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# NATURE OF INNOVATION IN THE NORTHERN TASMANIA REGION

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## ***BACKGROUND***

This brief responds to a request from the Director of Northern Tasmania Development for research on the nature of innovation in the northern Tasmania region.

## ***PURPOSE***

The main purpose of this document is to present a series of tables generated from the Tasmanian Innovation Census (TIC) project that provide a profile of firm-level innovation in northern Tasmania.

The northern Tasmania region includes Local Government Areas (LGAs) for the eight northern councils: Launceston, West Tamar, Break of Day, Meander Valley, Dorset, Northern Midlands, Georgetown, and Flinders Island<sup>1</sup>. Because of the relatively small number of firms in some LGAs, only some results can be provided at LGA level.

The data and tables in this document are structured in the following order with regard to content:

- Innovation status
- Innovation type
- Sales of innovative products
- Innovation investment
- Research & Development
- Collaboration activity
- Productivity measure for Northern Tasmania
- Reported share of tertiary educated employees in ‘science and engineering’ and ‘other’ disciplines

Tabulated data for this project is also provided in an excel file.

Explanations relating to the construction and interpretation of the data presented are included alongside the tables throughout this document. Detailed commentary and interpretation of tables and figures is not within the scope of this document.

## ***BACKGROUND TO THE TASMANIAN INNOVATION CENSUS***

The Tasmanian Innovation Census (TIC) project was conducted in 2007 and involved a survey of all businesses in Tasmania with 5 or more employees across all industry sectors in the Tasmanian Economy. The target population for the TIC consisted of 2807 eligible private sector firms with 5 or more employees. Of these, 1591 firms completed the questionnaire, giving a response rate of 56.7%. A follow-up survey of a

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<sup>1</sup> The Australian Standard Geographical Classification (ASGC) (ABS cat. no. 1216.0) defines an LGA as a spatial unit representing the whole geographical area of responsibility of an incorporated Local Government Council. Firms in the TIC population list were assigned to an LGA in Tasmania based on the post code of the firm’s street address. Post codes were matched to LGA using the Local Government Association of Tasmania’s Localities Index in 2007.

sample of non-respondents found no statistically significant differences in the proportion of innovators among the non-respondents compared to the respondents, indicating that the census results are unbiased. There were 746 firms in northern Tasmania in the TIC population list, of which 427 responded giving a response rate slightly above the state average at 57.3%.

The main reference period for the census is the three-year calendar period 2004-2006. Financial data on innovation expenditures were obtained for the financial year ended on or before 30 June 2006. Other point-in-time data were collected for both the 2004 and 2006 fiscal years, including figures for turnover and employment. The TIC questionnaire is included in Appendix B. All firms in the TIC were coded to the 2006 ANZSIC industry classification.

For cross-classification outputs, results need to be aggregated to industry, location and size categories to protect confidentiality of firms. This means there is a trade off between the level of detail in location or industry classifications used for figures presented, though the finest level of detail possible is used<sup>2</sup>. For industry level figures in this document an industry classification scheme is used based on the aggregation of ANZSIC 2006 divisions shown in Table 1. The industry classification scheme below is designed to provide the finest level of disaggregation possible while preserving firm confidentiality, statistical accuracy, and reflecting the industrial structure of the Tasmanian economy. Each industry sector shown in Table 1 includes firms in the corresponding ANZSIC divisions listed. This scheme is used for industry based outputs throughout this document.

**Table 1. Industry sector aggregations - ANZSIC 2006 Divisions**

<b>Industry sector</b>	<b>ANZSIC 2006 Divisions</b>
Natural resources	A. Agriculture, Forestry and Fishing B. Mining
Infrastructure	D. Electricity, Gas, Water and Waste Services E. Construction, I. Transport, Postal and Warehousing
Manufacturing	C. Manufacturing
Retail, wholesale, accommodation and food services	F. Wholesale Trade G. Retail Trade H. Accommodation and Food Services
Knowledge intensive business services	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
Health, education, public administration and safety	O. Public Administration and Safety P. Education and Training Q. Health Care and Social Assistance
Other services	R. Arts and Recreation Services S. Other Services

<sup>2</sup> To protect confidentiality of firms, there must be as a minimum 4 firms contributing to each cell of data for interval level data and no one firm can contribute more than 70% for a figure. As a result, some data cells are removed from tables.

## ***GEOGRAPHICAL REGIONS***

The figures and tables in this document are presented for four different geographical groupings apart from individual LGAs. Firstly, figures are presented for firms located in ‘northern Tasmania’, which includes the eight northern LGAs as defined above. Secondly, figures for firms located in northern Tasmania are compared with figures for firms located in the ‘rest of Tasmania’, which includes all LGAs outside of northern Tasmania.

Where it is not possible to provide figures at the individual LGA level, northern Tasmania is separated into ‘Launceston’ (which includes Launceston LGA) and ‘northern Tasmania excluding Launceston’ (which includes the seven remaining LGAs for Northern Tasmania).

## ***INDUSTRY AND BUSINESS DEMOGRAPHICS BY GEOGRAPHICAL GROUPINGS***

Table 2 on the Following page shows the distribution of firms, employment and total turnover by industry sector for each of the different geographical groupings (ranked by the size of sector contributions to total employment in northern Tasmania). Each column shows the relative distributions within each region. For example, manufacturing firms account for 23.9% of firms in northern Tasmania, 34.5% of total reported employment and 41.7% of total reported industry turnover, compared to the rest of Tasmania where manufacturing firms account for 18.4% of firms, 22.6% of employment and 24.8% of turnover. The bottom column in Table 2 shows the regional distribution of total firms, employment and turnover. For example, within northern Tasmania Launceston accounts for 66.5% of all firms and 59.3% of total employment, though firms in northern Tasmania excluding Launceston account for 58.5% of total reported turnover. Table 3 shows the distributions of firms, employment and turnover by firm size class for each regional group<sup>3</sup>.

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<sup>3</sup> Tables 2 and 3 show data for private sector firms in Tasmania with 5 or more employees that participated in the TIC. For a comprehensive picture of the distribution of value added and employment in the Tasmanian economy, Appendix A shows distributions based on ABS National Accounts and Population Census data, though these figures include the public sector.

**Table 2. Industry demographics by region, 2006.**

Industry sector	Northern Tasmania			Rest of Tasmania			Launceston			Northern region excluding Launceston		
	Industry share of all firms	Industry share of total employment	Industry share of total turnover	Industry share of all firms	Industry share of total employment	Industry share of total turnover	Industry share of all firms	Industry share of total employment	Industry share of total turnover	Industry share of all firms	Industry share of total employment	Industry share of total turnover
Manufacturing	23.9%	34.5%	41.7%	18.4%	22.6%	24.8%	20.1%	23.2%	18.7%	31.5%	51.0%	58.0%
Retail, wholesale, accommodation and food services	31.1%	21.6%	33.2%	27.7%	21.4%	20.6%	34.5%	25.7%	39.7%	24.5%	15.5%	**
Knowledge intensive business services	13.8%	13.3%	5.4%	22.3%	17.5%	23.5%	18.7%	20.6%	11.4%	4.2%	2.6%	1.2%
Infrastructure	11.2%	11.5%	9.3%	13.7%	16.5%	12.9%	11.3%	14.2%	16.1%	11.2%	7.6%	4.4%
Health, education, public administration and safety	5.4%	9.0%	1.9%	4.7%	7.9%	1.9%	4.9%	6.7%	3.5%	6.3%	12.3%	.8%
Natural resources	8.9%	7.8%	7.5%	7.1%	10.6%	11.4%	3.9%	6.4%	8.8%	18.9%	10.0%	6.7%
Other services	5.6%	2.3%	1.0%	6.0%	3.5%	4.9%	6.7%	3.2%	1.8%	3.5%	1.0%	**
<b>Total</b>	<b>100.0</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0</b>	<b>100.0%</b>	<b>100.0%</b>
<b>Region contribution to state total</b>							<b>Region contribution to Northern Tasmania total</b>					
	26.8%	22.8%	20.8%	73.2%	77.2%	79.2%	66.5%	59.3%	41.5%	33.5%	40.7%	58.5%

**Table 3. Business demographics by region, 2006.**

Firm size class	Northern Tasmania			Rest of Tasmania			Launceston			Northern region excluding Launceston		
	Share of all firms	Share of total employment	Share of total turnover	Share of all firms	Share of total employment	Share of total turnover	Share of all firms	Share of total employment	Share of total turnover	Share of all firms	Share of total employment	Share of total turnover
5-9 FTE	38.6%	9.7%	7.3%	37.3%	7.5%	5.2%	41.5%	11.7%	12.8%	32.9%	6.8%	3.3%
10-19 FTE	29.0%	14.5%	9.9%	29.3%	11.6%	11.7%	27.5%	15.6%	18.3%	32.2%	12.9%	3.9%
20-49 FTE	21.5%	23.7%	16.6%	19.8%	17.7%	12.0%	20.4%	24.9%	21.9%	23.8%	21.8%	12.9%
50-99 FTE	6.6%	17.0%	16.1%	6.9%	13.5%	11.4%	7.0%	21.4%	29.0%	5.6%	10.6%	7.0%
100+ FTE	4.2%	35.1%	50.1%	6.7%	49.7%	59.7%	3.5%	26.3%	18.0%	5.6%	48.0%	72.9%
<b>Total</b>	<b>100%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100%</b>	<b>100.0%</b>	<b>100.0%</b>

## INNOVATION STATUS

The following tables detail the share of innovation active firms by region, industry and firm size. An 'innovation active' firm is defined as any firm that has introduced a new or significantly improved product (good or service) or production process over the TIC reference period (2004-2006). This definition is consistent with the OECD's innovation manual, and that used with outputs from the European Community Innovation Surveys (CIS).<sup>4</sup>

**Table 4. Share of innovation active firms by LGA, 2004-2006.**

Northern LGA	No of responding firms	Share of innovation active firms
Break O'Day	14	64.3%
Dorset	17	64.7%
George Town	20	85.0%
Launceston	284	70.8%
Meander Valley	38	60.5%
Northern Midlands	28	89.3%
West Tamar	25	68.0%
<b>All northern Tasmania</b>	<b>427</b>	<b>71.2%</b>
<b>Rest of Tasmania</b>	<b>1164</b>	<b>69.7%</b>

Table 4 shows both the number of responding firms and the share of innovation-active firms for each northern LGA<sup>5</sup>. Of 427 responding firms in northern Tasmania, 71.2% were innovation active which was slightly higher than the 69.7% share of innovation-active firms for the rest of Tasmania.

**Table 5. Share of innovation active firms by industry sector, northern Tasmania, rest of Tasmania, 2004-2006.**

Industry sector	No of responding firms - Northern Tasmania	Northern Tasmania	Rest of Tasmania
Health, education, public administration and safety	23	91.3%	83.6%
Knowledge intensive business services	59	86.4%	77.2%
Manufacturing	102	84.3%	78.5%
Infrastructure	48	72.9%	64.4%
Natural resources	38	71.1%	75.9%
Retail, wholesale, accommodation and food services	133	54.9%	57.0%
Other services	24	45.8%	67.1%
<b>All</b>	<b>427</b>	<b>71.2%</b>	<b>69.7%</b>

<sup>4</sup> OECD, *Oslo Manual. The Collection and Interpretation of Innovation Data* (OECD: Paris) Third Edition, 2005. Publications from the ABS Australian innovation survey use a slightly broader definition of an 'innovation-active' firm. Details can be found in ABS 8158.0 - Innovation in Australian Business.

<sup>5</sup> This excludes Flinders to preserve confidentiality.

Table 5 shows the number of responding firms and the share of innovation-active firms by industry sector for northern Tasmania, and the share of innovation-active firms for by industry sector for the rest of Tasmania.

**Table 6. Share of innovation active firms by industry by region, northern Tasmania, 2004-2006.**

Industry sector	Launceston	Northern Tasmania excluding Launceston
Natural resources	63.6%	74.1%
Manufacturing	82.5%	86.7%
Infrastructure	75.0%	68.8%
Retail, wholesale, accommodation and food services	57.1%	48.6%
Knowledge intensive business services	86.8%	83.3%
Health, education, public administration and safety	92.9%	88.9%
Other services	42.1%	60.0%
<b>Total</b>	<b>70.8%</b>	<b>72.0%</b>

Table 6 shows the share of innovation-active firms by industry sector for Launceston and northern Tasmania excluding Launceston. For example there is a relatively higher share of innovation-active firms in infrastructure and health, education, public administration and safety in Launceston, though a higher share of innovation-active firms in manufacturing and natural resources in northern Tasmania excluding Launceston.

**Table 7. Share of innovation active firms by firm size class by region, 2004-2006.**

Firm size class	Northern Tasmania	Northern Tasmania	Rest of Tasmania	Launceston	Northern Tasmania excluding Launceston
5-9 FTE	165	66.7%	65.0%	67.8%	63.8%
10-19 FTE	124	68.5%	67.4%	66.7%	71.7%
20-49 FTE	92	75.0%	73.6%	72.4%	79.4%
50-99 FTE	28	82.1%	78.8%	85.0%	75.0%
100+ FTE	18	87.5%	84.6%	94.4%	100.0%
<b>Total</b>	<b>427</b>	<b>71.2%</b>	<b>69.7%</b>	<b>70.8%</b>	<b>72.0%</b>

Table 7 shows the number of responding firms by firm size class in northern Tasmania, as well as the share of innovation-active firms by size class for each other geographical grouping of firms.

### ***INNOVATION TYPE***

Table 8 shows the share of innovation active firms by innovation type for northern Tasmania and the rest of Tasmania, with definitions included below.



**Table 8. Share of firms by type of innovation, northern Tasmania, rest of Tasmania, 2004-2006.**

Industry sector	Share of product innovators		Share of novel product innovators		Share of process innovators		Share of novel process innovators		Share of organisational innovators		Share of marketing innovators	
	Northern Tasmania	Rest of Tasmania	Northern Tasmania	Rest of Tasmania	Northern Tasmania	Rest of Tasmania	Northern Tasmania	Rest of Tasmania	Northern Tasmania	Rest of Tasmania	Northern Tasmania	Rest of Tasmania
Natural resources	44.7%	48.2%	28.9%	20.5%	65.8%	61.4%	28.9%	21.7%	36.8%	55.4%	23.7%	38.6%
Manufacturing	75.5%	69.2%	40.2%	46.3%	54.9%	57.0%	11.8%	18.7%	53.9%	47.7%	52.0%	48.1%
Infrastructure	54.2%	56.9%	20.8%	33.1%	54.2%	36.9%	14.6%	17.5%	39.6%	45.0%	33.3%	36.9%
Retail, wholesale, accommodation and food services	45.1%	46.1%	24.1%	25.1%	40.6%	39.6%	14.3%	12.1%	45.1%	50.5%	49.6%	48.9%
Knowledge intensive business services	71.2%	64.9%	47.5%	37.1%	57.6%	56.8%	10.2%	18.9%	55.9%	59.1%	49.2%	52.5%
Health, education, public administration and safety	65.2%	67.3%	39.1%	34.5%	56.5%	60.0%	17.4%	18.2%	73.9%	47.3%	43.5%	36.4%
Other services	37.5%	61.4%	8.3%	42.9%	33.3%	40.0%	8.3%	20.0%	25.0%	44.3%	20.8%	32.9%
<b>All industries</b>	<b>57.6%</b>	<b>58.1%</b>	<b>31.1%</b>	<b>33.9%</b>	<b>50.6%</b>	<b>48.8%</b>	<b>14.3%</b>	<b>17.0%</b>	<b>47.8%</b>	<b>50.9%</b>	<b>44.0%</b>	<b>45.6%</b>

A firm is a *Product innovator* if they reported:

- Producing new or significantly improved goods in 2004-06
- Or, producing new or significantly improved services in 2004-06

A firm is a *Novel Product Innovator* if they reported:

- Introducing a new good or service onto the market before competitors in 2004-06 – i.e. new to the market

A firm is a *Process innovator* if they reported:

- Introducing any new or improved processes for producing or supplying goods or services in 2004-06

A firm is a *Novel Process Innovator* if they reported:

- Introducing any new or improved processes for producing or supplying goods or services in 2004-06 that were new to the industry

A firm is an *organisational innovator* if in 2004-06 they reported:

- Implementing a new or significantly changed corporate strategy
- or, implementing advanced management techniques within their enterprise, e.g. knowledge management systems
- or, implementing major changes to their organisational structure, e.g. introduction of cross-functional teams, outsourcing of major business functions.

A firm is a *marketing innovator* if in 2004-06 they reported:

- Implementing changes in marketing concepts or strategies (e.g. packaging or presentational changes to a product to target new markets, or new activities to open up new markets).

## ***SALES OF INNOVATIVE PRODUCTS***

In the TIC questionnaire, firms were asked to estimate the percentage of sales in the most recent financial year (2005-2006) that were generated from 3 categories of innovative products<sup>6</sup>:

- Sales from significantly improved products
- Sales from products new to the enterprise but not new to the market
- Sales from products new to the market.

The resulting shares of sales from innovative products are indicative of the level of replacement and change firms make to product mixes in order to remain competitive, and provide a key innovation output indicator. The rate of change differs substantially by industry due to variation in competitive environments and industry product life cycles and for this reason caution is recommended when considering differences in shares between industries. Table 9 shows the share of sales deriving from the three categories of innovative products by industry sector.

**Table 9. Share of sales deriving from innovative products by industry sector, northern Tasmania, rest of Tasmania, 2005-2006.**

Industry sector	Share of sales from significantly improved products		Share of sales from new to enterprise products		Share of sales from new to market products	
	Northern Tasmania	Rest of Tasmania	Northern Tasmania	Rest of Tasmania	Northern Tasmania	Rest of Tasmania
Manufacturing	17.7%	8.2%	2.7%	4.9%	31.4%	5.0%
Health, education, public administration and safety	9.5%	9.2%	4.2%	3.0%	15.6%	2.7%
Natural resources	10.8%	14.0%	1.3%	3.8%	14.2%	1.7%
Retail, wholesale, accommodation and food services	6.5%	19.1%	5.7%	11.4%	6.9%	9.8%
Knowledge intensive business services	7.5%	19.0%	3.7%	13.9%	4.3%	2.0%
Infrastructure	7.6%	6.5%	1.5%	3.8%	4.1%	3.4%
Other services	17.3%	3.1%	2.4%	3.2%	0.0%	17.6%
<b>All</b>	<b>13.4%</b>	<b>12.2%</b>	<b>3.2%</b>	<b>7.6%</b>	<b>21.1%</b>	<b>5.2%</b>

Table 10 shows the share of sales deriving from the three categories of innovative products by industry sector within the two regions in northern Tasmania.

<sup>6</sup> See explanations on pg 28-29 in the attached questionnaire.

**Table 10. Share of sales deriving from innovative products by industry sector by region, northern Tasmania, 2005-2006.**

Industry sector	Share of sales from significantly improved products		Share of sales from new to enterprise products		Share of sales from new to market products	
	Launceston	Northern Tasmania excluding Launceston	Launceston	Northern Tasmania excluding Launceston	Launceston	Northern Tasmania excluding Launceston
Natural resources	7.0%	17.9%	1.7%	0.5%	14.2%	14.1%
Manufacturing	11.9%	19.1%	6.2%	1.8%	6.8%	37.7%
Infrastructure	7.7%	7.0%	1.4%	2.0%	5.1%	0.0%
Retail, wholesale, accommodation and food services	6.3%	9.7%	5.2%	15.4%	7.1%	3.6%
Knowledge intensive business services	6.7%	13.1%	3.8%	3.1%	4.7%	2.1%
Health, education, public administration and safety	11.3%	0.3%	2.4%	13.3%	18.8%	0.2%
Other services	14.2%	**	2.7%	**	0%	**
<b>All</b>	<b>8.3%</b>	<b>18.3%</b>	<b>4.3%</b>	<b>2.1%</b>	<b>7.4%</b>	<b>34.0%</b>

\* Data removed due to confidentiality.

## ***INNOVATION INVESTMENT***

The innovation census questionnaire asked whether firms undertook particular types of innovative activity, and for expenditure figures on the particular activity in the most recent financial year (2005-2006). The majority of firms were able to provide good estimates, and as a result it is possible to review the patterns of expenditure, or investment in innovation. Table 11 shows the distribution of total innovation expenditure across different innovation activities within each industry for northern Tasmania, and for the rest of Tasmania.

For example, expenditure on in-house research and development represented 7.6% of total reported innovation expenditure in the natural resources sector in northern Tasmania, compared to 22.6% of total innovation expenditure in this sector for the rest of Tasmania. While in manufacturing in northern Tasmania in-house research and development represented 49.6% of total reported innovation expenditure compared to 15.9% of total innovation expenditure in this sector in the rest of Tasmania. The last row in Table 11 shows the distribution of total innovation expenditure by industry sector for each region, while the last column shows the distribution of total innovation expenditure by innovation activity type for each region.

Shares of total expenditure are featured in Table 11 rather than absolute financial figures, because these would not include data for non-respondents and would therefore underestimate the true values. Conversely, it is reasonable to assume that shares and percentages are similar between the respondents and non-respondents<sup>7</sup>. As an indication of the level of expenditure, the total reported innovation expenditure for northern Tasmania amounted to approximately \$109 million dollars, though as explained this would most certainly underestimate the true amount over the period.

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<sup>7</sup> Although AIRC is confident in the quality of the coverage - the quality of the population list has been comprehensively checked against every available source - there are likely to be random variations between the respondent and non-respondent groups. These and other methodological issues are discussed in greater depth in the working paper *Technical and methodological issues in the Tasmanian innovation census*, available through <http://www.airc.net.au>.

**Table 11. Distribution of total innovation investment by industry and activity, northern Tasmania, rest of Tasmania, 2005-2006.**

Innovation activity	Natural resources		Manufacturing		Infrastructure		Retail, wholesale, accommodation and food services		Knowledge intensive business services		Health, education, public administration and safety		Other services		Innovation activity share in total innovation expenditure	Innovation activity share in total innovation expenditure
	NT	RT	NT	RT	NT	RT	NT	RT	NT	RT	NT	RT	NT	RT	NT	RT
In-house research and development	7.6%	22.6%	49.6%	15.9%	11.5%	4.5%	12.3%	27.8%	36.5%	39.4%	37.4%	16.9%	31.5%	28.0%	<b>34.6%</b>	<b>17.4%</b>
Acquisition of research and development from other organisations	**	5.2%	1.6%	3.7%	**	0.3%	4.7%	3.1%	0.8%	4.4%	**	1.2%	0.0%	1.2%	<b>1.6%</b>	<b>2.4%</b>
Acquisition of advanced machinery, equipment, computer hardware or software	59.4%	60.4%	36.6%	68.0%	72.8%	79.2%	66.6%	42.6%	25.8%	30.3%	37.7%	64.1%	47.4%	61.5%	<b>45.8%</b>	<b>63.8%</b>
Acquisition of external knowledge	**	1.5%	0.8%	1.7%	**	5.8%	3.4%	3.7%	3.7%	4.1%	3.8%	3.2%	**	0.4%	<b>1.7%</b>	<b>3.6%</b>
Internal or external training	15.4%	7.5%	3.4%	3.9%	3.3%	4.2%	5.9%	8.0%	13.6%	6.8%	9.1%	12.1%	8.7%	5.0%	<b>6.3%</b>	<b>5.4%</b>
Design activities	7.6%	1.5%	4.1%	2.8%	5.6%	3.1%	1.4%	2.6%	12.5%	10.1%	**	0.8%	**	2.7%	<b>5.2%</b>	<b>3.7%</b>
Activities for the market preparation and introduction of new or improved products	7.7%	1.3%	3.8%	4.0%	2.5%	2.9%	5.8%	12.2%	7.1%	4.9%	**	1.7%	**	1.3%	<b>4.7%</b>	<b>3.7%</b>
<b>Total</b>	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	<b>100.0%</b>	<b>100.0%</b>
<b>Industry share in total innovation expenditure</b>	<b>13.8%</b>	<b>12.7%</b>	<b>54.6%</b>	<b>19.9%</b>	<b>11.3%</b>	<b>37.3%</b>	<b>9.3%</b>	<b>7.2%</b>	<b>8.0%</b>	<b>13.4%</b>	<b>2.5%</b>	<b>2.5%</b>	<b>0.5%</b>	<b>6.9%</b>	<b>100.0%</b>	<b>100.0%</b>

NT = Northern Tasmania, RT = Rest of Tasmania.

\*\* Data removed for confidentiality.

**Table 12. Distribution of innovation investment by activity by region, northern Tasmania, 2005-2006.**

Innovation activity	Share in total innovation expenditure	
	Launceston	Northern Tasmania excluding Launceston
In-house research and development	17.1%	49.6%
Acquisition of research and development from other organisations	1.9%	1.5%
Acquisition of advanced machinery, equipment, computer hardware or software	54.8%	38.1%
Acquisition of external knowledge	2.6%	1.0%
Internal or external training	10.1%	2.9%
Design activities	6.6%	4.0%
Activities for the market preparation and introduction of new or improved products	6.9%	2.9%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>
Region share in total innovation expenditure for Northern Tasmania	<b>46.2%</b>	<b>53.8%</b>

Table 12 shows the distribution of total innovation expenditure by activity within the two regions within northern Tasmania. For example, within northern Tasmania excluding Launceston, in-house research and development accounts for 49.6% of total innovation expenditure compared to 17.7% within Launceston. Northern Tasmania excluding Launceston accounts for the higher share of total innovation expenditure for northern Tasmania (53.8% compared to 46.2% for Launceston).

### ***RESEARCH & DEVELOPMENT***

Research and development comprises one of the key innovation input activities. As with the innovation activities above firms in the TIC were asked firstly whether they undertook any R&D in the period 2004-2006 and secondly the amount spent on R&D in the most recent financial year (2005-2006)<sup>8</sup>. Table 13 shows the share of responding firms in each LGA undertaking R&D over 2004-2006, as well as the LGA share of total R&D expenditure for northern Tasmania.

<sup>8</sup> A definition of R&D is provided in the attached TIC questionnaire.

**Table 13. Distribution of R&D activity and expenditure by Northern LGA.**

Northern LGA	Share of firms performing R&D	LGA share in total R&D expenditure for the northern region
Break O'Day	42.9%	0.2%
Dorset	52.9%	1.0%
George Town	65.0%	**
Launceston	50.0%	22.9%
Meander Valley	44.7%	**
Northern Midlands	60.7%	2.9%
West Tamar	32.0%	1.6%
<b>Northern Tasmania</b>	<b>49.6%</b>	<b>100.0%</b>
<b>Rest of Tasmania</b>	<b>48.6%</b>	

Table 14 shows the distribution of total R&D expenditure by industry for each geographical region. For example, manufacturing accounted for 78.3% of total R&D expenditure in northern Tasmania compared to 18.2% in the rest of Tasmania. Manufacturing accounted for 26% of total R&D expenditure in Launceston compared to 93.8% of total R&D expenditure in northern Tasmania excluding Launceston.

**Table 14. Distribution of total R&D expenditure by industry by region, 2005-2006.**

Industry sector	Launceston	Northern Tasmania excluding Launceston	Northern Tasmania	Rest of Tasmania
Natural resources	5.4%	2.3%	3.0%	16.6%
Manufacturing	26.0%	93.8%	78.3%	18.2%
Infrastructure	8.6%	2.3%	3.8%	9.7%
Retail, wholesale, accommodation and food services	11.4%	**	3.3%	11.6%
Knowledge intensive business services	35.6%	**	8.4%	30.5%
Health, education, public administration and safety	**	**	2.7%	2.4%
Other services	**	**	.4%	11.0%
	100.0%	100.0%	100.0%	100.0%

Table 15 shows the distribution of reported R&D by application area. Each firm who reported undertaking R&D in 2004-2006 was asked whether their R&D activity fell in to each of the application areas listed in Table 15. Thus Table 15 shows the share of firms undertaking R&D that reported R&D in each application area. As R&D activities over the reference period could be classified to more than one application area, the shares do not add up to 100%.

**Table 15. Share of innovation active firms undertaking R&D by application area, 2004-2006.**

Share of innovation active firms undertaking R&D by application area (%) - Northern Tasmania	
Plant production & plant products	22.7%
Animal production and animal products	10.9%
Mineral resources excluding energy	5.9%
Energy resources	9.5%
Energy supply	8.2%
Manufacturing	36.8%
Construction	18.1%
Transport	16.8%
Information and communication services	27.3%
Commercial services and tourism	17.8%
Other application area not mentioned	11.5%

Table 16 shows the distribution of reported R&D by research field. Each firm who reported undertaking R&D in 2004-2006 was asked whether their R&D activity fell in to each of the research fields listed in Table 16. Table 16 shows the share of firms undertaking R&D that reported R&D in each research field. As with Table 13, R&D activities over the reference period could be classified to more than one research field, so the shares do not add up to 100%.

**Table 16. Share of innovation active firms undertaking R&D by research field, 2004-2006.**

Share of innovation active firms undertaking R&D by research field (%) - Northern Tasmania	
Mathematical sciences	4.9%
Physical sciences	9.5%
Chemical sciences	13.5%
Earth sciences	8.6%
Biological sciences	11.8%
Information, Computing and Communication Sciences	24.7%
Engineering and Technology	31.3%
Agricultural, Urban environment and Building	21.7%
Medical and Health Sciences	5.9%
Other research field not mentioned	6.9%



## ***COLLABORATION ACTIVITY***

Innovation involves the development, acquisition, adoption, and application of new knowledge by firms, and often requires firms to search outside their existing stocks of knowledge and skills to solve innovation related problems. Collaboration activities are thus widely acknowledged as critical elements in successful innovation processes, facilitating the transfer and diffusion of new technologies and knowledge between firms, institutions and economies.

In the TIC questionnaire, collaboration was defined as ‘active participation with other enterprises or non-commercial institutions aimed at developing new goods, services, or processes’<sup>9</sup>. Firms were asked firstly whether they collaborated for innovation, and if so whether they collaborated with particular types of collaboration partner and the location of those collaboration partners. The resulting data facilitates a profile of collaboration activity in the following tables.

The share of innovation-active firms reporting collaboration with other enterprises or institutes during 2004 to 2006 was very similar in northern Tasmania as in the rest of Tasmania (45.7% and 45.4% of innovation-active firms respectively).

Table 17 shows the pattern of collaboration activities by type and location for collaborating firms in both northern Tasmania and the rest of Tasmania.

The shaded column in Table 17 shows the share of collaborating firms in each region that reported collaborating with each partner type. The three columns adjacent to the shaded column for each region show the share of collaborating firms that reported collaborating with each particular partner type in each location. For example, 74.8% of collaborating firms in northern Tasmania reported collaboration with suppliers of equipment, materials, services, or software compared to 73.1% of collaborating firms in the rest of Tasmania. Though 12.2% of collaborating firms in northern Tasmania reported collaboration with suppliers of equipment, materials, services, or software located outside of Australia, compared to 18.5% of collaborating firms in the rest of Tasmania.

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<sup>9</sup> Consistent with definitions in the 2005 OECD OSLO manual 3<sup>rd</sup> edition.

**Table 17. Share of collaborating firms collaborating by partner type and location, northern Tasmania, rest of Tasmania,**

Collaboration partner type	Northern Tasmania				Rest of Tasmania			
	Share of collaborating firms	Within Tasmania	Mainland Australia	Outside of Australia	Share of collaborating firms	Within Tasmania	Mainland Australia	Outside of Australia
Other enterprises within enterprise group	36.0%	23.0%	23.0%	7.2%	29.6%	20.4%	19.3%	6.0%
Suppliers of equipment, materials, services, or software	74.8%	43.2%	55.4%	12.2%	73.1%	42.9%	47.8%	18.5%
Clients or customers	69.1%	59.0%	29.5%	10.8%	75.0%	62.8%	37.5%	16.8%
Competitors or other enterprises within industry	50.4%	40.3%	24.5%	4.3%	54.6%	42.9%	26.1%	7.1%
Consultants, commercial labs, or private R&D institutes	47.5%	36.7%	28.1%	3.6%	44.3%	33.2%	23.1%	5.2%
Universities or other higher education institutions	31.7%	25.9%	13.7%	2.9%	35.3%	28.8%	10.6%	3.0%
Public research institutes or CRCs (Cooperative Research Centres)	17.3%	10.8%	10.8%	**	17.9%	12.0%	10.1%	1.4%

\*\* Data removed due to confidentiality rules.

**Table 18. Share of collaborating firms collaborating by partner type by northern Tasmania, 2004-2006.**

Collaboration partner type	Share of collaborating firms- Launceston	Share of collaborating firms - northern region excluding Launceston
Other enterprises within enterprise group	29.1%	47.2%
Suppliers of equipment, materials, services, or software	75.6%	73.6%
Clients or customers	70.9%	66.0%
Competitors or other enterprises within industry	52.3%	47.2%
Consultants, commercial labs, or private R&D institutes	44.2%	52.8%
Universities or other higher education institutions	26.7%	39.6%
Public research institutes or CRCs (Cooperative Research Centres)	10.5%	28.3%

Table 18 shows the share of collaborating firms within Launceston and northern Tasmania excluding Launceston, who reported collaboration with each particular partner type. For example, in northern Tasmania excluding Launceston 39.6% of collaborating firms reported collaborating with universities, compared to Launceston where 26.7% of collaborating firms reported collaborating with universities.

**Table 19. Share of collaborating firms collaborating by location by region, 2004-2006.**

	Northern Tasmania	Rest of Tasmania	Launceston	Northern Tasmania excluding Launceston
Share of collaborating firms collaborating within Tasmania	88.5%	86.7%	86.0%	92.5%
Share of collaborating firms collaborating with mainland Australia	77.7%	73.4%	80.2%	73.6%
Share of collaborating firms collaborating outside of Australia	26.6%	30.4%	25.6%	28.3%

Table 19 shows the share of collaborating firms with collaboration partners in particular locations for each different geographical region. For example 26.6% of collaborating firms in northern Tasmania reported collaboration activities with partners located outside of Australia compared to 30.4% of collaborating firms in the rest of Tasmania.

## ***PRODUCTIVITY MEASURE FOR NORTHERN TASMANIA***

The following tables present a proxy measure of productivity by industry, firm size and region, based on turnover and employment figures reported for 2006 in the TIC questionnaire. It must be stressed that figures in these tables provide a basic proxy measure for productivity and need to be interpreted with caution. They are based on firm point-in-time estimates for turnover and employment, and are derived using data only from firms who reported figures for both in 2006. As turnover in no way indicates value added or profitability the measure is limited and represents a ratio of reported turnover to reported number of full-time equivalent employees. Therefore it is not possible to compare across industries, but some comparison of figures between regions within industries may be useful.

**Table 20. Productivity proxy measure by industry by region, 2005-2006.**

Industry sector	Launceston	Northern region excluding Launceston	Northern Tasmania	Rest of Tasmania
Natural resources	\$255,819	\$264,588	\$260,278	\$325,841
Manufacturing	\$152,311	\$455,273	\$332,010	\$339,551
Infrastructure	\$211,201	\$234,211	\$217,130	\$263,155
Retail, wholesale, accommodation and food services	\$315,104	\$259,476	\$304,530	\$315,645
Knowledge intensive business services	\$130,855	\$178,125	\$135,586	\$431,343
Health, education, public administration and safety	\$102,796	\$54,687	\$84,228	\$99,991
Other services	\$108,447	\$138,298	\$113,722	\$433,675
<b>Total</b>	<b>\$201,160</b>	<b>\$354,616</b>	<b>\$259,533</b>	<b>\$325,788</b>

Some data removed in Table 20 and 21 due to confidentiality rules.

**Table 21. Productivity proxy measure by firm size class by region, 2005-2006.**

Firm size class	Northern Tasmania	Rest of Tasmania	Launceston	Northern region excluding Launceston
5-9 FTE	\$209,127	\$218,847	\$211,883	\$201,953
10-19 FTE	\$198,202	\$317,864	\$230,633	\$135,027
20-49 FTE	\$205,868	\$216,842	\$185,312	\$237,720
50-99 FTE	\$263,216	\$287,772	\$251,275	\$306,295
100+ FTE	\$343,284	\$531,832	\$145,274	\$527,331
<b>Total</b>	<b>\$259,533</b>	<b>\$394,299</b>	<b>\$201,160</b>	<b>\$354,616</b>

***REPORTED SHARE OF TERTIARY EDUCATED EMPLOYEES IN 'SCIENCE AND ENGINEERING' AND 'OTHER' DISCIPLINES***

In the TIC questionnaire, firms were asked to estimate the number of full time employees who were educated to degree level or above in 'science and engineering subjects' and 'other subjects'. Where firms could not provide a number they were asked to provide an estimate for each category as a percentage of all employees (which were used to derive a number based on reported number of employees for some firms). As a result, Table 22 shows the share of reported employees with tertiary qualifications in the two categories by industry and geographical region. For example, 6% of employees in manufacturing firms in northern Tasmania were educated in science and engineering subjects compared with 4% in the rest of Tasmania. For all industries 5.4% of employees were educated in science and engineering subjects in northern Tasmania compared with 6.1% in the rest of Tasmania.

**Table 22. Share of tertiary educated employees in ‘science and engineering’ and ‘other’ disciplines by region, 2006.**

Industry sector	Share of total employees with tertiary qualifications in science or engineering subjects				Share of total employees with tertiary qualifications in 'other' subjects			
	Northern Tasmania	Rest of Tasmania	Launceston	Northern Tasmania excluding Launceston	Northern Tasmania	Rest of Tasmania	Launceston	Northern Tasmania excluding Launceston
Natural resources	6.9%	6.3%	9.7%	4.2%	3.8%	3.4%	4.7%	2.9%
Manufacturing	6.0%	4.0%	4.6%	7.0%	2.2%	3.0%	1.5%	2.7%
Infrastructure	2.0%	2.7%	1.5%	3.3%	3.5%	2.8%	3.7%	3.0%
Retail, wholesale, accommodation and food services	1.2%	2.0%	1.4%	0.7%	3.9%	3.8%	3.4%	5.1%
Knowledge intensive business services	11.0%	12.4%	11.2%	8.7%	24.8%	14.5%	26.7%	3.8%
Health, education, public administration and safety	8.8%	15.9%	3.1%	13.3%	10.2%	6.3%	12.0%	8.7%
Other services	1.5%	4.8%	1.8%	0.0%	3.4%	4.7%	3.7%	2.1%
<b>Total</b>	<b>5.4%</b>	<b>6.1%</b>	<b>4.8%</b>	<b>6.2%</b>	<b>6.6%</b>	<b>5.5%</b>	<b>8.5%</b>	<b>3.9%</b>

Table 23 shows the share of employees within each LGA with tertiary qualifications in the two categories.

**Table 23. Share of tertiary educated employees in ‘science and engineering’ and ‘other’ disciplines by LGA, 2006.**

Northern LGA	Share of science or engineering qualified	Share of 'other' qualified
Break O'Day	1.7%	5.1%
Dorset	0.9%	2.9%
George Town	6.9%	1.9%
Launceston	4.8%	8.5%
Meander Valley	10.6%	3.9%
Northern Midlands	3.8%	5.9%
West Tamar	4.7%	6.8%
<b>All</b>	<b>5.4%</b>	<b>6.6%</b>

## CONCLUSION

This document sought to map out a firm-level innovation profile for northern Tasmania through presenting a series of tables and data generated from the Tasmanian Innovation Census project. Innovation indicators were presented for northern Tasmania compared to the rest of Tasmania, and within northern Tasmania data was presented for two main regions: Launceston and northern Tasmania excluding Launceston. The document featured a number of key indicators including innovation status and type, inputs or investments in innovation activities, an output measure based on the share of total sales derived from new and improved products, R&D activity and expenditure, and collaboration activities. Cross classification data was presented using the finest level of detail possible within confidentiality constraints.

The development, use, and interpretation of innovation indicators should be informed by an understanding of the industrial structure of the Tasmanian economy and its regions (though this is often subject to substantial limitations in available regional level data). TIC data was used to map out a picture of the business and industry demographics in terms of the distribution of firms, employment and turnover for northern Tasmania in relation to the rest of the state, provide a proxy measure for productivity derived from firm reported turnover and employment figures, and present shares of tertiary qualified employees reported by firms in the TIC.

A key challenge for policy makers relates to understanding differences in innovation capabilities, performance, and absorptive capacity across firms, industries and regions. Further work exploring new innovation metrics based on existing TIC data has potential for assisting with this task; for example using composite measures for *how* firms innovate and for ranking by intensity of innovation activities<sup>10</sup>. This document has provided a snapshot of baseline data in order to build understanding of innovation

<sup>10</sup> For an example of new innovation metrics utilising TIC data, see Arundel and O'Brien (2009) in *Innovation Metrics Framework: Consolidated Report*, Department of Innovation, Industry, Science and Research (available at <http://www.innovation.gov.au/Section/Innovation/Pages/OverviewforInnovation.aspx>).

in northern Tasmania that can be used to assess the changes in the regional innovation profile over time as new data becomes available.



**APPENDIX A – STRUCTURE OF THE TASMANIAN AND AUSTRALIAN ECONOMIES, 2006.**

Industry sector	Tasmania		Australia	
	Industry share of total gross value added	Industry share of total employment	Industry share of total gross value added	Industry share of total employment
Public administration and safety, health and education	22.0%	28.1%	16.3%	24.9%
Utilities construction, and transport	16.5%	12.7%	14.9%	13.5%
Knowledge intensive business services	16.3%	12.7%	25.4%	17.2%
Manufacturing	14.2%	10.3%	10.8%	10.5%
Retail trade, wholesale trade, accommodation and food services	12.0%	22.5%	12.2%	22.0%
Agriculture, forestry & fishing	6.4%	5.6%	3.0%	3.1%
Arts and recreation services, other services	3.2%	4.9%	3.0%	5.1%
Mining	2.1%	0.8%	7.2%	1.2%

Source: ABS cat 2068.0, 2006, ABS cat 5204.0, 2009. ABS cat 5220.0, 2009. Shares in GVA at current prices. Value added figures are from August 2006 for comparability with employment. Industry categories aggregate ANZSIC divisions as follows:  
 Public administration and safety, health and education: O,P,Q  
 Utilities, construction and transport: ANZSIC Divisions D, E, I,  
 Retail trade, wholesale trade, accommodation and food services : ANZSIC Divisions F, G ,H  
 Knowledge intensive business services: ANZSIC Divisions J, K, L, M, N  
 Arts and recreation services, other services : ANZSIC Divisions R, S

**APPENDIX B – TIC QUESTIONNAIRE**

**Tasmanian Innovation Census  
Survey Questionnaire**  
Version 2.7 - 9 August 2007

**Australian Innovation Research Centre  
University of Tasmania**

ID \_\_\_\_\_

Time actual interview started \_\_\_\_\_: \_\_\_\_\_ 24 hour time

Date started \_\_\_\_\_ / \_\_\_\_\_ / 2007

Good morning/afternoon, I'm calling on behalf of the Australian Innovation research Centre at the University of Tasmania.

I'm calling about an innovation project that the University of Tasmania is currently undertaking in collaboration with the Department of Economic Development.

Recently a letter was sent explaining the project, did you get a chance to read that letter?

The project aims to study innovation across different industries in Tasmania, exploring the development of new products and processes in Tasmanian businesses.

It aims to provide researchers and Policy makers with an understanding of what innovation is occurring in Tasmania, so that they can develop better forms of support for Tasmanian firms, and better policies to support innovation in Tasmania and improve the Tasmanian economy.

What the project involves is a short telephone questionnaire. It takes around 10 to 20 minutes. Would you be willing to participate in the survey now? [If no] Would it be possible to schedule a time to complete the questionnaire?

---

In this survey, the questions are about [business name]'s whole business enterprise in Tasmania.

Q1. To start with, could you describe the activity from which [business name] derives its main income?

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Q2a. Is [business name] part of an enterprise group, that is, two or more enterprises under common ownership?

*Please cross one box only*

Yes

No

Q2b. Is your headquarters in Tasmania, in mainland Australia or Outside of Australia:

*Please cross one box only*

In Tasmania

In Mainland Australia

Outside of Australia

(If the enterprise is part of an enterprise group) In the rest of these questions "your enterprise" refers only to [business name] in Tasmania.

**Q2c. Does [business name] have more than one location or establishment in Tasmania?**

*Please cross one box only*

Yes

No  → Go to Q3

**Q2d. (If yes) What was the number of locations operated by [business name] as at 30 December 2006?**

\_\_\_\_\_

The next question asks for the percentage distribution of sales revenue between markets in Tasmania, Australia and Overseas.

**Q3. Please estimate the percentage of your revenues in the 2005-2006 Financial Year (ended June 30 2006) that came from the sale of goods or services in:**

- a. Tasmania \_\_\_\_\_%
- b. Mainland Australia \_\_\_\_\_%
- c. Outside of Australia \_\_\_\_\_%

**The next section is about new or improved goods or services at [business name]**

*When we say that, we are talking about the market introduction of a good or service that is new or significantly improved.*

*That could mean that the good or service is completely new and different to goods or services previously produced by the enterprise.*

*That can also mean that the good or service is significantly improved in terms of quality, functions or intended uses; or significantly improved through changes in materials, components, design, or other characteristics that enhance performance.*

*For example, we would exclude superficial changes (such as new colours or patterns on a label), but include new packaging that improves shelf-life, or reduces costs.*

*The new good or service does not need to be new to your market, only to your enterprise, and it does not matter if the new good or service was originally developed by your enterprise, or by other enterprises.*

*We don't include the simple resale of new goods purchased from other enterprises.*

**Q4. During the past three calendar years, 2004, 2005 and 2006, did your enterprise introduce:**

		Yes	No
a.	New or significantly improved goods.	<input type="checkbox"/>	<input type="checkbox"/>
b.	New or significantly improved services	<input type="checkbox"/>	<input type="checkbox"/>

**(If 'no' to both options above go to Question 8, otherwise Q5a: )**

**Q5a. During the 3 years from 2004 to 2006, were any of these goods or services new to your market, that is where your enterprise introduced a new good or service onto your market before your competitors?**

*Please cross one box only*

Yes

No

**Q5b. During the 3 years from 2004 to 2006, were any of these goods or services only new to your enterprise, that is where you introduced a new good or service similar to a product already available from your competitors?**

*Please cross one box only*

Yes

No

**The next question applies to goods or services during the three calendar years 2004 to 2006.**

**The question asks how much of your turnover is due to goods or services that were unchanged during 2004 to 2006, and how much of your turnover is due to goods or services introduced during 2004 to 2006 that were new or improved.**

**We ask about turnover for the 2005-2006 financial year only (ended June 30 2006), and we ask for a percentage of turnover.**

**We are interested in the distribution of turnover between sales of goods or services that were unchanged, significantly improved, new to your enterprise but not your market, and new to your market.**

**Q6.**

a. What percentage of your 2005-2006 turnover, was from goods or services that were **unchanged**, or only marginally modified during 2004 to 2006? \_\_\_\_\_%

b. What percentage of your 2005-2006 turnover, was from goods or services introduced during 2004 to 2006, that were **significantly improved**? \_\_\_\_\_%

c. What percentage of your 2005-2006 turnover, was from goods or services introduced during 2004 to 2006, that were **new to your enterprise but not to your market**? \_\_\_\_\_%

d. What percentage of your 2005-2006 turnover, was from goods or services introduced during 2004 to 2006 that were **new to your market**? \_\_\_\_\_%

**Total turnover in 2006** 100%

**Q7. During the past three calendar years 2004 to 2006, were any of [business name]'s new or improved goods or services sold to the following industries in Tasmania?**

	Yes	No
a. The mining industry	<input type="checkbox"/>	<input type="checkbox"/>
b. Engineering	<input type="checkbox"/>	<input type="checkbox"/>
c. Forestry or forest products (i.e. wood, pulp and paper)	<input type="checkbox"/>	<input type="checkbox"/>
d. The food processing industry	<input type="checkbox"/>	<input type="checkbox"/>
e. Fishing or Aquaculture	<input type="checkbox"/>	<input type="checkbox"/>
f. Agriculture or horticulture	<input type="checkbox"/>	<input type="checkbox"/>
g. The wine industry	<input type="checkbox"/>	<input type="checkbox"/>

**The next section is about Process Change**

A New Process is the use of new or significantly improved **methods** for the production or supply of goods and services. Purely organisational or managerial changes should not be included - these will be covered shortly.

The new process must be new to your enterprise, but it does not need to be new to your industry. Again, it does not matter if the new process was originally developed by your enterprise or by other enterprises.

**Q8a. During the three calendar years 2004 to 2006, did your enterprise introduce any new or improved processes for producing or supplying goods or services?**

Yes

No  → Question 9

**Q8b. Were any of these processes new only to your enterprise and not to the industry?**

Yes

No

**Q8c. Were any of these processes new to the industry?**

Yes

No

**Q9. Does [business name] plan to introduce a new good, service or process within the next three calendar years 2007, 2008 or 2009?**

*Please cross one box only*

Yes

No

**Now a few questions about expenditure**

**Q10, Q11, Q12. During the three years 2004 to 2006, did your enterprise engage in [...]? (When 'yes') What was your approximate expenditure on [...] in the 2005/6 financial year only?**

*Please cross one box for each category*

		Yes	No	\$ 2005/6	% of Turnover in 2005/200 6 Financial year
a.	<b>In-house research and development for new products or processes, that is, creative work undertaken within your enterprise on an occasional or regular basis to increase the stock of knowledge and its use to devise new and</b>	<input type="checkbox"/>	<input type="checkbox"/> If no ski p to		

	<i>improved goods, services and processes</i>		Q1 5		
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The next questions ask for a “yes” or “no” response to a number of answer categories.

**Q13. Does your enterprise’s in-house R&D fall into any of the following application areas?**

	Application area	Yes	No
a.	Plant production and plant products	<input type="checkbox"/>	<input type="checkbox"/>
b.	Animal production and animal products	<input type="checkbox"/>	<input type="checkbox"/>
c.	Mineral resources excluding energy	<input type="checkbox"/>	<input type="checkbox"/>
d.	Energy resources	<input type="checkbox"/>	<input type="checkbox"/>
e.	Energy supply	<input type="checkbox"/>	<input type="checkbox"/>
f.	Manufacturing	<input type="checkbox"/>	<input type="checkbox"/>
g.	Construction	<input type="checkbox"/>	<input type="checkbox"/>
h.	Transport	<input type="checkbox"/>	<input type="checkbox"/>
i.	Information and Communication services	<input type="checkbox"/>	<input type="checkbox"/>
j.	Commercial services and tourism	<input type="checkbox"/>	<input type="checkbox"/>
k.	Other application area not mentioned	<input type="checkbox"/>	<input type="checkbox"/>

**Q14. Does your enterprise’s in-house R&D fall into any of the following research fields?**

	Research fields	Yes	No
a.	Mathematical sciences	<input type="checkbox"/>	<input type="checkbox"/>
b.	Physical sciences	<input type="checkbox"/>	<input type="checkbox"/>
c.	Chemical sciences	<input type="checkbox"/>	<input type="checkbox"/>
d.	Earth sciences	<input type="checkbox"/>	<input type="checkbox"/>
e.	Biological sciences	<input type="checkbox"/>	<input type="checkbox"/>
f.	Information, Computing and Communication Sciences	<input type="checkbox"/>	<input type="checkbox"/>
g.	Engineering and Technology	<input type="checkbox"/>	<input type="checkbox"/>
h.	Agricultural, Urban environment and Building	<input type="checkbox"/>	<input type="checkbox"/>
i.	Medical and Health Sciences	<input type="checkbox"/>	<input type="checkbox"/>
j.	Other research field not mentioned	<input type="checkbox"/>	<input type="checkbox"/>



**Q15, Q16, Q17. During the three calendar years 2004 to 2006, did your enterprise engage in [...]? (When 'yes') What was your approximate expenditure on [...] in the 2005/6 financial year only?**

		Yes	No	\$ 2005/6	% of Turnover in 2005/2006 Financial year
<b>b.</b>	<b>Acquisition of research and development from other organisations, that is, R&amp;D purchased by your enterprise and performed by other companies, including other enterprises within your group or by public or private research organisations.</b>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>c.</b>	<b>Acquisition of advanced machinery, equipment, computer hardware or software to produce new or improved goods, services, production processes, or delivery methods</b>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>d.</b>	<b>Acquisition of external knowledge: Purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other enterprises or organisations.</b>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>e.</b>	<b>Internal or external training for your personnel specifically for the development and/or introduction of new or improved goods, services and processes.</b>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>f.</b>	<b>Design activities, outside of the R&amp;D phase for the development or implementation of new or improved goods, services and processes.</b>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>g.</b>	<b>Activities for the market preparation and introduction of new or improved goods and services, including market research and launch advertising.</b>	<input type="checkbox"/>	<input type="checkbox"/>		

The next question is about collaboration. We define collaboration as active participation with other enterprises or non-commercial institutions aimed at developing new goods, services or processes. Both partners do not need to benefit commercially, or share risks. Exclude pure contracting out of work with no active collaboration.

**Q18. Did [business name] engage in any collaboration with other enterprises or institutes during the three calendar years 2004 to 2006?**

Yes

No  → Question 20

The next question asks for a “yes” or “no” response to whether your enterprise has collaboration partners, and whether they were located in Tasmania, Australia or Outside of Australia. Collaboration partners can be in more than one location.

**Q19. Did [business name] collaborate with (read for each category a to g).**

**(If ‘yes’ ask ) Were they located - within Tasmania ... in Mainland Australia ... Outside of Australia?**

*Please cross all that apply*

Type of collaboration partner		Within Tasmania	Mainland Australia	Outside of Australia
<b>a.</b>	Other enterprises within your enterprise group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>b.</b>	Suppliers of equipment, materials, services, or software	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>c.</b>	Clients or customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>d.</b>	Competitors or other enterprises in your industry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>e.</b>	Consultants, commercial labs, or private R&D institutes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>f.</b>	Universities or other higher education institutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>g.</b>	Public research institutes or CRCs (Cooperative Research Centres)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The next section is about support received for the development of new goods, services or processes. *(This includes financial support via tax credits or deductions, grants, subsidised loans, and loan guarantees. This excludes research and other innovation activities conducted entirely for the public sector under contract)*

**Q20. During the three calendar years 2004 to 2006, did your enterprise receive any financial support for new good, service, or process development activities from [ a and b below ]?**

	Yes	No
a. State government authorities	<input type="checkbox"/>	<input type="checkbox"/>
b. Federal Government (including their government agencies or ministries)	<input type="checkbox"/>	<input type="checkbox"/>
c. <i>(If yes in a or b)</i> did <b>your enterprise</b> claim a tax credit for R&D performed for any year between 2004 and 2006?	<input type="checkbox"/>	<input type="checkbox"/>

In this next section we ask about new forms of organisation, business structures or practices aimed at improving efficiency, or new approaches to markets and customers.

The question asks for a “yes” or “no” response to a number of answer categories.

**Q21. During the three calendar years 2004 to 2006, did your enterprise make major changes in the following areas of business structure and practices?**

*Please cross one box for each category*

	Yes	No
a. Implementation of a new or significantly changed <b>corporate strategy</b>	<input type="checkbox"/>	<input type="checkbox"/>
b. Implementation of <b>advanced management techniques</b> within your enterprise, e.g. knowledge management systems	<input type="checkbox"/>	<input type="checkbox"/>
c. Implementation of major changes to your <b>organisational structure</b> , e.g. introduction of cross-functional teams, outsourcing of major business functions.	<input type="checkbox"/>	<input type="checkbox"/>
d. Implementation of changes in <b>marketing concepts or strategies</b> <i>(e.g. packaging or presentational changes to a product to target new markets, or new activities to open up new markets)</i>	<input type="checkbox"/>	<input type="checkbox"/>

**And finally some basic economic information about your enterprise**

Turnover is defined as the market sales of goods and services based on the amount earned; **include** exports and taxes, but **exclude** GST.

**Q22. What was your enterprise's total turnover from its Tasmanian operations for the 2005-2006 financial year? What was it two years earlier, for the 2003/4 financial year?**

**a. 2005/6**

\$ \_\_\_\_\_

**b. 2003/4**

\$ \_\_\_\_\_

**Informed estimates** are fine if exact figures are not available

*(If unable or unwilling to estimate,)* can you tell us which of the following six broad categories your enterprise falls into? (Read all categories and circle relevant code)

<b>2005-2006</b>	<b>Code</b>	<b>2003-2004</b>	<b>Code</b>
\$1 Million or less	1	\$1 Million or less	1
\$5 Million or less	2	\$5 Million or less	2
\$10 Million or less	3	\$10 Million or less	3
\$50 Million or less	4	\$50 Million or less	4
\$100 Million or less	5	\$100 Million or less	5
Over \$100 Million	6	Over \$100 Million	6

The next question is about the number of employees at [business name].

**Q23. During the last pay period ending in December 2006, how many employees were there who worked [ ask for a to c below ]?**

a.	Full time that is 35 or more Hours per week	
b.	Part time, that is less than 35 hrs per week on a regular basis	
c.	Irregular hours or were there for seasonal work	

If there were employees working irregular hours or there for seasonal work, then ask d:

d.	For employee's working irregular hours or there for seasonal work, could you estimate how many full time people they were the equivalent of during the whole 2006 calendar year?	
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Next, we ask the same questions about the number of employees two years earlier:

**Q24. During the last pay period ending in December 2004 how many employees were there who worked [ask for a to c below ]?**

a.	Full time that is 35 or more Hours per week	
b.	Part time, that is less than 35 hrs per week on a regular basis	
c.	Irregular hours or were there for seasonal work	

If there were employees working irregular hours or there for seasonal work, then ask d:

d.	For employee's working irregular hours or there for seasonal work, could you estimate how many full time people they were the equivalent of during the whole 2004 calendar year?	
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**Q25. During the last pay period ending in December 2006, approximately what number of your enterprise's employees were educated to degree level or above in science or engineering subjects? ... What about other subjects?**

Note: If respondent has difficulty providing a number, then ask if they can provide their answer as a percentage of total no of employee's

December 2006

- a. Science and engineering subjects      \_\_\_ (Number) OR      \_\_\_%
- b. Other subjects                                      \_\_\_ (Number) OR      \_\_\_%

The final question is an open ended one.

**Q26. Could you briefly describe your most important innovation in the past three years?**

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**Q27. If I have any further questions or need further clarification will I be able to call you back on this number?**

Yes

No

Other number \_\_\_\_\_

**Notes:**

**That's the end of the survey, thank you very much for your time.**

Time finished \_\_\_\_\_: \_\_\_\_\_ 24 hour time

Date finished \_\_\_\_\_ / \_\_\_\_\_ / 2007

Interviewer Signed \_\_\_\_\_