Lessons from high capability innovators

Results from the 2013 Tasmanian Innovation Census
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1. Introduction

As a small regional economy, Tasmania faces tough challenges for the future. With a dispersed population and an economy consisting of mostly small businesses concentrated in services, primary industries and low tech-manufacturing, Tasmania lacks many of the opportunities for economies of scale available in the larger population centres of Australia.

As a result, Tasmania’s future competitiveness and prosperity largely depends on improvements to the innovative capabilities of Tasmanian businesses. Innovation includes the introduction of more efficient and cost effective processes based on new technologies or incremental improvements to existing technology, new or improved goods and services, better organisational methods that enhance productivity and finding new markets or better ways of marketing new and existing products.

A necessary step to improving innovative capabilities is for businesses and policy makers to develop a better understanding of the types of innovation that occur across industries, the activities and strategies that innovative businesses undertake, the factors that lead to successful innovation, and what can be learned from how successful businesses innovate.

This report aims to improve understanding of these factors by presenting key results from the third Tasmanian Innovation Census, a survey of the innovative activities of all Tasmanian businesses with five or more full-time employees. For the first time, the third Census also included questions on the use of social media.

1.1 Background

The target population of the 2013 Tasmanian Innovation Census included 1,965 businesses with five or more full-time employees. By industry, 64% of Tasmanian businesses were in services, 20% in manufacturing, 10% in construction, 5% in primary industries, and 1% in utilities. From the target population, 1,204 businesses responded, giving a response rate of 61.3%. The distribution of respondents by industry is similar to the original population.

The survey questionnaire covered innovative activities in the three years to June 2013. Those businesses that responded generated $16.9 billion in sales in the 2012-13 financial year and employed approximately 43,000 full-time equivalent employees.

Despite challenging economic conditions, this report shows that innovation is widespread. The first three sections provide background information on the different types of innovation, innovation investments, and changes since the 2010 Tasmanian Innovation Census.

Sections five to ten address key questions about the nature and diversity of innovation in the Tasmanian economy. Firstly, how innovative are Tasmanian businesses? Secondly, are more innovative businesses more likely than less innovative businesses to be successful? And thirdly, what are more innovative businesses doing differently?

The AIRC would like to thank all responding businesses for their participation in the Tasmanian Innovation Census.


1. A full breakdown of the respondent firms by industry and firm size is included in Appendix A.
2. This figure is not comparable to total full time employment figures from the ABS population Census or Labour Force Survey, which include businesses with less than 5 full time employees.
2. Main types of innovation

2.1 How common is product and process innovation in the Tasmanian economy?

The rates at which businesses introduce new products to their market and new production processes are key measures of innovation activity in an economy.

These activities represent a change in the quality and mix of goods and services produced, as businesses integrate new technologies into their product offerings and implement more efficient methods of production, delivery and supply.

This report defines a business as ‘innovative’ if it introduced at least one product or process innovation in the three-year period before each Census. The share of all Tasmanian businesses with five or more full-time employees that were innovative has remained relatively stable: 78% were innovative in the 2010 Census and 76% were innovative in the 2013 Census.

Of note, a business does not need to develop product or process innovations itself. It can adopt innovations that were already used by other firms, although this will often require some work to adapt the innovation to its own requirements.

Figure 1 shows the share of all businesses in each industry that introduced a new or significantly improved product (good or service) in the three years to June 2010 and in the three years to June 2013 (defined as product innovators). The largest increases in the percentage of product innovators over these time periods occurred in four service sectors: health care and social assistance, administrative and support services, financial and insurance services, and other services. The only notable decline in the percentage of product innovators occurred in manufacturing, where the rate fell from 65% in 2010 to 59% in 2013.

Results for all businesses, with 1,204 responses for 2013 and 1,401 for 2010.
2.2 Share of total sales from innovative products

Businesses reporting product innovations were asked to estimate the share of total sales in the 2012-13 financial year from products that were new to their market and from products new only to their business (and introduced over the three years to June 2013). ‘New to market’ innovations have a higher level of novelty than ‘new to business’ innovations. The former can increase the competitive advantage of the business, while the latter allows a business to catch up with its competitors. The results provide a picture of the economic impact of product innovations on business revenues.

For all 2013 respondents combined (including innovative and non-innovative businesses), total reported sales for the 2012-13 financial year were approximately $16.9 billion. Figure 2 presents the breakdown of total sales, showing that sales generated from product innovations accounted for 10% of total 2012-13 sales. This is an increase from 8% in the 2009-10 financial year as reported in the 2010 Tasmanian Innovation Census.

Figure 2. Sales from innovative products, all businesses

![Figure 2](image)

Sales from new-to-enterprise product innovations
Sales from new-to-market product innovations
Sales from unchanged products

Results for all 1,173 businesses that reported sales data for the 2012-13 financial year, equal to $16.9 billion. Results for sales of innovative products cover 634 businesses that provided data for innovation sales.

Of the total 2012-13 sales reported by respondent businesses, 5.5% were generated from products that were new to the market and 4.5% from products that were new or improved to the business only.

2.3 How common is process innovation across Tasmanian industries?

Process innovations can be an important source of cost reductions, efficiency gains and improvements to the quality or delivery of goods and services. Process innovators are firms that reported the introduction of one or more new processes in production, supply or back office systems in the three years to June 2013. Figure 3 shows the share of all businesses in each industry that were process innovators in 2013 compared to the share in 2010.

Figure 3 shows that the rate of process innovation declined from 66% of responding businesses in 2010 to 59% in 2013. As indicated in Figure 1, it appears that Tasmanian businesses were more focused on product innovation strategies in the three years to 2013.

The largest declines in process innovation are seen in public administration, safety, education and training, manufacturing, professional services and transport, postal and warehousing services. There are increasing shares in electricity, gas, water and waste services, financial services, and information media and telecommunications.

2.4 Process innovation novelty

The Tasmanian Innovation Census asked all process innovators if any of their process innovations were a world-first innovation, a first to the industry in Australia, or a first to the industry in Tasmania.

Of all responding businesses, 10.5% reported process innovations that were only a first to their industry in Tasmania, 5.6% reported a new to Australia process innovation and 3.5% reported a world-first process innovation. Figure 4 shows the incidence of new to Australia and new to the world process innovation by industry.

The natural resources sector has by far the highest proportion of businesses reporting new to world and new to Australia process innovations. There is also a higher than average share of firms in knowledge intensive business services reporting new to world (4.3%) and new to Australia process innovation (6.2%).

Novel process innovations were less common in infrastructure and in the health, education, public administration and other services sectors, suggesting that an above average share of innovations in these industries were based on adopting processes that were already in use on the mainland or outside Australia.

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3. This data covered 1,173 responding businesses, as 2.6% of the 1,204 respondents were unable to provide estimates for sales in 2012-13.

4. Includes back office systems for purchasing, accounting, computing or maintenance.
Figure 3. Percentage of all businesses that are process innovators, by industry

Figure 4. Percentage of all businesses with novel process innovations, by industry

1. Results for all 1,204 businesses (includes innovative and non-innovative businesses).
2. Industries are aggregated to protect confidentiality due to small firm counts. The natural resource industry includes agriculture, forestry and fishing, and mining. Knowledge intensive business services includes information, media and telecommunications, financial and insurance services, rental, hiring and real estate services, professional, scientific and technical services, and administrative and support services. Infrastructure includes electricity, gas, water and waste services, construction, and transport, postal and warehousing.
2.5 What are the main effects of process innovations?

Businesses that reported any process innovations in the three years to June 2013 were asked whether those innovations had a major positive effect in the 2012-13 year by reducing costs for production or supply of products, by increasing the speed of producing or supplying new products, or by improving the quality of products.

Figure 5 shows the percentage of process innovators in each industry reporting each type of effect. For example, in manufacturing 64% of process innovators reported that process innovations resulted in reductions in the cost of producing or supplying goods or services.

The most common effect of process innovation was an improvement in the quality of goods or services, reported by 74% of process innovators, followed by an increase in the speed of producing or supplying new products, and by improving the quality of products.

The general pattern of effects is the same across industries, apart from in retail, wholesale, accommodation and food services, where an increase in the speed of delivery is the most frequently cited effect of process innovation.

2.6 How common is organisational innovation?

Successful product and process innovations are often made possible through complementary innovations in organisational methods and marketing strategies. These types of innovation can also be important in their own right for improving business competitiveness and performance.

Respondents to the 2013 Tasmanian Innovation Census were asked whether their business implemented any innovations in corporate strategy, business practices\(^5\), or methods for organising work responsibilities and decision making in the three years to June 2013. Figure 6 shows the percentage of all businesses in each industry that reported each of these three organisational innovations.

For all firms combined, a similar percentage of businesses reported new management methods for organising work responsibilities or decision making (69% of firms) and new business practices (65%), but considerably fewer reported new corporate strategies (45%).

This pattern repeats across most sectors, except for information, media and telecommunications, arts and recreation services, and public administration, safety and education. The higher rates of new corporate strategies in these three industries are suggestive of substantial challenges to existing strategies. Overall, the rate of organisational innovation is highest in the service sectors.

2.7 How common is marketing innovation?

Marketing innovations involve activities to increase sales through new methods of product promotion, placement, pricing, or by entering new markets.

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\(^1\) Limited to 708 businesses that reported a process innovation.

\(^2\) Industries are aggregated to protect confidentiality due to small firm counts. The natural resource industry includes agriculture, forestry and fishing, and mining. Knowledge intensive business services includes information, media and telecommunications, financial and insurance services, rental, hiring and real estate services, professional, scientific and technical services, and administrative and support services. Infrastructure includes electricity, gas, water and waste services, construction, and transport, postal and warehousing.

\(^5\) Includes new practices for organising procedures, such as supply chain management, knowledge management, or quality systems.
Figure 7 shows the share of all firms in each industry that introduced new or significantly improved marketing concepts or strategies to increase market share or target new markets. Of all respondent firms, 64% reported at least one marketing innovation in the three years to June 2013. Apart from professional, scientific and technical services and other services, all service industries have above average rates of marketing innovators. The highest rates are in creative services sectors including arts and recreation and information media and telecommunications, and in the business-to-customer oriented sectors of accommodation and food services, retail and wholesale.
3. What are the most important investments for innovation in Tasmanian businesses?

Businesses need to invest in a range of activities to develop and implement new products or processes. The 2013 Tasmanian Innovation Census asked businesses whether or not they undertook six key innovation activities and to estimate the amount invested in those activities in the 2012-13 financial year:

- Acquisition of machinery, equipment, and software for innovation
- In-house R&D
- Purchase of R&D from other organisations
- Purchase of external knowledge such as patents, licences etc.
- Training for innovative activities
- Design

For 2012-13, the total reported investment in all six activities combined for the respondent businesses was approximately $757 million, equivalent to 4% of total reported sales in 2012-13. Figure 8 shows how this investment was split between activities.

Purchase of advanced machinery, equipment and information technology and spending on research and development accounted for 82% of total investments in product and process innovation. Design activities for new products accounted for 8% of total innovation investment and $61 million. A smaller proportion of total investment was on training for innovation (7% and $54 million) and purchase of external knowledge including licences and patents (3% and $19 million).

Figure 9 gives the share of total reported investment in the top two innovation activities for each of five industry groups. Clearly, the manufacturing sector is the biggest investor in innovation in the Tasmanian economy, accounting for 48% of the $440 million invested in machinery, equipment and information technology for innovation and for 44% of total R&D expenditures of $183 million.

The infrastructure sector accounts for the second largest share of investment in machinery and equipment for innovation (21%), followed by knowledge intensive business services (13%) and natural resources (10%). For total R&D expenditures the order is slightly different, with knowledge intensive business services coming in second place at 21%, followed by all other services at 20%.

Figure 10 shows how total innovation investment within each industry sector is split between R&D and non R&D activities. On average, 24% of innovation expenditures are for R&D and 76% are for other types of investments. Sectors with the highest percentages of expenditures on non R&D activities include...
electricity, gas, water and waste services, (98%), rental, hiring and real estate (95%), and accommodation and food services (92%).

The highest share of total investments on R&D is in financial and insurance services (50%), followed by public administration, safety, education and training (43%), though the value of total investments in these sectors is relatively small compared to other sectors (just over $10 million combined).

3.1 How has total innovation investment changed since 2009-10?

Data for firms that responded to both the 2010 and 2013 Tasmanian Innovation Census studies provides a picture of the trends in innovation investment over time. Using this data, Figure 11 shows the change in total innovation investment from the 2009-10 to the 2012-13 financial year, as well as the change in total investment within each industry. Over this period, total innovation investment for all firms decreased by 9%.

Figure 9. Industry shares of total investment in machinery, equipment, and information technology for innovation ($440 Mill).

Figure 10. Percentage of total innovation investment allocated to R&D and non R&D activities, 2012-13.

1. Results cover 869 businesses that reported a product or process innovation and reported some form of innovation investment in 2012-13. Some outliers removed.

2. Excludes investment in design, training, or purchase of external knowledge. Expenditure on R&D includes both R&D conducted in-house and R&D services purchased from other organisations.

3. Industries are aggregated to protect confidentiality due to small firm counts. The natural resource industry includes agriculture, forestry and fishing, and mining. Knowledge intensive business services includes information, media and telecommunications, financial and insurance services, rental, hiring and real estate services, professional, scientific and technical services, and administrative and support services. Infrastructure includes electricity, gas, water and waste services, construction, and transport, postal and warehousing. All other services include retail, wholesale, accommodation and food services, health, education, public administration and safety and other services.

4. All figures do not sum to 100% due to rounding.

6. There are 836 firms that responded to both the 2010 and 2013 Tasmanian Innovation Census and constitute the 2010-2013 panel data. Because the distribution of firms by industry and firm size in the 2010-2013 panel is not significantly different to that for all respondent firms, these figures provide a good indication of wider changes in the economy.
The only increase in investment is seen in the manufacturing sector, which increased total innovation expenditures by 26%. This was driven by investments in basic chemical products, primary metal and metal products, machinery and equipment, beverages and tobacco, and wood products manufacturing.

All other sectors reduced total investments in innovation. This result highlights both the continued importance of the manufacturing sector as a primary source of innovation in the Tasmanian economy and the fact that all other sectors have experienced large declines in innovation investments.

Large innovation investments, such as outlays on new machinery or in-house research, often correspond to particular projects or programs rather than regular expenditure. This helps to explain a broad decrease in investment across sectors. Both natural resources and infrastructure saw strong innovation investment growth between the 2007 and 2010 Tasmanian Innovation Census studies, though for remaining services industries a decrease in innovation investments between 2007 and 2010 has continued through to the 2010 – 2013 period.

3.2 What are the key industry investment trends?

Purchases of advanced machinery, equipment, and information technology are the largest and most common form of innovation investment. As shown in Figure 12, between the 2009-10 and 2012-13 financial year, total investment in machinery, equipment, hardware and software for innovation for all industries decreased by 22%. This type of expenditure declined in all sectors apart from manufacturing and natural resources. The greatest declines were in the service sectors.

3.3 Changes for in-house R&D expenditures by sector

R&D conducted in-house is a key element of high level innovation capability. It requires the creation of new knowledge or the application of existing scientific knowledge in new ways to solve technical problems involved with the production of new products and processes.

Investments in R&D conducted in-house are the second largest type of innovation investment. In contrast to the decline in capital expenditures linked to innovation (see Figure 12), Figure 13 shows that total investments for in-house R&D increased by 13% between the 2009-10 and 2012-13 financial years. Manufacturing accounted for 85% of the total increase, although the greatest percentage increase was in retail, wholesale, accommodation and food services, as shown in Figure 13.

Absolute increases in R&D investment over this period were also seen in health, education, public administration, safety and other services, knowledge intensive business services, and in manufacturing. Investment declined in infrastructure and was stagnant in natural resources.

1. Results for 836 businesses that responded to both the 2010 and 2013 innovation censuses. Some outliers removed.
2. Investment figures for 2009-10 were adjusted to account for inflation up to 2012-13.
3. Industries are aggregated to protect confidentiality due to small firm counts. The natural resource industry includes agriculture, forestry and fishing, and mining. Knowledge intensive business services includes information, media and telecommunications, financial and insurance services, rental, hiring and real estate services, professional, scientific and technical services, and administrative and support services. Infrastructure includes electricity, gas, water and waste services, construction, and transport, postal and warehousing.

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Figure 11. Percentage change in total innovation investment: 2009-10 to 2012-13

1. Results for 836 businesses that responded to both the 2010 and 2013 innovation censuses. Some outliers removed.
2. Investment figures for 2009-10 were adjusted to account for inflation up to 2012-13.
3. Industries are aggregated to protect confidentiality due to small firm counts. The natural resource industry includes agriculture, forestry and fishing, and mining. Knowledge intensive business services includes information, media and telecommunications, financial and insurance services, rental, hiring and real estate services, professional, scientific and technical services, and administrative and support services. Infrastructure includes electricity, gas, water and waste services, construction, and transport, postal and warehousing.
1. Results for 836 businesses that responded to both the 2010 and 2013 innovation censuses. Some outliers removed.
2. Investment figures for 2009-10 were adjusted to account for inflation up to 2012-13.
3. Industries are aggregated to protect confidentiality due to small firm counts. The natural resource industry includes agriculture, forestry and fishing, and mining. Knowledge intensive business services includes information, media and telecommunications, financial and insurance services, rental, hiring and real estate services, professional, scientific and technical services, and administrative and support services. Infrastructure includes electricity, gas, water and waste services, construction, and transport, postal and warehousing.

Figure 12. Percentage change in investment in machinery, equipment, hardware and software for innovation: 2009-10 to 2012-13

Figure 13. Percentage change in investment for in-house R&D for innovation: 2009-10 to 2012-13

1. Results for 836 businesses that responded to both the 2010 and 2013 innovation censuses. Some outliers removed.
2. Investment figures for 2009-10 were adjusted to account for inflation up to 2012-13.
3. Industries are aggregated to protect confidentiality due to small firm counts. The natural resource industry includes agriculture, forestry and fishing, and mining. Knowledge intensive business services includes information, media and telecommunications, financial and insurance services, rental, hiring and real estate services, professional, scientific and technical services, and administrative and support services. Infrastructure includes electricity, gas, water and waste services, construction, and transport, postal and warehousing.
4. R&D intensity and capability

R&D intensity equals total annual expenditures on in-house R&D as a proportion of total turnover. When calculated for an industry, R&D intensity indicates a focus on building innovation capabilities. Figure 14 presents R&D intensity figures by industry for 2013 and 2010.

For all industries combined, R&D intensity in 2013 was 0.9% compared to 0.6% in 2010, representing an increase of 50%. R&D intensity increased in manufacturing, knowledge intensive business services, and in retail, wholesale, accommodation and food services. Natural resources and infrastructure showed a decline in R&D intensity over the same period. These changes correspond to the key trends in investment observed in Figure 13 for the panel of businesses that responded to the Tasmanian Innovation Census in both 2010 and 2013.

R&D investments are a leading indicator of innovative capability and of future innovative products and processes, while investments in other innovation activities such as on design or capital expenditures are often required as part of implementing new processes or producing new products.

The increase in R&D in all service sectors and in manufacturing, if matched by an increase in other innovation investments in these sectors within Tasmania over the next few years, would result in an increase in competitiveness. Conversely, the decline in both R&D and other innovation expenditures in the natural resources and infrastructure sectors suggest that some of these firms could be facing a decline in competitiveness.

4.1 Distribution of businesses with high intensity R&D

For individual businesses, a high level of R&D intensity provides a useful measure of high innovation capability. This is defined as expenditure on in-house R&D that is greater than 1% of business turnover in the 2012-13 financial year. This measure can be used to show the distribution of innovation capability across businesses. Figure 15 shows the proportion of businesses with high level R&D intensity in each industry in 2013 and 2010.

In 2013 the proportion of firms with high R&D intensity increased to 16% from 14% in 2010. There were increases in all industries apart from manufacturing and infrastructure.

The broader increases in both industry R&D intensity and the share of firms with high R&D intensity may be related to a greater willingness to undertake R&D for innovation during the recovery period following the global financial crisis.

The results for manufacturing indicate that the increase in total sector expenditures has been driven by investments in a few large firms, since the share of firms with high R&D intensity decreased. Conversely, in the natural resources sector, the share of firms with high R&D intensity has increased, but the sector R&D intensity has decreased due to a fall in investments in large firms.

Figure 16 shows the geographical distribution of high R&D intensity businesses by Local Government Area (LGA). For example, LGAs shaded in purple have the highest concentrations of R&D intensive firms (over 20% of firms in the LGA are R&D intensive).

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1. Calculated using data for all responding businesses to the innovation census of 2013 (1,204 businesses) and 2010 (1,401 businesses).
2. Industries are aggregated to protect confidentiality due to small firm counts. The natural resource industry includes agriculture, forestry and fishing, and mining. Knowledge intensive business services includes information, media and telecommunications, financial and insurance services, rental, hiring and real estate services, professional, scientific and technical services, and administrative and support services. Infrastructure includes electricity, gas, water and waste services, construction, and transport, postal and warehousing.

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8. Some LGAs have been combined due to small firm numbers.
**Figure 15.** Percentage of R&D intensive businesses by industry: 2010 and 2013

1. Calculated using data for all responding businesses to the innovation census of 2013 (1,204 businesses) and 2010 (1,401 businesses).

2. Industries are aggregated to protect confidentiality due to small firm counts. The natural resource industry includes agriculture, forestry and fishing, and mining. Knowledge intensive business services includes information, media and telecommunications, financial and insurance services, rental, hiring and real estate services, professional, scientific and technical services, and administrative and support services. Infrastructure includes electricity, gas, water and waste services, construction, and transport, postal and warehousing.

**Figure 16.** Geographical distribution of R&D intensive businesses

Results are for 187 firms with high R&D intensity.
5. How innovative are Tasmanian businesses?

So far the results of this report show that innovation is widespread across the Tasmanian economy. A large share of firms in all industries innovated in the three years to 2013.

However, we know from previous Tasmania Innovation Census studies that high intensity innovation is limited to a small number of businesses. These businesses are highly innovative in terms of their activities and investments, the level of development undertaken in-house and the technological novelty of their product and process innovations.

The next sections address key questions about the nature and diversity of innovation in the Tasmanian economy. Firstly, how innovative are Tasmanian businesses? Secondly, are more innovative firms more likely to be successful? And thirdly, what are more innovative firms doing differently?

Three mutually exclusive categories are used to define how innovative a business is, based on activities in the three years to June 2013 (full definitions of each category are provided in Appendix C):

### Innovation leaders

Innovation leaders are the most innovative. This category includes businesses that conducted in-house R&D in the three years to June 2013 and developed highly novel product or process innovations.

### Modifiers

Modifiers are the second most innovative category. Modifiers include businesses that draw on in-house capabilities to develop new products or processes or adapt and modify those developed elsewhere. This category includes businesses that develop processes that are new to the local or national industry, or introduce products that are new to domestic markets.

### Adopters

Adopters are businesses that do not develop novel innovations. These include businesses that introduced products or processes that were only new to their business and which were not developed in-house. In general, adopters acquire innovations that were developed by other firms.

Figure 17 shows the distribution of 914 innovative firms by the three categories of innovation capability described above. The majority of innovative businesses fall into the mid-range of innovation capability: 74.4% are modifiers. Smaller percentages are innovation leaders (11.3%) or adopters (14.3%).

5.1 Are innovation leaders more successful than modifiers and adopters?

To examine the links between business innovation and performance, we separated firms into three performance categories based on the change in sales per employee from the 2010-11 to 2012-13 financial year, which also provides a proxy productivity measure. Business performance was defined as follows:

**High performance:** the growth in sales per employee was in the top 25%, growing by 22% or more from the 2010-11 to 2012-13 financial year.

**Medium performance:** the growth in sales per employee was in the second quartile, increasing by 5.7% to 22% from the 2010-11 to 2012-13 financial year.

**Low performance:** the growth in sales per employee was in the bottom 50%, with an increase of 5.7% or less from the 2010-11 to 2012-13 financial year.

9. Taking into account inflation, this category included firms with either no change or a decrease in sales per employee and covered the bottom two quartiles of possible values. The distribution of sales growth over the two year period is very similar to that in previous Tasmanian Innovation Censuses. In the 2010 census 50% of firms had growth in sales per employee between 2007-08 and 2009-10 of less than 3.7%, while in the 2007 census 50% of firms had sales growth in the two years to 2005-06 of less than 1.97%.
Figure 18 shows the distribution of businesses by sales growth performance for each category of innovation capability. A clear pattern is observed: as the level of innovation capability increases, the share of high performing businesses increases. For example, a higher percentage of innovation leaders are high performance businesses (32%) compared to modifiers (26%) and adopters (20%). Conversely 55% of adopters are low performers compared to 49% of modifiers and 42% of leaders. Highly innovative businesses are more likely to have high performance.

5.2 How is high innovation capability distributed across industries?

The distribution of innovation leaders across industries provides a picture of the concentration of highly innovative businesses. The left hand side of Figure 19 shows that those sectors with a higher share of innovation leaders are natural resources (23%), manufacturing (23%) and knowledge intensive business services (12%). The right hand side of Figure 19 shows that innovation leaders are over represented in manufacturing (with 42% of all innovation leaders) while 24% are found in knowledge intensive business services and 11% in natural resources. There is less concentration of innovation leaders in retail, other services and infrastructure sectors, as technology adoption and modification are more common forms of innovation in these sectors.

5.3 How is business size related to innovation capability in Tasmanian businesses?

How does the level of innovation differ by firm size? For instance, are larger businesses the most innovative? This question is addressed in Figure 20. The left hand side shows the proportion of innovative businesses in each size category that are innovation leaders. For instance, 37% of 27 innovative businesses with 250 or more employees are innovation leaders. The right hand side shows the proportion of all innovation leaders in Tasmania that are in each firm size category. This shows the distribution of highly innovative leader firms by size category. In the left hand side of Figure 20, the share of highly innovative leaders increases with business size based on the number of full time employees (FTEs). Only 8% of innovative firms in the smallest size category (5 to 9 FTEs) are innovation leaders, compared to 37% within the largest category (250 or more FTEs).

Size is clearly related to the likelihood of being an innovation leader. The share of innovation leaders rises in each successive size category apart from a slight drop in the 50-99 FTE group. Though not shown on this chart, the share of adopters also decreases with each increase in the size category.
Viewed from an alternative perspective, a second important pattern is observed in the right hand side of Figure 20: a large percentage of the highly innovative leaders are found in the smaller size categories. Taken together, 27% of all innovation leaders had between 10 to 19 FTEs, 24% had just 5 to 9 FTEs, while 24% had 20 to 49 FTEs.

The majority of respondent firms are small, which explains this observation. Nevertheless, despite the clear correlation between firm size and innovation capability, Figure 20 demonstrates that highly innovative firms are present in all size categories. Size is not necessarily a constraint to being highly innovative.

1. Results of the left side of Figure 19 are for 914 businesses that reported a product or process innovation.
2. Results on the right side of Figure 19 are for 103 innovation leaders.
3. Industries are aggregated to protect confidentiality due to small firm counts. The natural resource industry includes agriculture, forestry and fishing, and mining. Knowledge intensive business services includes information, media and telecommunications, financial and insurance services, rental, hiring and real estate services, professional, scientific and technical services, and administrative and support services. Infrastructure includes electricity, gas, water and waste services, construction, and transport, postal and warehousing.

1. Results on the left side of Figure 20 are for 895 businesses that reported a product or process innovation and reported employment figures.
2. Results on the right hand side are limited to 101 innovation-leading businesses that also provided employment figures.
6. What strategies are used to source knowledge for innovation?

Businesses working in isolation rarely possess all of the knowledge required to develop, test and implement new products or processes. The ability to identify, access and integrate knowledge and information from external sources is often essential for innovation.

In the 2013 Tasmanian Innovation Census all businesses that were innovative or had incomplete or abandoned innovations were asked whether they sought information or assistance for the development of new goods, services or processes from six types of external organisation. Figure 21 shows the percentage of these firms that sourced any external knowledge, and the percentage that obtained knowledge from each of the six sources.

Of all businesses that were innovative or had incomplete or abandoned innovations, 81% sought knowledge or assistance for innovation from at least one type of external organisation listed in Figure 21.

The most commonly reported source of knowledge was suppliers (57% of firms), followed by customers (47%), and industry or trade associations (44%). Less frequently cited sources were business consultants or commercial labs (38%), government departments or agencies (23%), and universities or the CSIRO (12%).

Figure 21. Obtaining knowledge for innovation from other organisations

Results are for 946 businesses that were innovative or had incomplete or abandoned innovations.

Figure 22. Innovation capability and knowledge sourcing: percentage of leaders, modifiers and adopters using each type of knowledge source

Results for 103 innovative leader businesses, 680 modifiers and 131 adopters.
6.1 Innovation capability and the use of external knowledge sources

Figure 22 reveals patterns in the types of knowledge source used by innovation leaders, modifiers, and adopters. This shows that compared to less innovative firms that are modifiers or adopters, innovation leaders are more likely to source knowledge from customers (66% of leaders), universities or the CSIRO (32%). Innovation modifiers are most likely to source knowledge for innovation from suppliers and customers. Adopters are considerably less likely than leaders and modifiers to source knowledge from each type of source, but their most widely used sources are suppliers and industry or trade associations.

Innovative businesses were also asked whether their knowledge sources for innovation were located in Tasmania, on mainland Australia or overseas. Figure 23 shows that 71% of innovation leaders reported sourcing knowledge from organisations located overseas compared to 10% of adopters, while 83% reported knowledge sources located on mainland Australia compared to 57% of adopters. Compared to innovation leaders, a higher percentage of modifiers and adopters sourced knowledge from within Tasmania.

Highly innovative businesses are more likely to seek knowledge and assistance for innovation from overseas or mainland Australia than less innovative businesses.

6.2 Informal and formal methods of sourcing knowledge

Businesses can use different methods for acquiring useful knowledge for innovation. However, little is known about

**Figure 23.** Innovation capability and location of knowledge sources: percentage of leaders, modifiers and adopters sourcing knowledge by location of the source

<table>
<thead>
<tr>
<th>Source Location</th>
<th>Leader</th>
<th>Modifier</th>
<th>Adopter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sourced knowledge from overseas</td>
<td>71%</td>
<td>29%</td>
<td>10%</td>
</tr>
<tr>
<td>Sourced knowledge from mainland Australia</td>
<td>83%</td>
<td>61%</td>
<td>39%</td>
</tr>
<tr>
<td>Sourced knowledge from within Tasmania</td>
<td>57%</td>
<td>40%</td>
<td>39%</td>
</tr>
</tbody>
</table>

Results for 103 innovative leader businesses, 680 modifiers and 131 adopters.

**Figure 24.** Methods used for sourcing external knowledge, by type of external organisation

<table>
<thead>
<tr>
<th>External Organisation</th>
<th>Any, N=762</th>
<th>Customers, N=443</th>
<th>Suppliers, N=537</th>
<th>Industry or trade associations, N=413</th>
<th>Government departments or agencies, N=213</th>
<th>Universities or the CSIRO, N=113</th>
<th>Business consultants or commercial labs, N=357</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any</td>
<td>85%</td>
<td>88%</td>
<td>84%</td>
<td>76%</td>
<td>71%</td>
<td>60%</td>
<td>77%</td>
</tr>
<tr>
<td>Customers</td>
<td></td>
<td>20%</td>
<td></td>
<td>40%</td>
<td></td>
<td>54%</td>
<td></td>
</tr>
<tr>
<td>Suppliers</td>
<td></td>
<td></td>
<td>20%</td>
<td>60%</td>
<td>71%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry or trade associations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government departments or agencies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Universities or the CSIRO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business consultants or commercial labs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percentage of firms using formal and informal methods for each knowledge source

Results for up to 762 businesses that were innovative or had incomplete or abandoned innovations, and reported at least one type of external knowledge source for innovation.
informal methods of accessing external knowledge, or the importance of formal versus informal methods

In the 2013 Tasmanian Innovation Census, each business that reported sourcing knowledge for innovation from one of the six types of external organisations in Figure 21 was also asked if they used formal and/or informal methods to access knowledge from that source.

**Formal methods:** require payment, such as contracts for consulting services or licences for technology use.

**Informal methods:** do not require payment, such as discussions with personal contacts, conference attendance, or seeking information from publicly accessible websites or publications.

Figure 24 gives results for the use of formal and informal methods for obtaining useful knowledge from each source. For example, of those 443 firms that reported sourcing knowledge from customers, 88% reported using informal methods and 20% used formal methods. Of 762 businesses that sought some form of external knowledge for innovation, 63% used formal methods and 85% used informal methods.

A key observation from Figure 24 is that both formal and informal methods of sourcing knowledge are widely used, though the mix differs by the type of knowledge source. However, informal methods of sourcing knowledge are more commonly used than formal methods, particularly when seeking information and assistance from customers, suppliers, industry or trade associations, and government departments or agencies.

Formal methods are more frequently used to source knowledge from business consultants and commercial labs. There is little difference for universities and the CSIRO, with 61% of businesses using formal methods and 60% using informal methods.

Of interest, highly innovative firms (leaders) are more likely than less innovative modifiers and adopters to use both formal and informal methods to source knowledge rather than just one method (results not shown).

### 6.3 How important is knowledge obtained using formal and informal methods?

Innovative businesses that sourced external knowledge for innovation were asked to rate the importance of the knowledge obtained using each method. Figure 25 shows that there are only minor differences in the importance of knowledge obtained from formal and informal methods, even though formal methods are costlier than informal methods. For example, 56% of firms that used formal methods gave a high importance rating to knowledge sourced using this method, versus 53% of firms that gave a high importance to knowledge sourced using informal methods.

This result emphasises the value of less costly informal knowledge networks. Developing and maintaining these networks are likely to require good skills in managing relationships with suppliers, customers and industry contacts.

**Figure 25.** Importance of external knowledge gained using formal and informal methods

<table>
<thead>
<tr>
<th>Method</th>
<th>High importance</th>
<th>Medium importance</th>
<th>Low importance</th>
<th>Not important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge sourced from formal methods</td>
<td>56%</td>
<td>36%</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Knowledge sourced from informal methods</td>
<td>53%</td>
<td>39%</td>
<td>6%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Results are for 479 businesses that reported knowledge sourcing for innovation using formal methods and 648 businesses that reported knowledge sourcing for innovation using informal methods.
7. What factors lead to successful innovation in Tasmanian businesses?

Not all innovations are successful. Research suggests that only 50% of new products reach the market. Fewer still succeed in the longer term. Yet innovations that do succeed can have a substantial impact on performance and occasionally catapult businesses into new positions of market or industry leadership.

The 2013 Tasmanian Innovation Census sought information about innovations with the greatest impact by asking all respondent businesses to describe their ‘most important innovation’ in the three financial years to June 2013. This could be a product, process, marketing or organisational innovation.

Businesses were asked how important four key factors were for the success of their most important innovation. As shown in Figure 26, “on the job learning during implementation” stands out as the most widely reported success factor for innovation, with 73% of responding businesses giving this factor a high importance rating.

Other factors such as employee skills, qualifications and training and knowledge from external experts were rated of high importance by just under half of responding businesses. These results suggest that the capability to learn “on the go” is one of the most important factors for innovation success.

7.1 What are the outcomes of the most important innovation?

Businesses were asked whether their most important innovation in the three years to June 2013 led to any of six different outcomes. The results are shown in Figure 27.

The most frequently reported outcome was an increase in skills and knowledge, cited by 87% of businesses. This result suggests that regardless of the type of innovation pursued, the process of innovating helps businesses to improve their capabilities.

The second most cited outcome was quality improvements, which highlights the importance of ongoing, incremental improvements to products, processes, organisational and marketing methods. Of interest, a reduction in costs was the least frequently cited outcome, suggesting that cost reduction is a less common business strategy than quality improvements.

Figure 26. Key success factors for innovation

<table>
<thead>
<tr>
<th>Factor</th>
<th>Percent of firms reporting high importance for each factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>On the job learning during implementation</td>
<td>73%</td>
</tr>
<tr>
<td>Formal skills, qualifications or training of employees</td>
<td>46%</td>
</tr>
<tr>
<td>Knowledge from external experts or sources</td>
<td>46%</td>
</tr>
<tr>
<td>Prior experience (for example learning from previous innovation activities)</td>
<td>44%</td>
</tr>
</tbody>
</table>

Results for 707 innovative businesses that described a ‘most important innovation’. Other businesses either reported no innovations (they were non-innovators) or were unable to answer the question.

11. Businesses were asked to rate the importance of each factor as either ‘high’, ‘medium’, ‘low’, or ‘not at all’.
7.2 What success factors are linked to particular innovation outcomes?

The above results raise questions about how inputs and outcomes for a business’s most important innovation are related. Are some success factors more likely to lead to particular innovation outcomes? How does the relationship between those success factors and innovation outcomes differ by industry or firm size?

Table 1 correlates the significance of the effect of each of the four success factors with each of the six outcomes.12 Some insightful patterns emerge from Table 1. Firstly, ‘on the job learning during implementation’ is linked to a wider range of positive innovation outcomes compared to ‘prior experience’ and ‘formal skills, qualifications and training’.

‘On the job learning during implementation’ is correlated with innovations that increase business skills and knowledge, result in quality improvements, achieve organisational efficiencies and reduce costs, while ‘prior experience’ is linked with innovations that result in access to new markets, increase sales, and improve skills and knowledge.

‘Formal skills, qualifications and training’ are correlated with innovations that increase skills and knowledge within the business and that result in access to new markets. However, no significant patterns in innovation outcomes are observed for ‘knowledge from external experts’.

Further analyses examined differences between the four key success factors and innovation outcomes by industry and firm size,13 showing that larger firms were more likely than smaller firms to report a most important innovation that resulted in cost reductions. Otherwise, the patterns observed in Table 1 were generally consistent across industries and firm size classes.

Table 1.

<table>
<thead>
<tr>
<th>Success Factors</th>
<th>Reduction in costs</th>
<th>Increase in sales</th>
<th>Access to new markets</th>
<th>Quality improvements</th>
<th>Organisational efficiencies</th>
<th>Increase in skills and knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>On the job learning during implementation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Prior experience (for example learning from previous innovation)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge from external experts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal skills, qualifications, or training of employees</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

1. Results for 707 businesses that described a ‘most important innovation’.

2. The significance of the relationship is represented by the tick.

12. The relationships are assessed by analysing correlations between a high importance rating given to each success factor and the occurrence of six innovation outcomes, controlling for differences in industry and firm size.

13. This included different types of correlation analysis to examine the differences between success factors and innovation outcomes by industry and firm size.
8. Work organisation and innovation capability

Much innovation comes from ‘learning by doing’, as highlighted in Figure 26 which shows that ‘on the job learning during implementation’ is the most common factor contributing to innovation success.

The knowledge required for innovation is often built up through experience and can be difficult to record in written documents. This is defined as ‘tacit knowledge’ and often resides in organisational routines and the skills and experience of existing employees.

A key challenge for businesses is how to best support the transfer of tacit knowledge between employees in order to encourage use of the best practices and processes and the development of entirely new ideas and innovations.

In the 2013 Tasmanian Innovation Census businesses were asked to rate the importance of three organisational methods that can encourage internal knowledge transfer:14

1. Planned job rotation of staff across different functional areas
2. Regular brainstorming sessions
3. Cross-functional work groups or teams (combined across different working areas or functions)

Of all respondent firms, 41% reported that regular brainstorming sessions were of high importance, 32% reported that job rotation was highly important, and 29% reported that cross-functional work teams were highly important.

Are highly innovative firms more likely to use these three organisational methods than less innovative firms? Figure 28 shows the percentage of innovation leaders, modifiers, and adopters that gave a high importance rating to each method. The largest differences are for cross-functional work groups, given a high importance rating by 50% of innovation leaders, 35% of modifiers, and 22% of adopters. Regular brainstorming sessions are of high importance for similar percentages of innovation leaders and modifiers (50% and 48%), but by only 31% of adopters.

Innovation leaders and modifiers are more likely than adopters to rate cross-functional work groups and regular brainstorming sessions as important management methods to promote knowledge sharing.

![Figure 28. Innovation capability and methods to encourage knowledge sharing: Percent of leaders, modifiers and adopters giving a ‘high’ importance to each method](image)

- Planned job rotation of staff across different functional areas: 39% leaders, 35% modifiers, 32% adopters
- Regular brainstorming sessions: 50% leaders, 48% modifiers, 31% adopters
- Cross-functional work groups or teams (combined across different working areas or functions): 50% leaders, 35% modifiers, 22% adopters

Results for 103 innovative leader businesses, 680 modifiers and 131 adopters.

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14. Businesses were asked to rate how important each method was on a scale of high importance, medium importance, low importance, or not applicable.
9. Market awareness and innovation capability

Many product and process innovations originate from customers, as businesses anticipate or react to changes in customer preferences and market needs. A capacity to understand customers is a generic capability that we would expect to be correlated with innovative capability. The 2013 Tasmanian Innovation Census asked businesses if they monitored customer satisfaction through questionnaires, focus groups, analysis of complaints or other methods. Of all responding businesses, 64% reported monitoring customer satisfaction through one of these methods. We found a clear correlation between the level of innovation capability and the level of engagement with customer preferences through monitoring satisfaction: 81% of innovation leaders monitored customer satisfaction, compared to 73% of modifiers and 48% of adopters (results not shown).

Highly innovative firms are more likely to monitor customer satisfaction than less innovative firms.
10. Are Tasmanian businesses engaging with social media?

Maintaining a digital presence is increasingly important for competitiveness. Not surprisingly, 85% of respondent businesses had a website as at June 30 2013.

The 2013 Tasmanian Innovation Census asked about business usage of social media, which includes applications such as Facebook, Twitter, LinkedIn, Youtube, and wiki and knowledge sharing tools. ‘Business use’ is defined as having a user profile, an account or user license.

Figure 29 shows the percentage of firms in each industry reporting business use of social media in the three years to June 2013. Of all respondents (including innovative and non-innovative firms), 49% reported business use of social media. Figure 29 shows that social media is generally more important for business-to-customer oriented services sectors, with the highest usage rates in arts and recreation (94%), information media and telecommunications (91%), rental, hiring and real estate (74%), accommodation and food services (74%) and retail (68%). There is notably lower usage in manufacturing, infrastructure and natural resource industries.

10.1 How do businesses use social media?

Businesses were asked whether social media was used for any of four different activities covering management, marketing and product innovation. Figure 30 shows the percentage share of all respondent firms that used social media for each activity.

Of all responding businesses, 42% used social media for marketing activities and 32% for interacting with customers. A smaller share of businesses used social media for knowledge management within the business (27%), while 14% used it to involve customers in the development of new goods or services.
10.2 Is social media important for innovation?

Those businesses using social media to interact with customers were asked how important information obtained via social media was for the development of new goods or services. Of those 386 firms using social media to obtain or respond to customer opinions, reviews or questions, 24% reported that the information obtained via social media was of high importance for developing goods and services (results not shown).

Of those 172 firms using social media to involve customers in developing goods and services innovations, 35% reported that the information obtained via social media was of high importance for developing goods and services (results not shown).

10.3 Innovation capability and the use of social media

Innovative businesses are more likely to use social media: 52% of innovative businesses reported business use of social media compared to 39% of non-innovative businesses.

Innovative businesses are more likely to use social media than non-innovative businesses

Figure 31 shows the patterns of social media usage for innovation leaders, modifiers, and adopters. For example, 34% of innovation leaders used social media to exchange knowledge within the business compared to 17% of adopters. In general, social media usage increases with innovative capability. The largest differences are between innovation capability and usage of social media to obtain customer opinions or involve customers in the development of new products.

Highly innovative leaders and modifiers are more likely than adopters to use social media to interact with customers and involve them in developing new products
11. Conclusions

Innovation is a key factor in economic performance and competitiveness, particularly in Tasmania where there are few opportunities to benefit from economies of scale. The results presented in this report provide a profile of innovative activity in the Tasmanian business sector between 2010 and 2013. This includes the strategies that businesses use to support innovation and the factors linked to innovation success.

There has been a general shift towards product versus process innovation since the 2010 study, suggesting that sales growth strategies were favoured over cost reduction strategies in the three years to June 2013. Process innovation is still important however, with the most commonly cited benefits including an increase in the quality of goods and services, followed by increases in production speed and then cost reductions.

A recurrent theme in the 2013 Census that was also evident in both the 2010 and 2007 studies is that only a small percentage of businesses are innovation leaders: 11.3% in 2013. Innovation leadership is based on innovation activities and investments, in house capabilities for developing innovations and the level of technological novelty in new products and processes. Most innovative businesses are either simple technology adopters (14.3%) or modifiers (74.4%), with their innovations limited to modifying technologies or ideas acquired from other businesses.

Most businesses (79%) implemented some form of organisational innovation in the three years to June 2013. The most common was new management methods for organising work responsibilities and decision making, followed by new business practices and corporate strategies.

While half of all respondent firms reported making some use of social media, this was predominantly for marketing products and less widely used for innovation activities (for instance obtaining ideas from customers to develop new products).

11.1 Industry challenges

The results for innovation investments, including investments both in R&D and other complementary innovation activities, show a decline since 2010 in the natural resources and infrastructure sectors that raises concerns for the future. There have also been large declines in investments in complementary innovation activities in the service sectors, but conversely R&D investments in these sectors have increased. Since R&D is a leading indicator for future innovations, this could be a positive result as long as there is an increase in complementary investments in the near future.

Manufacturing remains a primary source of innovation in the Tasmanian economy. Since 2010 the manufacturing sector has substantially increased investments in both R&D and in complementary innovation activities, although the data suggests that these investments are not distributed evenly across businesses and are concentrated in larger businesses.

These results indicate that Government policy to support innovation in Tasmania should pay close attention to the natural resources, infrastructure and services sectors where there are concerns over investment in innovation.

11.2 What leads to successful outcomes?

Innovative leaders are more likely to be high performers in terms of sales growth per employee than less innovative firms. Although there are innovation adopters and modifiers with high performance, a key question is whether or not high performance can be sustained without improving levels of innovative capability. Given this concern, a second major question emerges – how can businesses best improve their innovative capabilities over time? Some answers are found in the strategies used by highly innovative businesses:

- They are more likely than modifiers or adopters to source knowledge for innovation from customers, universities or the CSIRO, from sources located outside of Tasmania, and by using both informal and formal methods for sourcing knowledge.
- They are more likely to rate regular brainstorming sessions and cross-functional work groups as highly important management methods that encourage knowledge sharing across the business.
- They are more likely to connect with their market by undertaking activities to monitor customer satisfaction, for instance using social media to interact with customers and to seek their input for new product development.

In addition, based on the most important innovation reported by Tasmanian businesses, a wide range of positive innovation outcomes are associated with on the job learning during implementation. The ability to learn “on the go” is highly valued for the types of innovation that matter most to Tasmanian businesses.

In order to remain competitive, many Tasmanian firms would benefit from improving their innovative capabilities. Adopting some of the practices of highly innovative firms could help non-innovators and firms with limited innovative capabilities to realise new innovation opportunities and improve their capacity to develop and implement new ideas.
Appendix A: Tasmanian Innovation Census target population and response details

The target population for the 2013 Tasmanian Innovation Census included 1,965 businesses, covering all businesses with 5 or more Full Time Equivalent (FTE) employees in all industry sectors. 1,204 businesses responded, giving a 61.3% response rate. Figure A shows the distribution of firms for the respondent population compared to the target population. The high response rate and close match in the industry distributions indicates that the responding population provides a good representation of the target population.

Figure B shows the distribution of respondent firms by firm size category.

The total count (N) is less than 1,204 because 25 firms did not provide employment figures.
Figure B. Distribution of respondents by size category.

- 5-9 FTE, N=409 (35%)
- 10-19 FTE, N=372 (32%)
- 20-49 FTE, N=251 (21%)
- 50-99 FTE, N=77 (6%)
- 100-249 FTE, N=43 (4%)
- 250 or more FTE, N=27 (2%)

Total respondents, N=1,179.
## Appendix B: Industry classifications and ANZSIC 2006

<table>
<thead>
<tr>
<th>Industry Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Agriculture, Forestry and Fishing</td>
<td>Natural resources</td>
</tr>
<tr>
<td>B. Mining</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>C. Manufacturing</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>D. Electricity, Gas, Water and Waste Services E. Construction I. Transport, Postal and Warehousing</td>
<td>Infrastructure</td>
</tr>
<tr>
<td>F. Wholesale Trade G. Retail Trade H. Accommodation and Food Services</td>
<td>Retail, wholesale, accommodation and food services</td>
</tr>
<tr>
<td>J. Information Media and Telecommunications K. Financial and Insurance Services L. Rental, Hiring and Real Estate Services M. Professional, Scientific and Technical Services N. Administrative and Support Services</td>
<td>Knowledge intensive business services</td>
</tr>
<tr>
<td>O. Public Administration and Safety P. Education and Training Q. Health Care and Social Assistance R. Arts and Recreation Services S. Other Services</td>
<td>Health, education, public administration and safety, and other services</td>
</tr>
</tbody>
</table>
Appendix C: Definition of firms by innovation capability: leaders, modifiers, and adopters.

Innovation leaders

Innovation leaders are businesses that conducted in-house R&D in the three years to June 2013 and developed highly novel product or process innovations:

- They introduced new to market products as well as selling products on international markets, and/or introduced a new to world process innovation.

Innovation modifiers

Innovation modifiers are businesses that:

1. Introduced processes that were new to industry in Tasmania or Australia and that were developed in house; OR
2. Introduced products that were new to domestic markets in Tasmania or Australia; OR
3. Developed new products or processes in house, either with or without R&D; OR
4. Introduced new products or processes that were adapted or modified from those originally developed by other organisations.

Innovation adopters

Innovation adopters are businesses that did not develop novel innovations. These include businesses that introduced products or processes that were only new to their business and which were not developed in-house. In general, adopters acquire innovations that were developed by other firms.
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