construction	1,206	17,696
Total	**6,276**	**156,917**
Services Sector		
Wholesale Trade	1,767	32,128
Transport and Storage	885	20,148
Communication Services*	87	9,411
Finance and Insurance	282	21,514
Business Services	2,181	69,712
Motion Picture, Radio and Television Services	84	3,726
Total	**5,286**	**156,638**
Type of Innovator		
Leaders (new to market)	1,929	115,792
Leaders (new to firm)	1,527	55,009
Adopters (active adopters)	621	14,794
Adopters (passive adopters)	573	9,389
Ongoing or Abandoned	459	12,929
Non-innovators	6,450	105,641
Overall	**11,559**	**313,555**

(1) Counts are of New Zealand businesses in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Part 2

Overview

2.1 Rate of innovation

Results from the Innovation Survey 2003 show that 44 percent of New Zealand businesses reported innovation activity during the last three years.

The propensity to innovate was greater in larger businesses. Fifty-nine percent of businesses with more than 50 employees recorded innovation activity, compared with 50 percent for businesses with 30 to 49 employees and 40 percent for businesses with 10 to 29 employees.

The proportion of those innovative businesses who considered their innovations as being successfully carried out (as opposed to being ongoing or abandoned) was similar across all business sizes (91 percent).

There was variation across industries in the proportion of businesses with innovation activity. The highest proportion (57 percent) was recorded in the manufacturing industry, closely followed by finance and insurance (55 percent). The lowest proportion (25 percent) was recorded in the construction industry.

The results from the Innovation Survey 2003 are consistent with those from the most recent innovation survey conducted in the European Union (EU), which also indicated an overall innovation rate of 44 percent. The EU survey looked at similar indicators of innovation activity and success during the 1998–2000 reference period. There are some differences in groupings compared with the New Zealand survey, due to the different size of businesses in the EU and a different spread across industries.

(The EU survey is available from: www.europa.eu.int/comm/eurostat/)

More detailed analyses of the rate of innovation in New Zealand and comparisons with the EU findings are given in Chapter 5.

2.2 Types of innovative activity

Businesses can engage in a number of activities that give rise to innovation, through development or improvement of products, processes or services. These activities can occur within a business, or be acquired from other businesses.

The survey results indicate New Zealand businesses spent $1.8 billion on innovation activities in their last financial year. This represents 1.5 percent of total operating expenditure and expenditure on fixed assets over the same period.

The most prevalent type of innovation activity was research and development (R&D) undertaken within the business. Seventy-six percent of all businesses who undertook some sort of innovation activity indicated they carried out internal R&D.

Other forms of internal innovation activities used by a majority of businesses included staff training (60 percent), acquisition of enabling equipment (59 percent), marketing (54 percent), and other supporting activities (58 percent).

Less common was the acquisition of R&D or other types of enabling knowledge from organisations outside the business. Only 23 percent of businesses indicated that they had acquired R&D externally.

More detailed analyses of the types of innovation activity are given in Chapter 7.

2.3 Outcomes of innovation

The actual outcomes of innovation activities may or may not be the same as the intended results when the innovations were begun. This survey focused on the achieved outcomes of innovations which had been implemented, as opposed to those in progress or abandoned.

Eighty percent of businesses which had implemented innovations in the last three years reported an increased range of goods and services as a result.

The majority of businesses also reported increased profitability (79 percent), improved efficiency (75 percent), and new or expanded markets within New Zealand (64 percent).

Less than one third of businesses reported outcomes resulting in new overseas markets (30 percent), reduced environmental impact (21 percent), or reduced energy consumption (18 percent).

More detailed analyses of the outcomes of innovation reported by businesses in New Zealand are given in Chapter 9.

2.4 Barriers to innovation

Fifty-six percent of all businesses surveyed rated a lack of management resources as the biggest impediment to innovation, hampering it to a high (18 percent), medium (22 percent) or low (16 percent) degree.

Other factors rated by a majority of businesses as hampering innovation were the costs to develop new products, processes or services (53 percent), and lack of appropriate personnel (51 percent).

The availability or cost of intellectual property rated as the lowest impediment to innovation, with only 23 percent of businesses identifying this as hampering innovation activity.

More detailed analyses of the barriers to innovation in New Zealand are given in Chapter 10.

Part 3

Introduction

The Innovation Survey 2003 was sponsored by the Ministry of Research, Science and Technology (MoRST). It is the first survey of its type to be conducted in New Zealand and was developed by Statistics New Zealand in collaboration with MoRST.

The Innovation Survey is designed to develop an understanding of the contribution of technological innovation to the New Zealand economy, by producing current and meaningful statistics on the level and characteristics of innovative activity in New Zealand businesses.

This report is the second release of Innovation Survey 2003 data by Statistics New Zealand. It follows on from and expands upon the initial release of high-level results made by Statistics New Zealand on 16 April 2004 (available from http://www.stats.govt.nz).

3.1 Content of this report

Innovation is often seen as a significant factor in boosting economic growth by contributing to increases in productivity, market share, added value and employment. Innovation is increasingly being seen as a differentiating factor in an increasingly competitive global marketplace.

This report presents information on business innovation and its role in the operation of New Zealand businesses. It aims to examine the amount and type of innovation activity being carried out, what helps or hinders it and what the results are for businesses who innovate.

The report initially compares results and methodologies with the innovation section of the Business Practices Survey (BPS) conducted in 2001. This is the only previous survey carried out by Statistics New Zealand which has investigated innovation activity.

The report then presents a detailed analysis of results from the Innovation Survey 2003.

The rate of innovation across different size businesses and different industry groups is examined, as is the number of innovative products and services introduced and the resulting impact on sales. Consideration is given to different types of innovators to gain further insight into the nature of innovative activity.

Sources of ideas and information used by businesses for the development of innovations are investigated as well as the degree of collaboration and cooperation between businesses and institutions and government to develop innovations.

The amount and type of investment in innovative activities is analysed, looking at investment in research and development (R&D) and overall innovation expenditure. Both dollar amounts and intensities are examined, as is the ratio between R&D and innovation expenditure. The sources of funds used for innovation investment is also investigated.

Innovation has been cited as a key factor in stimulating and sustaining economic growth so particular attention is given in this report to test this assertion by examining the outcomes of innovation activity and what their effects are on various aspects of business performance. The effect of innovation activity on exports and profitability is investigated in some detail by comparing the relationship between various business characteristics and profitability for both innovating and non-innovating businesses.

An analysis of the factors hampering innovative activity is presented to determine what barriers to innovation businesses experience and the degree of impact they have.

Part 4

Comparison with the Business Practices Survey (BPS) 2000

4.1 Introduction

Results from the innovation section of the BPS 2000 reported an overall innovation rate of 68 percent. The Innovation Survey 2003 reported an overall innovation rate of 44 percent.

These two rates of innovation are not comparable. It is expected that reporting of innovation has been affected by different perceptions of what counts as innovation for an organisation, and because each questionnaire collected slightly different information about innovation activity.

Therefore, while the reported innovation rate has decreased, it does not necessarily reflect a real drop in innovation activity.

4.2 What was the difference?

The BPS and the Innovation Survey both had similar sample sizes of approximately 3,200 enterprises each. However, there were some differences in population between the surveys. In order to determine why there was a difference, those businesses who responded to both surveys were examined in more detail. There were 1,017 businesses that returned questionnaires for both surveys and table 4.01 shows their rates of innovation reporting.

Table 4.01

Comparison of Innovation Reporting

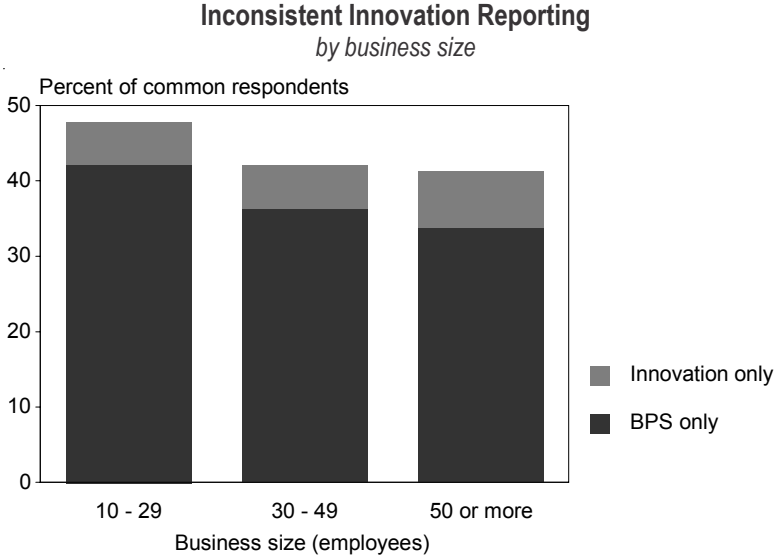
Reported Innovation Activity in:	Percent
BPS only	37
Innovation Survey only	7
Both	44
Neither	12
Total	**100**

An analysis of these overlapping organisations has been carried out showing that there is a systematic bias in the results. Table 4.01 shows that 56 percent of respondents consistently reported innovation across both surveys. Of the remaining 44 percent, respondents were far more likely to indicate that they undertook innovation in the BPS than in the Innovation Survey. This analysis focuses on the 44 percent which reported inconsistently.

4.2.1 Business size

The apparent bias is observed across three business sizes (bands of number of employees). Regardless of business size, more respondents reported innovation in the BPS only compared with the Innovation Survey only.

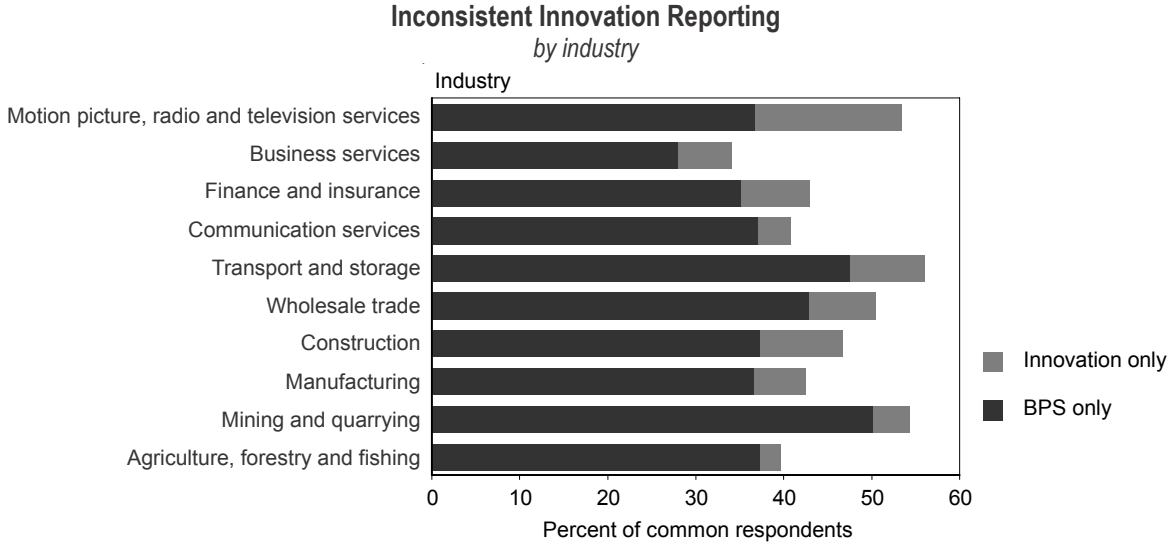
Figure 4.01



4.2.2 Industry

The same apparent bias is also observed across industry groupings, with every grouping displaying the same pattern. It can be seen that respondents who answered both surveys were much more likely to report innovation in the BPS than in the Innovation Survey.

Figure 4.02



The apparent systematic bias, regardless of business size or industry, points to differences such as the questionnaire design that encouraged a different rate of reporting in the two surveys. The remainder of this section will consider where the systematic bias might lie, and what impact it may have had on innovation reporting in both surveys.

4.3 What could have led to the observed differences?

Research was undertaken to investigate the possible reasons for the difference in reported innovation rates. This involved analysing the differences between the design of the two questionnaires, and using overseas studies to interpret the effect this may have had on reporting. Also, a selection of respondents who returned questionnaires for both surveys were contacted (referred to as 'interviewees'), to discuss their perceptions of innovation, and whether differences in wording or question layout might have had an effect on whether or not they reported innovation activity.

The following factors will be discussed in more detail:

- variation in perceptions of the term 'innovation'
- slight changes in the wording of the definitions
- instructions for skipping questions
- order of questions.

This research excludes sampling methodology, and other sources of non-sampling error.

4.3.1 Variation in perception of the term 'innovation'

There is scope for subjectivity (differences in personal opinion) both in what is meant by innovation, and the questions used to determine whether a business is an innovator.

With respect to the questions, both questionnaires used the phrase "significantly improved", which leaves the response open to the respondent's judgement. These phrases have a factual component along with an evaluation, as a product may unarguably be improved, but is the improvement significant?

Innovation

From the interviews conducted, it is clear that there is variation in perceptions of the term 'innovation'. Some interviewees described changes made to their products, services or processes that they felt were 'innovation' for their organisation, while other interviewees felt that this type of change was not innovation but 'normal ongoing development' or 'business continuity'. For example, some respondents with a broad perception of innovation had upgraded their operating system from Microsoft Windows '98 to Microsoft Windows XP. They had counted this as innovation because it had a positive impact on their organisation in terms of quality, cost, profit and so forth. Others with a narrower view of what is included felt that innovation should not just have a positive impact on their customers or business processes, but also be 'a bit new or clever'.

Measures taken

In order to address this difference in perception, the Innovation Survey questionnaire used a slightly different definition, but also included supporting information in the form of textual explanations of the terms used and two lists of examples. The intention was to obtain more uniform responses, and feedback showed that some interviewees did find this information helpful in clarifying what should be included. However, it is unknown what effect the explanations and examples had on the reporting of innovation, that is, whether respondents were more or less likely to report innovation if they read these.

In the BPS, there were no examples listed, which could result in greater variability of what is counted as innovation. The scope for variation in responses may result in socially desirable responses (see section 4.3.4).

Survey title

Given the subjective nature of innovation, respondents' decision-making about whether to complete the Innovation Survey questionnaire may have started with the questionnaire title on the front page. If a respondent decides the topic is not relevant, they may scan the questionnaire looking for a white answer box where they can indicate the questionnaire doesn't apply. This would not have occurred in the BPS, as the innovation section was half-way through the questionnaire, and respondents would be unlikely to query whether it was applicable to their organisation.

4.3.2 Slight changes in the wording of the definitions

The definition of innovation differed slightly in both the words and the layout used between the two questionnaires, and this may have affected what respondents reported, that is, what came to mind as being relevant.

Software

Notably, the BPS definition included software as a type of innovation, whereas the Innovation Survey mentions software in an example. Therefore, innovation as a result of new software only may be under-reported in the Innovation Survey. Many of the interviewees had implemented some new software in the last few years, and as discussed previously, this was reported inconsistently.

Product vs process innovation

The BPS asked respondents to overtly identify product innovation and process innovation by way of yes/no questions. The Innovation Survey asked for similar information in a slightly different way, because feedback from potential respondents showed they had difficulty in distinguishing between the two (particularly with respect to service industries). First, it asked a combined yes/no question about products, processes and services: these are the innovators. Those who identified that they had introduced zero new product or services were then asked what processes they had introduced: these are the process-only innovators.

Those who indicated that they had introduced one or more products or services were also asked what processes they had introduced: these are the product innovators who may also identify process innovation.

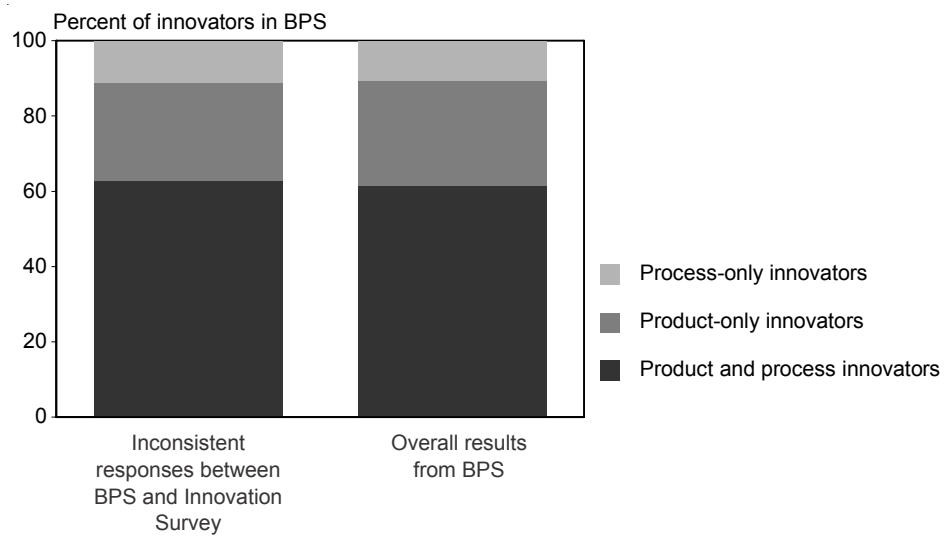
The process-only innovators were asked to describe the most significant process innovation, and this question design means it is not easy to quantify how many process innovators there were, and presupposes that those who left this question blank are not.

This alteration does not appear to have had an effect on responses as those who reported innovation in the BPS, but not the Innovation Survey, showed a similar distribution to the overall responses to the BPS. That is, those who gave an inconsistent response did not do so based on whether their innovation was a process, a product, or a combination of both. The results are shown in figure 4.03. The same trend was evident at an industry level.

Figure 4.03

Business Practices Survey – Distribution of Responses

by types of innovators



General feedback

A handful of interviewees felt that the definition used in the Innovation Survey was clearer, but after some consideration, they also felt that the essence of both definitions was similar and that they would report innovation in a similar way.

4.3.3 Instructions for skipping questions

The Innovation Survey focussed on innovation only, and respondents needed to follow the instructions at the beginning of the questionnaire to determine whether or not they needed to complete it. Innovation included three components; innovation that was implemented, abandoned or not yet completed, and respondents falling into one or more of these categories were to complete the questionnaire. Some respondents may have chosen not to report implemented, abandoned or incomplete innovation activity to avoid filling out the form – known as 'non-compliance incentive'.

This may especially be the case if the definition, textual explanations and examples at the beginning of the Innovation Survey were unclear, or looked too burdensome or complicated to read, putting respondents off the questionnaire. A statement was added below the definition to encourage everyone to respond.

The Innovation Survey asked for respondents to report incomplete and abandoned activities as well as those that were implemented, therefore this survey had a wider scope than the BPS (which just asked about those that were offered or introduced).

In contrast, respondents to the BPS were required to complete the entire questionnaire; it did not rely on them making up their own mind whether the topic was applicable to their organisation.

Wider scope

The Innovation Survey asked for respondents to report incomplete and abandoned activities as well as those that were implemented, therefore this survey had a wider scope than the BPS, which just asked about those which were introduced.

4.3.4 Order of questions

There are two possible effects arising from innovation being section nine of the BPS, but the focus of the Innovation Survey.

Social desirability

The subjective nature of innovation may give respondents scope to report in a socially desirable way. The BPS covers a range of practices that may be socially desirable to provide a positive response to, as a sign of a successful business. In other words, a respondent may be more likely to exaggerate facts slightly, or choose 'yes' rather than 'no' if they think they might, or should have done some innovation. The BPS appears to have a higher social desirability bias for the reporting of innovation, as well as other business practices. These practices are clearly visible as header bars to each section, and include titles such as 'Leadership and Planning' and 'Community and Social Responsibility'.

The Innovation Survey asks respondents who have identified innovation to a product, service or process to give a short description of the most significant innovation. Respondents therefore need to 'justify' the innovation they reported, and this may reduce the tendency to respond in a socially desirable way.

Priming

Respondents to the BPS may be affected by preceding questions 'priming' them to think carefully about their organisation and changes which may count as innovation. For example, respondents are prompted to think about systems and processes under previous sections, such as 'Customer Focus', 'Supplier Focus', and 'Quality and Process'. Also, respondents had already answered questions relating to innovation with respect to 'Strategy' and 'Information and Benchmarking'. Therefore, in the innovation section, respondents may be more likely to think of, and include such changes as innovation.

The Innovation Survey may be subject to some social desirability bias leading to over-reporting of innovation, but to a much lesser extent than the BPS, as there weren't preceding questions thought to have a high social desirability bias.

4.4 Conclusion

The BPS 2000 and the Innovation Survey 2003 had differing rates of innovation reported, which does not necessarily reflect a real drop in innovation activity. The innovation rates were not designed to be comparable, given the extent of changes made to the question wording, and the different questionnaires used. There were 1,017 organisations that returned questionnaires for both surveys (from samples of approximately 3,200), and their responses to the two surveys were considered in more detail to help explain what led to the differences.

The following table summarises which factors are thought to have had an effect on the rate of innovation reporting in the BPS and the Innovation Survey. The possible effect on the rate of reporting is indicated. It is not always possible to tell whether the effect was a positive or a negative one, and it is not possible to quantify which factors had the most effect on what respondents reported. It is expected that most factors are likely to have contributed to the observed differences in innovation rates.

Table 4.02

Factors Which May Explain Differences in Reported Innovation Rates

Possible Contributor:	Effect on Innovation Rate		
	Business Practices Survey	Innovation Survey	Difference Between Surveys
Explanations and examples as supporting information	N/A	Unknown	Unknown
Innovation Survey title appears not relevant to respondent	N/A	↓	↑
Software not mentioned in Innovation Survey definition	None	↓	↑
Combining product and process innovation	None	None	No change
Instructions to skip questions in the Innovation Survey	N/A	↓	↑
Implemented, incomplete and abandoned innovation	N/A	↑	↓
Provide socially desirable responses	↑	No	↑
'Primed' by previous business practices questions	↑	N/A	↑
Overall Difference Between Surveys	**68%**	**44%**	**24%**

Therefore, the different frameworks in which innovation was collected within each survey discourage direct comparison of the data without qualification.

Part 5

The rate of innovation

A full set of tables is available in the Statistical Tables section. Please view Tables 1 to 3 in conjunction with this section.

5.1 Total rate of innovation

The rate of innovation is broadly defined as the proportion of businesses that have had some innovative activity in the three years before the survey was conducted. This can be further split up into two distinct categories: implemented innovations, where a business successfully implemented an innovative product, process or service; and, ongoing and abandoned innovations, where the innovative activity was still in progress, or had been abandoned over the same time period.

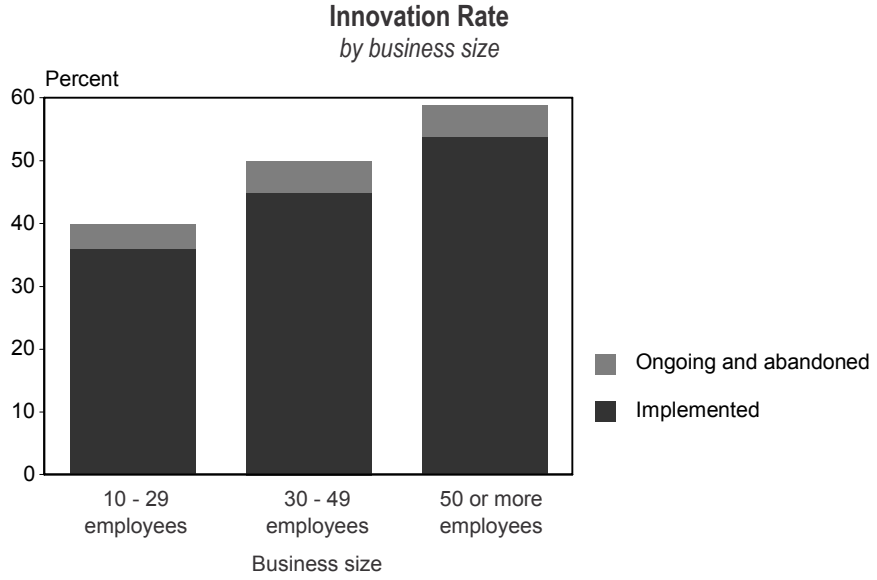
The rate of innovation can determine the competitiveness of a business or an industry. Innovation tends to drive two components of growth. Firstly, to satisfy a customer base with different, more pleasing products or services and secondly to increase levels of productivity which has flow-on repercussions for profitability. Later in this report, several indicators will be examined in reference to each other to test for leading influences on profitability due to innovative behaviours.

5.1.1 Innovation rate, by business size

From the results of the Innovation Survey 2003, the size of the business appears to have an influence on the choice to innovate. Nearly 60 percent of large businesses (those with over 50 employees) had some sort of innovative activity over the previous three years. Of those businesses, 54 percent had implemented their innovations.

The rate of ongoing and abandoned innovations is low across all business sizes (approximately 5 percent). This is shown in figure 5.01. There are a range of influences which could drive a business to innovate due to its size. Some influences potentially could be from foreign ownership, market pressures to grow and access to resources or technologies.

Figure 5.01



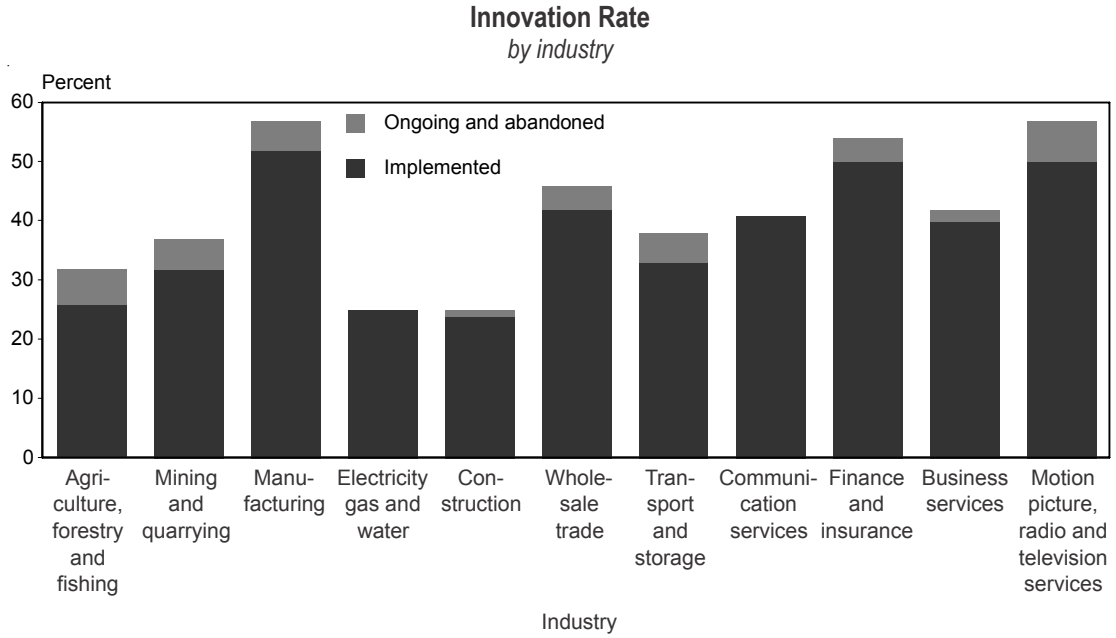
Note: If a business has implemented an innovation it is included under the 'implemented' category, even if it also has ongoing and abandoned innovations.

5.1.2 Innovation rate by industry

Of the eleven industries of interest: motion picture, manufacturing and finance showed the highest levels of innovation (61 percent, 56 percent and 54 percent, respectively). As reflected in the business size statistics (figure 5.01), most of the innovation activity within industries was actually implemented during the reference period.

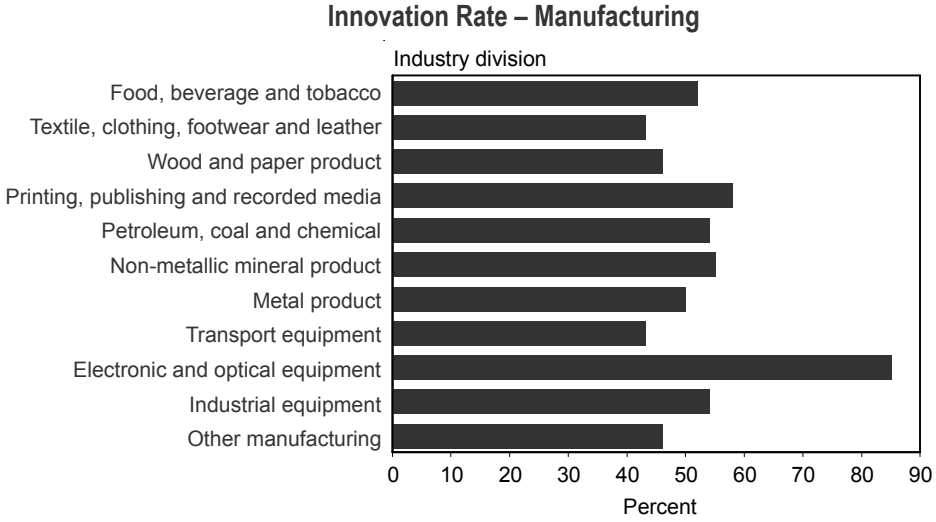
Whilst these figures illustrate the innovation rates in each industry, the overall impact on the country is determined from a combination of the innovation rates and the sizes of the industries. For instance, figure 5.02 shows that motion picture, radio and television services group shows a higher rate of innovation than manufacturing, but as shown in table 1.01, there are only 84 businesses in this industry compared to manufacturing with 3,500 businesses and a rate of 55 percent.

Figure 5.02



Examining manufacturing in more detail, higher rates of innovation are apparent in electronic and optical equipment manufacturing (89 percent) and non-metallic mineral product manufacturing (69 percent). In fact, the highest rate of innovation in the New Zealand economy occurred in electronic and optical equipment manufacturing. (See figure 5.03.)

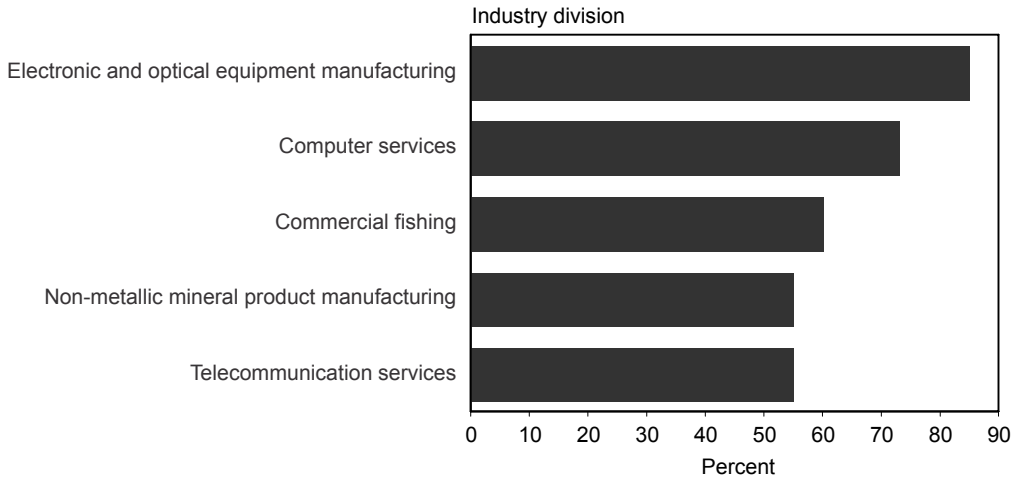
Figure 5.03



The top five industries for rates of innovation are displayed in figure 5.04. Not surprisingly computer services are amongst the top five. Interestingly, so are commercial fishing (70 percent) and non-metallic mineral product manufacturing (69 percent). Caution should be taken when interpreting the commercial fishing industry due to the low sample size.

Figure 5.04

Innovation Rate – Top Five Industries



5.1.3 International comparisons

New Zealand is approximately on par with European Union (EU) as a whole on an overall innovation rate of 44 percent.

Examining the individual countries in the EU shows some variation. New Zealand's rate of innovation is lower than the majority of EU countries in the industry sector, but higher in the services sector. New Zealand's position relative to the countries in the EU and the EU as a whole is shown in table 5.01 below.

Table 5.01

Comparison – Rates of Innovative Activity
by country

Industry				Services				Overall			
Country	Implemented	Ongoing and Abandoned	Total	Country	Implemented	Ongoing and Abandoned	Total	Country	Implemented	Ongoing and Abandoned	Total
Ireland	49	26	75	Germany	49	8	57	Ireland	45	20	65
Germany	60	6	66	Iceland	53	3	56	Germany	54	7	61
Belgium	59	0	59	Ireland	39	13	52	Iceland	51	4	55
Netherlands	51	3	55	Portugal	49	1	50	Belgium	50	0	50
Iceland	50	4	54	Luxembourg	44	4	48	Austria	43	6	49
Austria	44	9	53	Sweden	40	7	46	Luxembourg	45	4	48
Denmark	48	4	52	Austria	42	3	45	Sweden	40	7	47
Luxembourg	47	2	49	**New Zealand**	**39**	**3**	**42**	Portugal	44	2	46
Finland	43	6	49	Belgium	42	0	42	Netherlands	42	3	45
Sweden	40	8	47	**EU**	**36**	**4**	**40**	Finland	40	4	45
EU	**44**	**3**	**47**	Finland	37	3	40	Denmark	42	3	44
France	40	5	46	Netherlands	36	3	38	**EU**	**41**	**3**	**44**
Portugal	42	2	45	Denmark	34	2	36	**New Zealand**	**40**	**4**	**44**
New Zealand	**40**	**4**	**44**	France	29	5	34	France	36	5	41
Italy	38	2	40	Norway	30	4	34	Norway	33	5	37
Norway	35	4	39	Greece	32	1	33	Italy	35	2	36
United Kingdom	39	0	39	United Kingdom	26	6	33	United Kingdom	29	7	36
Spain	37	1	37	Italy	24	1	25	Spain	32	1	33
Greece	26	1	27	Spain	23	1	25	Greece	27	1	28

Source: *Innovation in Europe: Results for the EU, Iceland and Norway* Eurostat, 2004

5.2 Number of innovative products and services introduced to the market

The Innovation Survey 2003 asked businesses to record the number of new or significantly improved products and/or services they introduced over the previous three years, and indicate the proportion of their total sales from those products or services in the last financial year. Both results are examined here.

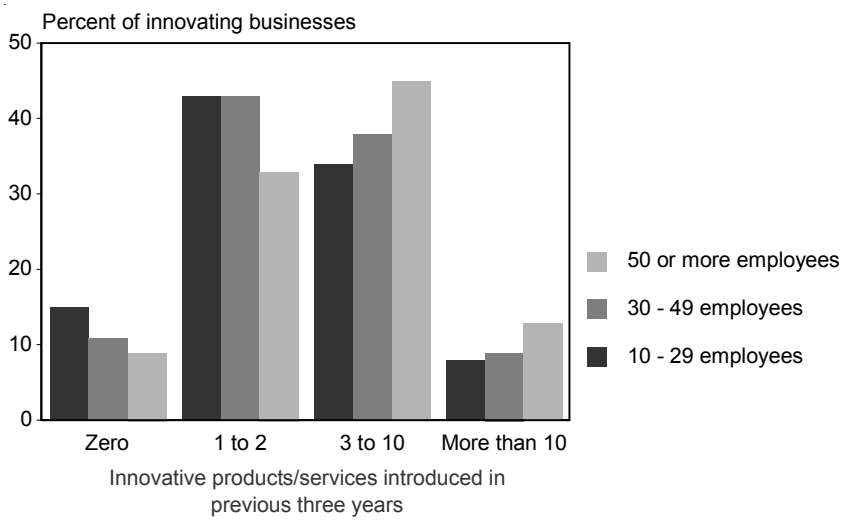
5.2.1 Business size

The size of an innovating business can often determine the number of new or improved products and services they introduce to the market. Nearly 45 percent of innovating businesses with 50 or more employees introduced between 3 and 10 new or improved products and/or services to the market. However, 43 percent of smaller businesses introduced 1 to 2 new or improved products and/or services.

Figure 5.05

Number of Innovative Products or Services

by business size



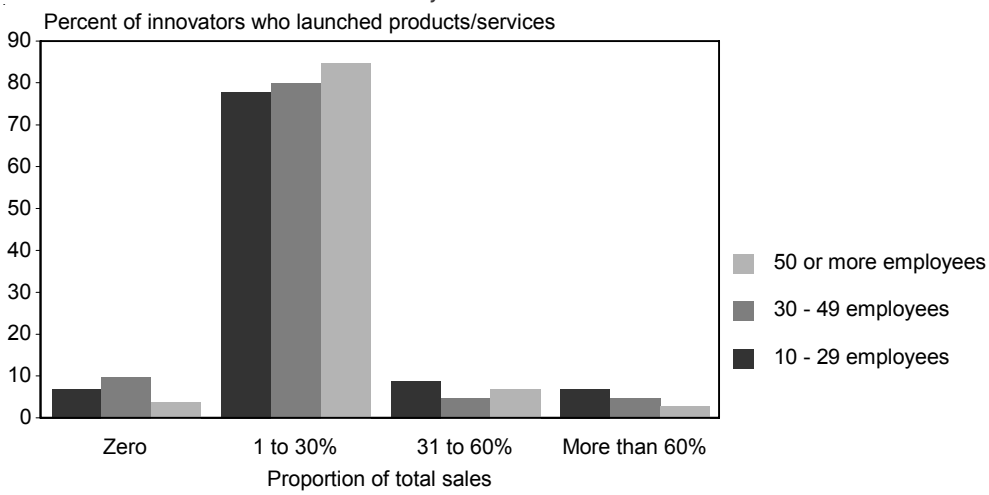
Note: Business with zero innovative products or services had ongoing or abandoned innovations, or are process-only innovators

The majority of innovative businesses reported between 1 and 30 percent of their total sales were from innovations. Businesses with 50 or more employees reported the highest rate (85 percent) in this category. In general, only small proportions of innovative businesses (less than 10 percent) reported more than 30 percent of their total sales were from innovations.

Figure 5.06

Proportion of Total Sales from Innovative Products or Services

by business size



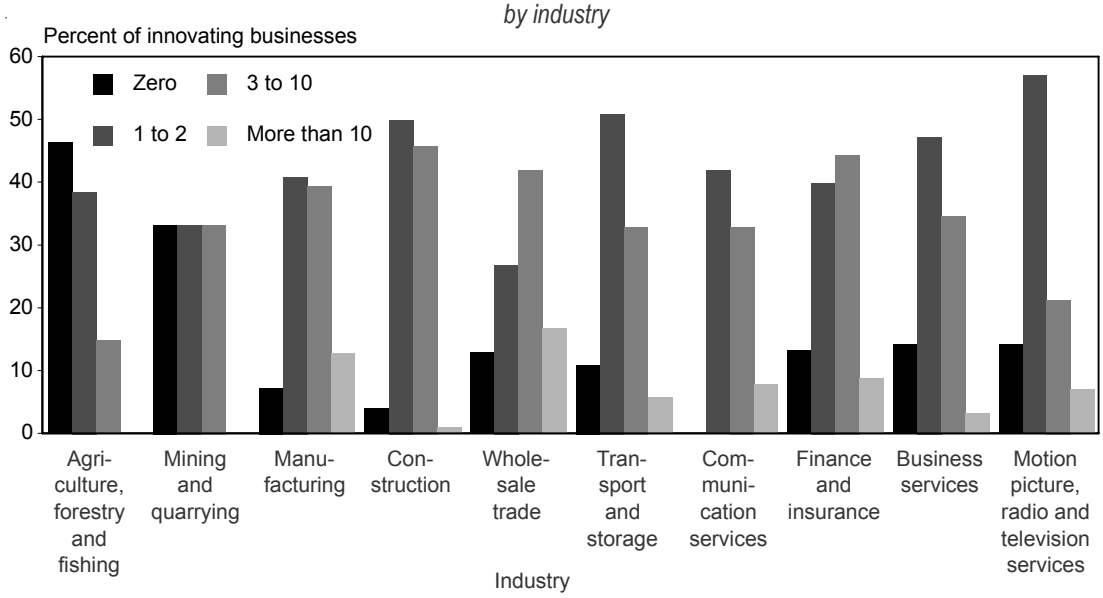
5.2.2 Industry

The wholesale trade industry was most likely to introduce larger numbers of innovations (17 percent reporting more than ten innovative products or services). Over 45 percent of innovative businesses in the construction industry group reported between 3 and 10 innovations. Results across industry groups are displayed in figure 5.07. In primary industry groups, such as agriculture and mining, there were larger proportions of innovative businesses who had not introduced new products and services, indicating that more of their innovations were process innovations.

Figure 5.07

Number of Innovative Products or Services

by industry



The proportion of total sales from the innovative products or services introduced across industry groups followed the same pattern as that across different size businesses at between 1 and 30 percent in most cases.

5.3 Types of innovators

Section 5.1 looked at the rate of innovation in New Zealand businesses. The 44 percent of businesses who were innovators can be further broken down into different types of innovators in order to gain more insight into the nature of innovating businesses.

There are four main groups of innovators that are considered in this report, these are:

- Leaders
- Adopters
- Ongoing and abandoned
- Non-innovators.

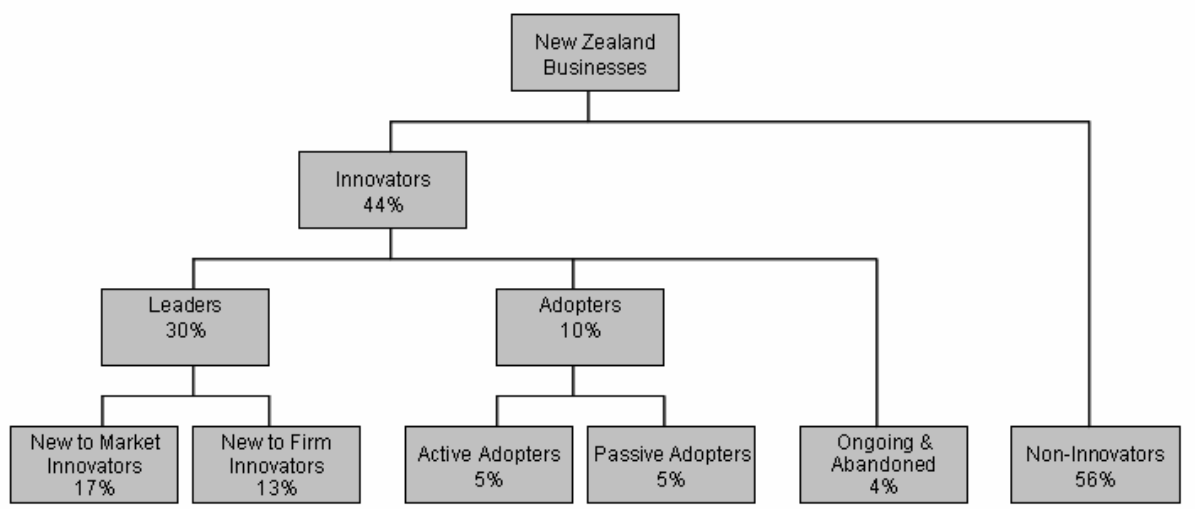
These have been identified from answers to survey questions using a grouping similar to that used by Tether.[1]

1 **Identifying Innovation, Innovators and Innovative Behaviours: A Critical Assessment of the Community Innovation Survey (CIS)**, Centre for Research on Innovation & Competition, **Discussion Paper 48**, December 2001, Dr Bruce Tether.

Figure 5.08 illustrates how businesses can be classified into these groups.

Figure 5.08

Types of Innovators



Leaders are defined as those innovative businesses that have introduced at least one innovative product, process or service to the market in the last three years that was developed mainly by the business or in partnership with others. They can be divided into two classifications, 'New to market' innovators and 'New to firm' innovators.

New to market innovators will present these innovations to the market first.

New to firm innovators are similar but their innovation is only new to the firm and not first on the market.

Adopters are defined as those businesses that adapt innovations from other businesses to their own business. They can be divided into two classifications, 'active' adopters and 'passive' adopters.

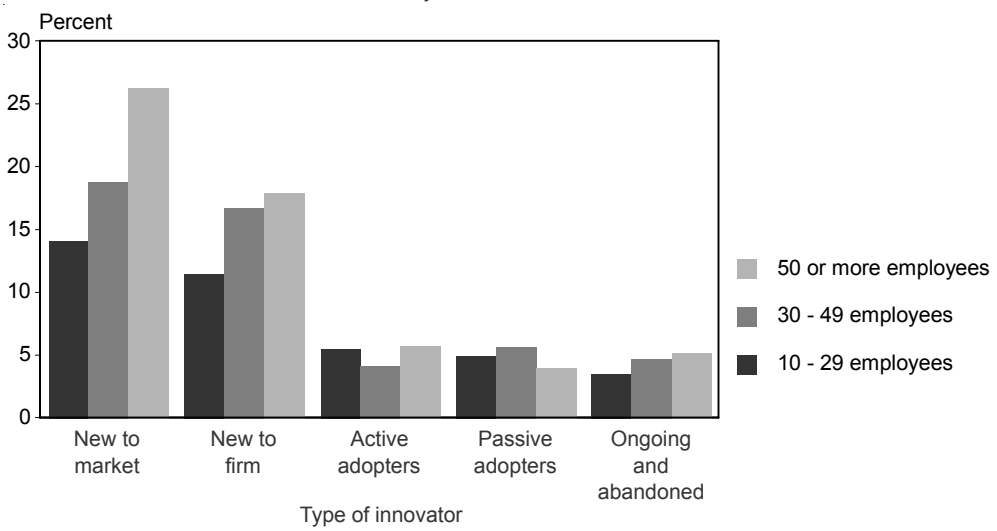
Active adopters will obtain other's innovations and significantly improve them through their own processes. Passive adopters incorporate other's innovations into their business directly without improvement.

Ongoing and abandoned innovators have performed some sort of innovative activity and had either: abandoned the innovation; or else the innovative activities were still in progress.

Larger businesses have higher proportions of leaders, particularly new to market innovators. Over 40 percent of businesses with 50 or more employees could be classified as leaders.

Figure 5.09

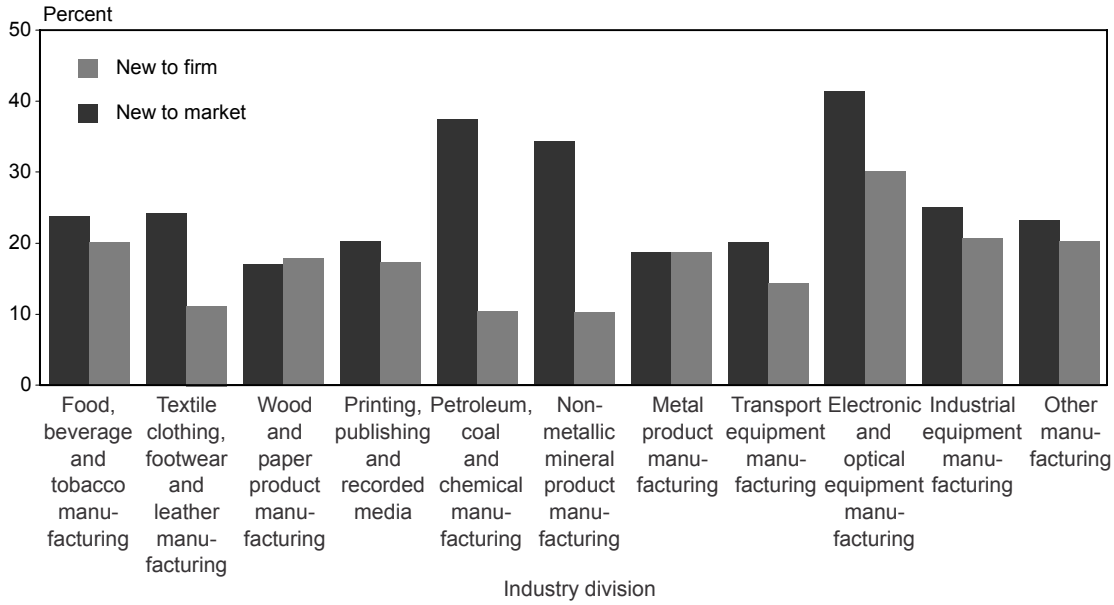
Types of Innovators
by business size



The manufacturing industry had the highest proportion (24 percent) of new to market innovators. Finance and insurance reported the highest (23 percent) proportion of new to firm innovators over the past three years. Further breaking down the manufacturing industry group (figure 5.10), the highest proportions of new to market innovators were found in the electronic and optical manufacturing and petroleum, coal and chemical manufacturing industries.

Figure 5.10

Leaders of Innovation – Manufacturing



Part 6

Sources of ideas and information

A full set of tables is available in the Statistical Tables section. Please view Tables 4 to 7 in conjunction with this section.

Ideas and information on new and improved products, processes and services can come from a range of sources. The Innovation Survey 2003 identified the following:

- Customers (intermediate or final customers)
- Suppliers
- From within the business (e.g. employees)
- Other New Zealand businesses in the same industry
- Other New Zealand businesses in other industries
- Other businesses overseas
- Industry or employer organisations
- Books, trade journals, conferences or shows
- Banks, accountants, or financial consultants
- Central/local government assistance services
- Universities
- Other research institutions, associations, research consultants or research services.

The survey asked innovating businesses to rate the importance to its business of each category over the last three years. Each was rated as either being 'very important', 'somewhat important', 'not important' or 'not used' in terms of the information it provided to create new or improved products, processes or services.

6.1 Sources of information for innovating businesses

Table 6.01 presents at the total level, the way innovating businesses in the Innovation Survey 2003 rated each source of information, from 'very important' to 'not used'.

Table 6.01

Sources of information – all businesses

	Very Important	Somewhat Important	Not Important	Not Used
	Percent of Businesses			
Within same business	64.8	26.2	4.5	4.4
Customers	64.2	24.1	4.3	7.4
Suppliers	35.4	36.4	17.8	10.5
Other New Zealand businesses in same industry	19.3	33.9	25.1	21.7
Books, trade journals, conferences or shows	19.0	41.1	22.7	17.2
Business overseas	18.8	32.5	23.7	25.0
Banks, accountants or financial institutions	14.5	26.1	35.3	24.1
Industry or employer organisations	8.4	24.4	34.9	32.4
Other research institutions	7.5	20.7	31.8	40.2
Other New Zealand businesses in other industries	7.0	31.7	34.3	27.1
Central/local government	2.5	12.3	38.8	46.7
Universities	1.7	11.9	38.1	48.4

The information source with the highest proportion of firms rating it 'very important' was information sourced from within the business (65 percent of all businesses). Customers were a close second at 64 percent. A further 26 percent of businesses rated information sourced from within the business as 'somewhat' important and 24 percent rated customer sources as 'somewhat' important. Suppliers were rated the third most important source of ideas or information with 72 percent of all businesses rating the source either 'very' or 'somewhat' important (35 percent 'very' and 36 percent 'somewhat'). Books, information obtained from within the same industry and businesses overseas were other highly rated sources of information.

Nearly half of all firms in the Innovation Survey 2003 hadn't used universities or government as a source of information or ideas over the last three years. A further 39 percent of firms found government assistance 'not important' as a source, with 38 percent saying the same of universities.

6.2 Sources of information, by type of innovator

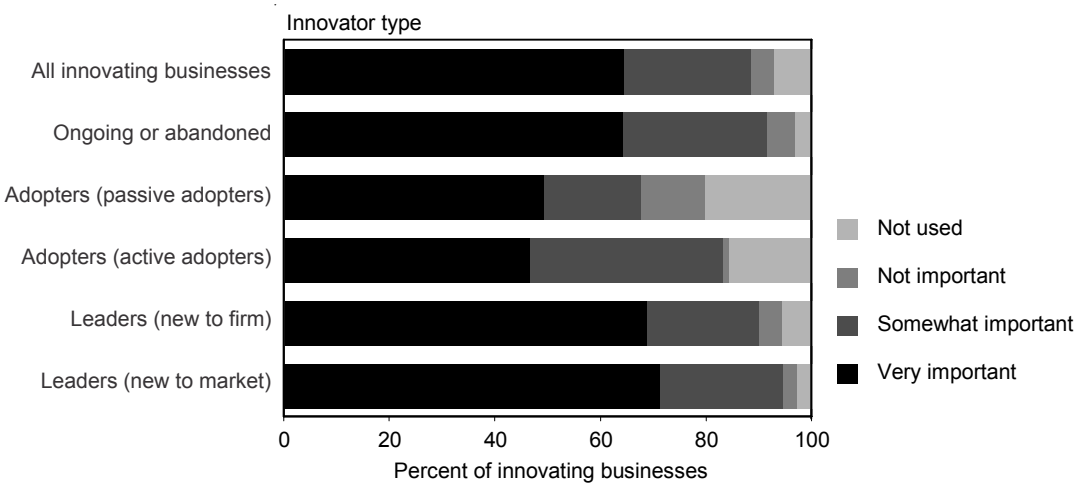
The way businesses rated each item as a source of ideas or information for new and improved products, processes or services, varied by type of innovator.

Customer sources were rated 'very important' by 64 percent of all business. The importance of the customer varied by type of innovator, with leaders being more likely to rate customers a 'very important' source than adopters. Of leaders, 71 percent of new to market innovators rated customers a 'very important' source as did 69 percent of new to firm innovators. This compares with 49 percent of passive adopters and 46 percent of active adopters (see figure 6.01).

Twenty percent of passive adopters and 16 percent of active adopters had not used customers as a source of information in the last three years. This compares with 7 percent for all businesses, 3 percent for new to market innovators and 6 percent for new to firm innovators.

Figure 6.01

Importance of Customers as a Source of Information for Innovation

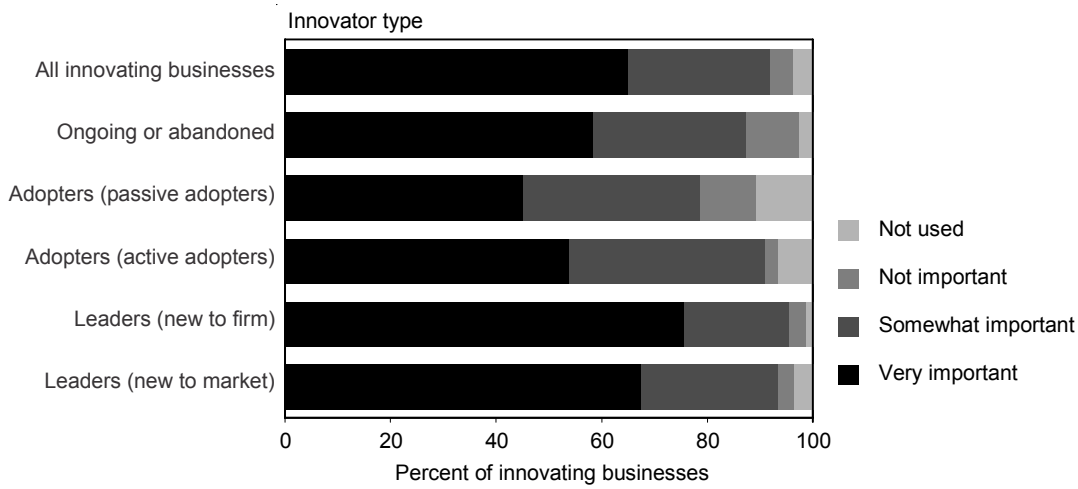


Information from within the business was rated a 'very important' source of ideas or information by higher proportions of leading firms than it was by adopting firms (see figure 6.02). Three-quarters (75 percent) of new to firm innovators and 67 percent of new to market innovators rated information from within the business as 'very important'. This compares with 54 percent of active adopters and 45 percent of passive adopters.

Figure 6.02

Importance of Within the Business as a Source of Information for Innovation

by type of innovator



The picture is a little different for suppliers which overall were the third most highly rated source of ideas or information. Adopters were more likely to rate suppliers a 'very important' source of ideas or information than leaders. Half of all passive adopters rated suppliers a 'very important' source of information as did 2 in 5 active adopters. In comparison, 3 in 10 leading firms rated suppliers a 'very important' source of information.

New to market innovators were less likely to use information sourced from within the same industry in New Zealand and more likely to use information sourced from overseas businesses than the other innovating types. Seventy-five percent of new to market innovators used information from within the same industry in New Zealand compared with 78 percent of all businesses. Eighty-one percent of new to market innovators used information from overseas compared with 75 percent of all businesses.

6.3 Sources of information, by business size

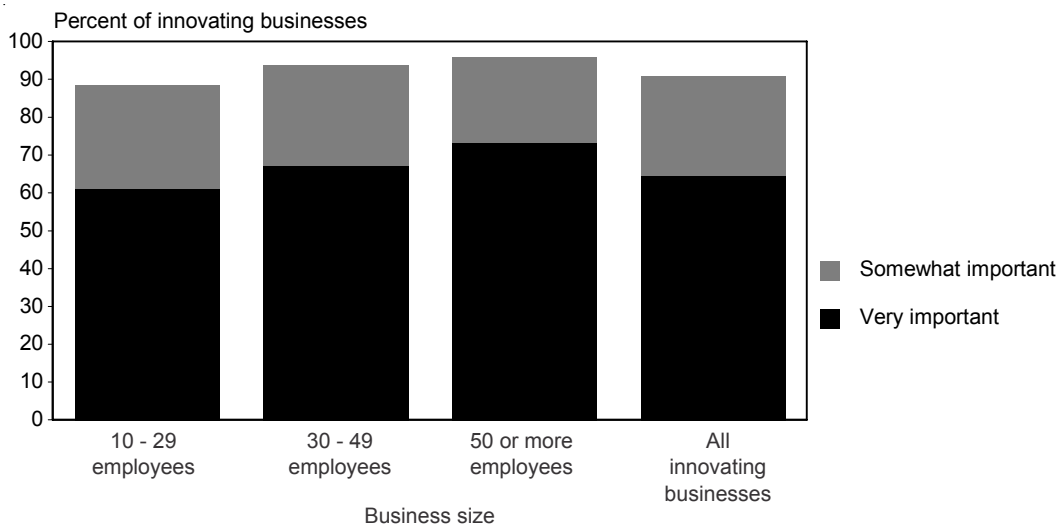
The way businesses rated the different sources of information varied by business size (see figure 6.03). For the purpose of this survey, businesses with 10 to 29 employees are referred to as small businesses, those with 30 to 49 employees as medium sized businesses and those with 50 or more employees as large businesses.

Customers and information sourced from within the business both rated highly as 'very important' sources of ideas or information for new or improved products, processes or services. The proportion of businesses rating customers a 'very important' source was higher for large businesses (70 percent) than for small or medium sized businesses (63 and 62 percent respectively). The importance of information sourced from within the business rose with the size of the firm with, 61 percent of small, 67 percent of medium and 74 percent of large businesses rating this source as 'very important'.

Figure 6.03

Businesses Rating Within the Business as an Important Source of Information for Innovation

by business size

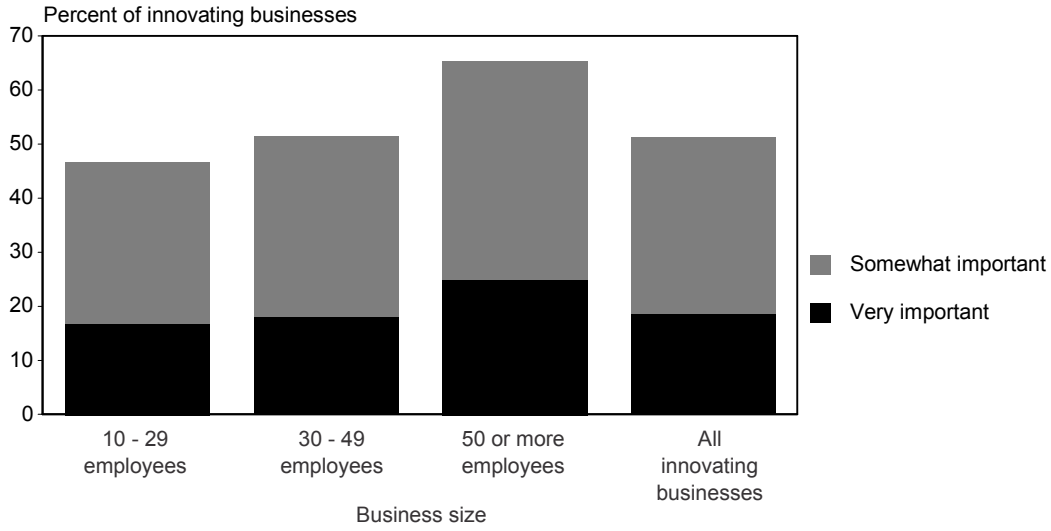


Over half (51 percent) of all business rated information sourced from businesses overseas as 'very' or 'somewhat' important (19 percent 'very' and 32 percent 'somewhat' – see figure 6.04). The proportions rating businesses overseas as very or somewhat important sources of ideas or information also increased with the size of the business (from 47 percent of small businesses to 66 percent of large businesses).

Figure 6.04

Businesses Rating Other Businesses Overseas as an Important Source of Information for Innovation

by business size

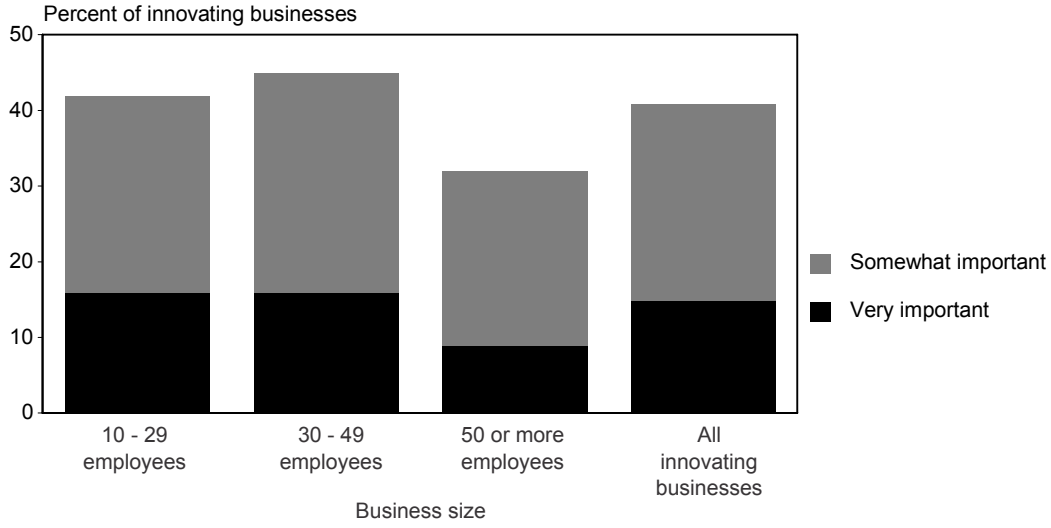


Information sourced from banks was rated more highly as a source of ideas or information by small and medium business than by large businesses. Forty-five percent of medium businesses and 42 percent of small businesses rated information sourced from banks as 'very' or 'somewhat' important. These compare to 33 percent of large businesses. Information from banks includes ideas or information obtained from banks, accountants, or financial consultants.

Figure 6.05

Businesses Rating Banks as an Important Source of Information for Innovation

by business size



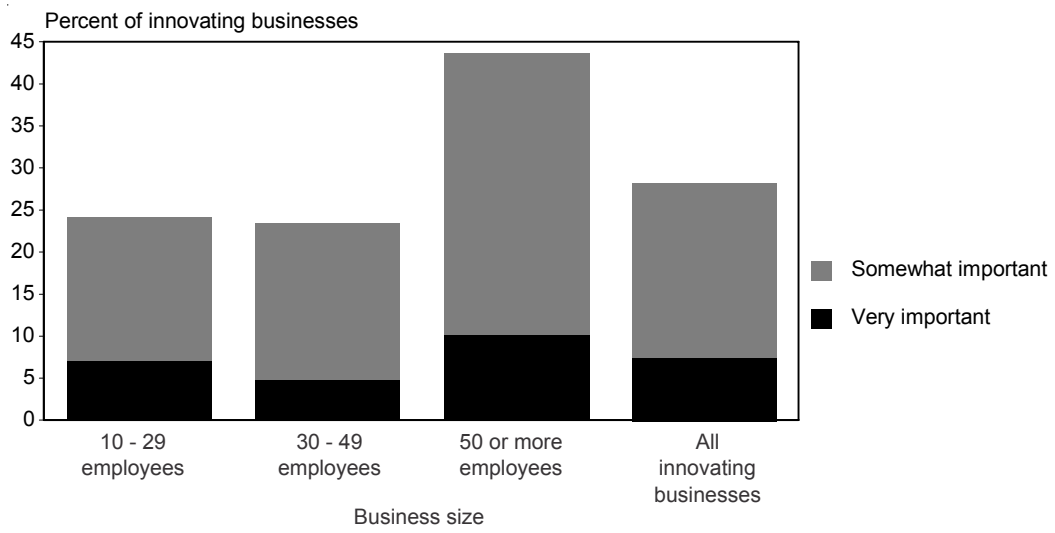
Universities, government and other research institutions were rated as not being important or unused as sources of ideas or information by the highest proportions of businesses overall (86 percent, 85 percent and 72 percent respectively). The importance of these sources is quite variable by business size. Considerably higher proportions of large businesses rated them very or somewhat important than for small or medium businesses (especially in terms of 'somewhat important' and for other

research as a source). 'Other research' includes information obtained from other research institutions, associations, research consultants or research services. Figure 6.06 below presents other research as a 'very' or 'somewhat important' source of ideas or information.

Figure 6.06

Businesses Rating Other Research Institutions as an Important Source of Information for Innovation

by business size



6.4 Sources of information by industry

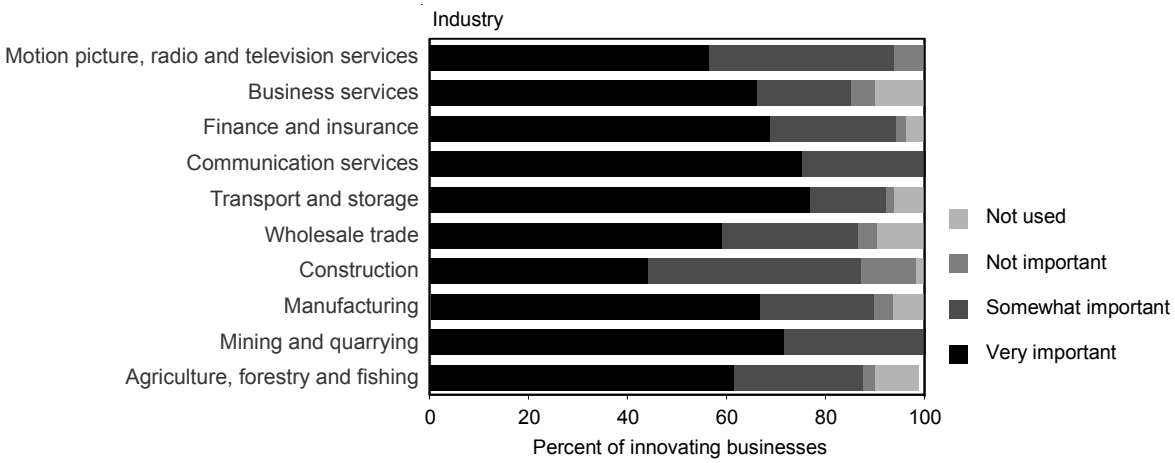
Sources of ideas or information used for innovation varied by industry. As previously noted, customers were one of the most highly rated sources of ideas or information. The majority of firms in the transport and storage and communication industries rated customers a 'very important' source (77 and 75 percent respectively). These compare with less than half the firms in the construction industry (44 percent) and 64 percent of businesses overall (see figure 6.07).

Interestingly, a much higher than average proportion of business in the construction industry rated suppliers a 'very important' source of ideas or information (66 percent compared with 35 percent for businesses overall).

Figure 6.07

Importance of Customers as a Source of Information for Innovation

by industry



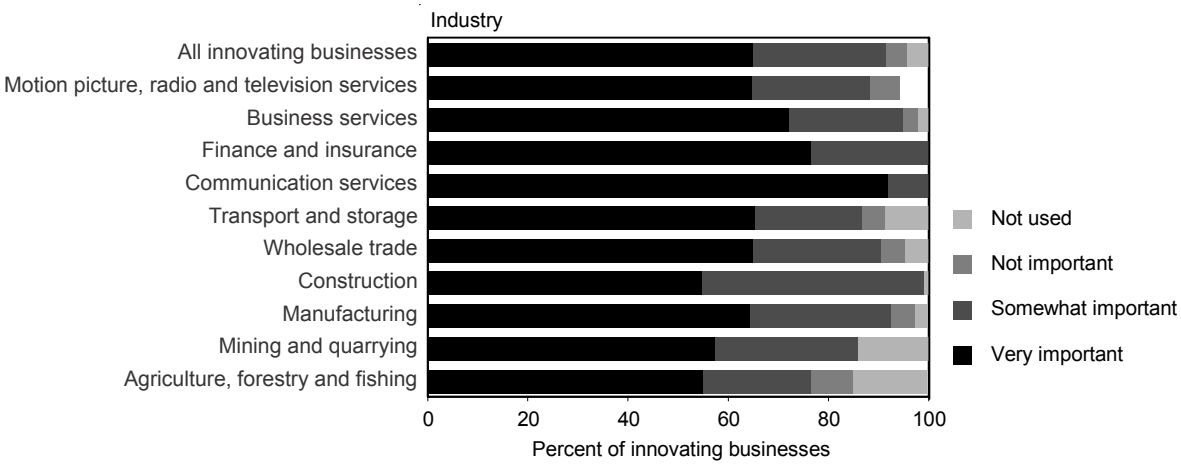
Note: Electricity, gas and water is not shown in the graph.

Nine in ten businesses in the communication industry rated information from within the business as a 'very important' source of ideas or information. The finance and insurance and business services industries also rated information from within the business highly. At the other end of the scale, a lower proportion of businesses in the construction, agriculture, forestry and fishing and mining and quarrying industries rated this as 'very important' (see figure 6.08).

Figure 6.08

Importance of Within the Business as a Source of Information for Innovation

by industry



Note: Electricity, gas and water is not shown in the graph.

A higher than average proportion of businesses in the agriculture, forestry and fishing industry rated other New Zealand businesses in the same industry as a 'very important' source of ideas or information (44 percent compared with 19 percent for businesses overall). This was also an important source for the motion picture, radio and television services industry with 38 percent of businesses rating domestic businesses in the same industry as a 'very important' source.

Banks were 'very important' sources of information for the agriculture, transport and storage sector and motion picture, radio and television service industries (30 percent, 22 percent and 24 percent respectively). This compares with 15 percent for businesses overall.

Higher than average proportions of businesses in the agriculture, forestry and fishing, finance and insurance and mining and quarrying industries rated information from other research institutes as 'very important'.

Businesses in the mining and quarrying, communication services and electricity, gas and water supply industries were more likely to use information sourced from overseas than businesses in other industries.

Higher than average proportions of businesses in the mining and quarrying, motion picture, radio and television service industries rated information from the government as 'very important'.

6.4.1 Selected industries

The following table gives the proportion of businesses rating each information sources as 'very important' for industries in the agriculture, forestry and fishing industry. Agriculture is an interesting industry, with information from banks, other businesses and other research institutes all having considerably higher proportions of businesses rating the source 'very important' than the overall average for all industries. To the contrary, the proportion of business in the agriculture industry rating information from within the business as a 'very important' source was one of the lowest of all industries.

Lower proportions of businesses in the forestry industry rated each of the sources of information (except banks) as 'very important' than the average proportion for all businesses. Across all industries, forestry had the lowest proportion of businesses rating information sourced from customers and from suppliers as 'very important'.

Table 6.02

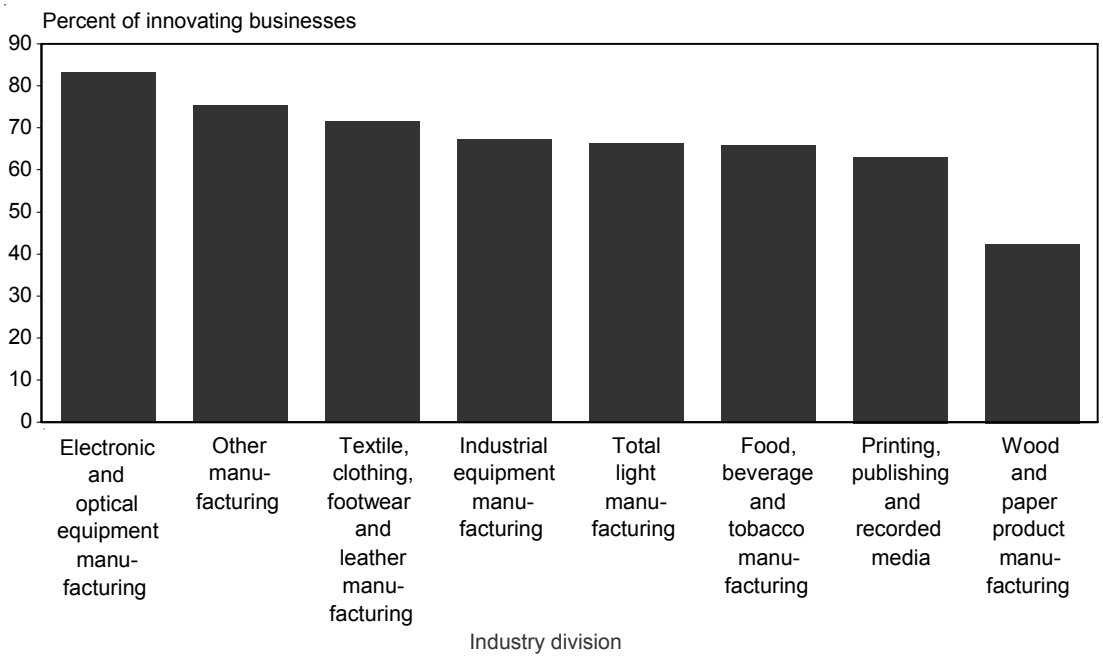
Detailed Breakdown for Agriculture, Forestry and Fishing

Information source	Industry			Total Agriculture, Forestry and Fishing	Total All Businesses
	Agriculture	Forestry and Logging	Commercial Fishing		
	Proportion of businesses rating the sources very important				
Customers	64.6	40.9	66.7	61.4	64.2
Suppliers	38.5	14.3	28.6	34.8	35.4
Within same business	55.4	57.1	66.7	56.1	64.8
Other NZ businesses	52.3	4.8	28.6	44.9	19.7
Businesses overseas	27.7	9.1	28.6	25.2	18.7
Industry or employer organisations	16.2	4.8	14.3	14.6	8.5
Books, trade journals, conferences or shows	20.0	4.8	14.3	17.7	19.1
Banks, accountants or financial institutions	32.3	19.0	14.3	29.7	14.7
Central/local government	9.2	0.0	0.0	7.5	2.5
Universities	1.5	0.0	0.0	1.3	1.6
Other research institutions	32.3	0.0	14.3	27.2	7.3

Thirty-nine percent of businesses in the Innovation Survey 2003 were in the manufacturing industry. Of these, 68 percent can be grouped into light manufacturing industries and 32 percent into heavy manufacturing industries. Industries under these groups are listed in table 7 in the Statistical Tables section. Two-thirds of light manufacturing businesses rated customers a 'very important' source of ideas or information (close to the average of 64 percent for all businesses). The proportions varied across industries in the grouping, ranging from 83 percent of businesses in the electronic and optical equipment manufacturing industry to 42 percent in the wood and paper product manufacturing industry (see figure 6.09).

Figure 6.09

Businesses Rating Customers as a Very Important Source of Information for Innovation – Light Manufacturing Industries

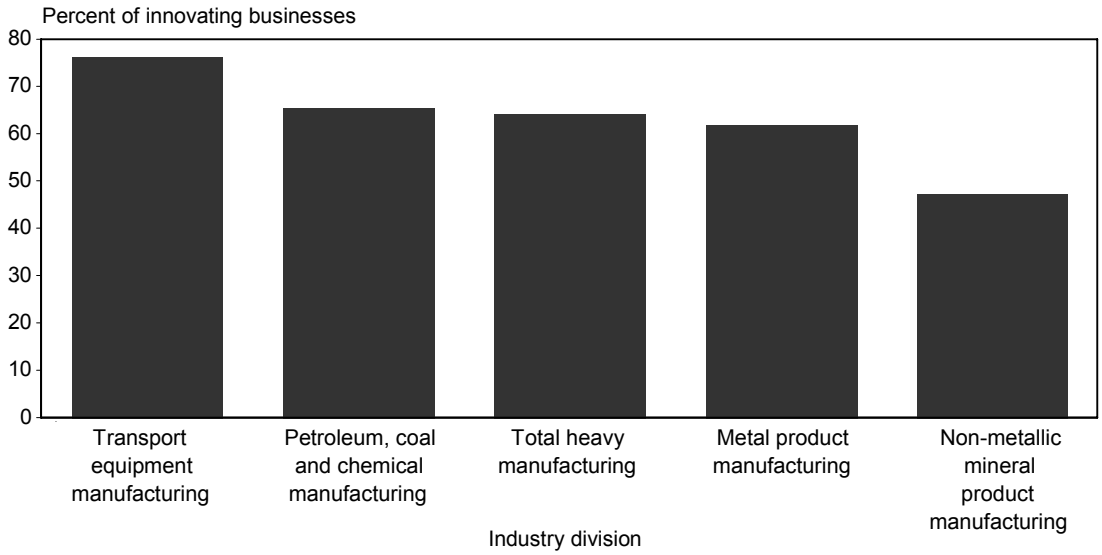


The picture is reversed for suppliers, with over half (51 percent) businesses in the wood and paper products manufacturing industry rating suppliers a 'very important' source of information. This compares with a lower 26 percent of businesses in the electronic and optical manufacturing industry and 35 percent for all businesses. Suppliers were not as important sources of information for heavy manufacturing industries with lower than average proportions of businesses in these industries rating the sources 'very important'.

Sixty-four percent of businesses in heavy manufacturing industries rated information from within the business as a 'very important' source of ideas or information (close to the average of 65 percent for all businesses). This proportion varied across the industries, from 76 percent of businesses in the transport equipment manufacturing industry to 47 percent of businesses in the non-metallic mineral product manufacturing industry (see figure 6.10).

Figure 6.10

Businesses Rating Within the Business as a Very Important Source of Information for Innovation – Heavy Manufacturing Industries



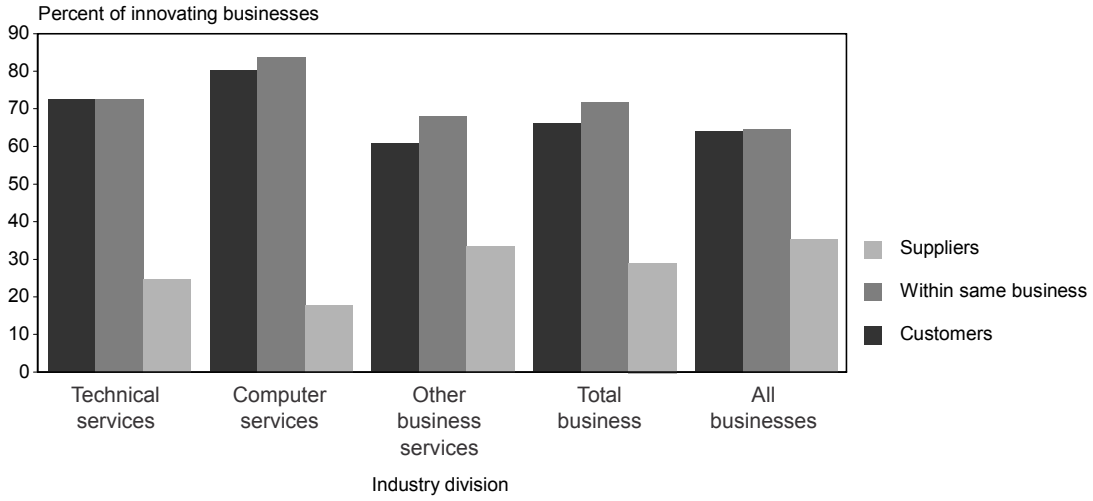
Higher than average proportions of businesses in light manufacturing industries found books 'very important' sources of information. For example, industrial equipment manufacturing (35 percent), printing, publishing and recorded media (30 percent) and food, beverages and tobacco manufacturing 28 percent). These compare with 19 percent of all businesses. Overseas businesses were an important source of information for businesses in the petroleum, coal and chemical manufacturing industry (28 percent) compared with 19 percent for all businesses.

Customers and information from within the business were rated a 'very important' source of ideas or information by a higher than average proportions of business in the technical services and computer services industries. Eighty-eight percent of businesses in the computer services industry rated customers as 'very important' and 84 percent rated information from within the businesses as 'very important' (near the highest ratings across all the industries). The corresponding proportions for technical services were both 73 percent. These compare with 64 and 65 percent of all businesses. Lower than average proportions of firms in these two industries rated information from suppliers as 'very important' sources of information.

Figure 6.11

Selected Sources of Information Rated as Very Important

by businesses in the business services industry



Part 7

Investment in innovative activities

A full set of tables is available in the Statistical Tables section. Please view Tables 8 to 13 in conjunction with this section.

Investment in innovation can be regarded as either a component of operating expenditure (current expenditure) or expenditure to increase the assets of a business (capital expenditure). As investment in innovation is a mix of current and capital expenditure, it does provide some problems interpreting the results. Note that there are high standard errors on the levels of innovation expenditure and care should be taken when interpreting these results.

7.1 Types of innovative activities

Businesses in the Innovation Survey were asked to identify the types of activities that they undertook in relation to the development of new or significantly improved products, processes or services. These activities were drawn from:

- Internal research and development (R&D)
- Acquisition of R&D
- Acquisition of machinery and equipment
- Acquisition of other external knowledge
- Training
- Market introductions, and
- All other activities.

The proportion of these activities undertaken by innovating businesses, by business size is graphed in figure 7.01.

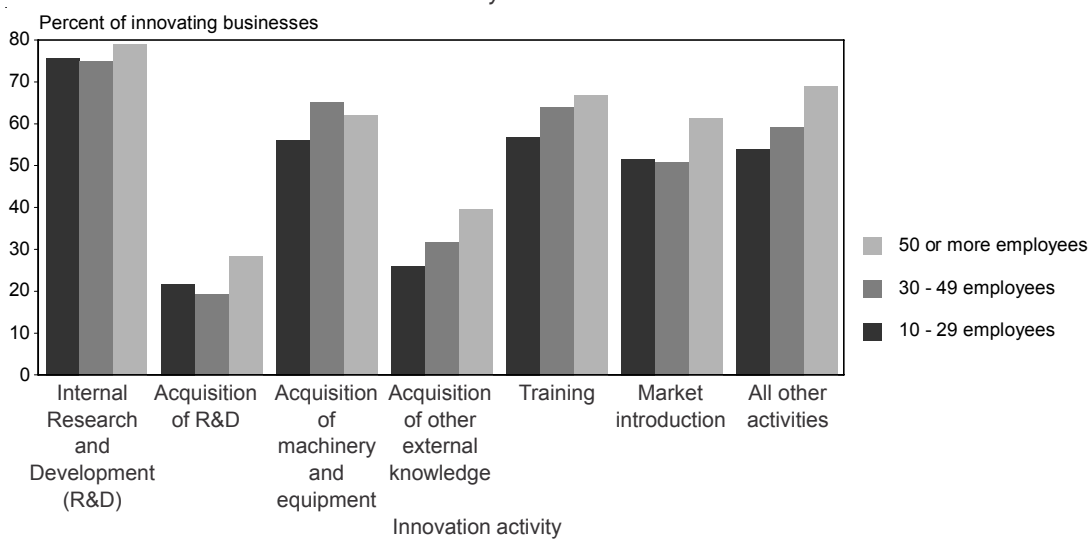
This shows that internal research and development was the most common innovative activity across all size ranges. Amongst the other specific types of activities, acquisition of machinery and equipment, and training also rated highly. This may be a reflection on the use of newer technology such as advanced machinery and computer hardware to drive innovation and a corresponding need to train staff in their use.

Acquisition of external R&D was consistently the least common type of innovation activity, closely followed by acquisition of other external knowledge.

Figure 7.01

Type of Innovation Activity

by business size

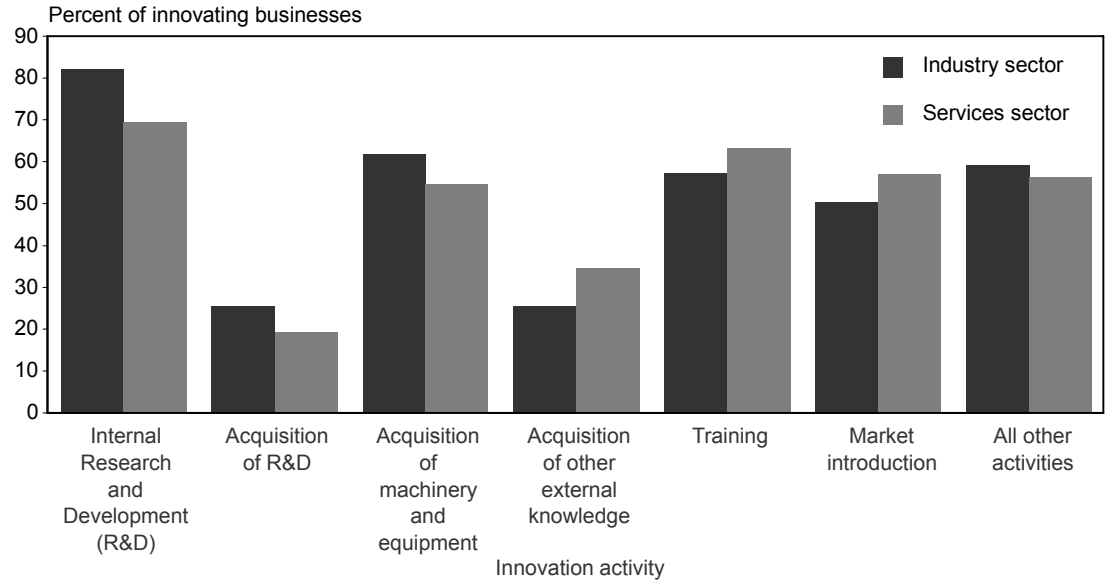


The proportion of innovative activities by industry group shows some differences across individual industries, but the same trends are evident overall.

This can clearly be seen in figure 7.02, which displays the results at an aggregated level across industries comprising the 'industry' and 'services' sectors.

Figure 7.02

Type of Innovation Activity
by sector

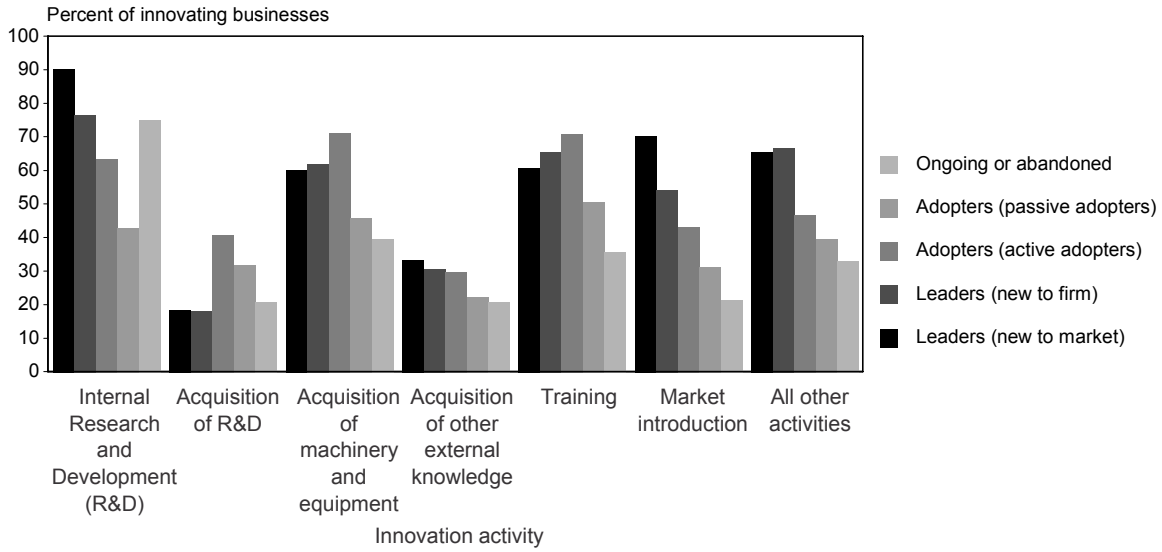


Some differences are evident if results are examined by the type of innovator (as defined in the technical notes, and analysed in chapter 5).

New to market innovators form approximately 17 percent of all businesses in New Zealand and have higher proportions of innovative activity than other types of innovator. New to market innovators are typified by higher levels of activity in internal R&D (90 percent) and market introduction (70 percent). Active adopters are typified by high levels of training (71 percent) and purchases of machinery and equipment (71 percent). A defining feature of adopters is the proportionally larger rates of purchasing external R&D (about double the rate of innovative leaders). The differences are illustrated in figure 7.03.

Figure 7.03

Type of Innovation Activity
by type of innovator



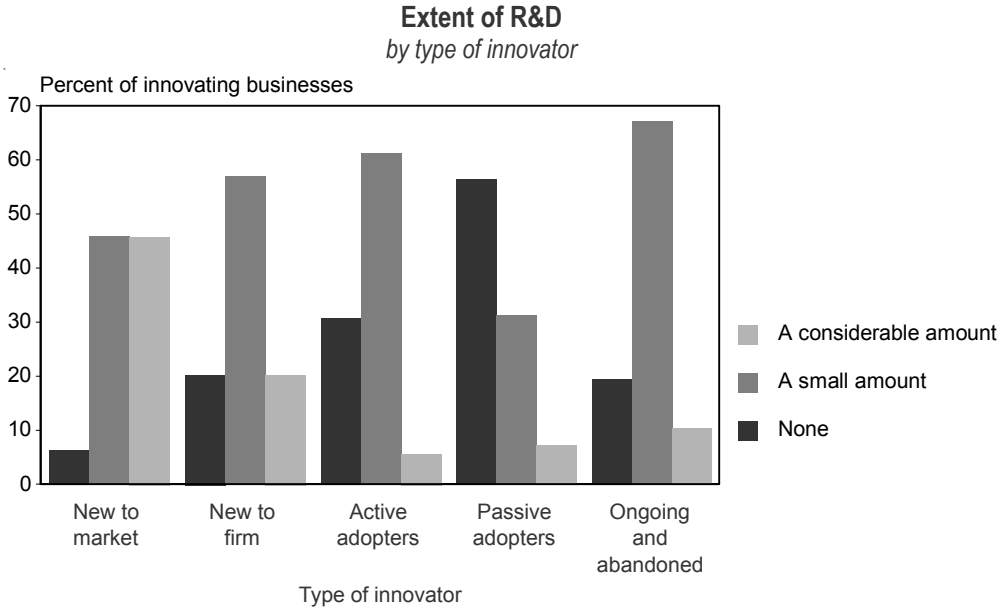
7.2 Use of Research and Development (R&D) and associated knowledge

7.2.1 Extent of R&D

Innovating businesses may conduct R&D activity as a part of the innovative process. Leaders are more likely to perform R&D activities, with 92 percent of new to market innovators and 77 percent of new to firm innovators indicating that they carried out R&D activity. While active and passive adopters also carried out R&D activity, a much smaller proportion indicated that they carried out 'a considerable amount' (6 and 7 percent respectively). This compares with new to market and new to firm leaders with 46 and 20 percent respectively.

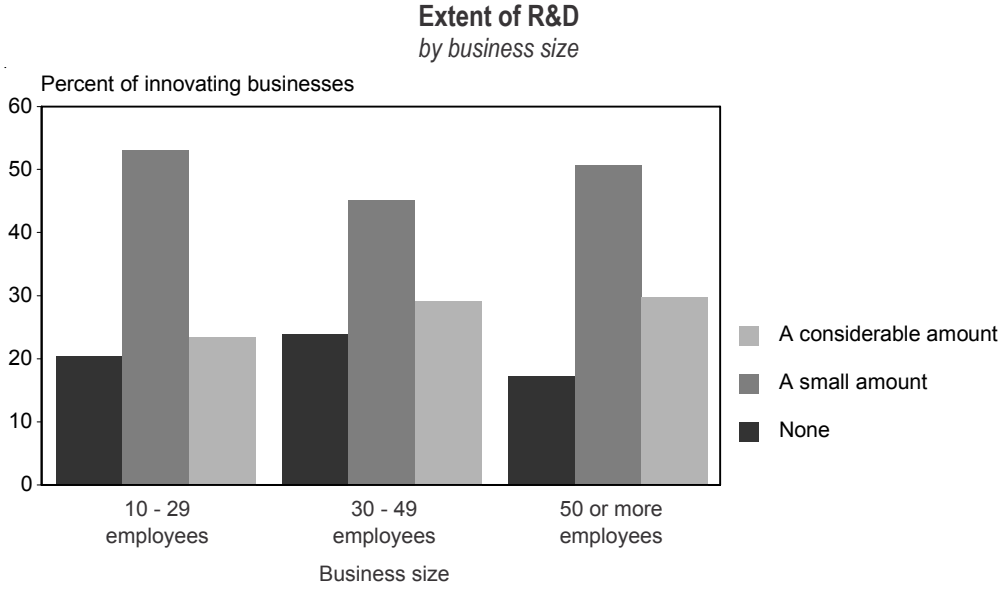
As can be seen in figure 7.04, most types of innovators are likely to have some R&D activity, even if only a small amount.

Figure 7.04



The size of business doesn't seem to influence the choice of R&D activity, as all business sizes undertook similar amounts of R&D. These results are shown in graphical form in figure 7.05.

Figure 7.05



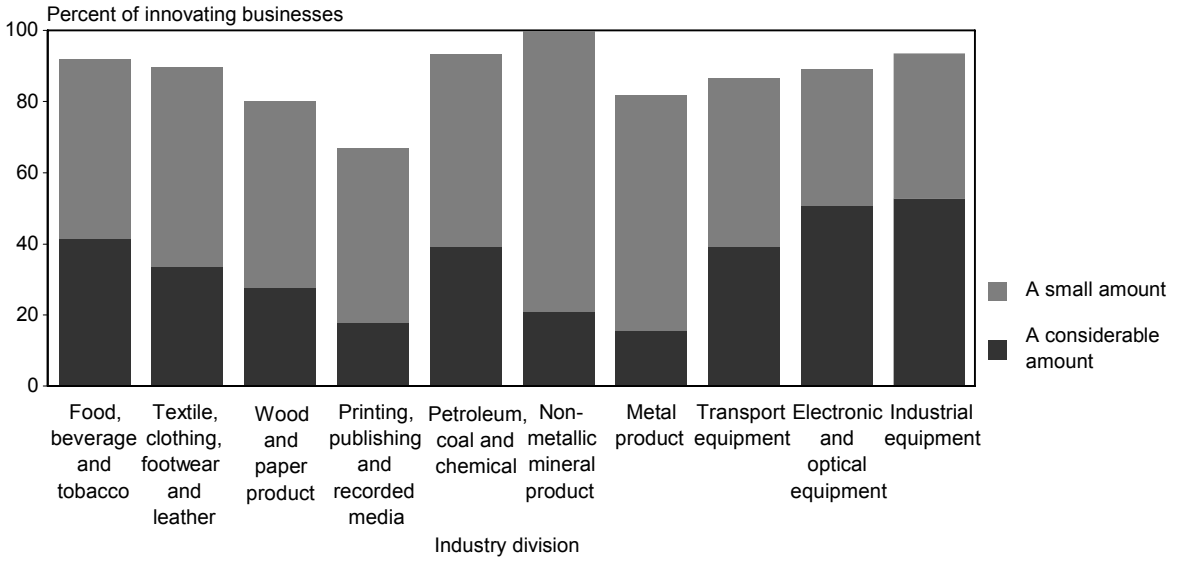
Industry groups show a more interesting pattern of R&D activity. While higher proportions of those innovators who are not doing R&D activity can be found (up to 38 percent of innovative businesses in the motion picture, radio and television services group), most of the activity is only considered to be

small amounts. Manufacturing and Communication Services groups seem to have more intense R&D activity (34 and 33 percent, respectively).

On further investigation of manufacturing (figure 7.06), the more high-tech industries, such as Electronic and optical equipment and industrial equipment manufacturing conduct most R&D. Over 50 percent of the innovators in these two industries consider themselves to have a considerable amount of R&D activity.

Figure 7.06

Extent of R&D in Manufacturing



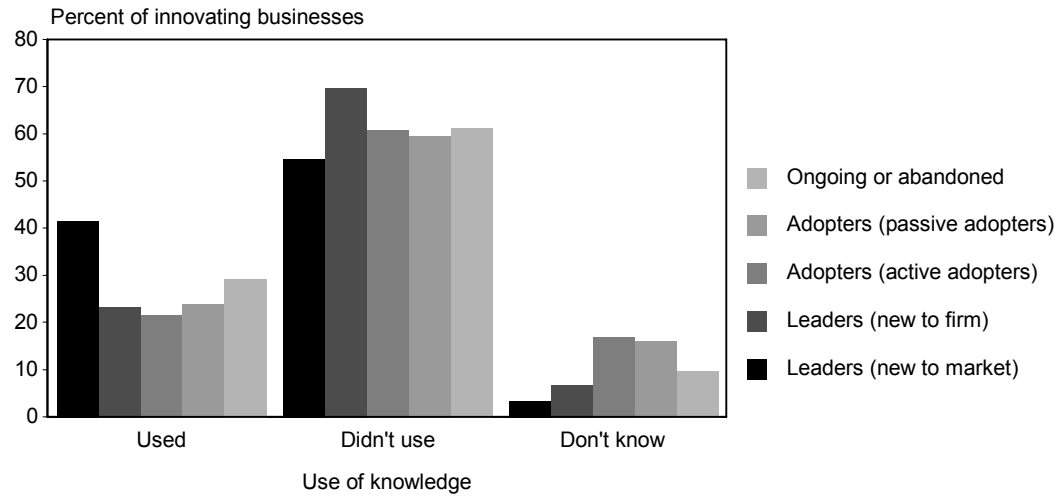
7.2.2 Use of knowledge obtained from R&D carried out overseas

Analysis of the types of innovative activity undertaken in section 7.1 showed a consistently low incidence of acquisition of R&D and other external knowledge. This is also evident when examining the use of knowledge obtained from R&D carried out overseas, as the majority of businesses indicated this was not used.

It was apparent that 44 percent of larger businesses (those with over 50 employees) were more likely to make use of knowledge obtained from overseas R&D, as against less than 30 percent for smaller businesses. A further notable fact was that of the various types of innovating businesses, the new to market innovators were significantly more likely to use overseas knowledge than other types of innovators. This can be seen from the results displayed in figure 7.07.

Figure 7.07

Use of Knowledge Obtained from R&D Carried Out Overseas



7.3 R&D and innovation investment

7.3.1 R&D and innovation investment, by type of innovator

Since the new to market innovators seem to be the highest group of innovators, it seems reasonable that the highest level of innovation investment is within this group. This is confirmed in figure 7.08 as the new to market innovators had the highest (nearly $1.1 billion) expenditure in innovation and over $590 million on R&D expenditure in New Zealand. Similarly, the new to firm innovators also spend substantial amounts ($430 million) on innovative activities and over $150 million on R&D.

Business expenditure on R&D (BERD) in New Zealand from the 2002 R&D survey was conservatively estimated at $524.0 million. Whilst the 2002 survey used improved methods to identify businesses undertaking R&D, it is still considered that some businesses of interest were not covered. This is being addressed in the 2004 R&D survey, which will incorporate further improvements to ensure more comprehensive coverage of R&D activity and expenditure.

A direct comparison is thus not possible due to both differences in the populations of the surveys and different reference periods. There are also design differences as the Innovation Survey 2003 did not contain specific definitions for R&D and does not directly follow OECD protocols for the undertaking of R&D surveys. This confirms the under-coverage which the redesign of the R&D survey will address.

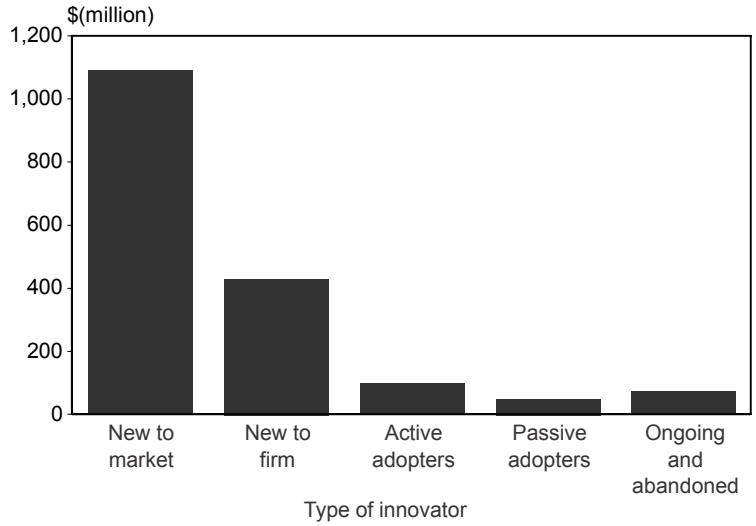
A high-level comparison of the above results however, would seem to indicate a larger amount of R&D is being undertaken than previously measured.

The Innovation Survey 2003 results, which are displayed in figure 7.08, show there are high levels of innovation investment within the leaders of innovative activity – that is, new to market and new to firm innovators.

Figure 7.08

Total Innovation Expenditure

by type of innovator



7.3.2 R&D and innovation investment by business size

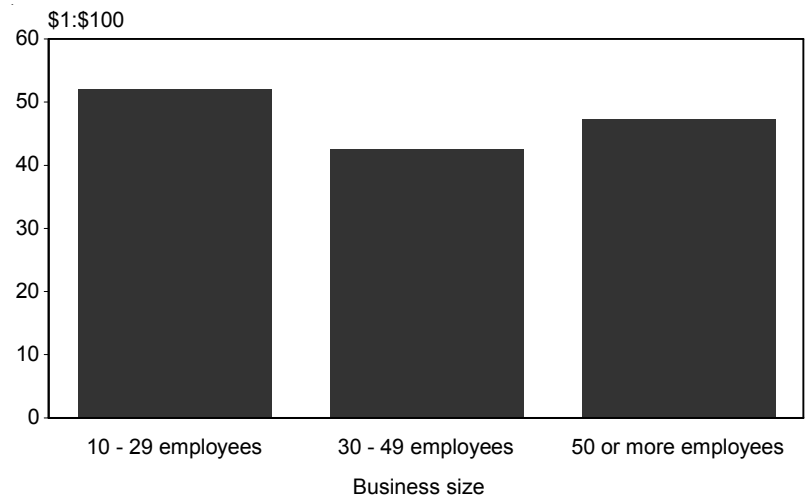
Larger businesses tend to spend more on R&D and innovative activities. Businesses with over 50 employees collectively spent more than $1.1 billion on innovative activities and $0.5 billion on R&D. R&D expenditure within businesses which directly leads to products, processes or services would typically be a part of overall innovation expenditure, but more basic research may not be covered if it does not directly lead to a commercial outcome.

The ratio of R&D expenditure to innovation expenditure was examined in order to give a measure of R&D concentration. The measure analysed was R&D spend per $100 of innovation spend. This ratio was slightly higher in the relatively small businesses (10 to 29 employees) where over $50 of every $100 of innovation expenditure is on R&D. This is displayed in figure 7.09.

Figure 7.09

R&D Expenditure per $100 of Innovation Expenditure

by business size



As innovation expenditure is classified differently within businesses' accounts structures it is difficult to construct a perfect measure of intensity of innovation expenditure for New Zealand. Two proposals are presented here, one as a ratio of operating expenditure and the other as a ratio of expenditure on fixed assets (a component of capital expenditure).

Figure 7.10 shows that the intensity of innovation expenditure (operating expenditure version) is highest (over $3 per $100) in medium sized businesses (those with 30 to 50 employees). Similarly, medium sized enterprises have high ratios of innovation intensity compared to capital expenditure ($64 in every $100 of expenditure on fixed assets) as shown in figure 7.11.

Figure 7.10

Innovation Expenditure per $100 of Operating Expenditure

by business size

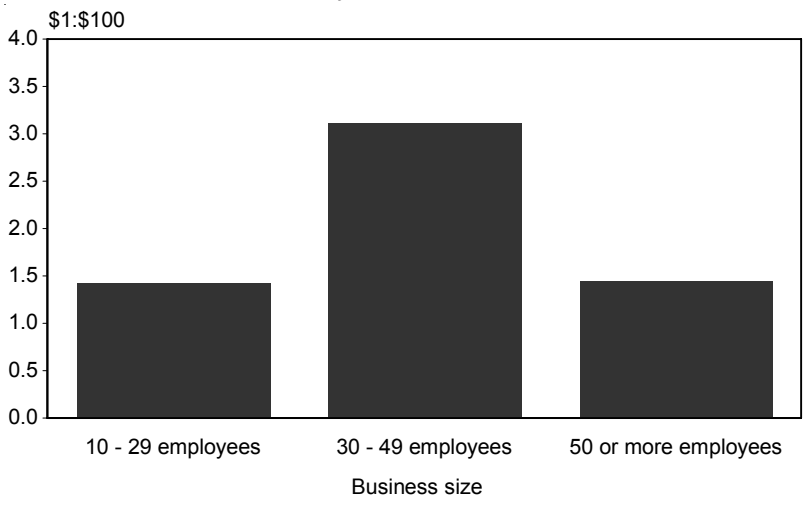
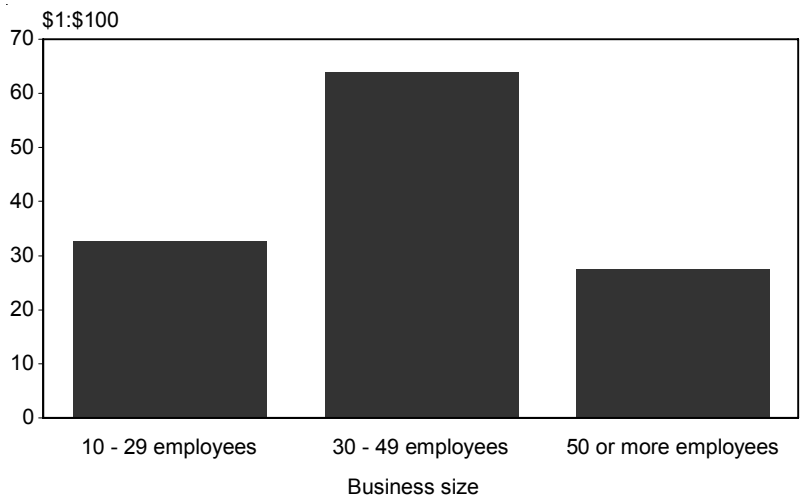


Figure 7.11

Innovation Expenditure per $100 of Expenditure on Fixed Assets

by business size



7.3.3 R&D and innovation investment, by industry group

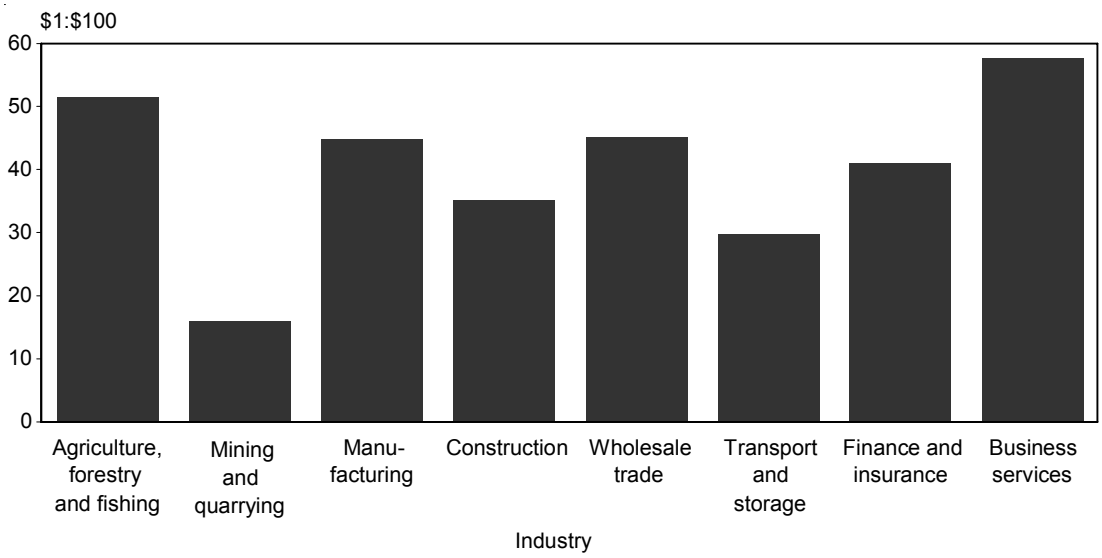
Innovation varies widely within industry groups. Manufacturing (including electricity, gas and water supply), spent nearly $700 million on innovative activities including $310 million on R&D. This accounted for nearly 40 percent of all innovation measured from the Innovation Survey. Business services was also significant, accounting for 28 percent ($490 million) of total innovative investment in New Zealand.

The concentration of R&D expenditure in industry groups is quite different to the pure expenditure numbers. Business services (including motion picture, television and radio services) had the highest concentration of all industries, spending nearly $60 per $100 of innovation expenditure. Agriculture, forestry and fishing was second highest, spending just over $50 per $100 of innovation expenditure.

Figure 7.12

R&D Expenditure per $100 of Innovation Expenditure

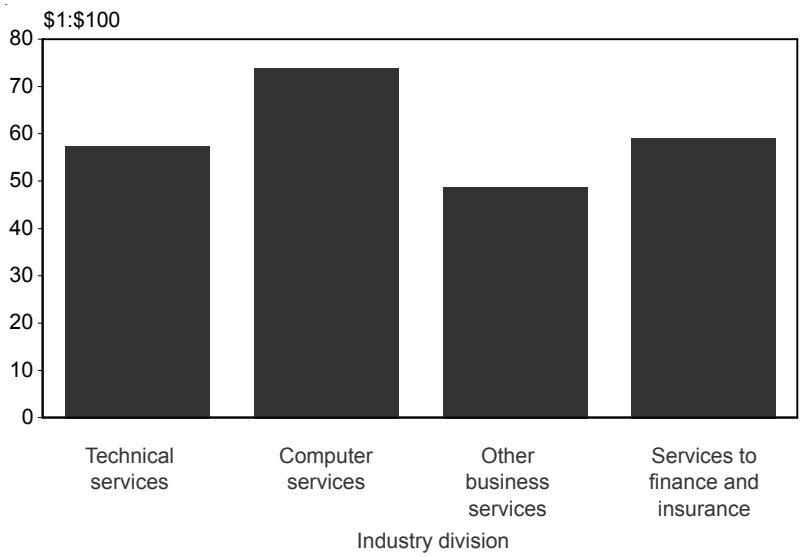
by industry



Breaking down the results for business services further (figure 7.13), Computer services ($74 of R&D expenditure per $100 of innovation expenditure) is higher than the others within that group. By coincidence this is also the highest ratio of the individual industries, ahead of Non-metallic mineral product manufacturing and commercial fishing (both on $68 per $100 innovation expenditure).

Figure 7.13

R&D Expenditure per $100 of Innovation Expenditure – Business Services Industry



7.4 Sources of funding for innovation

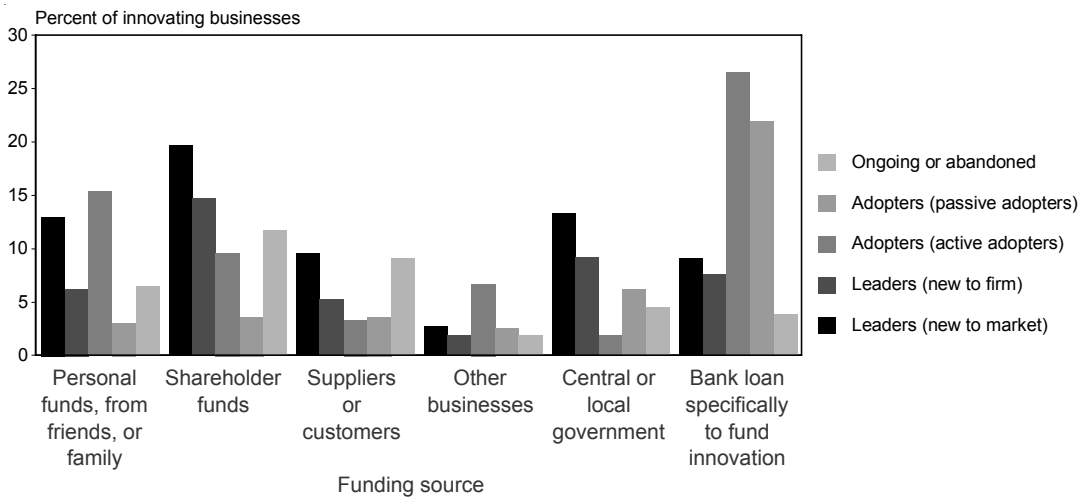
Businesses have access to a wide variety of funding options for innovative activity. The most prevalent source of funds was from within the business. Over 95 percent of new to market innovators and other leaders sourced funds from within their own businesses. Around 90 percent of the other types of innovators reported their own business as a source of funds.

Of the other sources of funds, new to market innovators also used shareholders (20 percent) whereas the adopters also sourced funds from bank loans (27 percent of active and 22 percent of passive adopters). The more significant sources of funding other than internal funds are displayed in figure 7.14.

Figure 7.14

Use of Selected Sources of Funding

by type of innovator



Sources of funding by business size follow similar patterns to that of the type of innovators. All sizes of businesses tended to fund their innovation activities from within their own business (over 90 percent of innovative businesses). Medium sized businesses (30 to 49 employees) also reported shareholders as a source of extra funds (18 percent), whereas larger businesses (more than 50 employees) reported higher access to central government funds (16 percent). Smaller sized businesses (10 to 29 employees) derived funds from shareholders (14 percent) and from bank loans for a specific activity (13 percent).

Within industry groups, most groups had very high levels of funding for innovation from within their own business. The only departure from this trend was from the construction industry group (79 percent). Their other sources of funding were derived from bank loans for specific innovative purposes (14 percent).

Part 8

Innovation cooperation and collaboration

A full set of tables is available in the Statistical Tables section. Please view Tables 14 to 20 in conjunction with this section.

Innovating businesses in the Innovation Survey 2003 were asked a number of questions about their cooperative and collaborative arrangements with other businesses or institutions to develop innovations. This chapter presents an analysis of the:

- proportion of firms that had these arrangements
- types of businesses or organisations that firms had cooperative or collaborative arrangements with
- reasons the firm engaged in collaborative arrangements
- number of collaborative arrangements firms were engaged in, and
- contribution of the government in the development of innovative products.

These factors are presented by business size (number of employees), type of innovator and by industry.

8.1 Firms with cooperative and collaborative arrangements

Innovating businesses in the Innovation Survey 2003 were asked if, in the last three years, they had any cooperation and collaborative arrangements with other businesses or institutions to develop innovations. Table 8.01 present some results.

Table 8.01

Proportion of Businesses in Collaborative or Cooperative Arrangements
by type of innovator and by business size

	Proportion of Businesses
	Percent
Type of innovator	
Leaders (new to market)	53
Leaders (new to firm)	37
Adopters (active adopters)	42
Adopters (passive adopters)	31
Ongoing or abandoned	41
Business size (number of employees)	
10 - 29	40
30 - 49	43
50 or more	53
All businesses	**43**

Forty-three percent of all innovating businesses in the Innovation Survey 2003 had engaged in cooperative and collaborative arrangements with other businesses or institutions to develop innovations. This proportion increased with the size of the businesses and varied type of innovator. Businesses classed as new to market innovators were on average the most likely to have cooperative or collaborative arrangements (53 percent) and passive adopting businesses were the least likely (31 percent).

The proportion of businesses with cooperative or collaborative arrangements with other businesses varied by industry. Businesses most likely to have collaborative or cooperative arrangements were businesses in the insurance industry (75 percent of businesses); commercial fishing (71 percent); telecommunication services (71 percent); finance (67 percent); petroleum, coal and chemical manufacturing industries (61 percent); food, beverages and tobacco manufacturing (58 percent). Those least likely to have collaborative arrangements were other manufacturing industries (23 percent

of businesses), forestry and logging (24 percent), metal product manufacturing (25 percent), transport equipment manufacturing (35 percent), agriculture (35 percent), technical services (36 percent), wood and paper product manufacturing (36 percent).

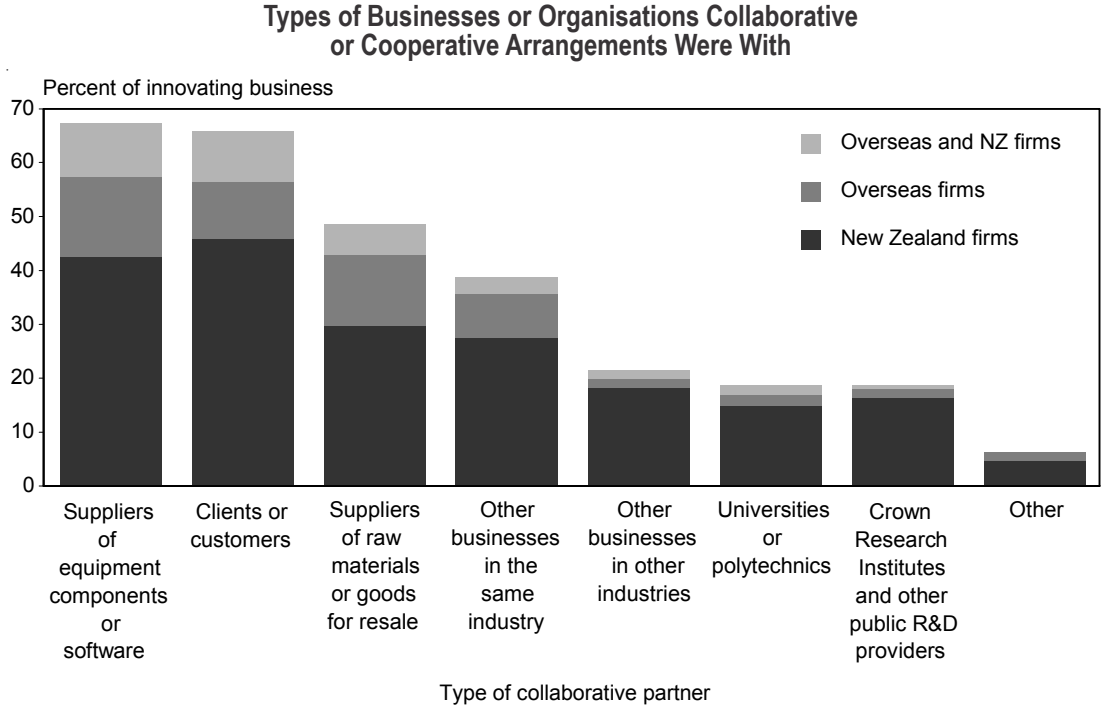
8.2 Collaborative partners

Innovating businesses in the Innovation Survey 2003 were asked, in the last three years, what types of businesses or organisations they had cooperative and collaborative arrangements with to develop new or significantly improved products, processes or services. Types of businesses included:

- suppliers of equipment components or software
- suppliers of raw materials or goods for resale
- clients or customers
- other businesses in the same industry (if not included above)
- other businesses in other industries (if not included above)
- universities or polytechnics, and
- crown research institutes and other public research and development providers.

Businesses were asked to indicate if the arrangements were with New Zealand businesses or with businesses from overseas. Results are presented in the following graph.

Figure 8.01



Businesses were most likely to have cooperative and collaborative arrangements with other businesses that were suppliers of equipment components or software (at 68 percent of all businesses). Clients or customers were the second most likely type of business (66 percent) and supplier of raw materials or goods for resale, the third most likely type (49 percent). Cooperative and collaborative arrangements were more likely to be with New Zealand businesses than with overseas businesses. For example, for businesses with cooperative and collaborative relationships with client or customer businesses, 46 of the total 66 percent were with New Zealand firms, 11 percent with overseas firms and 9 percent with both New Zealand and overseas businesses.

Businesses were the least likely to have cooperative or collaborative arrangements with universities or polytechnics and with crown research institutes or other public research and development providers (both 19 percent of businesses).

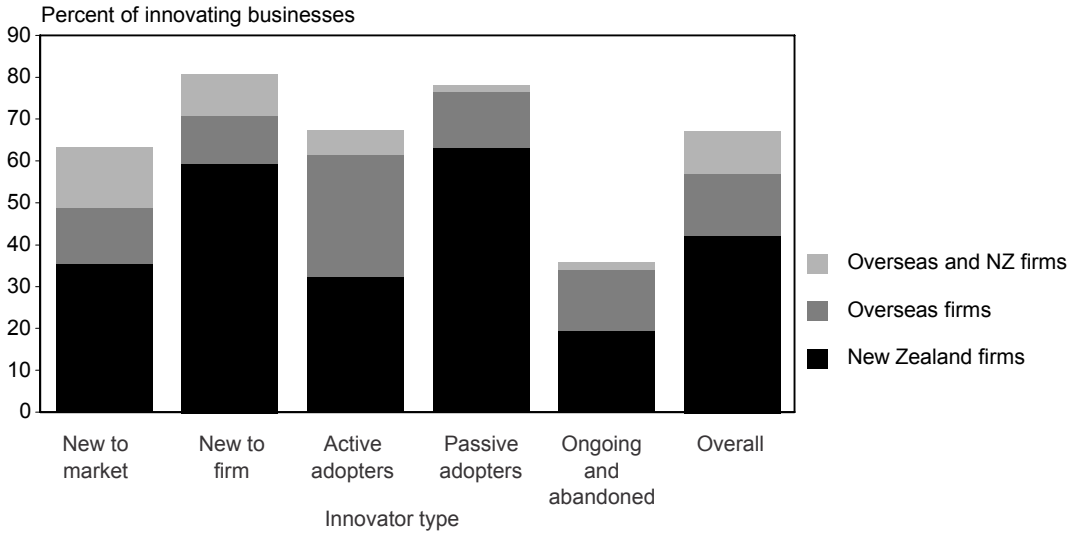
There is no apparent relationship between the size of the business (in terms of the number of employees) and its likelihood to have collaborative or cooperative arrangements with any of the business types.

There is some variation when results are examined across innovator type. New to firm innovators and passive adopters were the most likely innovator types to report cooperative or collaborative arrangements with suppliers of equipment components or software (see figure 8.02). For this category, active adopters were as likely to report cooperative or collaborative arrangements with overseas businesses as they were with New Zealand ones.

Figure 8.02

Businesses with Collaborative or Cooperative Arrangements

With suppliers of equipment components or software

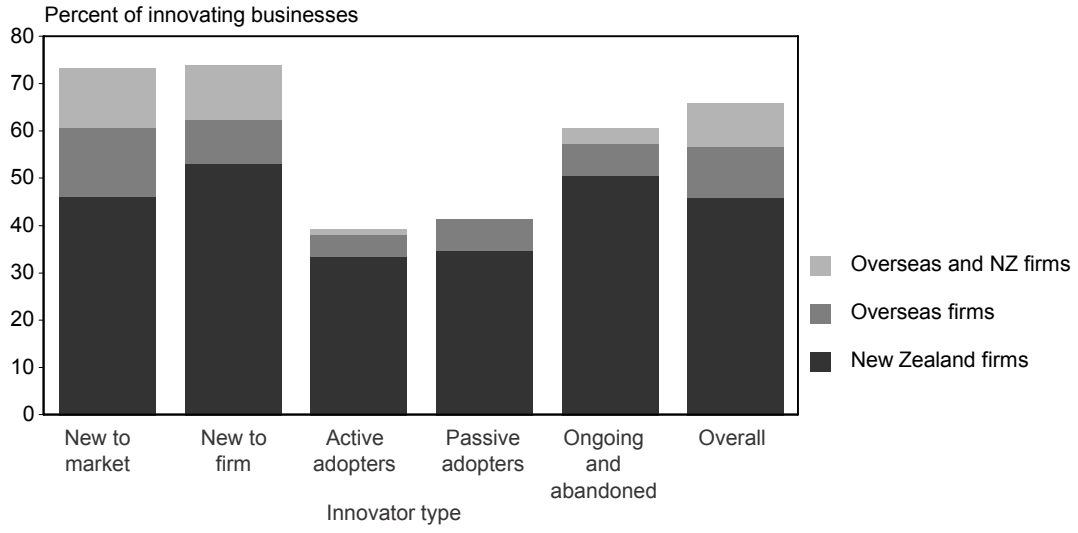


Leaders were more likely than adopters to have cooperative and collaborative relationships with businesses that are clients or customers (see figure 8.03). Seventy-three percent of new to market leaders and 74 percent of new to firm leaders were in cooperative and collaborative relationships with businesses that were clients or customers. These compare to 40 percent of active adopters and 42 percent of passive adopters. For all innovator types these arrangements were more likely to be with New Zealand businesses than with businesses overseas.

Figure 8.03

Businesses with Collaborative or Cooperative Arrangements

With clients or customers

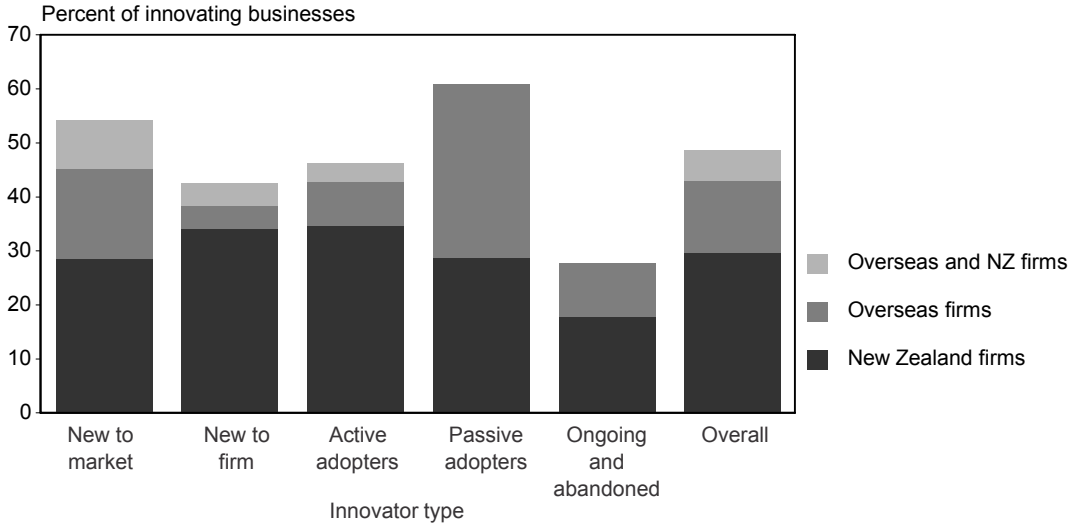


Passive adopters were the most likely innovator type to have cooperative or collaborative arrangements with suppliers of raw materials or goods for resale (see figure 8.04). New to market innovators were the second most likely. For passive adopters, the arrangements were more likely to be with overseas businesses (32 percent) than they were with New Zealand businesses (29 percent). For the other innovator types, and overall, the arrangement were more likely to be with New Zealand businesses than with overseas businesses.

Figure 8.04

Businesses with Collaborative or Cooperative Arrangements

With suppliers of raw materials or goods for resale



Few conclusions can be drawn from looking at results by industry group. Businesses in the finance and insurance and transport and storage industries were the most likely to have cooperative or collaborative arrangements with suppliers of equipment components or software (86 and 79 percent respectively). These compare to 67 percent for all businesses. The finance and insurance industry showed a higher than average incidence of collaboration with businesses from overseas. Businesses in the agriculture, fishing and forestry industry were the least likely to have collaborations with suppliers of equipment components or software. Businesses in the wholesale trade and manufacturing industries were the most likely to have cooperative or collaborative arrangements with suppliers of raw materials or raw goods for resale (56 and 69 percent respectively). Once again, higher than average proportions of this collaboration was with businesses from overseas.

Businesses in the transport and storage and the manufacturing industry were the most likely to have cooperative or collaborative arrangements with clients or customers (77 and 72 percent respectively). Most of these collaborations were with New Zealand businesses. Businesses in the construction industry were the least likely to have collaborations with businesses that were clients or customers.

8.3 Reasons for entering into collaborative arrangements

Businesses responding to the Innovation Survey 2003 were asked what their reasons were for engaging in cooperative and collaborative arrangement with other businesses during the last three years. Possible reasons included:

- sharing the costs of the development
- spreading risk
- accessing critical expertise or research and development
- finance
- improved efficiency
- accessing new distribution channels
- prototype development, and
- accessing new markets.

Businesses selected as many reasons as applicable.

The most prevalent reason for entering into cooperative or collaborative arrangements was to gain access to critical expertise or research and development (see table 8.02). This was a reason given by 63 percent of businesses and was particularly important for large businesses (50 or more employees), with 76 percent giving this as a reason. Improved efficiency, accessing new distribution channels and accessing new markets were the next most common. Improved efficiency and accessing new distributions channels were more important reasons for smaller firms that they were for larger firms.

Table 8.02

Reasons for Entering into Cooperative and Collaborative Arrangements

	Business Size (Employees)			**Overall**
	10 - 29	30 - 49	50 or more	
	Percent of Innovating Businesses			
Accessing critical expertise or R&D	59	57	76	**63**
Improved efficiency	57	50	42	**52**
Accessing new distribution channels	57	43	33	**49**
Accessing new markets	45	34	41	**42**
Sharing costs of the development	37	42	49	**41**
Prototype development	29	23	23	**26**
Spreading risk	20	18	23	**20**
Finance	16	28	11	**17**

The proportion of firms giving the reason of sharing the cost of development increased with the size of the business, from 37 percent of small businesses to 49 percent of large businesses. This was the second most important reason for large businesses.

Finance and spreading risk were the lowest reported reasons for engaging in collaborative or cooperative arrangements.

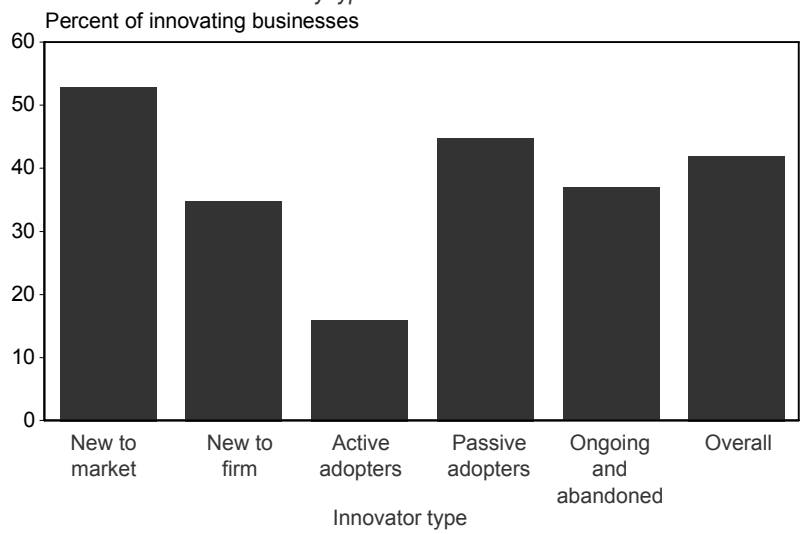
There is some variation when results are examined by type of innovator. Accessing critical expertise or R&D was the most common reason given by new to market leaders (67 percent) and by new to firm leaders (66 percent). In comparison, improved efficiency was the most common reason given by active adopters (61 percent of businesses) and accessing new distribution channels was the most given reason by passive adopting businesses (60 percent).

Accessing new markets was one of the most common reasons given by new to market leaders for engaging in cooperative and collaborative arrangements (53 percent of businesses). This proportion varied for other types of innovator.

Figure 8.05

Cooperation and Collaboration to Access New Markets

by type of innovator



Accessing critical expertise or research and development and improved efficiency were the top two reasons given by most industries for entering into cooperative and collaborative arrangements. Some notable variations from this were the construction, manufacturing and agriculture, forestry and fishing industries. The top two reasons given by businesses in the construction industry were accessing distribution channels (81 percent) and prototype development (74 percent). These were much higher proportions than those for all businesses (49 percent and 26 percent respectively).

The second most important reason given by businesses in the agriculture, forestry and fishing industry was spreading risk (70 percent). This was one of the least common reasons across other industries, with only 20 percent of all businesses giving this a reason.

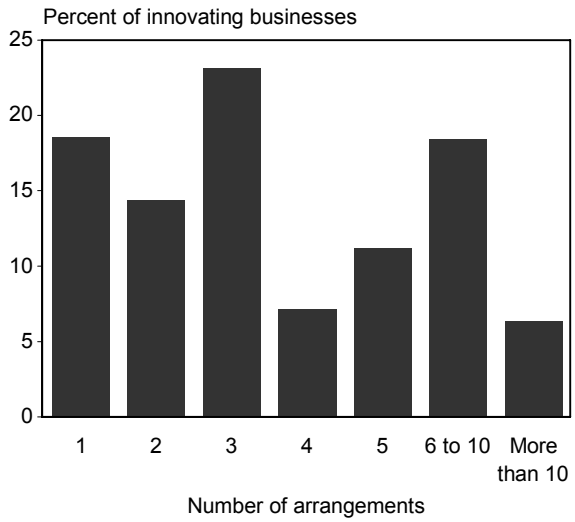
The second most important reason given by businesses in the manufacturing industry for cooperative and collaborative arrangements was accessing new markets (53 percent compared with 42 percent of all businesses).

8.4 Number of firms with collaborative arrangements

Businesses were also asked in the Innovation Survey about the number of cooperative and collaborative arrangements they had with other businesses. Overall results are shown on figure 8.06 (presented as a percentage of all businesses by number of arrangements).

Figure 8.06

Number of Cooperative and Collaborative Arrangements



In general, large businesses had a higher number of collaborative or cooperative arrangements than smaller businesses. Almost one third of businesses with over 50 employees had six or more such arrangements, whereas for smaller businesses the corresponding figure was 22 percent.

Of the different types of innovator, the majority of new to market innovators indicated they had four or more cooperative or collaborative relationships whereas for all the other innovator types, the majority had less than four such arrangements.

Examining results across industries show in most cases the majority of businesses have three or less cooperative or collaborative arrangements. There are however, two interesting results. The first is that, 60 percent of businesses in the agriculture, forestry and fishing sector had six to ten collaborative arrangements with other firms. This compares to 18 percent of all businesses. Secondly, 56 percent of businesses in the construction sector had collaborative arrangements with only one other business (compared to 18 percent overall).

8.5 Contribution by government

This section explores the contribution by government in the development of innovative products. Respondents in Innovation survey 2003 were asked if they had received assistance from central or local government research services, technological services, business services or government funds over the last three years and how useful they found this assistance.

The majority of businesses had not received assistance from each of the sources over the last three years (see figure 8.07). Business services were the most used type, with 44 percent of businesses having used this assistance.

Figure 8.07

Receipt of Government Assistance

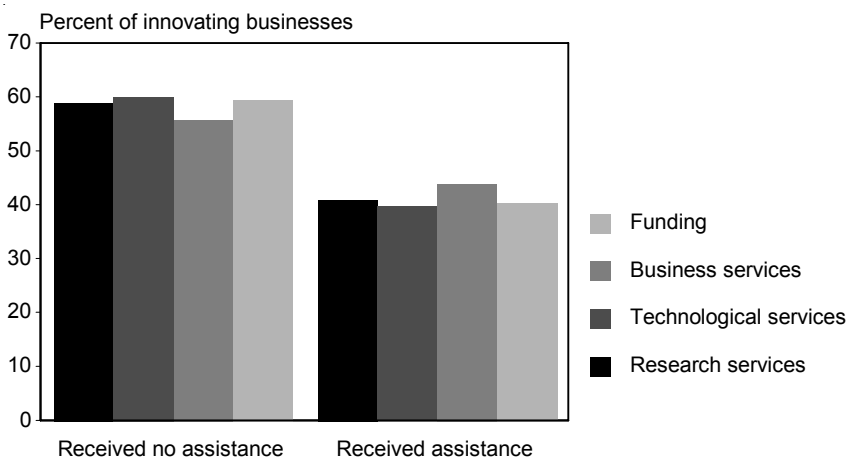


Table 8.03 breaks down these results further to show, if assistance was received, that the majority of businesses found it to be of no value. Only a small proportion of businesses found the types of assistance to be very valuable. Business services was the most valued type, with 38 percent of businesses receiving this assistance rating it very or moderately valuable.

Table 8.03

Value of Government Assistance

Type of Assistance	Very valuable	Moderate value	No value
	Percent		
Research Services	7.9	23.8	68.3
Technological Services	6.8	21.1	72.1
Government Funds	12.4	15.6	71.9
Business Services	7.7	30.0	62.3

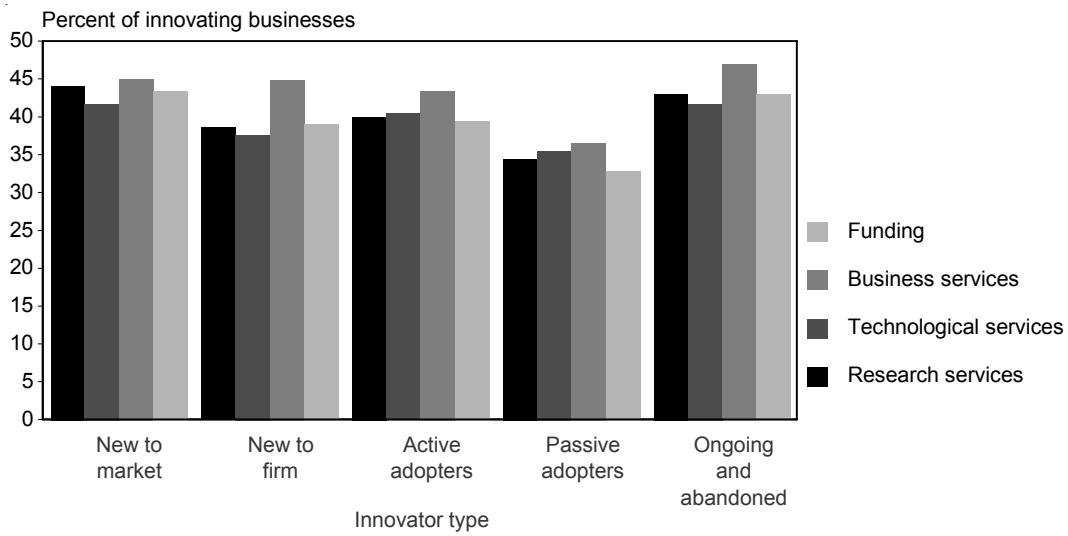
Large businesses were more likely to find the types of assistance of value than small and medium sized businesses. For example 38 percent of large businesses found assistance from government funding of some value. This compares with 25 percent of small business, 24 percent of medium business and 28 percent of all businesses. Similarly, 42 percent of large businesses found assistance from research services of value, compared with 30 percent of small businesses, 25 percent of medium business and 32 percent of all businesses.

Over the different types of innovators, the proportions of businesses using each source of government assistance were similar, as illustrated in figure 8.08.

Figure 8.08

Businesses Receiving Government Assistance

by type of innovator



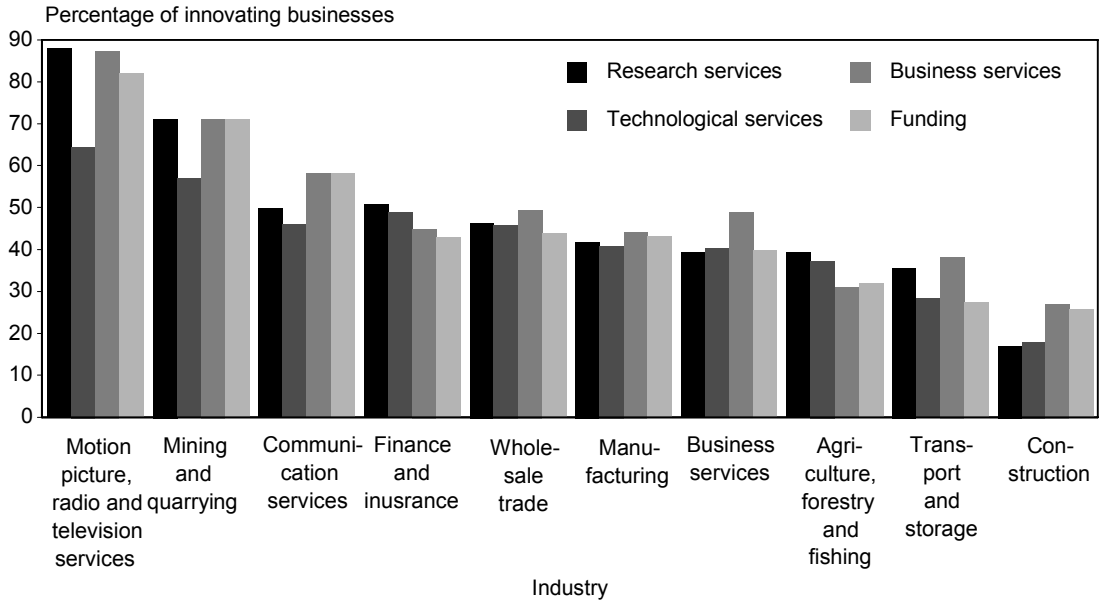
There is considerable variation across industry groups in the amount of assistance received. The two industries most likely to receive government assistance from the various sources were the motion picture, radio and television and mining and quarrying industries. The two least likely were construction and transport and storage.

The results are presented in figure 8.09.

Figure 8.09

Businesses Receiving Government Assistance

by industry



There is also variation in the perceived value of the assistance received between different industry groups. (Refer to table 20 in the Statistical Tables section for detail).

For businesses receiving government assistance from research or technological services, businesses in the agriculture, fishing and forestry industry were much more likely to find the assistance of some value than businesses in other industries. Sixty-three percent of businesses in the agriculture, forestry and fishing industry found information from research services to be of value, compared with 32 percent of all businesses. Similarly, 61 percent of businesses in the agriculture, forestry and fishing industry found assistance from government technological services of value, compared with 28 percent of all businesses.

Assistance from government funding was of the most value to businesses in construction (42 percent) and motion, picture, radio and television services industries (36 percent).

Business services received were of the most value to businesses in the agriculture, forestry and fishing sector, the construction sector and the business services sector.

Part 9

Innovation and business performance

A full set of tables is available in the Statistical Tables section. Please view Tables 21 to 26 in conjunction with this section.

9.1 Outcomes of innovative activities

9.1.1 Outcomes

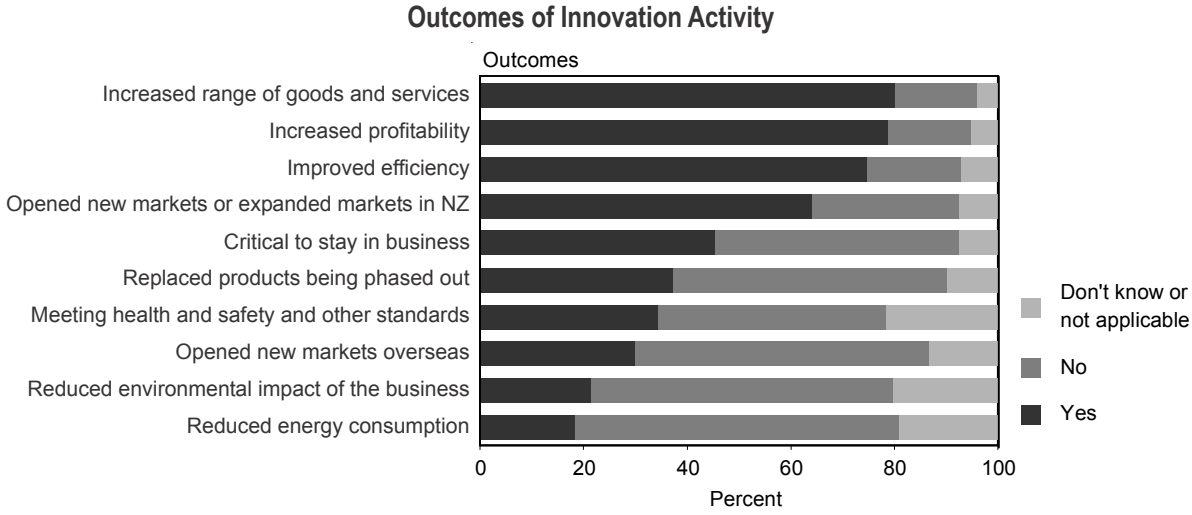
The actual outcomes of innovation activities may or may not be the same as the intended results when the innovations were begun. This survey focused on the achieved outcomes of innovations which had been implemented, as opposed to those in progress or abandoned. Overall results are shown in figure 9.01.

Eighty percent of businesses which had implemented innovations in the last three years reported an increased range of goods and services as a result.

The majority of businesses also reported increased profitability (79 percent), improved efficiency (75 percent), and new or expanded markets within New Zealand (64 percent).

Less than one third of businesses reported outcomes resulting in new overseas markets (30 percent), reduced environmental impact (21 percent), or reduced energy consumption (18 percent).

Figure 9.01



In examining these outcomes across different sized businesses, very similar trends were apparent. The only notable point of difference from the overall results was the proportion of businesses who opened new markets overseas as a result of implementing their innovations, which was greater for larger businesses (41 percent versus 26 percent for small businesses and 32 percent for medium businesses).

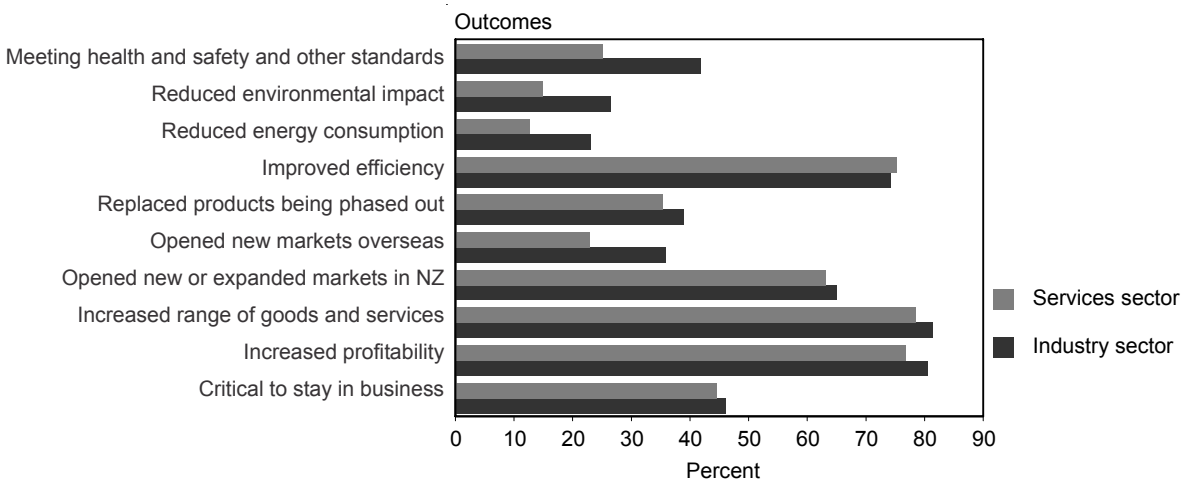
Across individual industries, there was some variation, but once again, similar trends were evident in the most likely or least likely outcomes. When results are aggregated at a sector level however, some variation can be seen between the industry and services sectors of the economy, particularly with some of the outcomes which were least reported overall.

Businesses in the industry sector were much more likely to report new or expanded overseas markets (36 percent) than those in the services sector (23 percent). This result is to be expected as the services sector, by its nature, is likely to be more domestically focussed. Businesses in the industry sector were also more likely to record reduced energy consumption, reduced environmental impact or the meeting of regulatory requirements (23, 26 and 42 percent respectively) than those in the services sector whose corresponding results were 13, 15 and 25 percent. Results are presented in figure 9.02.

Figure 9.02

Outcomes of Innovation Activity

by sector

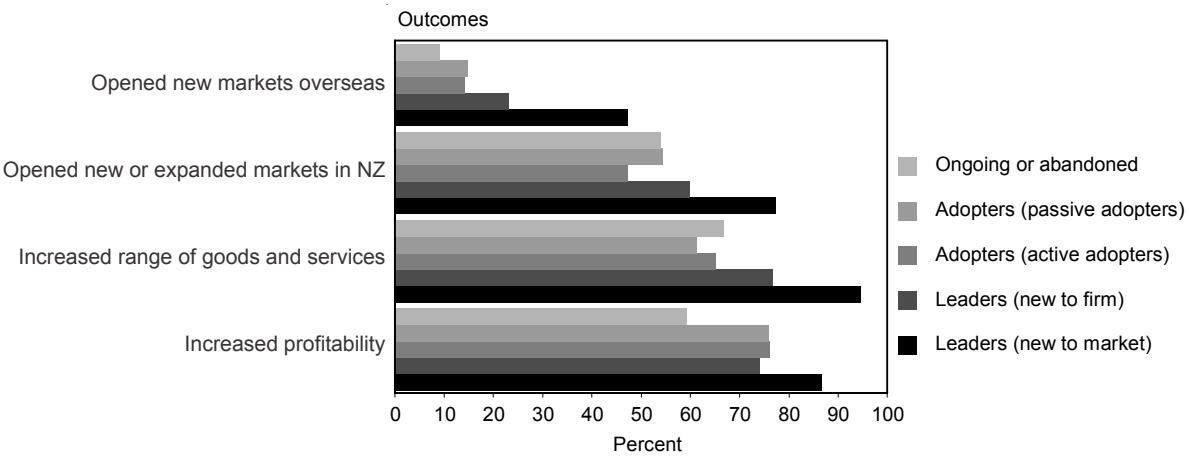


Examining outcomes reported by type of innovator shows new to market innovators to be clearly ahead in opening new or expanded markets (both in New Zealand and overseas); increasing their range of goods or services and increasing profitability. In each of these key areas, much higher proportions of new to market innovators reported achieving these outcomes, as can be seen in figure 9.03.

Figure 9.03

Outcomes of Innovation (Selected Outcomes)

by type of innovator



9.1.2 Effect of innovative activities on exports

Those businesses in the Innovation Survey 2003 who had implemented their innovations were asked to indicate if they had exported any products or services which were either new to the market or new to their business during the last three years. They were then asked to indicate the proportion of their total export sales which these had contributed.

A significant result was that 54 percent of new to market innovators had exported innovations of various types. This was significantly higher than all other types of innovators, whose corresponding proportions ranged from 19 to 28 percent.

Looking across industry groups, another significant result was that 48 percent of businesses in the manufacturing industry had exported innovations. The next highest was the agriculture, forestry and fishing industry with 38 percent. These results are doubly significant given the importance of these industries to the New Zealand economy.

Across all sizes of business, all industry groups and all types of innovator, the majority of businesses indicated that between 1 and 30 percent of their export sales were from the innovative products and services they had exported.

9.2 Intellectual property

Innovative activities may result in development of intellectual property which can benefit a business through a competitive advantage over their rivals, or the realisation of income from the sale or licensing of that intellectual property. As such, the level of intellectual property developed by a business and any resultant benefits would be expected to correlate to the level of innovation activity within that business.

This was examined in the Innovation Survey 2003 by asking businesses if they had developed any intellectual property over the previous three years, and if so what steps they had taken to protect it. Results were compared across different types of innovator and trends examined.

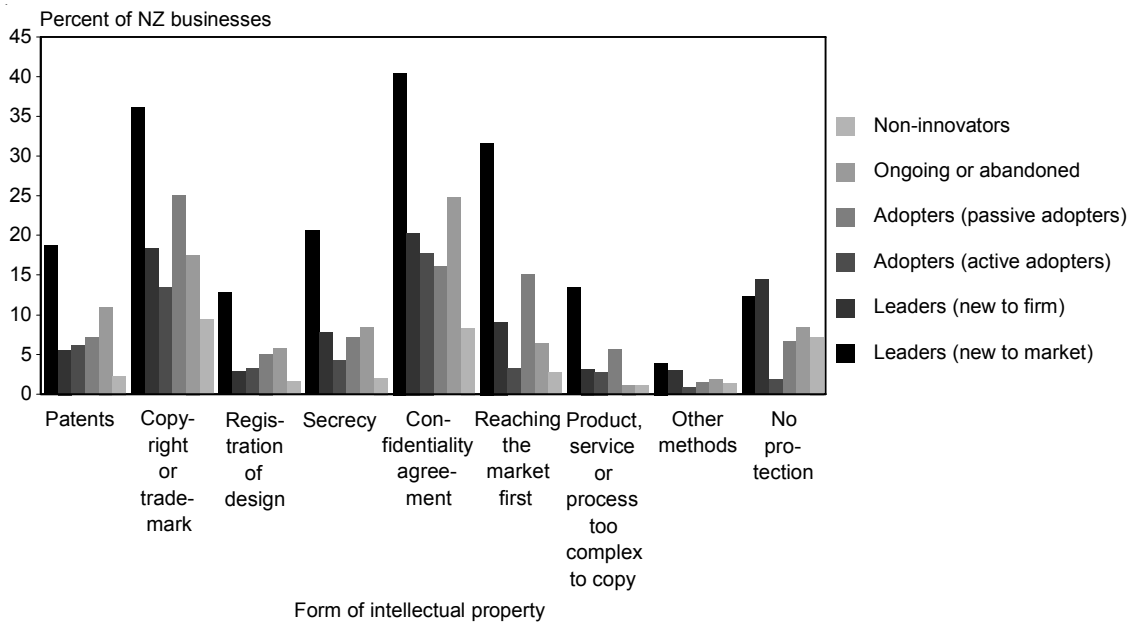
The most innovative of firms – the new to market innovators – clearly had the highest levels of intellectual property, with 75 percent of such businesses indicating they had developed intellectual property over the last three years. The corresponding figures for the other innovator types ranged from 31 to 50 percent, whilst for non-innovators the figure was 24 percent. The overall proportion for all businesses was 38 percent.

Businesses who have developed intellectual property often take a number of steps to protect against others exploiting it. This can allow them to gain advantage over their competitors or gain income from selling or licensing. If the risks or costs of protection are deemed too great or if technologies are developing at a rapid rate, businesses may elect not to take any measures to protect their intellectual property, but may still gain benefit from being ahead of their competitors and setting the standard.

As may be expected, new to market innovators – being the group with the largest proportion of intellectual property – were also the highest in the use of the various mechanisms used to protect intellectual property. This can be seen in figure 9.04.

Figure 9.04

Intellectual Property Protection
by type of innovator



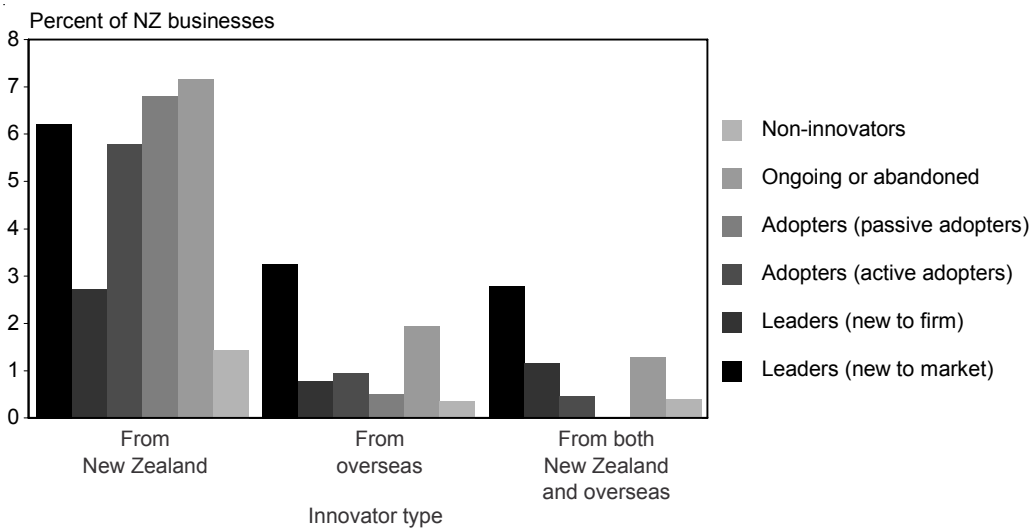
Income from sales of intellectual property or license fees is a tangible measure of the benefit of developing and protecting intellectual property. Therefore, the Innovation Survey 2003 also asked businesses to indicate if they had received any income from the sale of intellectual property or licence fees over the last three years. Note that this income could be from intellectual property developed at any at any time prior – not just during that three year period.

The overall results show a very low proportion of New Zealand businesses realised income from intellectual property sales. Only five percent of all businesses in the survey indicated they had received such income. Of those who did, most indicated that the income was received from within New Zealand rather than overseas. Similar trends were evident across all sizes of business, industries and innovator types, although higher proportions were once again evident from the new to market innovators. Results are presented in figure 9.05.

Figure 9.05

Income from Sales of Intellectual Property

by type of innovator



9.3 Innovation and its effect on profitability

The purpose of this analysis was to investigate the relationship between characteristics of business activity and increased profitability. The response variable was whether or not an enterprise experienced increased profitability during the last three years. The characteristics considered were:

- innovator type
- intellectual property
- number of innovations
- collaboration
- export intensity (export sales over total sales) – innovative products
- export intensity (export sales over total sales) – overall
- competition
- enterprise size
- enterprise age
- expenditure on innovation
- expenditure on R&D.

Profitability could be answered by a respondent in the following ways:

- decreased
- stayed the same
- increased
- don't know or not applicable.

Given that the purpose was to determine characteristics associated with increased profitability, 'increased' was coded as 'yes' and the remaining options were coded as 'no'.

This analysis was undertaken using a logistic regression, which is frequently used to examine the relationship between a set of explanatory variables and a binary (yes/no) response variable. Further detail of the methodology is given in section 9.3.2.

9.3.1 Results

The results consistently showed innovator type and intellectual property to be significantly related to profitability. Other variables, such as enterprise age and export intensity – overall were significant; however, their contribution to the model was minimal. This can be seen from table 9.01, which outlines Nagelkerke's adjusted general coefficients of determination. This statistic gives an indication of the proportion of the variability of the responses explained by the explanatory variables, similar to that of classical regression.

Table 9.01

R2 – Nagelkerke's Adjusted General Coefficient of Determination

Explanatory variable	As sole explanatory variable	Combined with preceding explanatory variables
	Percent	
Innovator type	10.3	10.3
Intellectual property	8.5	13.9
Export intensity	1.4	15.0
Enterprise age	0.7	16.0

Innovator type

Each enterprise in the survey corresponded to one of six innovator types:

- Leaders (new to market)
- Leaders (new to firm)
- Adopters (active adopters)
- Adopters (passive adopters)
- Ongoing and Abandoned
- Non-innovators.

Innovator type was the most significant indicator of profitability in the analysis. An odds ratio of each type of innovator compared with non-innovators is given in table 9.02, together with the upper and lower bounds at the 95 percent confidence level to assist in the interpretation of these odds.

Table 9.02

Comparison with Non-innovator

	Odds ratio	Lower bound 95% CI	Upper bound 95% CI
New to market	1.6	1.2	2.2
New to firm	1.5	1.1	2.1
Active adopter	1.2	0.6	2.2
Passive adopter	2.6	1.5	4.5
Ongoing and abandoned	0.9	0.5	1.6

This table shows that the odds of a passive adopter increasing profitability are approximately 2.6 times greater than for a non-innovator. An interpretation of the other innovator types can be read in a similar manner. These results indicate that passive adopters are more likely to improve profitability than other types of innovator. This is possibly due to passive adopters not having to invest in development to the same extent as other innovator types.

Intellectual property

Intellectual property addresses the methods a business or a business's parent company used to protect intellectual property developed by this business.

It was a derived variable made up of the following components:

- no intellectual property
- formal
    1. patents
    2. copyright or trademark
    3. registration of design
- informal
    1. secrecy
    2. confidentiality agreement
    3. reaching the market first
    4. product, service or process too complex to copy
- formal and informal
- no protection.

An odds ratio of each component compared with no intellectual property is given in table 9.03.

Table 9.03

Comparison with No Intellectual Property

	Odds ratio	Lower bound 95% CI	Upper bound 95% CI
Formal	1.6	1.1	2.3
Informal only	1.4	1.0	2.0
Formal and informal	1.9	1.3	2.6
No protection	1.3	0.8	2.1

These results indicate that businesses that developed intellectual property tended to experience improved profitability over those who did not. The results also indicate that the likelihood of improvement was similar, regardless of whether or not the intellectual property was protected, or how it was protected.

9.3.2 Detail of methodology

This analysis was undertaken using a logistic regression, which is frequently used to examine the relationship between a set of explanatory variables and a binary (yes/no) response variable.

Consider a binary response variable Y and a vector of p explanatory variables, $\mathbf{X} = (X_1, \ldots, X_P)$, let $P(Y = 1 | \mathbf{X} = \mathbf{x} = (x_1, \ldots, x_p)) = \pi(\mathbf{x})$. The logistic regression model is

$$\pi(\mathbf{x}) = \frac{\exp(\alpha + \sum_{k=1}^{p} \beta_k x_k)}{1 + \exp(\alpha + \sum_{k=1}^{p} \beta_k x_k)},$$

where α is the intercept parameter, and β_i refers to the effect x_i has on the odds that Y=1, for $1 \leq i \leq p$. Equivalently, the log of the odds that an event occurs is

$$\log \frac{\pi(\mathbf{x})}{1 + \pi(\mathbf{x})} = \alpha + \sum_{k=1}^{p} \beta_k x_k.$$

This is commonly referred to as a logit link function.

Two stepwise model-building procedures were used in this analysis, namely forward addition and backwards elimination. The forward addition procedure iteratively adds the most influential variable to the model, until there are no more influential variables to include. Conversely, backwards elimination begins with a full model and variables are eliminated iteratively, by determining which variable contributes the least at each step. The process ends when no more variables can be eliminated from the model, or there are no variables remaining in the model. Both procedures can be useful in an exploratory setting, where they can provide evidence of a dependency structure.

Part 10

Barriers to innovation

A full set of tables is available in the Statistical Tables section. Please view Tables 27 to 29 in conjunction with this section.

Factors hampering innovative activity were reported for the three years prior to survey. The main barriers to innovation were adapted from the European model for use within New Zealand. These barriers were:

- Development costs
- Lack of information about finance
- Lack of marketing expertise
- Lack of cooperation with other businesses
- Availability or costs of obtaining intellectual property
- Lack of appropriate personnel
- Lack of management resources.

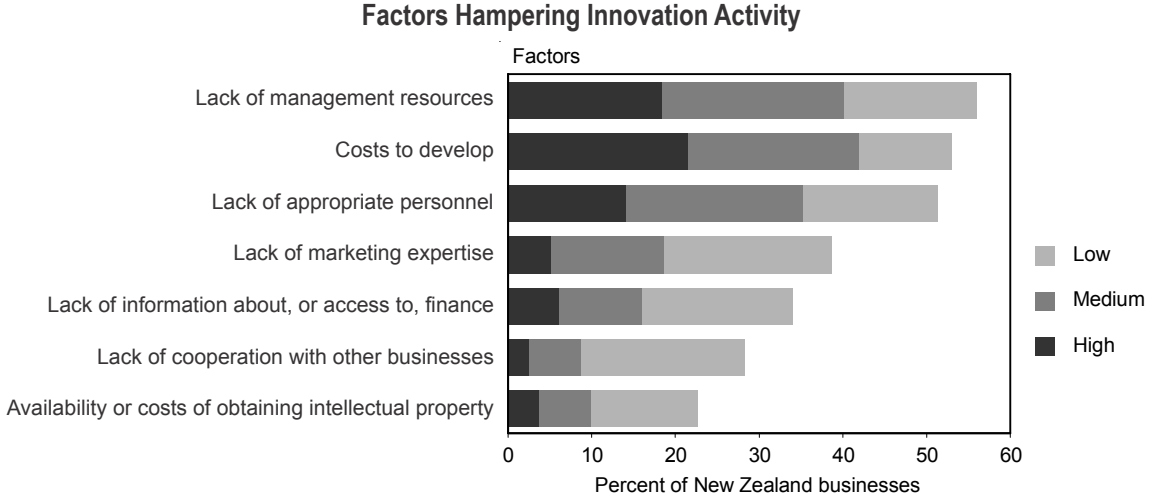
10.1 Overall results

Fifty-six percent of all businesses surveyed rated a lack of management resources as the biggest impediment to innovation, hampering it to a high (18 percent), medium (22 percent) or low (16 percent) degree (see figure 10.01).

Other factors rated by a majority of businesses as hampering innovation were the cost to develop new products, processes or services (53 percent), and lack of appropriate personnel (51 percent).

The availability or cost of intellectual property rated as the lowest impediment to innovation, with only 23 percent of businesses identifying this as hampering innovation activity.

Figure 10.01



10.2 Highest barriers

Whilst a lack of management resources was the largest impediment to innovation overall, a slightly different picture emerges if we look at which factors were rated as hampering innovation to a high degree.

Over 1 in 5 businesses ranked development costs as the highest barrier to innovative activity. By type of innovator (see chapter 5), about one-third of leaders found that development costs were the highest barrier, and nearly 2 in 10 businesses with ongoing or abandoned innovative activity found costs to be hampering innovative activity.

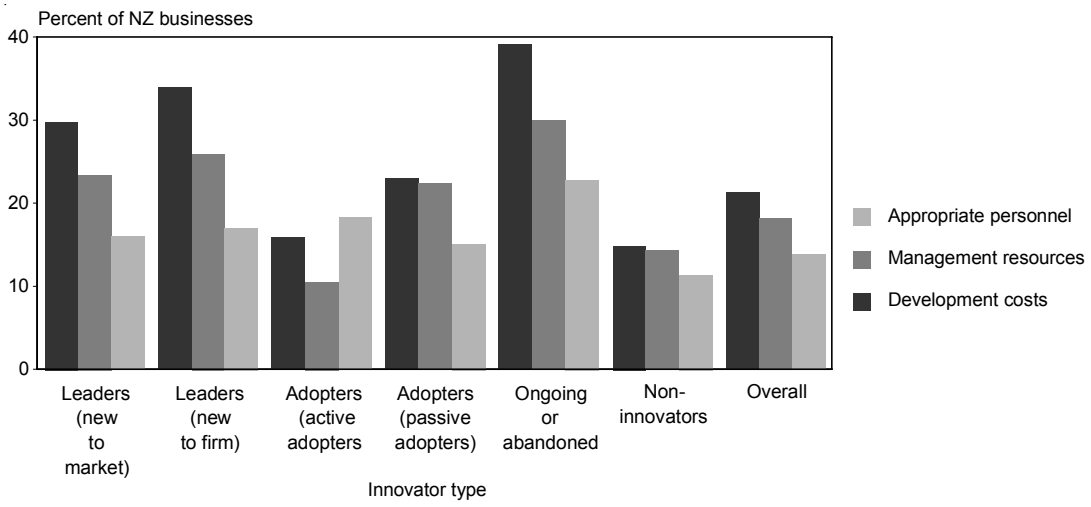
Development costs were reported to hamper innovators to a high degree, as identified by 34 percent of new to market innovators, and by 30 percent of new to firm innovators.

These innovators also identified a lack of management resources as a barrier (26 percent of new to market innovators, and 24 percent of new to firm innovators.

Figure 10.02

Factors Hampering Innovation Activity to a High Degree

by type of innovator

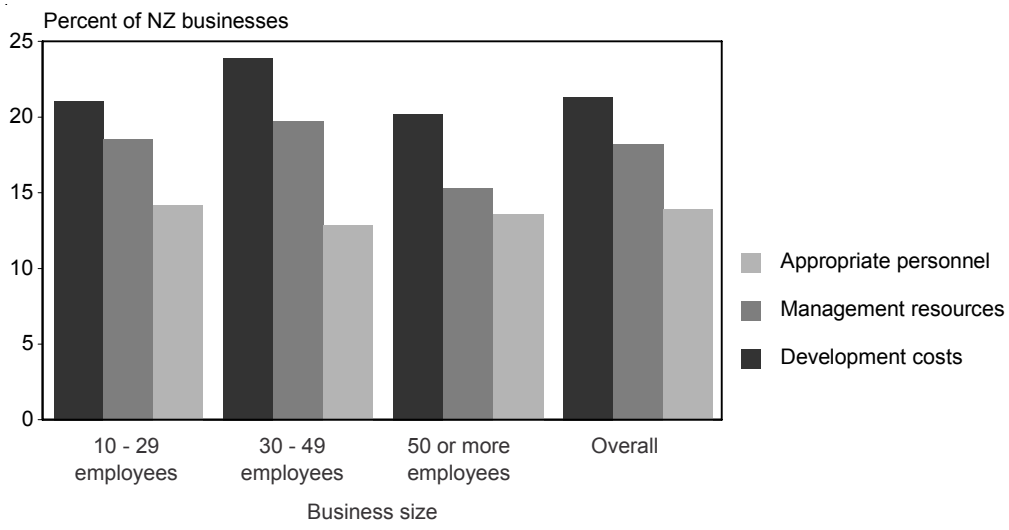


Examining results across different size businesses showed similar results. About 1 in 4 businesses within the 30 to 49 employees category reported that the main barrier to innovative activity was through development costs. About 1 in 5 smaller (10 to 29 employees) and larger (50 or more employees) experienced the same factor.

Figure 10.03

Factors Hampering Innovation Activity to a High Degree

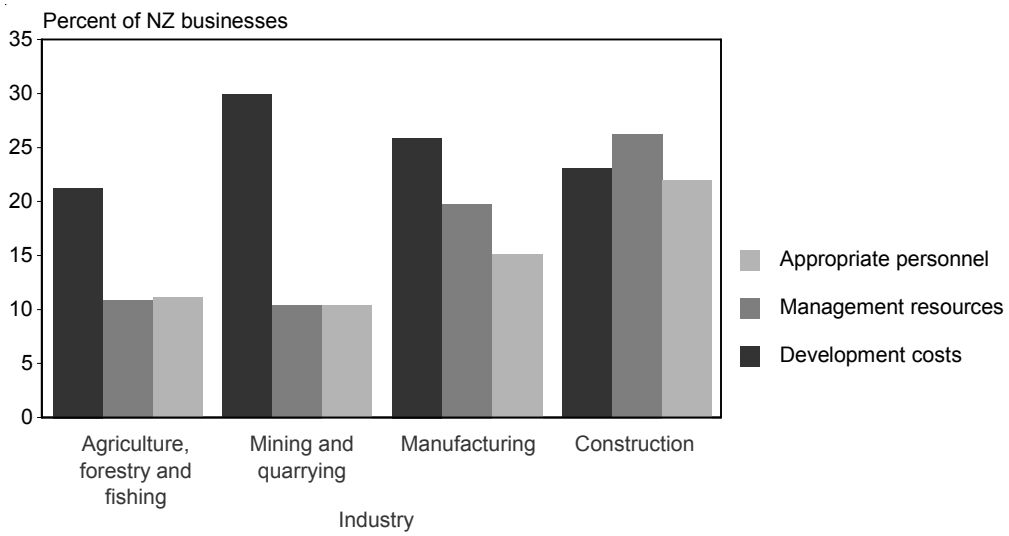
by business size



Results across the industry sector show the mining and quarrying (30 percent) and manufacturing industries (26 percent) reporting that development costs were a major barrier to innovative activity. The construction industry (26 percent) indicated that management resources were a significantly high barrier to innovation.

Figure 10.04

Factors Hampering Innovation Activity to a High Degree – Industry Sector

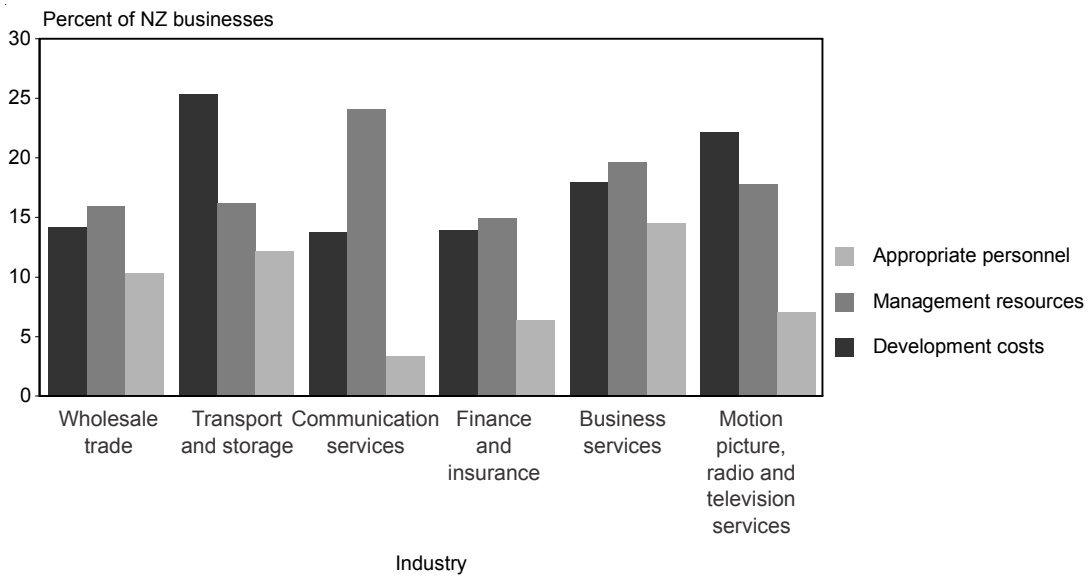


Excludes Electricity, Gas and Water Supply

Across the services sector the same factors were evident. Twenty-five percent of businesses in the transport and storage industry reported development costs as the biggest factor which hampered innovation to a high degree. About 1 in 5 businesses within the communications services industry reported a lack of management resources as a barrier to innovation.

Figure 10.05

Factors Hampering Innovation Activity to a High Degree – Services Sector

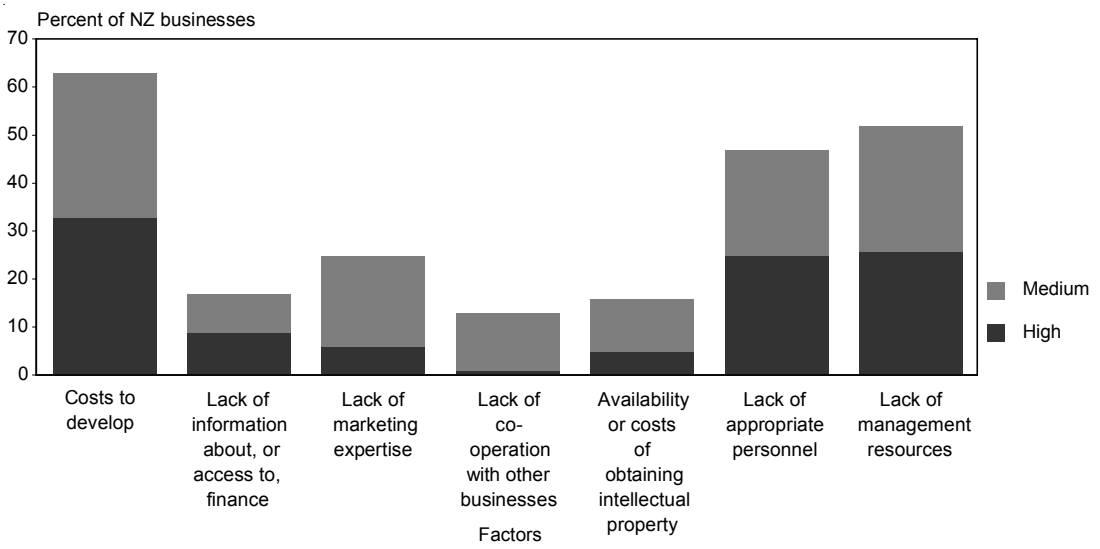


The manufacturing industry group can be further split into high and low technology groupings (please refer to the Technical Notes for a definition of high and low technology manufacturing groups).

It was reported by 1 in 3 of the high technology manufacturing group that development costs were the most likely to hamper innovative activity. This was followed strongly by lack of management resources (26 percent) and lack of appropriate personnel (25 percent).

Figure 10.06

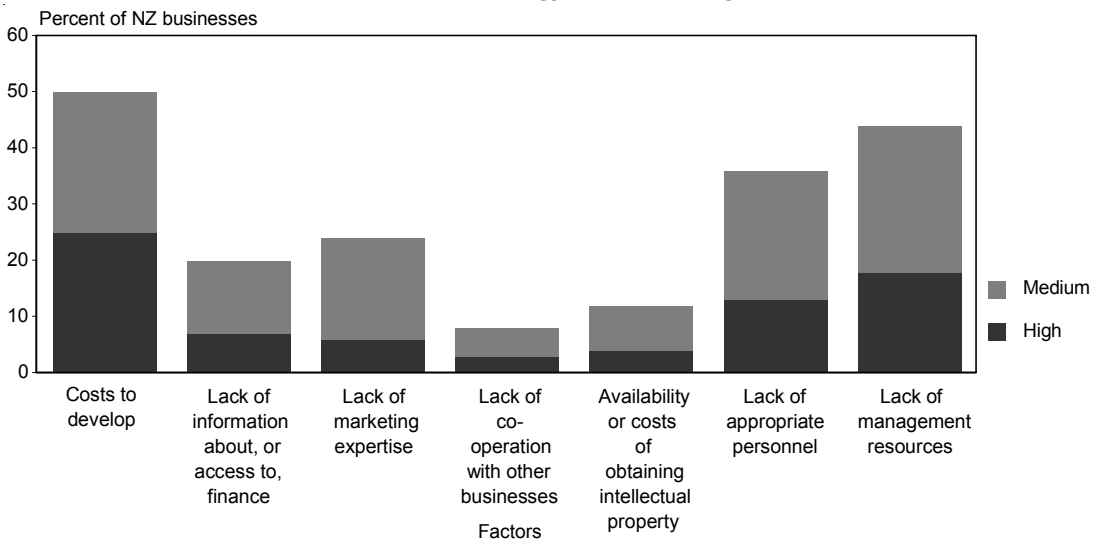
Factors Hampering Innovation Activity to a High or Medium Degree – High Technology Manufacturing



Of the low technology group (see Technical Notes for a definition), development costs were reported as the high barrier to (25 percent of those reporting) innovative activity. Management resources and lack of personnel were also seen as factors that hampered innovative activity but were rated as more moderate effects.

Figure 10.07

Factors Hampering Innovation Activity to a High or Medium Degree – Low Technology Manufacturing



Part 11

Technical notes

This section provides a technical description of the data that has been used to compile this report. It focuses on the data quality and the definitions and processes used for data collection and analysis.

11.1 Survey background

The Innovation Survey 2003 was sponsored by the Ministry of Research, Science and Technology (MoRST). It is the first survey of its type to be conducted in New Zealand and was developed by Statistics New Zealand in collaboration with MoRST.

The main objective of the Innovation Survey is to inform New Zealanders about the level of innovative activity and its contribution to economic growth and development. The information will be used to:

- help Government in forming policies to assist growth
- assist business in forming growth strategies
- inform public debate about innovation and growth.

The Innovation Survey is designed to develop an understanding of the contribution of technological innovation to the New Zealand economy, by producing current and meaningful statistics on the level and characteristics of innovative activity in New Zealand businesses.

The survey was developed with four main objectives in mind:

- to capture levels of business innovation
- to provide information on factors affecting the ability of businesses to innovate
- to find out what outcomes of innovation are for businesses, including its effect on exports
- to provide information on how businesses collaborate with other businesses and institutions in order to innovate.

11.2 Data collection

The Innovation Survey 2003 was a postal survey. Initial contact was made to key and/or complex businesses in the survey by telephone, before postout, to determine the appropriate person(s) within the business with adequate knowledge to answer the survey questions. For all other businesses, the survey form was directed to the 'Managing Director'.

The survey was posted out in late August 2003. Information collected included: whether the enterprise had been involved in any innovative activities during the previous three years; the nature of those activities and their outcomes; and any factors which hampered innovation. Information was also sought on sources of assistance and information, and any collaborative arrangements with other organisations. Financial information on expenditure and export sales was also collected for the business' last financial year.

11.3 Target population

The target population for the Innovation Survey 2003 was live enterprise units on Statistics New Zealand's Business Frame at the population selection date which:

- were economically significant enterprises (those that have an annual GST turnover figure of greater than $30,000)
- had 10 or more employees
- had been operating for one year or more
- were classified to Australian and New Zealand Standard Industrial Classification NZ Version 1996 (ANZSIC96) codes listed as in scope in Table 11.01
- were private enterprises as defined by New Zealand Institutional Sector 1996 Classification (NZISC96) listed in Table 11.02, shown on page 64.

An enterprise is defined as a business or service entity operating in New Zealand such as a company, partnership, trust, government department or agency, state-owned enterprise, university, or self-employed individual.

The final estimated population size for the Innovation Survey 2003 was 11,557 enterprises.

Table 11.01

ANZSIC96 Codes in Scope

ANZSIC96 Code	
Code	**Description**
In scope	
A	Agriculture, Forestry and Fishing
B	Mining and Quarrying
C	Manufacturing
D	Electricity, Gas and Water Supply
E	Construction
F	Wholesale Trade
I	Transport and Storage
J	Communication Services
K	Finance and Insurance
L78	Business Services
P91	Motion Picture, Radio and Television Services
Out of scope	
G	Retail Trade
H	Accommodation, Cafes and Restaurants
L77	Property Services
M	Government Administration and Defence
N	Education
O	Health and Community Services
P92	Libraries, Museums and the Arts
P93	Sport and Recreation
Q	Personal and Other Services

Table 11.02

NZISC96 Codes in Scope

NZISC96 Code	Description
1111	Private Corporate Producer Enterprises
1121	Private Non-Corporate Producer Enterprises
1211	Producer Boards
2211	Private Registered Banks
2221	Private Other Broad Money (M3) Depository Organisations
2291	Private Other Depository Organisations nec
2311	Private Other Financial Organisations Excluding Insurance and Pension Funds
2411	Private Insurance and Pension Funds

11.4 Sample design

The sample design was a two-level stratification according to ANZSIC industry, and employee size groups. This information was obtained using enterprise ANZSIC industry and employee information from Statistics New Zealand's Business Frame.

The first level of stratification was into 29 ANZSIC industry groupings, using a mixture of one, two, and three-digit ANZSIC codes. Within each of the ANZSIC groups, there is a further stratification by employee size group. The five employee size groups used in the sample design are (the use of which varied across industry):

10–29 employees (small)

30–49 employees (medium 1)

50–99 employees (medium 2)

50 or more employees (large)

100 or more employees (very large)

11.5 Measurement errors

The Innovation Survey 2003 results are subject to measurement errors, including both non-sample and sample errors. These errors should be considered when analysing the results from the survey.

11.5.1 Non-sample errors

Non-sampling errors include mistakes by respondents when completing questionnaires, variation in the respondents' interpretation of the questions asked, and errors made during the processing of the data. In addition, the survey applied imputation methodologies to cope with non-respondents. Statistics New Zealand adopts procedures to minimise these types of error, but they may still occur and are not quantifiable.

Given the nature of the data collected, there are limitations on the level of accuracy that can be expected from the Innovation Survey. Many respondents do not keep separate account of their innovation expenditure, records may not be kept in the form required for the survey and estimation may be required. Even though detailed descriptions of what should and should not be included as innovation were provided on the questionnaire, there may still be differences in interpretation by respondents in respect to what constitutes innovation and the nature of any collaborative or cooperative arrangements with other businesses involved in the innovation process.

11.5.2 Sample errors

Categorical variables

The sample was designed to give statistics for the categorical questions with the following maximum sample errors (at the 95 percent confidence level):

- 10 percent absolute sample error for proportions of strata where the employee size group is either 'very large' or 'large'
- 10 percent absolute sample error for proportions of strata where the employee size group is either 'medium' or 'small', and the design level industry is equal to one of the following: Machinery and Equipment Wholesaling, Other Wholesaling, Services to Finance and Insurance, Computer Services, and Other Business Services
- 15 percent absolute sample error for all other strata.

This means, for example, that there is a 95 percent likelihood that the true proportion of the answers to a categorical question, within strata where the employee size group is either 'very large' or 'large', lies within 10 percent of the calculated results.

Financial variables

The sample was designed to provide sample errors for three of the financial variables (value of innovation expenditure, value of export sales, value of operating expenditure) with a maximum of 10 percent relative sample error at the overall level.

The final estimated (but not assured) maximum relative sample errors were calculated as follows:

- 7 percent for value of innovation expenditure
- 6 percent for value of operating expenditure
- 4 percent for value of export sales.

11.6 Response rate

The target overall response rate for the Innovation Survey 2003 was 80 percent. The survey achieved an actual response rate of 81.6 percent, which represented 2987 businesses. Individual response rates are given below.

Table 11.03

Response Rates by Industry

Design level industry	Response rate
	Percent
Agriculture	76.2
Forestry and Logging	83.0
Commercial Fishing	71.0
Mining and Quarrying	80.9
Food, Beverage and Tobacco Manufacturing	83.0
Textile, Clothing, Footwear and Leather Manufacturing	79.0
Wood and Paper Product Manufacturing	85.4
Printing, Publishing and Recorded Media	82.6
Petroleum, Coal and Chemical Manufacturing	85.5
Non-Metallic Mineral Product Manufacturing	76.8
Metal Product Manufacturing	82.2
Transport Equipment Manufacturing	80.5
Electronic and Optical Equipment Manufacturing	78.8
Industrial Equipment Manufacturing	84.2
Other Manufacturing	71.9
Electricity, Gas and Water Supply	85.7
Construction	80.4
Machinery and Equipment Wholesaling	79.2
Other Wholesale Trade	81.6
Transport and Storage	83.5
Postal and Courier Services	82.9
Telecommunication Services	84.8
Finance	84.5
Insurance	83.3
Services to Finance and Insurance	83.2
Technical Services	91.1
Computer Services	80.9
Other Business Services	81.4
Motion Picture, Radio and Television Services	84.3
Total	**81.6**

11.7 Imputation methodology

11.7.1 Unit non-response

Unit (or complete) non-response occurs when units in the sample do not return the questionnaire. The initial selection weight of the remaining units in the stratum was adjusted to account for the unit non-response (no item non-response imputation would occur for the units that did not return the questionnaire).

For each unit i in stratum h the adjusted selection weights are as follows:

$$W_{h\_adjusted} = \frac{N_h}{n_h^r + n_c}$$

where;

N_h = number of units in the stratum population
n_h^r = number of received and valid responses in the stratum population
n_c = number of ceased units in the stratum population

11.7.2 Item non-response

Item (or partial) non-response is when units return the questionnaire but some questions are not answered. No item non-response imputation was carried out for units that did not answer the key questions required to determine type of innovator, and did not answer 60 percent or more of the rest of the questions it is required to answer (based on questionnaire routing rules). The respondents that did not meet this criterion were classified as a non-response and the weights were adjusted accordingly.

Nearest neighbour imputation was used to impute answers for unanswered categorical questions.

Weighted mean imputation was used to impute answers for unanswered numerical questions (value of R&D expenditure, value of innovation expenditure, value of export sales, value of operating expenditure, value of fixed assets expenditure).

Nearest neighbour imputation for responses to categorical questions

Responses were imputed for categorical questions using nearest neighbour imputation. The nearest neighbour method involves finding a donor unit with the most similar set of responses to the unit that needs answers imputed. The donor unit supplies responses for all variables requiring a response. If the donor unit does not respond to any of the variables requiring a response, then the next best donor unit would be used to supply the information. This is continued until all the variables have a response.

Example:

Unit	Variable 1	Variable 2	Variable 3	Variable 4	Variable 5	Variable 6	Variable 7	No. of matches
A	a	b	c	?	?	?	?	
B	a	b	c	a	c	?	?	3
C	a	b	d	d	c	d	a	2
D	a	b	c	a	b	e	?	3

Unit A does not respond to four variables. Units B and D have the greatest number of matches with unit A. Unit D is chosen as the first donor variable as it can supply the greatest number of responses required (supplies responses for variables 4, 5, and 6). Unit C is the donor for variable 7 as units D and B can not supply a response.

Therefore, unit A would have the following responses:

Unit	Variable 1	Variable 2	Variable 3	Variable 4	Variable 5	Variable 6	Variable 7
A	a	b	c	a	b	e	a

The matching of responses for finding the best donor in the Innovation Survey and imputing it, was done within innovator types (using data obtained through key questions to the survey), then by index questions, and then overall. Index questions are those considered to have a relationship (related response topics) with the question requiring imputation.

Mean imputation for dollar value responses

Mean imputation was used to impute dollar values for the questions that required dollar value responses (value of R&D expenditure, value of innovation expenditure, value of export sales, value of operating expenditure, value of expenditure on acquisition of fixed assets). Imputed dollar values were calculated using a weighted mean within imputation cells. Imputation cells were merged/collapsed with other imputation cells if there were too few responses in a cell.

The weighted mean for current period *t* was calculated as follows:

I = number of Enterprises linked for weighted mean imputation within the imputation cell.

(Only linked units are used to calculate the weighted mean. Some significant responding units are removed from the calculation of imputed values for non-respondents)

v_i = value of linked Enterprises i

fw_i = adjusted weight for linked Enterprise i

$$\text{Weighted mean factor} = \frac{\sum_{i}^{I} (v_i * fw_i)}{\sum_{i}^{I} fw_i}$$

11.8 Manufacturing businesses

Manufacturing is of special interest for policy analysis so a further breakdown of results into high and low technology manufacturing groups has been used for Barriers to Innovation (Chapter 10). The make-up of these groups is detailed in table 11.04.

Table 11.4

Technology Groupings for Manufacturing Industries

Code	Description
High technology manufacturing	
C2212	Synthetic Fibre Textile Manufacturing
C253	Basic Chemical Manufacturing
C254	Other Chemical Product Manufacturing
C281	Motor Vehicle and Part Manufacturing
C2823	Railway Equipment Manufacturing
C2824	Aircraft Manufacturing
C2829	Transport Equipment Manufacturing nec
C283	Photographic and Scientific Equipment Manufacturing
C284	Electronic Equipment Manufacturing
C285	Electrical Equipment and Appliance Manufacturing
C286	Industrial Machinery and Equipment Manufacturing
Low technology manufacturing	
C21	Food, Beverage and Tobacco
C22 (excl. C2212)	Textile, Clothing, Footwear and Leather Manufacturing (excl. Synthetic Fibre Textile Manufacturing)
C23	Wood and Paper Product Manufacturing
C24	Printing, Publishing and Recorded Media
C251	Petroleum Refining
C252	Petroleum and Coal Product Manufacturing nec
C255	Rubber Product Manufacturing
C256	Plastic Product Manufacturing
C26	Non-Metallic Mineral Product Manufacturing
C27	Metal Product Manufacturing
C2821	Shipbuilding
C2822	Boatbuilding
C29	Other Manufacturing

11.9 Comparisons between New Zealand and the European Union

A similar study of innovation was carried out in the European Union (EU) in 1997/1998.

Comparisons between the New Zealand and European Union surveys are made in the report. However, these comparisons should be made with caution due to methodological differences.

There are differences in the coverage between the surveys. The European survey results are presented across two sectors of the economy for analytical purposes: industry and services. These groupings were redefined in the New Zealand survey to make them more meaningful for a New Zealand context. Accordingly, the corresponding groupings whilst similar contain different industry groups. As such, most results in this report have been presented by industry with aggregate results at sector level used for occasional comparisons. Industries making up each sector in the respective surveys are detailed below.

Table 11.05

Groupings for Industry and Services Sectors

	Innovation Survey 2003 (New Zealand)		CIS3 (European Union)	
Sector	**ANZSIC Code**	**Description**	**NACE Code**	**Description**
Industry	A	Agriculture, Forestry and Fishing		
	B	Mining and Quarrying	Section C	Mining and Quarrying
	C	Manufacturing	Section D	Manufacturing
	D	Electricity, Gas and Water Supply	Section E	Electricity, Gas and Water Supply
	E	Construction		
Services	F	Wholesale Trade	Division 51	Wholesale Trade
	I	Transport and Storage	Section I	Transport, Storage and Communication
	J	Communication Services		
	K	Finance and Insurance	Section J	Financial Intermediation
	L78	Business Services	Division 72	Computer and Related Activities
			Division 73	Research & Development
			Group 74.2	Architectural and Engineering Activities
			Group 74.3	Technical Testing & Analysis
	P91	Motion Picture, Radio and Television Services		

In addition, there are differences in the reference periods. The New Zealand Survey measures innovation during the three years 2001-2003, while the CIS3 covered the three years 1998-2000 (except for Norway where the survey covered 1999-2001).

11.10 Definitions

The Innovation Survey is designed to collect innovation data in accordance with the definitions contained in the “OECD Oslo Manual” (1996). (The Oslo Manual is available from: www.oecd.org/)

11.10.1 Innovation definitions

For the purposes of this survey, innovation is defined very broadly. It includes the ‘never done before’ as well as changes that others have already done, but that a business is doing for the first time.

For the Innovation Survey 2003 an innovation is defined as:

- the introduction of a new or significantly improved product or service to the market, or
- the introduction of a new or significantly improved process within a business.

Innovation could be the result of the introduction, adaptation or adoption of new knowledge or technological developments. It could also be the result of the combination of existing technologies in novel ways.

New Product or Service: Is a product or service which is new to a business. Its characteristics or intended uses differ significantly from those of the business’s previously produced products or services. It does not include the selling of new products wholly produced and developed by other businesses.

Significantly Improved Product/Service: Is an existing product/service, whose performance has been significantly enhanced or upgraded. Changes to a business’s existing products which are purely aesthetic or which involve minor modifications are not included.

New Production/Manufacturing/Delivery Process: Is a process which is new to a business. It could involve the introduction of new or significantly improved production technology or ways of delivering products.

Significantly Improved Production/Manufacturing/Delivery Process: Involves significant changes to a business's existing processes which result in changes to the level of output, quality of products, or costs of production or distribution.

New or Significantly Improved Service Process: Is a process, which involves new or improved methods of supplying a service that improves the output, cost, quality or delivery of the service.

Cooperation and Collaboration: Means active participation in development and joint R&D with other organisations (businesses, associated businesses, or non-commercial institutions).

Each party should bring exclusive knowledge or expertise to the cooperation or collaboration. It does not necessarily imply that both partners derive immediate commercial benefit from the venture.

It does not include only contracting out work, where there is no active cooperation or collaboration.

11.10.2 Type of innovator definitions

Innovation as defined above is a basic indicator of innovative activity. It provides a general idea of the propensity to innovate, but fails to measure the complexity of the innovation process and does not give any indication of the intensity or quality of innovation. As such, several types of innovators were defined and used in this report in order to further differentiate businesses according to how they undertake their innovation activities. The types of innovators used in this report are:

Leaders: are those innovative businesses that that have introduced at least one innovative product, process or service to the market in the last three years that was developed mainly by the business or in partnership with others. They can be divided into:

- *New to Market:* innovators present these innovations to the market first.
- *New to Firm:* innovators are similar but their innovation is only new to the firm and not first on the market.

Adopters: are those businesses that adapt innovations from other businesses to their own business. They can be divided into two classifications:

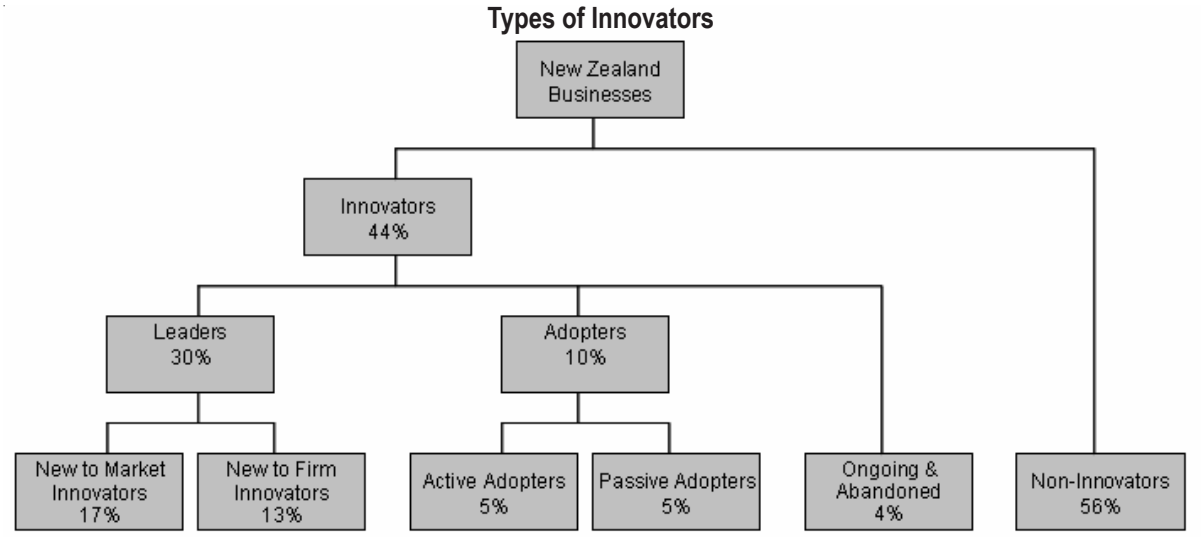
- *Active adopters:* obtain other's innovations and significantly improve them through their own processes.
- *Passive adopters:* incorporate other's innovations into their business directly without improvement.

Ongoing and abandoned: innovators have performed some sort of innovative activity and had either: abandoned the innovation; or else the innovative activities were still in progress.

Non-innovators: are businesses who had not introduced any innovations.

The relationship between each of these types of innovators is illustrated below:

Figure 11.01



11.10.3 Other definitions

ANZSIC: Australian and New Zealand Standard Industrial Classification System – NZ Version 1996.

Business Frame: A register of all businesses operating in New Zealand.

Employees: The number of employees is defined by an enterprise's Rolling Mean Employment (RME) Count. RME is a twelve month moving average of the monthly Employment Count (EC) figure. The EC is obtained from taxation data.

Enterprise: A business or service entity operating in New Zealand. It can be a company, partnership, trust, estate, incorporated society, producer board, local or central government organisation, voluntary organisation or self-employed individual.

Goods and Services Tax (GST): Respondents are asked to exclude GST if possible in the financial figures provided in the questionnaire. If they have not, Statistics New Zealand takes out GST to make all enterprises comparable.

Innovating Business: For the purposes of this survey, an innovating business is one which indicated that they had successfully implemented an innovation. This corresponds to all the innovator types described in section 11.10.2 above, except 'Ongoing and Abandoned' and 'Non-Innovators'.

Last Financial Year: For the purposes of this survey, this refers to the last financial year for which the business had results available as at August 2003, as entered on the questionnaire.

Statistical tables

Table 1

Innovation Activity in New Zealand

August 2003

	Total number of businesses[2]	Proportion of all businesses[1]			
		Businesses with innovation activity	Implemented	Ongoing and abandoned	Businesses without innovation activity
		Percent			
Business Size					
10 - 29 Employees[3]	8,206	40	36	4	60
30 - 49 Employees	1,575	50	45	5	50
50 or more Employees	1,776	59	54	5	41
Industry					
Industry Sector					
Agriculture, Forestry and Fishing	1,476	32	26	6	68
Mining and Quarrying*	57	37	32	5	63
Manufacturing	3,522	56	52	5	43
Electricity, Gas and Water Supply*	12	50	25	0	50
Construction	1,209	25	24	1	75
Total	**6,276**	**44**	**40**	**4**	**56**
Services Sector					
Wholesale Trade	1,767	46	42	4	54
Transport and Storage	885	38	33	5	62
Communication Services*	87	41	41	0	59
Finance and Insurance	282	54	50	4	45
Business Services	2,181	42	40	2	58
Motion Picture, Radio and Television Services	84	61	50	7	39
Total	**5,286**	**42**	**39**	**3**	**58**
Overall	**11,562**	**44**	**40**	**4**	**56**

(1) Proportions are of New Zealand businesses in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Table 2

Number of Innovations Introduced[1][2]

August 2003

	Number of businesses with innovation activities	Number of new or significantly improved products and/or services introduced to the market during previous three years			
		Zero	1 to 2	3 to 10	More than 10
		Proportion of businesses with innovation activities			
Business Size					
10 - 29 Employees[3]	2,976	15	43	34	8
30 - 49 Employees	714	11	43	38	9
50 or more Employees	960	9	33	45	13
Industry					
Industry Sector					
Agriculture, Forestry and Fishing	381	46	39	15	0
Mining and Quarrying*	18	33	33	33	0
Manufacturing	1,824	7	41	39	13
Electricity, Gas and Water Supply*	3	0	100	0	0
Construction	288	4	50	46	1
Total	**2,514**	**13**	**42**	**36**	**9**
Services Sector					
Wholesale Trade	744	13	27	42	17
Transport and Storage	291	11	51	33	6
Communication Services*	36	0	42	33	8
Finance and Insurance	135	13	40	44	9
Business Services	882	14	47	35	3
Motion Picture, Radio and Television Services	42	14	57	21	7
Total	**2,130**	**13**	**40**	**37**	**9**
Overall	**4,644**	**13**	**41**	**37**	**9**

Table 2
continued

Proportion of Total Sales from Innovations Introduced[1][2]

Last financial year[4]

	Number of businesses who have introduced innovations	Proportion of total sales from new or significantly improved products and/or services introduced to the market during previous three years			
		Zero	1 to 30%	31 to 60%	More than 60%
		Proportion of businesses with innovation activities			
Business Size					
10 - 29 Employees[3]	2,532	7	78	9	7
30 - 49 Employees	639	10	80	5	5
50 or more Employees	870	4	85	7	3
Industry					
Industry Sector					
Agriculture, Forestry and Fishing	207	7	86	1	4
Mining and Quarrying*	12	25	50	25	0
Manufacturing	1,686	5	78	9	6
Electricity, Gas and Water Supply*	6	50	0	0	0
Construction	276	5	95	1	0
Total	**2,187**	**6**	**80**	**8**	**5**
Services Sector					
Wholesale Trade	648	7	78	10	5
Transport and Storage	261	11	86	0	0
Communication Services*	36	0	83	8	8
Finance and Insurance	126	2	83	5	5
Business Services	753	7	74	10	8
Motion Picture, Radio and Television Services	36	17	75	0	8
Total	**1,860**	**7**	**78**	**8**	**6**
Overall	**4,047**	**6**	**79**	**8**	**5**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

(4) This refers to the last financial year for which the business had results available as at August 2003, as entered on the questionnaire.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.
Results marked with an * should be treated with caution.

Table 3

Type of Innovators[1][2]

August 2003

	Total number of businesses	Leaders		Adoptors		Ongoing & Abandoned	Non-Innovators
		New to market	New to firm	Active adoptors	Passive adoptors		
		Proportion of all businesses					
Business Size							
10 - 29 Employees[3]	8,208	14	12	6	5	4	60
30 - 49 Employees	1,575	19	17	4	6	5	50
50 or more Employees	1,776	26	18	6	4	5	41
Industry							
Industry Sector							
Agriculture, Forestry and Fishing	1,473	9	7	3	8	6	68
Mining and Quarrying*	60	15	10	0	5	5	60
Manufacturing	3,531	24	18	6	3	5	43
Electricity, Gas and Water Supply*	12	0	0	25	0	25	50
Construction	1,209	5	6	9	4	1	75
Total	**6,285**	**17**	**13**	**6**	**5**	**4**	**55**
Services Sector							
Wholesale Trade	1,764	19	12	4	7	4	54
Transport and Storage	885	14	14	4	1	5	62
Communication Services*	87	21	10	7	3	0	59
Finance and Insurance	279	18	23	4	4	5	46
Business Services	2,178	16	13	6	6	2	58
Motion Picture, Radio and Television Services	84	11	18	7	14	7	39
Total	**5,277**	**17**	**14**	**5**	**5**	**3**	**56**
Overall	**11,562**	**17**	**13**	**5**	**5**	**4**	**56**

(1) Proportions are of New Zealand businesses in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.
Results marked with an * should be treated with caution.

Table 4

Source of Information, by Type of Innovator[1][2]

August 2003

Source of Information / Type of Innovator	Number of businesses with innovation activity in the last three years	Importance			
		Very important	Somewhat important	Not important	Not used
		Percent of innovating businesses			
Customers (intermediate or final customers)					
Leaders (new to market)	1,929	71	23	3	3
Leaders (new to firm)	1,527	69	21	5	6
Adopters (active adopters)	621	46	37	1	16
Adopters (passive adopters)	573	49	18	12	20
Ongoing or Abandoned	459	64	27	5	3
All Innovating Businesses	**5,109**	**64**	**24**	**4**	**7**
Suppliers					
Leaders (new to market)	1,929	34	34	23	9
Leaders (new to firm)	1,527	32	40	17	11
Adopters (active adopters)	621	42	34	11	14
Adopters (passive adopters)	573	50	29	8	13
Ongoing or Abandoned	459	26	44	22	7
All Innovating Businesses	**5,109**	**35**	**36**	**18**	**10**
From Within this Business (e.g. employees)					
Leaders (new to market)	1,929	67	25	3	4
Leaders (new to firm)	1,527	75	20	3	1
Adopters (active adopters)	621	54	37	2	7
Adopters (passive adopters)	573	45	34	10	11
Ongoing or Abandoned	459	58	29	10	3
All Innovating Businesses	**5,109**	**65**	**26**	**4**	**4**
Other NZ Businesses in the Same Industry					
Leaders (new to market)	1,929	10	31	34	25
Leaders (new to firm)	1,527	22	40	20	18
Adopters (active adopters)	621	23	30	26	21
Adopters (passive adopters)	573	30	33	14	24
Ongoing or Abandoned	459	28	34	18	20
All Innovating Businesses	**5,109**	**19**	**34**	**25**	**22**
Other NZ Businesses in Other Industries					
Leaders (new to market)	1,929	8	31	35	27
Leaders (new to firm)	1,524	7	31	36	26
Adopters (active adopters)	621	5	36	26	33
Adopters (passive adopters)	573	4	23	40	32
Ongoing or Abandoned	459	8	42	29	20
All Innovating Businesses	**5,106**	**7**	**32**	**34**	**27**
Other Businesses Overseas					
Leaders (new to market)	1,929	21	38	21	19
Leaders (new to firm)	1,527	18	27	26	28
Adopters (active adopters)	621	16	28	18	37
Adopters (passive adopters)	573	18	28	27	27
Ongoing or Abandoned	459	14	38	30	18
All Innovating Businesses	**5,109**	**19**	**32**	**24**	**25**

Table 4
continued

Source of Information, by Type of Innovator[1][2]

August 2003

Source of Information / Type of Innovator	Number of businesses with innovation activity in the last three years	Importance			
		Very important	Somewhat important	Not important	Not used
		Percent of innovating businesses			
Industry or Employer Organisations					
Leaders (new to market)	1,929	8	20	41	32
Leaders (new to firm)	1,527	10	23	33	34
Adopters (active adopters)	621	4	36	29	30
Adopters (passive adopters)	573	15	23	23	40
Ongoing or Abandoned	459	5	33	39	24
All Innovating Businesses	**5,109**	**8**	**24**	**35**	**32**
Books, Trade Journals, Conferences or Shows					
Leaders (new to market)	1,929	23	38	25	15
Leaders (new to firm)	1,527	18	43	20	19
Adopters (active adopters)	621	20	41	19	20
Adopters (passive adopters)	573	12	47	19	21
Ongoing or Abandoned	459	12	41	32	15
All Innovating Businesses	**5,109**	**19**	**41**	**23**	**17**
Banks, Accountants or Financial Consultants					
Leaders (new to market)	1,929	9	25	41	25
Leaders (new to firm)	1,524	19	27	33	21
Adopters (active adopters)	621	21	37	19	23
Adopters (passive adopters)	573	16	14	41	30
Ongoing or Abandoned	459	12	29	33	25
All Innovating Businesses	**5,106**	**15**	**26**	**35**	**24**
Central/local Government Assistance Services					
Leaders (new to market)	1,929	3	13	43	41
Leaders (new to firm)	1,524	1	11	40	48
Adopters (active adopters)	621	0	15	28	57
Adopters (passive adopters)	573	1	13	32	54
Ongoing or Abandoned	459	10	8	39	42
All Innovating Businesses	**5,106**	**2**	**12**	**39**	**47**
Universities					
Leaders (new to market)	1,929	2	16	40	42
Leaders (new to firm)	1,524	1	6	42	51
Adopters (active adopters)	621	1	13	24	63
Adopters (passive adopters)	573	1	8	36	55
Ongoing or Abandoned	459	6	17	39	39
All Innovating Businesses	**5,106**	**2**	**12**	**38**	**48**
Other Research Institutions, Associations, Research Consultants or Research Services					
Leaders (new to market)	1,929	7	25	33	35
Leaders (new to firm)	1,527	3	18	35	43
Adopters (active adopters)	621	10	18	21	51
Adopters (passive adopters)	573	17	13	29	42
Ongoing or Abandoned	459	9	22	35	35
All Innovating Businesses	**5,109**	**8**	**20**	**32**	**40**

(1) Proportions are of New Zealand businesses with innovation activities in each category.
(2) For more information on businesses included, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.

Table 5

Source of Information, by Business Size[1][2]

August 2003

Source of Information / Business Size	Number of businesses with innovation activity in the last three years	Importance			
		Very important	Somewhat important	Not important	Not used
		Percent of innovating businesses			
Customers (intermediate or final customers)					
10 - 29 Employees[3]	3,267	63	23	5	9
30 - 49 Employees	789	62	30	3	5
50 or more Employees	1,053	70	22	4	3
All Innovating Businesses	**5,109**	**64**	**24**	**4**	**7**
Suppliers					
10 - 29 Employees	3,267	37	32	19	12
30 - 49 Employees	789	37	41	13	9
50 or more Employees	1,050	30	46	17	7
All Innovating Businesses	**5,106**	**35**	**36**	**18**	**10**
From Within this Business (eg employees)					
10 - 29 Employees	3,267	61	27	5	6
30 - 49 Employees	789	67	27	3	2
50 or more Employees	1,053	74	23	2	2
All Innovating Businesses	**5,109**	**65**	**26**	**4**	**4**
Other NZ Businesses in the Same Industry					
10 - 29 Employees	3,267	20	33	24	23
30 - 49 Employees	789	20	31	29	20
50 or more Employees	1,053	15	40	26	19
All Innovating Businesses	**5,109**	**19**	**34**	**25**	**22**
Other NZ Businesses in Other Industries					
10 - 29 Employees	3,267	6	31	33	30
30 - 49 Employees	789	10	33	35	22
50 or more Employees	1,053	7	33	38	22
All Innovating Businesses	**5,109**	**7**	**32**	**34**	**27**
Other Businesses Overseas					
10 - 29 Employees	3,267	17	30	25	29
30 - 49 Employees	789	18	33	25	23
50 or more Employees	1,053	25	40	19	15
All Innovating Businesses	**5,109**	**19**	**33**	**24**	**25**
Industry or Employer Organisations					
10 - 29 Employees	3,267	9	23	32	36
30 - 49 Employees	789	8	27	37	29
50 or more Employees	1,050	7	26	42	25
All Innovating Businesses	**5,106**	**8**	**24**	**35**	**32**
Books, Trade Journals, Conferences or Shows					
10 - 29 Employees	3,267	19	40	22	19
30 - 49 Employees	789	20	40	25	16
50 or more Employees	1,053	17	47	25	11
All Innovating Businesses	**5,109**	**19**	**41**	**23**	**17**
Banks, Accountants or Financial Consultants					
10 - 29 Employees	3,267	16	26	33	25
30 - 49 Employees	789	16	29	34	21
50 or more Employees	1,050	9	23	43	25
All Innovating Businesses	**5,106**	**15**	**26**	**35**	**24**

Table 5
continued

Source of Information, by Business Size[1][2]

August 2003

Source of Information / Business Size	Number of businesses with innovation activity in the last three years	Importance			
		Very important	Somewhat important	Not important	Not used
		Percent of innovating businesses			
Central/local Government Assistance Services					
10 - 29 Employees	3,267	2	12	36	50
30 - 49 Employees	789	2	12	45	41
50 or more Employees	1,053	5	15	41	40
All Innovating Businesses	**5,109**	**2**	**12**	**39**	**47**
Universities					
10 - 29 Employees	3,267	1	9	37	53
30 - 49 Employees	789	1	11	44	44
50 or more Employees	1,053	4	21	36	39
All Innovating Businesses	**5,109**	**2**	**12**	**38**	**48**
Other Research Institutions, Associations, Research Consultants or Research Services					
10 - 29 Employees	3,267	7	17	32	44
30 - 49 Employees	789	5	19	38	39
50 or more Employees	1,050	10	33	28	29
All Innovating Businesses	**5,106**	**8**	**21**	**32**	**40**
Other					
10 - 29 Employees	3,267	7	2	38	53
30 - 49 Employees	789	4	1	37	57
50 or more Employees	1,053	6	1	34	58
All Innovating Businesses	**5,109**	**6**	**1**	**37**	**55**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.

Table 6

Source of Information, by Industry[1][2]

August 2003

Source of Information Business Size	Number of businesses with innovation activity in the last three years	Importance			
		Very important	Somewhat important	Not important	Not used
		Percent of innovating businesses			
Customers (intermediate or final customers)					
Agriculture, Forestry and Fishing	474	61	26	3	9
Mining and Quarrying*	21	71	29	14	0
Manufacturing	1,989	67	23	4	7
Electricity, Gas and Water Supply*	6	100	0	50	0
Construction	300	44	43	11	2
Wholesale Trade	819	59	27	4	10
Transport and Storage	336	77	15	2	6
Communication Services*	36	75	25	0	0
Finance and Insurance	153	69	25	2	4
Business Services	918	66	19	5	10
Motion Picture, Radio and Television Services	48	56	38	6	6
All Innovating Businesses	**5,100**	**64**	**24**	**4**	**8**
Suppliers					
Agriculture, Forestry and Fishing	477	35	29	23	12
Mining and Quarrying*	21	29	43	14	0
Manufacturing	1,995	33	43	15	8
Electricity, Gas and Water Supply*	6	0	50	50	0
Construction	297	66	19	4	12
Wholesale Trade	819	38	34	21	7
Transport and Storage	336	37	34	16	13
Communication Services*	36	25	42	25	17
Finance and Insurance	153	35	31	24	12
Business Services	918	29	35	20	17
Motion Picture, Radio and Television Services	51	24	35	41	0
All Innovating Businesses	**5,109**	**35**	**36**	**18**	**10**
From Within this Business (eg employees)					
Agriculture, Forestry and Fishing	471	55	22	8	15
Mining and Quarrying*	21	57	29	0	14
Manufacturing	1,998	64	28	5	3
Electricity, Gas and Water Supply*	6	100	0	0	0
Construction	297	55	44	0	3
Wholesale Trade	819	65	26	5	5
Transport and Storage	336	65	21	4	9
Communication Services*	36	92	17	0	0
Finance and Insurance	153	76	24	0	2
Business Services	921	72	23	3	2
Motion Picture, Radio and Television Services	51	65	24	6	0
All Innovating Businesses	**5,109**	**65**	**26**	**4**	**4**

Table 6
continued

Source of Information, by Industry[1][2]

August 2003

Source of Information / Industry	Number of businesses with innovation activity in the last three years	Importance			
		Very important	Somewhat important	Not important	Not used
		Percent of innovating businesses			
Other NZ Businesses in the Same Industry					
Agriculture, Forestry and Fishing	474	44	28	10	18
Mining and Quarrying*	21	29	57	14	0
Manufacturing	1,998	15	33	27	24
Electricity, Gas and Water Supply*	6	0	50	0	50
Construction	297	5	46	31	18
Wholesale Trade	816	15	34	27	24
Transport and Storage	336	24	35	21	21
Communication Services*	39	23	31	23	15
Finance and Insurance	153	24	41	20	10
Business Services	921	18	31	28	22
Motion Picture, Radio and Television Services	48	38	38	19	13
All Innovating Businesses	**5,109**	**19**	**34**	**25**	**22**
Other NZ Businesses in Other Industries					
Agriculture, Forestry and Fishing	471	1	43	29	27
Mining and Quarrying*	21	14	43	43	29
Manufacturing	1,995	5	33	33	28
Electricity, Gas and Water Supply*	6	0	50	50	0
Construction	297	24	23	23	30
Wholesale Trade	822	8	30	41	21
Transport and Storage	336	6	38	30	26
Communication Services*	36	17	25	42	8
Finance and Insurance	153	4	29	43	27
Business Services	921	7	26	35	31
Motion Picture, Radio and Television Services	51	6	29	47	18
All Innovating Businesses	**5,109**	**7**	**32**	**34**	**27**
Other Businesses Overseas					
Agriculture, Forestry and Fishing	477	25	19	33	22
Mining and Quarrying*	21	43	29	14	14
Manufacturing	1,998	19	35	22	24
Electricity, Gas and Water Supply*	6	50	0	50	0
Construction	297	9	39	22	29
Wholesale Trade	819	22	36	20	21
Transport and Storage	336	11	38	27	26
Communication Services*	36	25	25	17	25
Finance and Insurance	153	22	29	35	18
Business Services	921	16	27	23	33
Motion Picture, Radio and Television Services	51	12	35	35	24
All Innovating Businesses	**5,115**	**19**	**32**	**24**	**25**

Table 6
continued

Source of Information, by Industry[1][2]

August 2003

Source of Information / Industry	Number of businesses with innovation activity in the last three years	Importance			
		Very important	Somewhat important	Not important	Not used
		Percent of innovating businesses			
Industry or Employer Organisations					
Agriculture, Forestry and Fishing	471	15	43	16	29
Mining and Quarrying*	21	14	43	43	14
Manufacturing	1,992	6	22	39	33
Electricity, Gas and Water Supply*	6	0	0	50	0
Construction	297	16	29	27	26
Wholesale Trade	816	5	18	41	36
Transport and Storage	336	4	19	36	41
Communication Services*	36	8	50	42	17
Finance and Insurance	153	12	27	37	22
Business Services	918	10	26	33	31
Motion Picture, Radio and Television Services	48	13	19	44	31
All Innovating Businesses	**5,094**	**8**	**24**	**35**	**33**
Books, Trade Journals, Conferences or Shows					
Agriculture, Forestry and Fishing	474	18	46	20	15
Mining and Quarrying*	21	14	57	14	29
Manufacturing	1,995	22	43	20	15
Electricity, Gas and Water Supply*	6	0	50	0	50
Construction	297	17	36	21	25
Wholesale Trade	819	16	41	26	17
Transport and Storage	336	5	41	31	22
Communication Services*	36	8	33	42	17
Finance and Insurance	153	14	27	41	20
Business Services	918	22	39	20	18
Motion Picture, Radio and Television Services	51	18	29	29	18
All Innovating Businesses	**5,106**	**19**	**41**	**23**	**17**
Banks, Accountants or Financial Consultants					
Agriculture, Forestry and Fishing	474	30	25	20	25
Mining and Quarrying*	21	0	43	43	0
Manufacturing	1,998	12	21	38	29
Electricity, Gas and Water Supply*	6	0	50	0	0
Construction	297	4	59	23	14
Wholesale Trade	816	11	24	41	23
Transport and Storage	336	22	24	32	21
Communication Services*	39	8	31	46	8
Finance and Insurance	153	20	31	35	16
Business Services	918	15	29	35	21
Motion Picture, Radio and Television Services	51	24	12	41	18
All Innovating Businesses	**5,109**	**15**	**26**	**35**	**24**

Table 6
continued

Source of Information, by Industry[1][2]

August 2003

Source of Information Industry	Number of businesses with innovation activity in the last three years	Importance			
		Very important	Somewhat important	Not important	Not used
		Percent of innovating businesses			
Central/local Government Assistance Services					
Agriculture, Forestry and Fishing	477	8	23	23	43
Mining and Quarrying*	21	14	0	57	43
Manufacturing	1,995	3	11	39	47
Electricity, Gas and Water Supply*	6	0	0	50	0
Construction	297	0	4	49	47
Wholesale Trade	819	0	10	42	47
Transport and Storage	336	1	4	41	55
Communication Services*	39	0	0	62	23
Finance and Insurance	153	0	12	45	41
Business Services	918	1	19	35	45
Motion Picture, Radio and Television Services	48	19	6	50	31
All Innovating Businesses	**5,109**	**2**	**12**	**39**	**46**
Universities					
Agriculture, Forestry and Fishing	477	1	26	31	40
Mining and Quarrying*	21	0	0	57	29
Manufacturing	1,998	3	11	38	48
Electricity, Gas and Water Supply*	6	0	0	100	50
Construction	297	0	7	47	44
Wholesale Trade	819	2	11	36	51
Transport and Storage	336	0	2	36	63
Communication Services*	39	0	8	54	31
Finance and Insurance	153	2	14	51	35
Business Services	921	1	14	36	49
Motion Picture, Radio and Television Services	51	0	18	47	41
All Innovating Businesses	**5,118**	**2**	**12**	**38**	**48**
Other Research Institutions, Associations, Research Consultants or Research Services					
Agriculture, Forestry and Fishing	474	28	24	22	26
Mining and Quarrying*	21	14	14	57	14
Manufacturing	1,989	6	21	32	42
Electricity, Gas and Water Supply*	6	0	0	50	50
Construction	297	0	22	36	42
Wholesale Trade	816	6	21	33	41
Transport and Storage	336	5	19	28	48
Communication Services*	36	8	42	42	25
Finance and Insurance	153	12	20	39	33
Business Services	921	5	18	33	44
Motion Picture, Radio and Television Services	51	0	24	53	24
All Innovating Businesses	**5,100**	**8**	**21**	**32**	**40**

Table 6
continued

Source of Information, by Industry[1][2]

August 2003

Source of Information / Industry	Number of businesses with innovation activity in the last three years	Importance			
		Very important	Somewhat important	Not important	Not used
		Percent of innovating businesses			
Other					
Agriculture, Forestry and Fishing	474	2	6	41	52
Mining and Quarrying*	21	0	0	43	57
Manufacturing	1,998	7	1	36	55
Electricity, Gas and Water Supply*	6	0	0	50	50
Construction	297	2	1	34	62
Wholesale Trade	819	14	1	39	48
Transport and Storage	336	2	4	45	50
Communication Services*	36	8	0	58	42
Finance and Insurance	153	6	0	41	49
Business Services	921	3	1	34	62
Motion Picture, Radio and Television Services	48	6	0	44	56
All Innovating Businesses	**5,109**	**6**	**1**	**38**	**55**

(1) Proportions are of New Zealand businesses with innovation activities in each category.
(2) For more information on businesses included, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Table 7

Percent of Businesses Rating the Source 'Very Important', by Industry

August 2003

	Source of information				
	Customers	Suppliers	Within same business	Other business	Businesses overseas
Agriculture, Forestry and Fishing					
Agriculture	65	38	55	52	28
Forestry and Logging	41	14	57	5	9
Commercial Fishing*	67	29	67	29	29
Total Agriculture, Forestry and Fishing	**61**	**35**	**56**	**45**	**25**
Mining and Quarrying*	**71**	**29**	**57**	**29**	**43**
Manufacturing					
Heavy Manufacturing					
Petroleum, Coal and Chemical Manufacturing	64	18	66	10	28
Non-Metallic Mineral Product Manufacturing	65	21	47	16	15
Metal Product Manufacturing	70	31	62	19	13
Transport Equipment Manufacturing	62	29	76	16	16
Total Heavy Manufacturing	**67**	**26**	**64**	**16**	**18**
Light Manufacturing					
Food, Beverage and Tobacco Manufacturing	66	35	66	25	17
Textile, Clothing, Footwear and Leather Manufacturing	72	44	64	12	15
Wood and Paper Product Manufacturing	43	51	74	21	18
Printing, Publishing and Recorded Media	63	37	54	15	28
Electronic and Optical Equipment Manufacturing	83	26	71	13	26
Industrial Equipment Manufacturing	68	30	65	14	25
Other Manufacturing	75	33	50	9	9
Total light manufacturing	**66**	**37**	**64**	**16**	**20**
Total Manufacturing	**66**	**33**	**64**	**16**	**19**
Electricity, Gas and Water Supply*	**50**	**50**	**100**	**0**	**0**
Construction	**45**	**65**	**55**	**6**	**9**
Wholesale Trade					
Machinery and Equipment Wholesaling	72	51	72	15	24
Other Wholesale Trade	54	34	62	16	22
Total Wholesale Trade	**59**	**38**	**65**	**15**	**22**
Transport and Storage	**77**	**37**	**65**	**25**	**11**
Communication Services					
Postal and Courier Services*	67	20	100	20	20
Telecommunication Services*	57	29	71	29	29
Total Communication Services	**62**	**25**	**83**	**25**	**25**
Finance and Insurance					
Finance	72	28	78	33	28
Insurance*	88	38	75	25	25
Services to Finance and Insurance	64	40	72	20	20
Total Finance and Insurance	**71**	**35**	**75**	**25**	**24**
Business Services					
Technical Services	73	25	73	18	23
Computer Services	80	18	84	5	26
Other Business Services	61	34	68	22	11
Total Business Services	**66**	**29**	**72**	**18**	**16**
Motion Picture, Radio and Television Services	**53**	**24**	**65**	**38**	**12**
All Innovating Businesses	64	35	65	20	19

Table 7
continued

Percent of Businesses Rating the Source 'Very Important', by Industry

August 2003

	Source of information					
	Employer organisations	Books	Banks	Government	Universities	Other research
Agriculture, Forestry and Fishing						
Agriculture	16	20	32	9	2	32
Forestry and Logging	5	5	19	0	0	0
Commercial Fishing*	14	14	14	0	0	14
Total Agriculture, Forestry and Fishing	**15**	**18**	**30**	**8**	**1**	**27**
Mining and Quarrying*	**14**	**0**	**0**	**0**	**0**	**14**
Manufacturing						
Heavy Manufacturing						
Petroleum, Coal and Chemical Manufacturing	2	18	3	7	3	10
Non-Metallic Mineral Product Manufacturing	0	21	0	5	11	11
Metal Product Manufacturing	12	7	11	1	2	3
Transport Equipment Manufacturing	5	27	14	8	3	3
Total Heavy Manufacturing	**7**	**15**	**8**	**4**	**3**	**6**
Light Manufacturing						
Food, Beverage and Tobacco Manufacturing	8	27	14	2	2	16
Textile, Clothing, Footwear and Leather Manufacturing	10	25	15	2	3	2
Wood and Paper Product Manufacturing	13	20	16	2	0	5
Printing, Publishing and Recorded Media	10	30	20	0	0	2
Electronic and Optical Equipment Manufacturing	2	23	11	2	4	6
Industrial Equipment Manufacturing	2	35	14	7	1	5
Other Manufacturing	2	20	7	0	6	0
Total light manufacturing	**7**	**26**	**14**	**2**	**2**	**6**
Total Manufacturing	**7**	**23**	**12**	**3**	**3**	**6**
Electricity, Gas and Water Supply*	**0**	**0**	**0**	**50**	**0**	**0**
Construction	**17**	**17**	**4**	**1**	**0**	**0**
Wholesale Trade						
Machinery and Equipment Wholesaling	3	32	11	0	4	1
Other Wholesale Trade	6	10	12	0	1	7
Total Wholesale Trade	**5**	**16**	**12**	**0**	**2**	**5**
Transport and Storage	**4**	**5**	**22**	**1**	**0**	**5**
Communication Services						
Postal and Courier Services*	0	0	17	0	0	0
Telecommunication Services*	0	14	0	0	0	14
Total Communication Services	**0**	**8**	**8**	**0**	**0**	**8**
Finance and Insurance						
Finance	17	11	28	0	0	11
Insurance*	13	0	13	0	0	13
Services to Finance and Insurance	8	12	16	0	4	8
Total Finance and Insurance	**12**	**10**	**20**	**0**	**2**	**10**
Business Services						
Technical Services	9	20	9	5	2	2
Computer Services	7	11	3	2	0	2
Other Business Services	12	26	20	1	1	7
Total Business Services	**10**	**23**	**15**	**2**	**1**	**5**
Motion Picture, Radio and Television Services	**12**	**19**	**24**	**18**	**0**	**0**
All Innovating Businesses	8	19	15	3	2	7

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Table 8

Type of Innovation Activity[1][2]

Last financial year[4]

	Number of businesses with innovation activities	Internal Research and Development (R&D)	Acquisition of R&D	Acquisition of machinery and equipment	Acquisition of other external knowledge[5]	Training	Market introduction	All other activities[6]
		Percent						
Business Size								
10 - 29 Employees[3]	3,267	76	22	56	26	57	52	54
30 - 49 Employees	789	75	19	65	32	64	51	59
50 or more Employees	1,050	79	29	62	40	67	61	69
Industry								
Industry Sector								
Agriculture, Forestry and Fishing	474	87	42	49	22	44	24	32
Mining and Quarrying*	21	57	29	71	29	57	29	86
Manufacturing	1,995	83	20	65	27	57	58	67
Electricity, Gas and Water Supply*	6	50	0	50	0	50	0	0
Construction	297	70	37	61	26	79	45	53
Total	**2,793**	**82**	**26**	**62**	**26**	**57**	**51**	**59**
Services Sector								
Wholesale Trade	819	66	18	52	32	55	58	59
Transport and Storage	336	67	8	56	28	60	39	38
Communication Services*	36	67	17	67	50	75	75	75
Finance and Insurance	153	71	29	49	37	65	55	55
Business Services	921	75	23	55	38	72	63	62
Motion Picture, Radio and Television Services	51	47	24	82	41	65	53	53
Total	**2,316**	**70**	**19**	**55**	**35**	**63**	**57**	**57**
Type of Innovator								
Leaders (new to market)	1,929	90	19	60	33	61	70	66
Leaders (new to firm)	1,524	77	18	62	31	66	54	67
Adopters (active adopters)	621	64	41	71	30	71	43	47
Adopters (passive adopters)	573	43	32	46	23	51	31	40
Ongoing or Abandoned	459	75	21	40	21	36	22	33
Overall	**5,106**	**76**	**23**	**59**	**30**	**60**	**54**	**58**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

(4) This refers to the last financial year for which the business had results available as at August 2003, as entered on the questionnaire.

(5) For example, acquisition of rights to use patents and non-patented inventions, licences, know-how, trademarks, software and other types of knowledge from others for use in the business's innovations.

(6) For example, activities relating to design, other preparations for production/deliveries, activities to realise the actual implementation of innovative products, processes or services.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Table 9

Extent of Research and Development[1][2]

August 2003

	Number of businesses with innovation activities	Amount of R&D carried out in the last three years			
		None	A small amount	A considerable amount	Don't know
		Percent			
Business Size					
10 - 29 Employees[3]	3,267	21	53	24	3
30 - 49 Employees	789	24	45	29	1
50 or more Employees	1,053	17	51	30	1
Industry					
Industry Sector					
Agriculture, Forestry and Fishing	474	20	59	14	7
Mining and Quarrying*	21	29	43	29	14
Manufacturing	2,001	12	53	34	1
Electricity, Gas and Water Supply*	6	0	50	0	0
Construction	297	24	69	7	0
Total	**2,799**	**15**	**56**	**28**	**2**
Services Sector					
Wholesale Trade	816	28	47	22	3
Transport and Storage	336	32	45	23	1
Communication Services*	36	17	58	33	0
Finance and Insurance	153	22	45	25	2
Business Services	918	26	46	25	3
Motion Picture, Radio and Television Services	48	38	38	19	6
Total	**2,307**	**27**	**46**	**24**	**3**
Type of Innovator					
Leaders (new to market)	1,929	6	46	46	2
Leaders (new to firm)	1,527	20	57	20	2
Adopters (active adopters)	621	31	61	6	2
Adopters (passive adopters)	573	57	31	7	5
Ongoing or Abandoned	459	20	67	10	3
Overall	**5,109**	**20**	**51**	**26**	**2**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution. Excludes Electricity, Gas and Water Supply figures.

Table 10

Use of Knowledge Obtained From R&D Carried Out Overseas[1][2]

August 2003

	Number of businesses with innovation activities	Use of knowledge in the last three years		
		Used	Didn't use	Don't know
		Percent		
Business Size				
10 - 29.9' Employees[3]	3,267	28	63	9
30 - 49.9' Employees	789	24	68	8
50 or more Employees	1,053	44	49	7
Industry				
Industry Sector				
Agriculture, Forestry and Fishing	474	32	63	5
Mining and Quarrying*	21	43	43	29
Manufacturing	1,998	25	69	6
Electricity, Gas and Water Supply*	6	50	50	0
Construction	297	31	35	33
Total	**2,796**	**27**	**64**	**9**
Services Sector				
Wholesale Trade	819	43	48	8
Transport and Storage	336	35	64	1
Communication Services*	36	42	58	8
Finance and Insurance	153	33	59	8
Business Services	924	29	62	9
Motion Picture, Radio and Television Services	51	18	65	12
Total	**2,319**	**35**	**57**	**8**
Type of Innovator				
Leaders (new to market)	1,929	42	55	4
Leaders (new to firm)	1,527	23	70	7
Adopters (active adopters)	621	22	61	17
Adopters (passive adopters)	573	24	60	16
Ongoing or Abandoned	459	29	61	10
Overall	**5,109**	**31**	**61**	**8**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.
Results marked with an * should be treated with caution.

Table 11

R&D and Innovation Expenditure[1][2]

Last financial year[4]

	Number of businesses with innovation activities	Total expenditure on Research and Development (R&D)	Total expenditure on innovation
		$(millions)	$(millions)
Business Size			
10 - 29 Employees[3]	3,267	159.8	306.3
30 - 49 Employees	789	128.9	302.2
50 or more Employees	1,053	543.4	1,145.2
Industry			
Industry Sector			
Agriculture, Forestry and Fishing	474	22.6	43.8
Mining and Quarrying*	21	1.3	7.9
Manufacturing[5]	2,004	312.0	694.2
Construction	297	9.1	25.7
Total	**2,796**	**344.9**	**771.7**
Services Sector			
Wholesale Trade	819	72.5	160.1
Transport and Storage	336	14.9	49.7
Finance and Insurance[6]	189	97.6	249.8
Business Services[7]	975	302.1	522.4
Total	**2,319**	**487.1**	**982.0**
Type of Innovator			
Leaders (new to market)	1,929	591.7	1,093.6
Leaders (new to firm)	1,527	159.1	432.7
Adopters (active adopters)	621	23.4	101.4
Adopters (passive adopters)	573	8.4	50.9
Ongoing or Abandoned	459	49.4	75.0
Overall	**5,109**	**832.0**	**1,753.7**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

(4) This refers to the last financial year for which the business had results available as at August 2003, as entered on the questionnaire.

(5) Includes Electricity, gas and Water Supply for this analysis.

(6) Includes Communication Services for this analysis.

(7) Includes Motion Picture, Television and Radio Services for this analysis.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Table 12

Intensity of Investment in Innovation[1][2]

Last financial year[4]

	Number of businesses with innovation activities	Ratio of R&D investment to total innovation investment	Ratio of innovation investment to total operating expenditure	Ratio of innovation investment to expenditure on fixed assets
		$1:$100		
Business Size				
10 - 29 Employees[3]	3,267	52.2	1.4	32.7
30 - 49 Employees	789	42.6	3.1	64.1
50 or more Employees	1,053	47.4	1.5	27.7
Industry				
Industry Sector				
Agriculture, Forestry and Fishing	474	51.6	1.1	16.5
Mining and Quarrying*	21	16.1	1.1	4.5
Manufacturing[5]	2,004	44.9	1.6	31.6
Construction	297	35.3	0.4	9.7
Services Sector				
Wholesale Trade	819	45.3	0.5	36.2
Transport and Storage	336	29.9	0.8	8.2
Finance and Insurance[6]	189	41.2	3.9	26.1
Business Services[7]	975	57.7	4.6	96.4

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

(4) This refers to the last financial year for which the business had results available as at August 2003, as entered on the questionnaire.

(5) Includes Electricity, gas and Water Supply for this analysis.

(6) Includes Communication Services for this analysis.

(7) Includes Motion Picture, Television and Radio Services for this analysis.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Table 13

Sources of Funding for Innovation[1][2]

August 2003

	Number of businesses with innovation activities	Sources of innovation funding used in the last three years								
		Funding from within own business	Personal funds, from friends, or family	Share-holder funds	Suppliers or customers	Other businesses	Central[4] or local[5] government	Private venture capital funds	Bank loan specifically to fund innovation	Don't know
		Percent								
Business Size										
10 - 29 Employees[3]	3,267	94	12	14	6	3	6	1	13	2
30 - 49 Employees	789	94	10	18	8	3	10	1	13	2
50 or more Employees	1,053	98	3	13	10	3	17	1	8	1
Industry										
Industry Sector										
Agriculture, Forestry and Fishing	471	93	11	4	3	1	11	0	16	3
Mining and Quarrying*	21	86	14	14	14	0	0	0	0	0
Manufacturing	1,992	95	11	16	6	3	15	1	14	2
Electricity, Gas and Water Supply*	6	50	0	0	0	0	0	0	0	50
Construction	300	79	11	4	0	11	3	1	14	11
Total	**2,790**	**93**	**11**	**13**	**5**	**3**	**13**	**1**	**14**	**3**
Services Sector										
Wholesale Trade	819	96	8	13	11	2	5	1	11	0
Transport and Storage	336	98	17	25	10	0	0	0	6	1
Communication Services*	39	85	8	31	0	8	0	0	0	0
Finance and Insurance	153	94	4	16	10	2	0	2	4	4
Business Services	924	97	8	15	8	3	7	2	9	0
Motion Picture, Radio and Television Services	51	100	0	12	6	18	12	0	18	0
Total	**2,322**	**96**	**9**	**16**	**9**	**3**	**5**	**1**	**9**	**1**
Type of Innovator										
Leaders (new to market)	1,929	97	13	20	10	3	13	1	9	0
Leaders (new to firm)	1,524	96	6	15	5	2	9	1	8	2
Adopters (active adopters)	621	89	15	10	3	7	2	0	27	0
Adopters (passive adopters)	573	91	3	4	4	3	6	1	22	7
Ongoing or Abandoned	459	93	7	12	9	2	5	2	4	5
Overall	**5,106**	**95**	**10**	**15**	**7**	**3**	**9**	**1**	**12**	**2**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

(4) For example, grants from Foundation for Research Science and Technology, Technology New Zealand.

(5) Includes Local or Regional Government Agencies (e.g. BIZINFO).

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution. Excludes Electricity, Gas and Water Supply figures.

Table 14

Businesses Having Cooperative and Collaborative Arrangements with Other Businesses or Institutions, by Business Size[1][2]

August 2003

	Number of innovating businesses with cooperative and collaborative arrangements	Type of organisations arrangements were with			
		New Zealand firms	Overseas firms	Overseas and NZ firms	No cooperation or collaboration
		Percent			
Suppliers of Equipment Components or Software					
10 - 29 Employees[3]	1,317	45	12	6	37
30 - 49 Employees	342	43	18	15	25
50 or more Employees	555	37	21	16	28
Overall	**2,214**	**43**	**15**	**10**	**33**
Suppliers of Raw Materials or Goods for Resale					
10 - 29 Employees[3]	1,320	30	13	3	7
30 - 49 Employees	342	21	14	9	2
50 or more Employees	555	23	13	10	48
Overall	**2,217**	**30**	**13**	**6**	**16**
Clients or Customers					
10 - 29 Employees[3]	1,317	48	9	7	37
30 - 49 Employees	345	43	7	10	38
50 or more Employees	555	44	17	15	24
Overall	**2,217**	**46**	**11**	**9**	**34**
Other Businesses in the Same Industry					
10 - 29 Employees	1,320	32	5	3	61
30 - 49 Employees	342	18	10	5	67
50 or more Employees	552	23	16	3	58
Overall	**2,214**	**28**	**8**	**3**	**61**
Other Businesses in Other Industries					
10 - 29 Employees	1,320	16	1	0	82
30 - 49 Employees	345	23	1	3	73
50 or more Employees	555	20	4	3	72
Overall	**2,220**	**18**	**2**	**2**	**78**
Universities or Polytechnics					
10 - 29 Employees	1,320	13	2	1	84
30 - 49 Employees	342	11	1	3	85
50 or more Employees	552	23	2	3	73
Overall	**2,214**	**15**	**2**	**2**	**81**
Crown Research Institutes and Other Public Research and Development Providers					
10 - 29 Employees	1,317	15	2	0	83
30 - 49 Employees	342	12	1	2	85
50 or more Employees	552	23	1	2	75
Overall	**2,211**	**17**	**1**	**1**	**81**
Other					
10 - 29 Employees	1,320	5	1	0	93
30 - 49 Employees	345	4	1	0	94
50 or more Employees	555	4	2	0	94
Overall	**2,220**	**5**	**1**	**0**	**94**

(1) Proportions are of innovating New Zealand businesses with cooperative and collaborative arrangements in each category.
(2) For more information on businesses included, refer to the Technical Notes.
(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.

Table 15

Businesses Having Cooperative and Collaborative Arrangements with Other Businesses or Institutions, by Type of Innovator[(1)(2)]

August 2003

	Number of innovating businesses with cooperative and collaborative arrangements	Type of organisations arrangements were with			
		New Zealand firms	Overseas firms	Overseas and NZ firms	No cooperation or collaboration
		Percent			
Suppliers of Equipment Components or Software					
Leaders (new to market)	1,026	36	13	14	37
Leaders (new to firm)	570	59	12	10	18
Adopters (active adopters)	258	33	29	6	33
Adopters (passive adopters)	180	63	13	2	20
Ongoing or Abandoned	183	20	15	2	66
Overall	**2,217**	42	15	10	32
Suppliers of Raw Materials or Goods for Resale					
Leaders (new to market)	1,026	29	17	9	46
Leaders (new to firm)	570	34	4	4	57
Adopters (active adopters)	258	35	8	3	53
Adopters (passive adopters)	177	29	32	0	39
Ongoing or Abandoned	183	18	10	0	74
Overall	**2,214**	30	13	6	51
Clients or Customers					
Leaders (new to market)	1,026	46	15	13	27
Leaders (new to firm)	570	53	9	12	26
Adopters (active adopters)	258	34	5	1	62
Adopters (passive adopters)	180	35	7	0	58
Ongoing or Abandoned	183	51	7	3	38
Overall	**2,217**	46	11	9	34
Other Businesses in Other Industries					
Leaders (new to market)	1,026	19	2	3	76
Leaders (new to firm)	567	19	0	2	80
Adopters (active adopters)	258	21	1	0	79
Adopters (passive adopters)	177	8	2	0	88
Ongoing or Abandoned	183	18	7	0	75
Overall	**2,211**	18	2	2	78
Universities or Polytechnics					
Leaders (new to market)	1,023	14	3	4	79
Leaders (new to firm)	567	14	1	1	85
Adopters (active adopters)	261	8	0	0	91
Adopters (passive adopters)	180	28	5	0	65
Ongoing or Abandoned	183	20	0	0	80
Overall	**2,214**	15	2	2	81
Crown Research Institutes and Other Public Research and Development Providers					
Leaders (new to market)	1,026	20	2	1	77
Leaders (new to firm)	570	15	0	1	84
Adopters (active adopters)	258	17	3	0	81
Adopters (passive adopters)	177	7	0	0	93
Ongoing or Abandoned	186	15	0	0	85
Overall	**2,217**	17	1	1	81
Other					
Leaders (new to market)	1,023	4	2	0	95
Leaders (new to firm)	570	2	2	0	97
Adopters (active adopters)	261	17	0	0	80
Adopters (passive adopters)	180	0	0	0	98
Ongoing or Abandoned	186	8	2	0	90
Overall	**2,220**	5	1	0	94

(1) Proportions are of innovating New Zealand businesses with cooperative and collaborative arrangements in each category.
(2) For more information on businesses included, refer to the Technical Notes.
(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.

Table 16

Businesses Having Cooperative and Collaborative Arrangements with Other Businesses or Institutions, by Industry[1][2]

August 2003

	Number of innovating businesses with cooperative and collaborative arrangements	Type of organisations arrangements were with			
		New Zealand firms	Overseas firms	Overseas and NZ firms	No cooperation or collaboration
		Percent			
Suppliers of Equipment Components or Software					
Agriculture, Forestry and Fishing	168	38	4	2	50
Mining and Quarrying*	15	20	0	20	20
Manufacturing	864	38	15	11	35
Construction	129	37	28	5	33
Wholesale Trade	384	38	17	13	34
Transport and Storage	156	58	12	10	23
Communication Services*	18	67	33	33	0
Finance and Insurance	84	46	29	11	21
Business Services	369	52	12	8	27
Motion Picture, Radio and Television Services	27	56	0	11	33
Overall	**2,214**	**42**	**15**	**10**	**33**
Suppliers of Raw Materials or Goods for Resale					
Agriculture, Forestry and Fishing	168	25	20	2	52
Mining and Quarrying*	15	0	20	40	40
Manufacturing	858	47	14	8	31
Construction	132	30	7	0	64
Wholesale Trade	384	18	28	10	43
Transport and Storage	156	23	0	2	75
Communication Services*	21	14	14	0	71
Finance and Insurance	87	10	0	0	86
Business Services	372	14	6	2	77
Motion Picture, Radio and Television Services	24	13	0	0	100
Overall	**2,217**	**30**	**13**	**6**	**51**
Clients or Customers					
Agriculture, Forestry and Fishing	168	52	4	4	41
Mining and Quarrying*	15	20	0	20	40
Manufacturing	861	46	14	11	27
Construction	129	40	0	0	60
Wholesale Trade	384	44	5	9	42
Transport and Storage	156	50	13	13	19
Communication Services*	21	29	0	14	43
Finance and Insurance	84	61	0	0	36
Business Services	372	44	11	10	32
Motion Picture, Radio and Television Services	27	33	11	11	56
Overall	**2,217**	**46**	**10**	**9**	**34**
Other Industries in the Same Industry					
Agriculture, Forestry and Fishing	165	82	2	2	16
Mining and Quarrying*	15	40	0	20	40
Manufacturing	861	19	8	3	71
Construction	129	5	2	5	91
Wholesale Trade	384	20	12	1	69
Transport and Storage	156	27	10	0	63
Communication Services*	18	33	17	0	33
Finance and Insurance	87	38	14	3	41
Business Services	369	37	11	5	46
Motion Picture, Radio and Television Services	27	44	0	11	33
Overall	**2,211**	**28**	**9**	**3**	**61**

Table 16
continued

Businesses Having Cooperative and Collaborative Arrangements with Other Businesses or Institutions, by Industry[(1)(2)]

August 2003

	Number of innovating businesses with cooperative and collaborative arrangements	Type of organisations arrangements were with			
		New Zealand firms	Overseas firms	Overseas and NZ firms	No cooperation or collaboration
		Percent			
Other Businesses in Other Industries					
Agriculture, Forestry and Fishing	168	14	0	4	84
Mining and Quarrying*	15	20	0	0	60
Manufacturing	867	21	2	3	74
Construction	132	2	0	2	98
Wholesale Trade	384	13	1	0	87
Transport and Storage	156	23	0	0	75
Communication Services*	21	29	0	0	57
Finance and Insurance	87	21	0	0	76
Business Services	369	21	3	2	73
Motion Picture, Radio and Television Services	24	38	0	0	88
Overall	**2,223**	**19**	**1**	**2**	**78**
Universities or Polytechnics					
Agriculture, Forestry and Fishing	168	25	4	2	70
Mining and Quarrying*	15	20	0	0	60
Manufacturing	861	20	0	1	80
Construction	132	7	0	0	93
Wholesale Trade	387	22	7	4	66
Transport and Storage	156	0	0	0	98
Communication Services*	18	0	0	0	100
Finance and Insurance	87	3	0	0	93
Business Services	366	7	2	2	88
Motion Picture, Radio and Television Services	27	11	0	11	89
Overall	**2,217**	**15**	**2**	**2**	**81**
Crown Research Institutes and Other Public Research and Development Providers					
Agriculture, Forestry and Fishing	165	36	0	0	65
Mining and Quarrying*	15	20	0	0	60
Manufacturing	867	19	1	1	77
Construction	129	0	0	0	100
Wholesale Trade	384	21	4	1	73
Transport and Storage	156	0	0	0	98
Communication Services*	18	0	0	0	117
Finance and Insurance	84	4	0	0	96
Business Services	369	10	1	2	86
Motion Picture, Radio and Television Services	27	11	0	0	78
Overall	**2,214**	**16**	**1**	**1**	**81**
Other					
Agriculture, Forestry and Fishing	165	4	0	0	96
Mining and Quarrying*	12	0	0	0	100
Manufacturing	867	3	2	0	93
Construction	132	25	0	0	75
Wholesale Trade	387	2	1	0	98
Transport and Storage	156	0	0	0	100
Communication Services*	18	0	0	0	100
Finance and Insurance	84	7	4	4	89
Business Services	369	6	1	0	93
Motion Picture, Radio and Television Services	27	11	0	0	89
Overall	**2,217**	**5**	**1**	**0**	**94**

(1) Proportions are of innovating New Zealand businesses with cooperative and collaborative arrangements in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.
Results marked with an * should be treated with caution.
Electricity, Gas and Water Supply has been removed, as no respondents in this industry answered these questions.

Table 17

Reasons for Cooperative or Collaborative Arrangements[1][2]

August 2003

	Number of innovating businesses with cooperative and collaborative arrangements	Sharing costs of the development	Spreading risk	Accessing critical expertise or R&D	Finance	Improved efficiency	Accessing new distribution channels	Prototype development	Accessing new markets	Other
		Percent								
Business Size										
10 - 29 Employees[3]	1,320	37	20	59	16	57	57	29	45	6
30 - 49 Employees	345	42	18	57	28	50	43	23	34	13
50 or more Employees	552	49	23	76	11	42	33	23	41	7
Industry										
Industry Sector										
Agriculture, Forestry and Fishing	168	64	70	63	36	77	48	25	34	14
Mining and Quarrying*	12	25	0	75	25	100	50	25	50	25
Manufacturing	861	34	15	59	13	41	46	21	53	6
Construction	129	30	5	65	0	35	81	74	33	7
Total	**1,170**	**38**	**22**	**60**	**15**	**46**	**51**	**27**	**48**	**8**
Services Sector										
Wholesale Trade	387	42	14	63	16	57	44	22	43	12
Transport and Storage	156	42	25	56	23	67	50	25	37	0
Communication Services*	18	33	50	67	33	33	17	33	33	17
Finance and Insurance	87	48	17	62	17	48	34	34	21	0
Business Services	372	47	22	76	23	67	52	25	31	5
Motion Picture, Radio and Television Services	27	33	22	44	22	44	22	33	22	11
Total	**1,047**	**44**	**19**	**66**	**20**	**60**	**46**	**25**	**35**	**7**
Type of Innovator										
Leaders (new to market)	1,023	46	23	67	14	50	55	27	53	6
Leaders (new to firm)	567	41	19	66	22	53	42	24	35	9
Adopters (active adopters)	261	29	8	56	13	61	49	37	16	6
Adopters (passive adopters)	180	35	25	57	28	58	60	32	45	7
Ongoing or Abandoned	186	39	26	45	11	48	21	11	37	13
Overall	**2,217**	**41**	**20**	**63**	**17**	**53**	**49**	**26**	**42**	**7**

(1) Proportions are of innovating New Zealand businesses with cooperative and collaborative arrangements in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.

Results marked with an * should be treated with caution.

Table 18

Number of Cooperative or Collaborative Arrangements[1][2]

August 2003

	Number of innovating businesses with cooperative and collaborative arrangements	1	2	3	4	5	6 - 10	> 10
		Percent						
Business Size								
10 - 29 Employees[3]	1,320	20	14	27	5	10	17	5
30 - 49 Employees	345	21	15	17	10	12	17	5
50 or more Employees	552	14	14	18	10	12	22	10
Industry								
Industry Sector								
Agriculture, Forestry and Fishing	165	11	4	9	5	9	60	4
Mining and Quarrying*	15	20	20	0	40	20	0	20
Manufacturing	864	15	18	27	6	10	15	8
Construction	129	56	7	0	28	7	2	2
Total	**1,173**	**19**	**15**	**21**	**9**	**9**	**20**	**7**
Services Sector								
Wholesale Trade	384	16	15	23	3	13	23	6
Transport and Storage	156	15	13	25	12	4	12	15
Communication Services*	21	14	14	0	0	14	14	14
Finance and Insurance	87	21	17	17	10	21	14	3
Business Services	366	19	12	30	7	16	11	5
Motion Picture, Radio and Television Services	24	25	25	13	0	13	38	0
Total	**1,038**	**18**	**14**	**24**	**6**	**14**	**16**	**7**
Type of Innovator								
Leaders (new to market)	1,023	10	12	26	10	12	21	10
Leaders (new to firm)	570	17	16	23	7	12	15	7
Adopters (active adopters)	258	42	19	22	2	5	9	1
Adopters (passive adopters)	177	27	14	17	5	22	19	0
Ongoing or Abandoned	183	31	16	16	2	3	31	0
Overall	**2,211**	**19**	**14**	**23**	**7**	**11**	**18**	**6**

(1) Proportions are of innovating New Zealand businesses with cooperative and collaborative arrangements in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.
Results marked with an * should be treated with caution.

Table 19

Receipt of Government Assistance[1][2]

August 2003

	Number of businesses with innovation activity	Type of government assistance received			
		Research services	Technological services	Business services	Funding
		Percent			
Business Size					
10 - 29 Employees[3]	3,267	40	39	44	39
30 - 49 Employees	789	37	39	42	39
50 or more Employees	1,050	45	43	45	46
Industry					
Agriculture, Forestry and Fishing	471	39	37	31	32
Mining and Quarrying*	21	71	57	71	71
Manufacturing	2,004	42	41	44	43
Construction	297	17	18	27	26
Wholesale Trade	819	47	46	50	44
Transport and Storage	336	36	29	38	28
Communication Services*	36	50	46	58	58
Finance and Insurance	153	51	49	45	43
Business Services	921	39	40	49	40
Motion Picture, Radio and Television Services	51	88	65	88	82
Type of Innovator					
Leaders (new to market)	1,929	44	42	45	44
Leaders (new to firm)	1,527	39	38	45	39
Adopters (active adopters)	621	40	41	43	40
Adopters (passive adopters)	573	35	36	37	33
Ongoing or Abandoned	459	43	42	47	43
Overall	**5,115**	**41**	**40**	**44**	**40**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution. Excludes Electricity, Gas and Water Supply.

Table 20

Value of Government Assistance, by Industry[1][2]

August 2003

	Number of innovating businesses receiving assistance	Value of assistance received		
		Very valuable	Moderate value	No value
		Percent		
Research Services				
Agriculture, Forestry and Fishing	186	19	44	37
Mining and Quarrying*	15	20	0	80
Manufacturing	840	6	24	69
Construction	51	6	12	82
Wholesale Trade	381	6	21	73
Transport and Storage	120	13	15	73
Communication Services*	18	0	17	83
Finance and Insurance	78	8	19	73
Business Services	363	10	22	68
Motion Picture, Radio and Television Services	45	7	27	67
Overall	**2,097**	**8**	**24**	**68**
Technological Services				
Agriculture, Forestry and Fishing	177	3	58	39
Mining and Quarrying*	12	0	25	75
Manufacturing	822	7	20	73
Construction	54	0	22	78
Wholesale Trade	375	3	21	76
Transport and Storage	96	0	6	94
Communication Services*	18	0	0	100
Finance and Insurance	75	4	16	80
Business Services	372	15	12	73
Motion Picture, Radio and Television Services	33	18	9	73
Overall	**2,034**	**7**	**21**	**72**
Government funds				
Agriculture, Forestry and Fishing	153	25	8	67
Mining and Quarrying*	15	0	0	100
Manufacturing	867	16	18	66
Construction	78	0	42	58
Wholesale Trade	363	2	14	83
Transport and Storage	93	3	3	94
Communication Services*	21	0	0	100
Finance and Insurance	66	0	9	91
Business Services	369	15	13	72
Motion Picture, Radio and Television Services	42	21	14	64
Overall	**2,067**	**12**	**15**	**72**
Business Services				
Agriculture, Forestry and Fishing	147	6	51	43
Mining and Quarrying*	15	0	20	80
Manufacturing	891	6	30	64
Construction	81	0	56	44
Wholesale Trade	405	2	27	71
Transport and Storage	129	23	7	70
Communication Services*	21	0	29	71
Finance and Insurance	69	0	17	83
Business Services	450	15	31	54
Motion Picture, Radio and Television Services	42	7	29	64
Overall	**2,250**	**7**	**30**	**62**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.
Excludes Electricity, Gas and Water Supply.

Table 21

Outcomes of Innovation Activity[1][2]

August 2003

	Number of businesses who implemented new products or services	Critical to stay in business	Increased profitability	Increased range of goods and services	Opened new or expanded markets in NZ	Opened new markets overseas	Replaced products being phased out	Improved efficiency	Reduced energy consumption	Reduced environmental impact	Meeting health and safety and other standards
		Percent									
Business Size											
10 - 29 Employees[3]	2,988	45	78	80	65	26	36	73	18	21	34
30 - 49 Employees	690	43	77	79	61	32	36	83	18	18	37
50 or more Employees	963	49	80	82	64	41	41	75	19	23	32
Industry											
Industry Sector											
Agriculture, Forestry and Fishing	396	52	83	65	52	39	26	70	16	45	40
Mining and Quarrying*	15	20	80	60	80	20	20	100	0	80	60
Manufacturing	1,803	47	79	83	68	41	43	75	23	19	38
Electricity, Gas and Water Supply*	6	0	100	0	50	50	50	0	0	0	50
Construction	291	36	84	93	61	3	33	73	31	45	63
Total	**2,511**	**46**	**80**	**81**	**65**	**36**	**39**	**74**	**23**	**26**	**42**
Services Sector											
Wholesale Trade	744	32	78	82	73	21	44	71	17	23	30
Transport and Storage	306	50	71	71	50	23	28	82	15	16	30
Communication Services*	33	45	91	109	82	18	27	91	27	36	27
Finance and Insurance	144	52	79	77	56	13	38	83	4	6	13
Business Services	858	51	77	77	61	27	30	74	9	9	22
Motion Picture, Radio and Television Services	45	47	67	67	40	13	40	73	13	0	13
Total	**2,130**	**44**	**77**	**78**	**63**	**23**	**35**	**75**	**13**	**15**	**25**
Type of Innovator											
Leaders (new to market)	1,845	47	87	94	77	47	47	73	23	24	37
Leaders (new to firm)	1,446	45	74	77	60	23	32	70	16	15	33
Adopters (active adopters)	600	42	76	65	47	14	22	80	11	23	34
Adopters (passive adopters)	516	38	76	61	54	15	30	84	22	27	23
Ongoing or Abandoned	234	62	59	67	54	9	49	79	8	26	40
Overall	**4,641**	**45**	**79**	**80**	**64**	**30**	**37**	**75**	**18**	**21**	**34**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Table 22

Type of Exports from Outcomes of Innovation Activity[1][2]

August 2003

	Number of businesses who implemented new products or services	New to market products / services	New to firm products / services	New to market and new to firm products / services	No exports of new / improved products / services	Did not export at all
		Percent				
Business Size						
10 - 29 Employees[3]	2,988	5	13	16	19	47
30 - 49 Employees	690	10	10	15	17	48
50 or more Employees	966	11	13	21	21	35
Industry						
Industry Sector						
Agriculture, Forestry and Fishing	393	3	8	27	20	44
Mining and Quarrying*	18	0	17	0	17	67
Manufacturing	1,800	7	19	22	25	27
Electricity, Gas and Water Supply*	6	0	0	0	0	50
Construction	291	2	2	0	14	81
Total	**2,508**	**6**	**15**	**20**	**23**	**36**
Services Sector						
Wholesale Trade	744	9	8	15	17	52
Transport and Storage	306	5	12	19	14	50
Communication Services*	36	8	8	0	17	67
Finance and Insurance	141	2	6	4	6	81
Business Services	858	7	10	12	16	54
Motion Picture, Radio and Television Services	48	6	6	6	13	69
Total	**2,133**	**7**	**9**	**13**	**15**	**55**
Type of Innovator						
Leaders (new to market)	1,845	11	12	31	15	31
Leaders (new to firm)	1,446	3	17	8	22	50
Adopters (active adopters)	600	3	12	7	27	54
Adopters (passive adopters)	516	2	8	10	18	62
Ongoing or Abandoned	234	15	0	5	19	59
Overall	**4,641**	**7**	**12**	**17**	**19**	**45**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.
Results marked with an * should be treated with caution.

Table 23

Proportion of Exports from Outcomes of Innovation Activity[1][2]

Last financial year[4]

	Number of businesses who exported new products or services	Proportion of export sales from new or significantly improved products and/or services introduced to the market during previous three years			
		Zero	1 to 30%	31 to 60%	More than 60%
		Percent			
Business Size					
10 - 29 Employees[3]	999	20	66	10	5
30 - 49 Employees	237	9	77	6	8
50 or more Employees	426	8	78	6	7
Industry					
Industry Sector					
Agriculture, Forestry and Fishing	141	2	96	2	0
Mining and Quarrying*	3	50	50	0	0
Manufacturing	876	10	72	11	7
Construction	15	43	43	14	0
Total	**1,035**	**10**	**75**	**10**	**6**
Services Sector					
Wholesale Trade	234	21	72	8	0
Transport and Storage	108	16	74	0	11
Communication Services*	9	33	33	0	33
Finance and Insurance	15	60	20	20	0
Business Services	252	32	54	7	7
Motion Picture, Radio and Television Services	9	0	50	0	50
Total	**627**	**25**	**63**	**6**	**6**
Type of Innovator					
Leaders (new to market)	993	11	73	10	6
Leaders (new to firm)	399	19	68	5	8
Adopters (active adopters)	120	3	90	5	3
Adopters (passive adopters)	102	31	54	9	6
Ongoing or Abandoned	48	59	29	12	0
Overall	**1,662**	**15**	**70**	**9**	**6**

(1) Proportions are of New Zealand businesses with innovation activities in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

(4) This refers to the last financial year for which the business had results available as at August 2003, as entered on the questionnaire.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from 'those stated. Results marked with an * should be treated with caution.

Table 24

Proportion of Total Sales from Exports[1][2]

Last financial year[4]

	Number of all businesses	Proportion of total sales from exports			
		Zero	1 to 30%	31 to 60%	More than 60%
		Percent			
Business Size					
10 - 29 Employees[3]	2,256	4	62	13	21
30 - 49 Employees	573	4	63	18	16
50 or more Employees	816	3	55	17	25
Industry					
Industry Sector					
Agriculture, Forestry and Fishing	531	2	29	12	56
Mining and Quarrying*	15	0	60	0	40
Manufacturing	1,866	3	62	19	17
Construction	30	20	90	0	0
Total	**2,442**	**3**	**55**	**17**	**25**
Services Sector					
Wholesale Trade	636	6	80	8	6
Transport and Storage	93	3	52	3	42
Communication Services*	6	0	50	50	0
Finance and Insurance	24	13	75	0	13
Business Services	432	8	63	15	15
Motion Picture, Radio and Television Services	18	0	67	0	33
Total	**1,209**	**6**	**71**	**10**	**12**
Type of Innovator					
Leaders (new to market)	1,119	5	65	15	16
Leaders (new to firm)	684	3	66	16	15
Adopters (active adopters)	183	2	59	10	28
Adopters (passive adopters)	192	2	48	9	39
Ongoing or Abandoned	138	4	61	7	26
Non-Innovators	1,335	4	56	16	24
Overall	**3,651**	**4**	**60**	**15**	**21**

(1) Proportions are of New Zealand businesses in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

(4) This refers to the last financial year for which the business had results available as at August 2003, as entered on the questionnaire.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Table 25

Types of Intellectual Property Protection[1][2]

August 2003

	Number of all businesses	No intellectual property	Patents	Copyright or trademark	Registration of design	Secrecy	Confidentiality agreement	Reaching the market first	Product, service or process too complex to copy	Other methods	No protection
		Percent									
Business Size											
10 - 29 Employees[3]	8,205	67	5	14	3	6	14	8	3	2	9
30 - 49 Employees	1,575	60	7	18	6	6	16	10	5	1	10
50 or more Employees	1,776	44	14	27	9	12	30	16	6	2	9
Industry											
Industry Sector											
Agriculture, Forestry and Fishing	1,476	83	2	8	0	3	7	7	2	0	4
Mining and Quarrying*	60	70	5	20	0	10	5	5	0	0	5
Manufacturing	3,525	54	10	17	7	9	20	12	5	2	11
Electricity, Gas and Water Supply*	12	100	0	0	0	0	0	0	0	0	0
Construction	1,206	87	0	3	0	3	6	4	3	3	4
Total	**6,279**	**67**	**6**	**13**	**4**	**7**	**14**	**9**	**4**	**2**	**8**
Services Sector											
Wholesale Trade	1,764	53	10	26	7	6	18	12	3	1	8
Transport and Storage	885	73	4	13	4	6	11	11	4	3	12
Communication Services*	87	62	7	17	7	10	17	7	10	3	7
Finance and Insurance	282	50	3	24	3	7	31	13	3	3	6
Business Services	2,178	53	6	20	3	7	26	7	5	3	11
Motion Picture, Radio and Television Services	84	46	4	36	7	0	14	18	0	0	7
Total	**5,280**	**56**	**7**	**21**	**5**	**7**	**21**	**10**	**4**	**2**	**10**
Type of Innovator											
Leaders (new to market)	1,929	25	19	36	13	21	41	32	14	4	12
Leaders (new to firm)	1,527	50	6	18	3	8	20	9	3	3	15
Adopters (active adopters)	621	69	6	14	3	4	18	3	3	1	2
Adopters (passive adopters)	573	60	7	25	5	7	16	15	6	2	7
Ongoing or Abandoned	459	55	11	18	6	8	25	7	1	2	8
Non innovators	6,447	76	2	10	2	2	8	3	1	1	7
Overall	**11,556**	**62**	**6**	**17**	**4**	**7**	**17**	**9**	**4**	**2**	**9**

(1) Proportions are of New Zealand businesses in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.

Results marked with an * should be treated with caution.

Table 26

Income from Sales of Intellectual Property[1][2]

August 2003

	Number of all businesses	From NZ	From overseas	From both NZ and overseas	None
		Percent			
Business Size					
10 - 29 Employees[3]	8,208	3	1	1	96
30 - 49 Employees	1,575	3	1	1	95
50 or more Employees	1,776	5	2	2	91
Industry					
Industry Sector					
Agriculture, Forestry and Fishing	1,473	2	0	0	97
Mining and Quarrying*	60	5	0	0	90
Manufacturing	3,525	2	1	1	97
Electricity, Gas and Water Supply*	12	0	0	0	100
Construction	1,206	3	0	0	97
Total	**6,276**	**2**	**0**	**0**	**97**
Services Sector					
Wholesale Trade	1,767	4	2	0	94
Transport and Storage	885	2	2	0	96
Communication Services*	87	0	0	0	97
Finance and Insurance	282	3	2	1	91
Business Services	2,181	5	1	3	90
Motion Picture, Radio and Television Services	84	7	4	0	86
Total	**5,286**	**4**	**2**	**1**	**93**
Type of Innovator					
Leaders (new to market)	1,929	6	3	3	88
Leaders (new to firm)	1,527	3	1	1	95
Adopters (active adopters)	621	6	1	0	93
Adopters (passive adopters)	573	7	1	0	93
Ongoing or Abandoned	459	7	2	1	90
Non innovators	6,450	1	0	0	98
Overall	**11,559**	**3**	**1**	**1**	**95**

(1) Proportions are of New Zealand businesses in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Table 27

Factors Hampering Innovation Activity, by Type of Innovator[1][2]

August 2003

Hampering Factor / Type of Innovator	Number of all businesses	Degree			
		High	Medium	Low	Did not hamper
		Percent			
Costs to develop new or significantly improved products, processes or services					
Leaders (new to market)	1,929	30	37	15	18
Leaders (new to firm)	1,524	34	30	14	22
Adopters (active adopters)	621	16	33	20	31
Adopters (passive adopters)	573	23	14	15	48
Ongoing or Abandoned	459	39	31	10	20
Non-Innovators	6,450	15	12	8	65
Overall	**11,556**	**21**	**20**	**11**	**47**
Lack of information about, or access to appropriate sources of finance					
Leaders (new to market)	1,929	11	16	28	46
Leaders (new to firm)	1,524	11	16	22	51
Adopters (active adopters)	621	2	9	30	58
Adopters (passive adopters)	573	6	8	20	65
Ongoing or Abandoned	459	10	14	24	52
Non-Innovators	6,450	3	7	12	78
Overall	**11,556**	**6**	**10**	**18**	**66**
Lack of marketing expertise					
Leaders (new to market)	1,929	6	23	28	43
Leaders (new to firm)	1,524	5	20	27	48
Adopters (active adopters)	621	3	7	32	58
Adopters (passive adopters)	573	3	8	19	71
Ongoing or Abandoned	459	10	33	24	34
Non-Innovators	6,450	5	9	15	71
Overall	**11,556**	**5**	**14**	**20**	**62**
Lack of co-operation with other businesses					
Leaders (new to market)	1,929	2	8	29	60
Leaders (new to firm)	1,524	1	10	26	64
Adopters (active adopters)	621	1	3	22	74
Adopters (passive adopters)	573	8	2	25	66
Ongoing or Abandoned	459	3	15	18	65
Non-Innovators	6,450	3	5	14	78
Overall	**11,556**	**3**	**6**	**19**	**72**
Availability or costs of obtaining intellectual property					
Leaders (new to market)	1,929	4	11	20	65
Leaders (new to firm)	1,524	2	8	17	73
Adopters (active adopters)	621	0	4	27	69
Adopters (passive adopters)	573	1	5	12	83
Ongoing or Abandoned	459	7	14	14	65
Non-Innovators	6,450	4	4	8	83
Overall	**11,556**	**4**	**6**	**13**	**77**
Lack of appropriate personnel					
Leaders (new to market)	1,929	16	30	24	29
Leaders (new to firm)	1,524	17	31	22	30
Adopters (active adopters)	621	18	29	16	37
Adopters (passive adopters)	573	15	34	16	35
Ongoing or Abandoned	459	23	34	25	17
Non-Innovators	6,450	11	13	12	63
Overall	**11,556**	**14**	**21**	**16**	**49**
Lack of management resources (eg time)					
Leaders (new to market)	1,929	23	33	22	21
Leaders (new to firm)	1,524	26	30	19	25
Adopters (active adopters)	621	11	32	25	33
Adopters (passive adopters)	573	23	25	19	33
Ongoing or Abandoned	459	30	39	14	16
Non-Innovators	6,450	14	14	12	60
Overall	**11,556**	**18**	**22**	**16**	**44**

(1) Proportions are of New Zealand businesses in each category.

(2) For more information on businesses included, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.

Table 28

Factors Hampering Innovation Activity, by Business Size[1][2]

August 2003

Hampering Factor / Type of Innovator	Number of all businesses	Degree			
		High	Medium	Low	Did not hamper
		Percent			
Costs to develop new or significantly improved products, processes or services					
10 - 29 Employees[3]	8,205	21	19	10	50
30 - 49 Employees	1,575	24	19	11	46
50 or more Employees	1,776	20	28	15	37
Overall	**11,556**	**21**	**20**	**11**	**47**
Lack of information about, or access to appropriate sources of finance					
10 - 29 Employees[3]	8,205	6	10	19	66
30 - 49 Employees	1,575	7	10	16	67
50 or more Employees	1,776	5	10	17	67
Overall	**11,556**	**6**	**10**	**18**	**66**
Lack of marketing expertise					
10 - 29 Employees[3]	8,205	6	14	19	61
30 - 49 Employees	1,575	4	12	19	64
50 or more Employees	1,776	4	14	23	60
Overall	**11,556**	**5**	**14**	**20**	**61**
Lack of co-operation with other businesses					
10 - 29 Employees[3]	8,205	3	5	20	72
30 - 49 Employees	1,575	2	8	16	73
50 or more Employees	1,776	2	8	20	70
Overall	**11,556**	**3**	**6**	**19**	**72**
Availability or costs of obtaining intellectual property					
10 - 29 Employees[3]	8,205	4	6	12	78
30 - 49 Employees	1,575	3	8	12	77
50 or more Employees	1,776	1	7	18	74
Overall	**11,556**	**4**	**6**	**13**	**77**
Lack of appropriate personnel					
10 - 29 Employees[3]	8,205	14	20	15	51
30 - 49 Employees	1,575	13	23	16	47
50 or more Employees	1,776	14	25	20	41
Overall	**11,556**	**14**	**21**	**16**	**49**
Lack of management resources (eg time)					
10 - 29 Employees[3]	8,205	19	21	15	46
30 - 49 Employees	1,575	20	22	16	42
50 or more Employees	1,776	15	27	20	38
Overall	**11,556**	**18**	**22**	**16**	**44**

(1) Proportions are of New Zealand businesses in each category.

(2) For more information on businesses included, refer to the Technical Notes.

(3) Defined by Rolling Mean Employment (RME) count. For more information on the RME count, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated.

Table 29

Factors Hampering Innovation Activity, by Industry[1][2]

August 2003

Hampering Factor / Industry	Number of all businesses	Degree			
		High	Medium	Low	Did not hamper
		Percent			
Costs to develop new or significantly improved products, processes or services					
Agriculture, Forestry and Fishing	1,476	21	15	6	57
Mining and Quarrying*	60	30	10	15	50
Manufacturing	3,522	26	26	13	35
High technology manufacturing	*618*	*33*	*30*	*12*	*25*
Low technology manufacturing	*2,907*	*25*	*25*	*13*	*38*
Electricity, Gas and Water Supply*	12	0	25	0	75
Construction	1,206	23	19	8	50
Wholesale Trade	1,764	14	18	14	55
Transport and Storage	885	25	16	7	51
Communication Services*	87	14	24	14	45
Finance and Insurance	279	14	26	15	47
Business Services	2,181	18	19	13	50
Motion Picture, Radio and Television Services	81	22	22	7	48
Overall	**11,553**	**21**	**20**	**11**	**47**
Lack of information about, or access to appropriate sources of finance					
Agriculture, Forestry and Fishing	1,476	8	6	17	69
Mining and Quarrying*	60	5	10	20	60
Manufacturing	3,522	7	12	22	58
High technology manufacturing	*618*	*9*	*8*	*33*	*50*
Low technology manufacturing	*2,907*	*7*	*13*	*20*	*60*
Electricity, Gas and Water Supply*	12	0	0	0	100
Construction	1,206	5	10	17	69
Wholesale Trade	1,764	4	11	17	68
Transport and Storage	885	8	8	22	62
Communication Services*	87	3	14	24	59
Finance and Insurance	279	2	8	14	76
Business Services	2,181	4	9	12	75
Motion Picture, Radio and Television Services	81	7	7	18	64
Overall	**11,553**	**6**	**10**	**18**	**66**
Lack of marketing expertise					
Agriculture, Forestry and Fishing	1,476	5	8	16	71
Mining and Quarrying*	60	5	10	10	75
Manufacturing	3,522	6	18	23	53
High technology manufacturing	*618*	*6*	*19*	*24*	*50*
Low technology manufacturing	*2,907*	*6*	*18*	*23*	*53*
Electricity, Gas and Water Supply*	12	0	0	25	100
Construction	1,206	7	12	21	60
Wholesale Trade	1,764	2	8	22	69
Transport and Storage	885	4	15	20	61
Communication Services*	87	10	10	24	52
Finance and Insurance	279	2	16	22	63
Business Services	2,181	6	15	14	65
Motion Picture, Radio and Television Services	81	0	11	25	64
Overall	**11,553**	**5**	**14**	**20**	**62**
Lack of co-operation with other businesses					
Agriculture, Forestry and Fishing	1,476	3	2	21	74
Mining and Quarrying*	60	0	5	26	74
Manufacturing	3,522	3	6	21	71
High technology manufacturing	*618*	*1*	*12*	*20*	*67*
Low technology manufacturing	*2,907*	*3*	*5*	*21*	*72*
Electricity, Gas and Water Supply*	12	25	0	0	75
Construction	1,206	0	12	20	68
Wholesale Trade	1,764	2	3	19	76
Transport and Storage	885	3	12	17	67
Communication Services*	87	3	7	21	72
Finance and Insurance	279	1	10	22	68
Business Services	2,181	4	5	17	74
Motion Picture, Radio and Television Services	81	4	7	18	71
Overall	**11,553**	**3**	**6**	**20**	**72**

Table 29
continued

Factors Hampering Innovation Activity, by Industry[1][2]

August 2003

Hampering Factor / Industry	Number of Businesses	Degree			
		High	Medium	Low	Did not hamper
		Percent			
Availability or costs of obtaining intellectual property					
Agriculture, Forestry and Fishing	1,476	2	1	16	82
Mining and Quarrying*	60	5	5	16	74
Manufacturing	3,522	4	9	14	74
High technology manufacturing	*618*	*5*	*11*	*15*	*69*
Low technology manufacturing	*2,907*	*4*	*8*	*13*	*75*
Electricity, Gas and Water Supply*	12	0	0	0	100
Construction	1,206	5	7	10	78
Wholesale Trade	1,764	3	4	13	80
Transport and Storage	885	2	10	14	75
Communication Services*	87	0	0	14	79
Finance and Insurance	279	4	8	13	75
Business Services	2,181	5	6	10	79
Motion Picture, Radio and Television Services	81	11	4	15	74
Overall	**11,553**	**4**	**6**	**13**	**77**
Lack of appropriate personnel					
Agriculture, Forestry and Fishing	1,476	11	14	13	62
Mining and Quarrying*	60	11	21	21	47
Manufacturing	3,522	15	23	20	43
High technology manufacturing	*618*	*25*	*22*	*22*	*31*
Low technology manufacturing	*2,907*	*13*	*23*	*19*	*45*
Electricity, Gas and Water Supply*	12	0	0	0	75
Construction	1,206	22	23	8	47
Wholesale Trade	1,764	10	21	18	51
Transport and Storage	885	12	19	15	54
Communication Services*	87	3	28	24	41
Finance and Insurance	279	6	28	23	42
Business Services	2,181	15	22	15	48
Motion Picture, Radio and Television Services	81	7	18	21	54
Overall	**11,553**	**14**	**21**	**16**	**49**
Lack of management resources (eg time)					
Agriculture, Forestry and Fishing	1,476	11	18	13	58
Mining and Quarrying*	60	11	26	26	47
Manufacturing	3,522	20	26	17	37
High technology manufacturing	*618*	*26*	*26*	*19*	*29*
Low technology manufacturing	*2,907*	*18*	*26*	*17*	*39*
Electricity, Gas and Water Supply*	12	25	25	25	50
Construction	1,206	26	22	10	41
Wholesale Trade	1,764	16	18	20	46
Transport and Storage	885	16	21	14	48
Communication Services*	87	24	24	10	38
Finance and Insurance	279	15	29	19	39
Business Services	2,181	20	21	15	45
Motion Picture, Radio and Television Services	81	18	14	25	43
Overall	**11,553**	**18**	**22**	**16**	**44**

(1) Proportions are of New Zealand businesses in each category.
(2) For more information on businesses included, refer to the Technical Notes.

Note: All counts in this survey were random rounded to base 3 to protect confidentiality, so some figures may differ from those stated. Results marked with an * should be treated with caution.

Appendix 1

Questionnaire

Statistics NEW ZEALAND Te Tari Tatau

EA/IN/01

Innovation Survey 2003

Please correct any errors in this panel

Innovation Survey

For help and information:

Phone: 0800 333 108

Fax: 09 920 9195

Email: surveys@stats.govt.nz

Mail: Statistics New Zealand
Freepost 10007
Private Bag 92003
Auckland

Return date:

Please return this completed questionnaire, in the reply paid envelope enclosed, within **3 weeks** of receiving it.

Purpose of this survey:

The purpose of this survey is to gather information to help improve New Zealand's growth and competitiveness by assisting the development of government policy to support innovation in New Zealand businesses.

Compulsory requirement:

This survey has been approved by the Minister of Statistics and the return of this questionnaire, duly filled in and signed, is a compulsory requirement under section 31 of the Statistics Act 1975.

Confidentiality of information supplied:

Only people authorised by the Statistics Act 1975 are allowed to see your individual information, and they must use it only for statistical purposes. Your information will be combined with similar information to prepare summary statistics.

Brian Pink
Government Statistician

Page 2

Instructions

1 **Include only the New Zealand operation of the business named on the front page. Do not provide consolidated data.**

Include:
All parts of the company operating under the same legal name in New Zealand, even if they are in different locations.

Don't include:
Associated businesses operating under another legal name.
Associated businesses outside New Zealand.

2 **How to answer:**

Mark your answers like this:

Keep each number within the boxes provided, for example: 3 2 1

Leave question and answer boxes blank where there is no response.

3 **Please keep a record of the time it takes to complete this questionnaire. You are asked to record this at the end of the questionnaire.**

To help work out your time, you can record your start time here.

Include:
The time spent reading the instructions, working on the questions and obtaining information.
The time spent by all employees in collecting and providing this information.

Definition

4 For the purpose of this survey innovation is defined very broadly. It includes the 'never done before' as well as changes that others have already done, but your business is doing for the first time.

Therefore, for this survey an innovation is:

- the introduction of a new or significantly improved product or service to the market, or
- the introduction of a new or significantly improved process within your business.

Innovation can be the result of the introduction, adaption or adoption of new knowledge or technological developments. It could also be the result of the combination of existing technologies in novel ways.

5 **Please complete this questionnaire even if you don't think it applies to your business. All responses are important to help us understand innovation in New Zealand.**

Value of Government Assistance

6 **Mark one oval for each item listed.**
During the last 3 years, how valuable was the following Government assistance to your business's development of new or improved products, processes or services?

	received no assistance	very valuable	moderate value	no value	
research services from central/local government organisations	1	2	3	4	0601
technological services from central/local government organisations	1	2	3	4	0602
business services from central/local government organisations	1	2	3	4	0603
central/local government funds	1	2	3	4	0604

New and Significantly Improved Products, Processes and Services

7 **A new product or service** is a product or service which is new to your business. Its characteristics or intended uses differ significantly from those of your business's previously produced products or services. Do not include the selling of new products wholly produced and developed by other businesses.

A significantly improved product/service is an existing product/service, whose performance has been significantly enhanced or upgraded. Changes to your business's existing products which are purely aesthetic or which only involve minor modifications are not to be included.

A new production/manufacturing/delivery process is a process which is new to your business. It could involve the introduction of new or significantly improved production technology or ways of delivering products.

A significantly improved production/manufacturing/delivery process involves significant changes to your existing processes which result in changes in the level of output, quality of products, or costs of production or distribution.

A new or significantly improved service process is a process, which involves new or improved methods of supplying a service that improves the output, cost, quality, or delivery of the service.

Include:
Any of the above whether your own business developed them or not.

Don't include:
The selling of new products wholly produced and developed by other businesses.

8 **Examples:**

- Change of materials in goods, like 'respiration-active' textile material.
- New or improved software or PC networks improving the business's internal performance.
- Inclusion of ecological products in the range of goods.
- A bank launching an insurance product.
- A significant variation to an existing product, eg the production of A2 milk.
- New technology that leads to more efficient routing and planning.
- Production of new plant or animal varieties.
- Laptops for sales people as direct acquisition support.
- Starch-based packaging materials, replacing plastic wrap and polystyrene packaging.
- Refrigeration for display shelves in supermarkets.

There are more examples on the last page of the questionnaire.

New and Significantly Improved Products, Processes, and Services (continued)

9 **During the last 3 years, did your business introduce any new or significantly improved products, processes or services, as defined in number 7?**

- 1 yes
- 2 no, go to **16**

0901

10 **Mark as many as apply.**
In what ways were these new or significantly improved products, processes, and/or services developed?

- 1 mainly developed by your business
- 2 developed by your business in partnership with others
- 3 obtained by your business from others and significant improvements were made by your business
- 4 obtained by your business from others and no significant improvements were made by your business

1001

11 **During the last 3 years, how many new or significantly improved products and/or services did your business introduce to the market?**

- 1 zero, go to **15**
- 2 1 to 2
- 3 3 to 10
- 4 more than 10

1101

Page 6

New and Significantly Improved Products, Processes, and Services (continued)

12 **Please estimate the proportion of your business's total sales from the products and/or services in question 11 during your last financial year.**

- 1 zero
- 2 between 1 and 30%
- 3 between 31 and 60%
- 4 more than 60%

1201

13 **Was your business the first to introduce any of these new or significantly improved products or services to your business's market?**

- 1 yes
- 2 no

1301

14 **Please give a short description of your business's most significant new or significantly improved product or service in the last 3 years.** 1401

15 **Please give a short description of your business's most significant new or significantly improved process in the last 3 years.** 1501

Abandoned or Not Yet Completed Activities

16 **During the last 3 years, did your business abandon any activities (including R&D) to develop or introduce new or significantly improved products, processes or services?**

1 yes

2 no

1601

17 **During the last 3 years, did your business have any ongoing activities (including R&D) to develop or introduce new or significantly improved products, processes or services, that are not yet completed?**

1 yes

2 no

1701

Where to Next?

18

	Yes	No
What did you answer to question 9?		
What did you answer to question 16?		
What did you answer to question 17?		

If you answered 'no' to all of the questions above,

go to question 35 on page 15.

Otherwise continue.

Most Significant Problem Encountered

19 **Please give a short description of the most significant problem your business encountered during the last 3 years, when developing new or significantly improved products, processes and/or services.**

1901

Page 8

Sources of Information

20 **Mark one oval for each item listed.**
During the last 3 years, how important were any of the following as a source of ideas or information for new and improved products, processes or services?

	not used	very important	somewhat important	not important	
customers (intermediate or final customers)	1	2	3	4	2001
suppliers	1	2	3	4	2002
from within this business (eg employees)	1	2	3	4	2003
other NZ businesses in the same industry	1	2	3	4	2004
other NZ businesses in other industries	1	2	3	4	2005
other businesses overseas	1	2	3	4	2006
industry or employer organisations	1	2	3	4	2007
books, trade journals, conferences or shows	1	2	3	4	2008
banks, accountants, or financial consultants	1	2	3	4	2009
central/local government assistance services	1	2	3	4	2010
universities	1	2	3	4	2011
other research institutions, associations, research consultants or research services	1	2	3	4	2012
other	1	2	3	4	2013

please specify: 2014

Research and Development (R&D)

21 **During the last 3 years, how much Research and Development (R&D) work did your business carry out?**

Only answer for the New Zealand business named on the front page.

- 1 none
- 2 a small amount
- 3 a considerable amount
- 4 don't know

2101

22 **<u>For the last financial year</u>, what was the total expenditure on R&D carried out within your business for developing new or significantly improved products, processes or services?**

Please supply a GST exclusive figure if possible. $, , 2201

23 **During the last 3 years, did your business use knowledge obtained from R&D carried out overseas?**

Include:
R&D used from associated businesses overseas.

Don't include:
Buying R&D embedded in a product bought overseas.

- 1 yes
- 2 no
- 3 don't know

2301

Page 10

Co-operative and Collaborative Arrangements

24 Co-operation and collaboration mean active participation in development and joint R&D with other organisations (businesses, associated businesses, or non-commercial institutions).

Each party should bring exclusive knowledge or expertise to the co-operation and collaboration. It does not necessarily imply that both partners derive immediate commercial benefit from the venture.

Don't include:
Only contracting out work, where there is no active co-operation and collaboration.

25 **During the last 3 years, did your business have any co-operation and collaborative arrangements with other businesses or institutions to develop new or significantly improved products, processes or services?**

○ 1 yes

○ 2 no, go to **29**

2501

26 **In the last 3 years, what types of businesses or organisations did your business have co-operative and collaborative arrangements with to develop new or significantly improved products, processes or services?**
Indicate whether they were from New Zealand and/or overseas.

	NZ	overseas	no co-operation/ collaboration	
suppliers of equipment components or software	○ 1	○ 2	○ 3	2601
suppliers of raw materials or goods for resale	○ 1	○ 2	○ 3	2602
clients or customers	○ 1	○ 2	○ 3	2603
other businesses in the same industry (if not included above)	○ 1	○ 2	○ 3	2604
other businesses in other industries (if not included above)	○ 1	○ 2	○ 3	2605
universities or polytechnics	○ 1	○ 2	○ 3	2606
Crown Research Institutes and other public research and development providers	○ 1	○ 2	○ 3	2607
other	○ 1	○ 2	○ 3	2608

Co-operative and Collaborative Arrangements (continued)

27 **How many different businesses or organisations did your business have co-operative and collaborative arrangements with to develop new or significantly improved products, processes or services during the last 3 years?**

If the exact number is not known, please give a careful estimate. 2701

28 **Mark as many as apply.**
What were the reasons your business engaged in co-operative and collaborative arrangements during the last 3 years?

- sharing costs of the development 2801
- spreading risk 2802
- accessing critical expertise or research and development 2803
- finance 2804
- improved efficiency 2805
- accessing new markets 2806
- accessing new distribution channels 2807
- prototype development 2808
- other 2809

please specify: 2810

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Activity and Expenditure to Develop New or Significantly Improved Products, Processes or Services

29 **During the last financial year, did your business engage in any of the following activities to develop new or significantly improved products, processes or services?**

		yes	no	
a	**Research and development (R&D) within your business**	1	2	2901
b	**Acquisition of R&D** R&D activities performed by other companies (including other associated businesses) or other public or private research organisations.	1	2	2902
c	**Acquisition of machinery and equipment aimed at the development and/or introduction of new or significantly improved products, processes and services** Eg advanced machinery, computer hardware.	1	2	2903
d	**Acquisition of other external knowledge** Eg acquisition of rights to use patents and non-patented inventions, licences, know-how, trademarks, software and other types of knowledge from others for use in your business's innovations.	1	2	2904
e	**Training** Internal or external training for your personnel directly aimed at the introduction or development of new or significantly improved products and processes.	1	2	2905
f	**Market introduction** Internal or external marketing activities for the market introduction of your business's new or significantly improved products or services.	1	2	2906
g	**All other activities relating to the development and introduction of new or significantly improved products, services or processes** Eg activities relating to design, other preparations for production/deliveries, activities to realise the actual implementation of the new or significantly improved products, process or services.	1	2	2907

Activity and Expenditure to Develop New or Significantly Improved Products, Processes or Services (continued)

30 **For the last financial year, please estimate your business's total expenditure on all activities it has undertaken to develop new or significantly improved products, processes or services.**

Include:
Personnel and related investment expenditure.
The cost to this New Zealand business only.

Please supply a GST exclusive figure if possible. $,, 3001

Sources of Funding

31 **Mark as many as apply.**
During the last 3 years, how did your business fund its development of new or significantly improved products, processes or services?

- ○ funding from within own business 3101
- ○ personal funds, from friends, or family 3102
- ○ extra funding from shareholders 3103
- ○ suppliers or customers 3104
- ○ other businesses 3105
- ○ central government grants (Foundation for Research Science and Technology, Technology New Zealand, Industry New Zealand) 3106
- ○ local or regional government agencies (eg BIZINFO) 3107
- ○ private venture capital funds 3108
- ○ bank loan specifically to fund innovation 3109
- ○ don't know 3110

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Outcomes

32 **Mark one oval for each category listed.**
During the last 3 years, did your business's new and improved products, processes and services have any of the following effects on your business?

If you haven't implemented any of your new or improved products, processes or services yet, mark here ( ) 3200 and go to question **35**

	yes	no	don't know or n/a	
critical to stay in business	1	2	3	3201
increased profitability	1	2	3	3202
increased range of goods and services	1	2	3	3203
opened new markets or expanded markets in New Zealand	1	2	3	3204
opened new markets overseas	1	2	3	3205
replaced products being phased out	1	2	3	3206
improved efficiency	1	2	3	3207
reduced energy consumption	1	2	3	3208
reduced environmental impact of the business	1	2	3	3209
enabled Health and Safety standards and other regulatory requirements to be met	1	2	3	3210

33 **Mark as many as apply.**
During the last 3 years, did your business export any of the following?

Include:
Tourism services to overseas clients.

( ) 1 products and/or services which are new to your market

( ) 2 products and/or services which are new to your business (exclude products only new to your market)

( ) 3 no exports of any new or significantly improved products or services, go to **35**

( ) 4 didn't export at all, go to **35**

3301

Outcomes (continued)

34 **For the last financial year, estimate the proportion of your business's total export sales from the products and services in question 33.**

- 1 zero
- 2 between 1 and 30%
- 3 between 31 and 60%
- 4 more than 60%

3401

Intellectual Property

35 **Mark as many as apply.**
During the last 3 years, which of the following methods did this business or the business's parent company use to protect intellectual property developed by this business?

- no intellectual property, go to question **36** 3501
- patents 3502
- copyright or trademark 3503
- registration of design 3504
- secrecy 3505
- confidentiality agreement 3506
- reaching the market first 3507
- product, service or process too complex to copy 3508
- other methods 3509
- no protection 3510

36 **During the last 3 years, did your business receive any income from the sales of intellectual property or from licence fees?**

- 1 yes, from NZ
- 2 yes, from overseas
- 3 no

3601

Page 16

Factors Hampering Activity

37 **During the last 3 years, to what degree did the following factors hamper your business's ability to develop new or significantly improved products, processes or services?**

	high	medium	low	did not hamper	
costs to develop new or significantly improved products, processes or services	1	2	3	4	3701
lack of information about, or access to appropriate sources of finance	1	2	3	4	3702
lack of marketing expertise	1	2	3	4	3703
lack of co-operation with other businesses	1	2	3	4	3704
availability or costs of obtaining intellectual property	1	2	3	4	3705
lack of appropriate personnel	1	2	3	4	3706
lack of management resources (eg time)	1	2	3	4	3707

Market Conditions and Financial Performance

38 **During the last 3 years, has there been a change to your business in any of the following?**

	decreased	stayed the same	increased	don't know or n/a	
market share (in New Zealand)	1	2	3	4	3801
sales	1	2	3	4	3802
profitability	1	2	3	4	3803
exports	1	2	3	4	3804

Market Conditions and Financial Performance (continued)

39 **How would you describe the overall competition of your business?**

- 1 no other effective competition/captive market
- 2 no more than two competitors
- 3 three or more competitors

3901

40 **In the last financial year, what was the total amount of export sales for your business?**

export sales $, , , 4001

if no export sales, mark here and go to **42** 4002

41 **For the last financial year, what was the amount of your business's export sales as a percentage of total sales?**

- 1 zero
- 2 between 1 and 30%
- 3 between 31 and 60%
- 4 more than 60%

4101

42 **In the last financial year, what was the operating expenditure for your business?**

Include:
salaries and wages paid to employees,
purchase of goods and services from suppliers,
renting and leasing costs.

Don't include:
purchase of fixed assets,
interest and finance costs,
losses on sale of fixed assets.

Please supply GST exclusive figures if possible

$, , , 4201

43 **In the last financial year, what was your business's expenditure on acquisitions of fixed assets?**

Don't include: land, buildings or GST.

$, , , 4301

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Market Conditions and Financial Performance (continued)

44 **Do the figures given in this questionnaire exclude GST?**

1 yes

2 no

4401

45 **The information given for the last financial year relates to the period**

from Day Month Year 4501 **to** Day Month Year 4502

Follow-up Study

46 The Ministry of Research Science and Technology (MORST) and the Ministry of Economic Development (MED) would like to do a follow-up study. Where respondents agree, some may be contacted by phone by MORST or MED for an in-depth study.

To make the follow-up study useful, MORST and MED will need the information given in this questionnaire as well as the name and address of the business. Statistics New Zealand can only pass on that information in a form that would allow your business to be identified if you give your consent.

If you are prepared to take part in the study and have your identified business information passed to MORST and MED, please mark **YES and** sign the consent below.

If you do not consent:
The information from this questionnaire will only be passed on to users of the data in a way that will NOT allow your business to be identified and the business will not be contacted by phone for an in-depth study.

Yes, I consent to being contacted for the follow-up study and I consent to Statistics New Zealand passing information from this questionnaire with business name and address to MORST and MED.

yes

(Signature of person consenting)

No, I do not consent to this business's name and address together with the information given in this questionnaire being passed on to MORST and MED to be used in the follow-up study.

no

(Signature of person refusing consent)

4601

47 **How long did it take you to complete this questionnaire?**

Include:
The time spent reading the instructions, working on the questions and obtaining information.
The time spent by all employees in collecting and providing this information.

hrs mins 4701

48 **Comments**
Please make any comments that would help Statistics New Zealand interpret the information you have given.

4801

49 **Please provide details of the person completing this questionnaire.**

Name 4901

Position 4902

Email 4903

Phone 4904

Fax 4905

Signature

Date

Thank you for your time and effort.

www.stats.govt.nz has the main results of all our surveys.

09/2003

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Examples of New or Significantly Improved Products, Processes and Services

- Introduction of clientcard systems.
- Electronic banking services.
- Web-related services and e-commerce (exclude information only sites).
- On-line mastitis testing for use by dairy farmers.
- Computer peripherals designed for use by the vision impaired.
- Serial application of powder varnish/lacquer for metal varnishing.
- Inoculating plants by stem injection.
- The use of barcode systems, optical processing of data.
- The use of new software tools for supply-chain management.
- Computer-assisted/based/aided methods for product development.
- Logistics and control with the following features:
    - the new technology leads to more efficient routing and planning,
    - more flexibility in distribution,
    - improved stock control.
- New breeding selection techniques.
- Improvements in pest management or irrigation or other production processes.
- Addition of a running total on the supermarket check-out screen.