

Research and Commercial Innovation in New Zealand: Background Report for SfTI Industry-Led Discussions

Appendix II

Motu Economic and Public Policy Research

April 2017

Adam Jaffe

Motu Economic and Public Policy Research and Queensland University of Technology
adam.jaffe@motu.org.nz

Nathan Chappell

Motu Economic and Public Policy Research
nathan.chappell@motu.org.nz

Tables

Table 1: R&D intensity and R&D scope in selected industries	3
Table 2: Proportion of firms engaging with CRIs & universities regarding R&D needs	8
Table 3: Type of R&D spending	13
Table 4: Proportion of firms reporting innovation & other activities	18
Table 5: Nascent and growing industries	23

Introduction

These appendix tables supplement the main report by showing more comprehensive breakdowns of industry R&D and commercial activity. Tables 1-3 use Statistics NZ's 2004-2014 Research and Development surveys, while Table 4 uses Statistics NZ's 2005-2015 Business Operations Surveys (BOS). Standard errors, in parentheses, capture the uncertainty in estimating population values from survey data. Table 5 uses population data to present descriptive statistics, and so standard errors in Table 5 are zero.

Table 1: R&D intensity and R&D scope in selected industries

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	R&D intensity	R&D intensity among performers	R&D personnel intensity	R&D personnel intensity among performers	Average yearly R&D (\$m)
Agriculture, forestry & fishing			0.001	0.034	0.003	0.090	\$17.0m
				(0.004)		(0.014)	(\$3.1m)
	Agriculture		0.000	0.037	0.003	0.173	\$5.8m
				(0.008)		(0.034)	(\$1.3m)
	Aquaculture		0.006	0.058	0.015	0.104	\$0.6m
				(0.026)		(0.043)	(\$0.2m)
	Forestry & logging		0.000	0.009	0.002	0.062	\$0.7m
				(0.005)		(0.029)	(\$0.3m)
	Fishing & hunting		0.000	0.007	0.001	0.211	\$0.02m
				(0.000)		(0.000)	(\$0.02m)
	Agr support services		0.003	0.038	0.006	0.053	(\$9.9m)
				(0.006)		(0.011)	(\$2.8m)
Mining			0.003	0.015	0.006	0.025	\$12.4m
				(0.006)		(0.007)	(\$6.3m)
	Coal mining		0.009	0.013	0.008	0.014	\$7.4m
				(0.008)		(0.008)	(\$6.0m)
	Metal ore mining		0.003	0.008	0.012	0.035	\$1.7m
				(0.002)		(0.006)	(\$0.8m)
	Non-metallic mining		0.001	0.024	0.005	0.089	\$0.5m
				(0.003)		(0.005)	(\$0.3m)
Manufacturing			0.004	0.012	0.021	0.064	\$375.2m

			(0.001)		(0.005)	(\$23.2m)
Lvl 2 industry	Lvl 3/4 industry	R&D intensity	R&D intensity among performers	R&D personnel intensity	R&D personnel intensity among performers	Average yearly R&D (\$m)
Food product manuf		0.002	0.004	0.010	0.020	\$70.2m
			(0.001)		(0.003)	(\$12.2m)
Beverage & tobac manuf		0.001	0.003	0.006	0.021	\$4.1m
			(0.001)		(0.003)	(\$1.2m)
Textile manuf		0.002	0.016	0.009	0.064	\$6.1m
			(0.002)		(0.008)	(\$0.8m)
Wood product manuf		0.001	0.017	0.005	0.059	\$3.5m
			(0.006)		(0.025)	(\$1.1m)
Pulp & paper manuf		0.001	0.002	0.005	0.018	\$2.3m
			(0.001)		(0.005)	(\$0.6m)
Printing		0.001	0.013	0.003	0.068	\$1.1m
			(0.001)		(0.028)	(\$0.4m)
Petrol & coal product		0.000	0.001	0.002	0.013	\$0.4m
			(0.001)		(0.007)	(\$0.3m)
Basic chemical manuf		0.004	0.011	0.030	0.085	\$17.1m
			(0.002)		(0.010)	(\$2.4m)
	Chemical manuf	0.003	0.016	0.041	0.122	\$3.1m
			(0.007)		(0.051)	(\$0.9m)
	Basic polymer manuf	0.002	0.008	0.008	0.070	\$0.9m
			(0.002)		(0.019)	(\$0.4m)
	Fertiliser & pesticide manuf	0.003	0.004	0.025	0.055	\$3.0m
			(0.001)		(0.014)	(0.7m)
	Pharma & med product manuf	0.007	0.018	0.029	0.075	\$5.5m
			(0.003)		(0.011)	(\$1.0m)
	Cleaning compound & toiletry prep manuf	0.006	0.014	0.031	0.077	\$3.5m

Lvl 2 industry	Lvl 3/4 industry	R&D intensity	R&D intensity among performers	R&D personnel intensity	R&D personnel intensity among performers	Average yearly R&D (\$m)
			(0.005)		(0.020)	(\$1.9m)
	Other chemical product manuf	0.010	0.063	0.119	0.368	\$1.1m
			(0.020)		(0.159)	(\$0.3m)
Polymer & rubber manuf		0.005	0.014	0.023	0.049	\$20.1m
			(0.002)		(0.005)	(\$2.3m)
Non-metallic product		0.001	0.005	0.008	0.040	\$3.4m
			(0.002)		(0.012)	(\$0.7m)
Metal product manuf		0.002	0.007	0.011	0.040	\$8.0m
			(0.002)		(0.013)	(\$2.8m)
Fabricated metal product		0.003	0.019	0.014	0.099	\$15.6m
			(0.004)		(0.010)	(\$2.1m)
Transport equip manuf		0.006	0.042	0.025	0.139	\$13.9m
			(0.007)		(0.018)	(\$2.1m)
Machinery & equip manuf		0.030	0.062	0.087	0.186	\$204.0m
			(0.005)		(0.010)	(\$19.1m)
	Prof & science equip manuf	0.074	0.104	0.168	0.253	\$51.3m
			(0.009)		(0.019)	(\$14.5m)
	Comp & electr equip manuf	0.092	0.132	0.222	0.305	\$78.4m
			(0.018)		(0.028)	(\$13.2m)
	Electrical equip manuf	0.012	0.023	0.052	0.099	\$12.4m
			(0.005)		(0.014)	(\$2.4m)
	Domestic appliance manuf	0.026	0.032	0.132	0.146	\$22.0m
			(0.006)		(0.024)	(\$8.2m)
	Pump,compressor,heating & ventilation manuf	0.036	0.053	0.065	0.085	\$9.8m
			(0.012)		(0.017)	(\$2.7m)
	Specialised machinery & equip manuf	0.012	0.036	0.055	0.161	\$13.0m

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	R&D intensity	R&D intensity among performers	R&D personnel intensity	R&D personnel intensity among performers	Average yearly R&D (\$m)
				(0.005)		(0.022)	(\$2.2m)
		Other machinery & equip manuf	0.009	0.039	0.028	0.144	\$17.2m
				(0.004)		(0.014)	(\$2.4m)
	Furniture & other manuf		0.003	0.027	0.017	0.139	\$5.4m
				(0.004)		(0.038)	(\$1.0m)
	Information media & telecommunications		0.002	0.028	0.010	0.121	\$21.0m
				(0.009)		(0.054)	(\$5.2m)
	Publishing (excl internet & music)		0.002	0.020	0.007	0.057	\$2.4m
				(0.011)		(0.048)	(\$0.7m)
	Motion picture & sound		0.006	0.067	0.035	0.747	\$9.2m
				(0.008)		(0.356)	(\$4.3m)
	Broadcasting (excl internet)		0.000	0.001	0.001	0.014	\$0.4m
				(0.000)		(0.002)	(\$0.3m)
	Telecom services		0.001	0.048	0.003	0.095	\$4.6m
				(0.019)		(0.026)	(\$2.3m)
	ISPs & other info services		0.003	0.055	0.015	0.291	\$2.7m
				(0.017)		(0.076)	(\$0.9m)
	Library & other info services		0.024	0.047	0.078	0.166	\$1.6m
				(0.019)		(0.067)	(\$1.1m)
	Professional, scientific & technical services		0.032	0.264	0.072	0.428	\$921.8m
				(0.039)		(0.025)	(\$62.3m)
	Professional & technical serv		0.030	0.265	0.061	0.398	\$741.3m
				(0.049)		(0.030)	(\$60.9m)
	Scientific research serv		0.449	0.659	0.586	0.622	\$653.5m
				(0.047)		(0.024)	(\$60.3m)
	Engineering design & consulting serv		0.008	0.075	0.046	0.265	\$27.5m

Table 2: Proportion of firms engaging with CRIs & universities regarding R&D needs

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Any engagement with CRI/uni	No need to engage more with CRI/uni	Didn't know how to contact to engage more	Not enough expertise in CRI/uni to engage more	Too expensive to engage more
Agriculture, forestry & fishing			0.089 (0.019)	0.582 (0.035)	0.150 (0.025)	0.161 (0.027)	0.068 (0.017)
	Agriculture		0.097 (0.023)	0.575 (0.038)	0.142 (0.028)	0.167 (0.030)	0.075 (0.020)
	Aquaculture		0.040 (0.036)	0.147 (0.126)	0.029 (0.028)	0.732 (0.194)	0.066 (0.052)
	Forestry & logging		0.052 (0.026)	0.310 (0.201)	0.008 (0.006)	0.232 (0.199)	0.008 (0.006)
	Fishing & hunting		0.451 (0.190)	0.400 (0.198)	0.138 (0.105)	0.062 (0.064)	0.062 (0.064)
	Agr support services		0.047 (0.017)	0.705 (0.085)	0.229 (0.079)	0.083 (0.051)	0.041 (0.030)
Mining			0.356 (0.230)	0.831 (0.078)	0.021 (0.014)	0.038 (0.022)	0.013 (0.009)
	Coal mining		0.050 (0.057)	0.723 (0.194)	0.073 (0.082)	0.000 (0.000)	0.000 (0.000)
	Metal ore mining		0.122 (0.084)	0.515 (0.156)	0.000 (0.000)	0.326 (0.160)	0.000 (0.000)
	Non-metallic mining		0.475 (0.330)	0.949 (0.037)	0.016 (0.015)	0.007 (0.008)	0.007 (0.008)
Manufacturing			0.117 (0.010)	0.593 (0.020)	0.130 (0.014)	0.147 (0.013)	0.090 (0.009)
	Food product manuf		0.229 (0.057)	0.536 (0.072)	0.072 (0.040)	0.066 (0.021)	0.133 (0.036)

	Lvl 2 industry	Lvl 3/4 industry	Any engagement with CRI/uni	No need to engage more with CRI/uni	Didn't know how to contact to engage more	Not enough expertise in CRI/uni to engage more	Too expensive to engage more
Beverage & tobac manuf			0.077 (0.035)	0.388 (0.171)	0.197 (0.145)	0.030 (0.017)	0.023 (0.014)
Textile manuf			0.059 (0.008)	0.720 (0.065)	0.101 (0.057)	0.043 (0.008)	0.022 (0.006)
Wood product manuf			0.051 (0.016)	0.676 (0.072)	0.112 (0.054)	0.157 (0.057)	0.013 (0.004)
Pulp & paper manuf			0.259 (0.086)	0.534 (0.095)	0.052 (0.050)	0.130 (0.062)	0.134 (0.061)
Printing			0.046 (0.041)	0.788 (0.071)	0.276 (0.085)	0.147 (0.068)	0.003 (0.002)
Petrol & coal product			0.285 (0.130)	0.693 (0.133)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Basic chemical manuf			0.284 (0.050)	0.460 (0.070)	0.067 (0.018)	0.085 (0.019)	0.327 (0.069)
		Chemical manuf	0.648 (0.119)	0.357 (0.111)	0.000 (0.000)	0.243 (0.098)	0.194 (0.089)
		Basic polymer manuf	0.398 (0.230)	0.254 (0.125)	0.031 (0.032)	0.020 (0.021)	0.654 (0.155)
		Fertiliser & pesticide manuf	0.298 (0.108)	0.492 (0.172)	0.036 (0.021)	0.035 (0.020)	0.398 (0.170)
		Pharma & med product manuf	0.307 (0.080)	0.583 (0.096)	0.130 (0.052)	0.075 (0.030)	0.200 (0.062)
		Cleaning compound & toiletry prep manuf	0.104 (0.059)	0.680 (0.128)	0.108 (0.057)	0.090 (0.051)	0.115 (0.060)

Lvl 2 industry	Lvl 3/4 industry	Any engagement with CRI/uni	No need to engage more with CRI/uni	Didn't know how to contact to engage more	Not enough expertise in CRI/uni to engage more	Too expensive to engage more
	Other chemical product manuf	0.188 (0.086)	0.149 (0.092)	0.016 (0.017)	0.182 (0.099)	0.444 (0.196)
	Polymer & rubber manuf		0.158 (0.024)	0.484 (0.045)	0.105 (0.068)	0.282 (0.047)
	Non-metallic product		0.081 (0.017)	0.639 (0.046)	0.130 (0.026)	0.089 (0.035)
	Metal product manuf		0.235 (0.098)	0.667 (0.078)	0.083 (0.039)	0.057 (0.030)
	Fabricated metal product		0.071 (0.019)	0.616 (0.031)	0.140 (0.036)	0.185 (0.024)
	Transport equip manuf		0.038 (0.011)	0.565 (0.038)	0.106 (0.049)	0.175 (0.034)
	Machinery & equip manuf		0.150 (0.019)	0.560 (0.035)	0.126 (0.023)	0.194 (0.029)
	Prof & science equip manuf		0.227 (0.056)	0.557 (0.099)	0.067 (0.028)	0.280 (0.104)
	Comp & electr equip manuf		0.322 (0.076)	0.362 (0.082)	0.140 (0.066)	0.251 (0.083)
	Electrical equip manuf		0.072 (0.027)	0.546 (0.108)	0.125 (0.074)	0.145 (0.083)
	Domestic appliance manuf		0.372 (0.112)	0.404 (0.125)	0.248 (0.101)	0.000 (0.000)
	Pump,compressor,heating & ventilation		0.182 (0.088)	0.327 (0.129)	0.000 (0.000)	0.387 (0.204)

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Any engagement with CRI/uni	No need to engage more with CRI/uni	Didn't know how to contact to engage more	Not enough expertise in CRI/uni to engage more	Too expensive to engage more
		Specialised machinery & equip manuf	0.109 (0.040)	0.644 (0.074)	0.080 (0.035)	0.154 (0.055)	0.121 (0.047)
		Other machinery & equip manuf	0.118 (0.030)	0.588 (0.055)	0.166 (0.044)	0.187 (0.046)	0.053 (0.019)
	Furniture & other manuf			0.068 (0.020)	0.519 (0.066)	0.200 (0.073)	0.196 (0.055)
		Information media & telecommunications		0.075 (0.022)	0.802 (0.009)	0.030 (0.077)	0.154 (0.010)
	Publishing (excl internet & music)			0.070 (0.035)	0.775 (0.009)	0.017 (0.128)	0.150 (0.008)
	Motion picture & sound				0.161 (0.143)	0.701 (0.028)	0.116 (0.040)
	Broadcasting (excl internet)				0.015 (0.018)	0.942 (0.000)	0.000 (0.000)
	Telecom services			0.035 (0.028)	0.903 (0.061)	0.027 (0.021)	0.468 (0.284)
	ISPs & other info services				0.071 (0.042)	0.800 (0.027)	0.049 (0.016)
	Library & other info services				0.000 (0.000)	1.000 (0.000)	0.000 (0.000)
		Professional, scientific & technical services			0.104 (0.012)	0.672 (0.017)	0.053 (0.012)
	Professional & technical serv			0.100 (0.015)	0.684 (0.030)	0.041 (0.012)	0.116 (0.021)
							0.063 (0.015)

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Any engagement with CRI/uni	No need to engage more with CRI/uni	Didn't know how to contact to engage more	Not enough expertise in CRI/uni to engage more	Too expensive to engage more
		Scientific research serv	0.513 (0.029)	0.348 (0.025)	0.054 (0.012)	0.181 (0.023)	0.164 (0.019)
		Engineering design & consulting serv	0.138 (0.031)	0.548 (0.070)	0.047 (0.034)	0.168 (0.050)	0.123 (0.059)
		Scientific testing & analysis serv	0.428 (0.076)	0.490 (0.072)	0.083 (0.028)	0.301 (0.073)	0.233 (0.064)
	Computer systems design			0.118 (0.014)	0.620 (0.014)	0.105 (0.016)	0.131 (0.013)
Health care & social assistance				0.027 (0.010)	0.697 (0.035)	0.159 (0.027)	0.091 (0.014)
	Hospitals		0.017 (0.021)	0.712 (0.178)	0.014 (0.016)	0.014 (0.016)	0.000 (0.000)
	Medical care services		0.018 (0.005)	0.720 (0.054)	0.152 (0.044)	0.084 (0.034)	0.030 (0.017)
		Pathology & diagnostic imaging serv	0.000 (0.000)	0.432 (0.205)	0.000 (0.000)	0.415 (0.216)	0.000 (0.000)
	Residential care services			0.012 (0.007)	0.706 (0.075)	0.113 (0.088)	0.168 (0.006)
	Social assistance services			0.070 (0.045)	0.617 (0.087)	0.227 (0.049)	0.056 (0.042)
Observations			8,019	8,808	8,808	8,808	8,808
Pop size			65142	68574	68574	68574	68574

Notes: This table presents estimates of industry engagement with CRIs and universities, from the pooled 2004-2014 R&D surveys. Standard errors are in parentheses.

Table 3: Type of R&D spending

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Prop. of R&D spending that is applied	Prop. of R&D spending that is experimental	Prop. of R&D spending that is basic
Agriculture, forestry & fishing			0.296	0.376	0.107
			(0.074)	(0.076)	(0.065)
	Agriculture		0.322	0.338	0.048
			(0.087)	(0.079)	(0.019)
	Aquaculture		0.477	0.445	0.078
			(0.122)	(0.117)	(0.060)
	Forestry & logging		0.392	0.486	0.122
			(0.085)	(0.124)	(0.076)
	Fishing & hunting		0.000	1.000	0.000
			(0.000)	(0.000)	(0.000)
	Agr support services		0.168	0.496	0.336
			(0.078)	(0.212)	(0.233)
Mining			0.343	0.633	0.024
			(0.101)	(0.106)	(0.015)
	Coal mining		0.370	0.587	0.043
			(0.126)	(0.147)	(0.022)
	Metal ore mining		0.626	0.374	0.000
			(0.133)	(0.133)	(0.000)
	Non-metallic mining		0.061	0.908	0.031
			(0.062)	(0.093)	(0.031)
Manufacturing			0.233	0.636	0.060
			(0.017)	(0.037)	(0.007)

Lvl 2 industry	Lvl 3/4 industry	Prop. of R&D spending that is applied	Prop. of R&D spending that is experimental	Prop. of R&D spending that is basic
Food product manuf		0.186 (0.028)	0.717 (0.035)	0.092 (0.021)
Beverage & tobac manuf		0.188 (0.052)	0.752 (0.059)	0.060 (0.028)
Textile manuf		0.212 (0.060)	0.574 (0.101)	0.046 (0.015)
Wood product manuf		0.232 (0.106)	0.730 (0.112)	0.038 (0.023)
Pulp & paper manuf		0.250 (0.068)	0.650 (0.078)	0.099 (0.048)
Printing		0.044 (0.042)	0.100 (0.087)	0.005 (0.005)
Petrol & coal product		0.159 (0.124)	0.828 (0.125)	0.013 (0.012)
Basic chemical manuf		0.358 (0.031)	0.606 (0.028)	0.033 (0.007)
	Chemical manuf	0.340 (0.077)	0.615 (0.085)	0.045 (0.021)
	Basic polymer manuf	0.337 (0.095)	0.633 (0.096)	0.029 (0.014)
	Fertiliser & pesticide manuf	0.353 (0.058)	0.614 (0.058)	0.033 (0.010)
	Pharma & med product manuf	0.355 (0.046)	0.593 (0.046)	0.040 (0.013)
	Cleaning compound & toiletry prep manuf	0.410 (0.050)	0.577 (0.046)	0.013 (0.007)

	Other chemical product manuf	0.214 (0.037)	0.706 (0.053)	0.079 (0.022)
	Polymer & rubber manuf	0.283 (0.030)	0.631 (0.030)	0.060 (0.010)
		Prop. of R&D spending that is applied	Prop. of R&D spending that is experimental	Prop. of R&D spending that is basic
Lvl 2 industry	Lvl 3/4 industry			
	Non-metallic product	0.238 (0.039)	0.662 (0.050)	0.090 (0.028)
	Metal product manuf	0.142 (0.043)	0.776 (0.069)	0.082 (0.044)
	Fabricated metal product	0.153 (0.020)	0.753 (0.041)	0.066 (0.016)
	Transport equip manuf	0.234 (0.064)	0.646 (0.069)	0.114 (0.059)
	Machinery & equip manuf	0.265 (0.019)	0.686 (0.022)	0.048 (0.011)
	Prof & science equip manuf	0.356 (0.048)	0.606 (0.048)	0.038 (0.009)
	Comp & electr equip manuf	0.262 (0.048)	0.669 (0.050)	0.064 (0.041)
	Electrical equip manuf	0.224 (0.034)	0.690 (0.046)	0.086 (0.021)
	Domestic appliance manuf	0.221 (0.069)	0.757 (0.068)	0.022 (0.009)
	Pump,compressor,heating & ventilation manuf	0.308 (0.067)	0.644 (0.070)	0.048 (0.024)
	Specialised machinery & equip manuf	0.294 (0.033)	0.688 (0.033)	0.019 (0.005)

		Other machinery & equip manuf	0.237 (0.044)	0.716 (0.054)	0.047 (0.016)
		Furniture & other manuf	0.368 (0.108)	0.528 (0.100)	0.098 (0.045)
			Prop. of R&D spending that is applied	Prop. of R&D spending that is experimental	Prop. of R&D spending that is basic
Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry			
		Information media & telecommunications	0.345 (0.055)	0.530 (0.057)	0.118 (0.032)
		Publishing (excl internet & music)	0.517 (0.116)	0.389 (0.100)	0.086 (0.036)
		Motion picture & sound	0.267 (0.096)	0.537 (0.110)	0.196 (0.082)
		Broadcasting (excl internet)	0.147 (0.106)	0.803 (0.141)	0.049 (0.035)
		Telecom services	0.328 (0.101)	0.415 (0.106)	0.192 (0.094)
		ISPs & other info services	0.327 (0.092)	0.621 (0.096)	0.052 (0.025)
		Library & other info services	0.249 (0.125)	0.751 (0.125)	0.000 (0.000)
		Professional, scientific & technical services	0.373 (0.022)	0.481 (0.025)	0.085 (0.011)
		Professional & technical serv	0.409 (0.032)	0.401 (0.037)	0.093 (0.016)
		Scientific research serv	0.478 (0.019)	0.388 (0.018)	0.086 (0.010)
		Engineering design & consulting serv	0.344 (0.048)	0.540 (0.071)	0.048 (0.015)

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Prop. of R&D spending that is applied	Prop. of R&D spending that is experimental	Prop. of R&D spending that is basic
		Scientific testing & analysis serv	0.441 (0.055)	0.424 (0.046)	0.129 (0.033)
	Computer systems design		0.314 (0.019)	0.610 (0.020)	0.072 (0.008)
			0.380 (0.104)	0.319 (0.103)	0.070 (0.024)
	Hospitals		0.513 (0.068)	0.179 (0.042)	0.128 (0.072)
		Medical care services	0.437 (0.139)	0.365 (0.140)	0.043 (0.021)
		Pathology & diagnostic imaging serv	0.504 (0.354)	0.000 (0.000)	0.496 (0.354)
	Residential care services		0.215 (0.083)	0.599 (0.158)	0.186 (0.109)
	Social assistance services		0.146 (0.086)	0.176 (0.105)	0.125 (0.087)
Observations			5,712	5,712	5,712
Pop size			12,489	12,489	12,489

Notes: This table presents estimates of the type of R&D spending by firms in different industries, using the pooled 2004-2014 R&D surveys. Standard errors are in parentheses. Proportions are calculated from firm-level data and are weighted by sample weights but not by firm R&D expenditure. Hence an estimated basic R&D proportion of 0.2 means the average firm in the industry is estimated to channel 20% of its R&D toward basic research, and not that 20% of the industry's R&D spending goes toward basic research.

Table 4: Proportion of firms reporting innovation & other activities

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Any innovation in last year	Undertook or funded R&D in last year	Entered new export market in last year	Protects intellectual property in any way	Exports as % of sales in last year
Agriculture, forestry & fishing			0.262	0.068	0.041	0.232	22.6
			(0.012)	(0.006)	(0.005)	(0.011)	(1.1)
	Agriculture		0.256	0.076	0.054	0.245	30.7
			(0.015)	(0.008)	(0.007)	(0.014)	(1.6)
	Aquaculture		0.349	0.190	0.058	0.403	8.3
			(0.051)	(0.041)	(0.026)	(0.053)	(2.2)
	Forestry & logging		0.245	0.058	0.018	0.130	6.9
			(0.022)	(0.011)	(0.007)	(0.016)	(1.2)
	Fishing & hunting		0.305	0.157	0.155	0.366	21.3
			(0.050)	(0.041)	(0.038)	(0.049)	(3.4)
	Agr support services		0.278	0.041	0.009	0.214	2.7
			(0.019)	(0.008)	(0.003)	(0.018)	(0.8)
Mining			0.316	0.095	0.028	0.455	7.5
			(0.024)	(0.013)	(0.008)	(0.025)	(1.1)
	Coal mining		0.314	0.101	0.042	0.545	7.9
			(0.066)	(0.040)	(0.030)	(0.071)	(2.8)
	Metal ore mining		0.205	0.126	0.022	0.298	24.9
			(0.075)	(0.049)	(0.022)	(0.068)	(6.2)
	Non-metallic mining		0.288	0.079	0.023	0.379	2.7
			(0.032)	(0.018)	(0.009)	(0.036)	(1.0)
Manufacturing			0.444	0.189	0.119	0.586	13.5
			(0.008)	(0.006)	(0.005)	(0.008)	(0.4)

Lvl 2 industry	Lvl 3 industry	Any innovation in last year	Undertook or funded R&D in last year	Entered new export market in last year	Protects intellectual property in any way	Exports as % of sales in last year
Food product manuf		0.484 (0.023)	0.234 (0.017)	0.153 (0.014)	0.656 (0.024)	18.6 (1.3)
Beverage & tobac manuf		0.456 (0.046)	0.146 (0.031)	0.484 (0.046)	0.823 (0.036)	38.7 (2.8)
Textile manuf		0.401 (0.023)	0.144 (0.013)	0.119 (0.014)	0.599 (0.023)	16.5 (1.3)
Wood product manuf		0.346 (0.026)	0.096 (0.014)	0.079 (0.010)	0.371 (0.026)	9.9 (1.1)
Pulp & paper manuf		0.353 (0.048)	0.214 (0.037)	0.102 (0.025)	0.864 (0.037)	20.7 (3.0)
Printing		0.442 (0.026)	0.072 (0.010)	0.033 (0.007)	0.498 (0.026)	3.7 (0.5)
Petrol & coal product		0.526 (0.121)	0.240 (0.082)	0.000 (0.000)	0.954 (0.033)	4.3 (2.1)
Basic chemical manuf		0.510 (0.038)	0.369 (0.036)	0.178 (0.028)	0.828 (0.031)	26.3 (2.9)
	Chemical manuf	0.400 (0.101)	0.367 (0.105)	0.187 (0.069)	0.933 (0.050)	16.3 (6.0)
	Basic polymer manuf	0.368 (0.090)	0.207 (0.063)	0.186 (0.072)	0.607 (0.100)	16.9 (4.9)
	Fertiliser & pesticide manuf	0.596 (0.091)	0.553 (0.090)	0.198 (0.076)	0.978 (0.022)	6.7 (2.1)
	Pharma & med product manuf	0.615 (0.065)	0.508 (0.066)	0.165 (0.038)	0.891 (0.045)	43.7 (5.6)
	Cleaning compound & toiletry prep manuf	0.508	0.162	0.223	0.687	16.2

	(0.089)	(0.073)	(0.086)	(0.085)	(3.2)
Other chemical product manuf	0.400	0.367	0.187	0.933	16.3
	(0.101)	(0.105)	(0.069)	(0.050)	(6.0)

Lvl 2 industry	Lvl 3/4 industry	Any innovation in last year	Undertook or funded R&D in last year	Entered new export market in last year	Protects intellectual property in any way	Exports as % of sales in last year
Polymer & rubber manuf		0.514	0.312	0.184	0.714	14.5
		(0.031)	(0.026)	(0.024)	(0.031)	(1.3)
Non-metallic product		0.487	0.223	0.039	0.585	2.5
		(0.028)	(0.023)	(0.010)	(0.028)	(0.5)
Metal product manuf		0.496	0.297	0.133	0.673	19.4
		(0.072)	(0.059)	(0.042)	(0.075)	(2.9)
Fabricated metal product		0.349	0.115	0.034	0.495	4.3
		(0.020)	(0.012)	(0.007)	(0.021)	(0.5)
Transport equip manuf		0.436	0.171	0.101	0.512	12.1
		(0.039)	(0.025)	(0.019)	(0.038)	(1.7)
Machinery & equip manuf		0.500	0.307	0.166	0.654	19.0
		(0.021)	(0.019)	(0.015)	(0.021)	(1.1)
	Prof & science equip manuf	0.621	0.463	0.315	0.773	46.6
		(0.054)	(0.053)	(0.052)	(0.050)	(5.0)
	Comp & electr equip manuf	0.686	0.491	0.323	0.814	36.4
		(0.048)	(0.047)	(0.041)	(0.044)	(3.7)
	Electrical equip manuf	0.614	0.379	0.166	0.744	18.1
		(0.038)	(0.040)	(0.030)	(0.036)	(1.9)
	Domestic appliance manuf	0.498	0.467	0.082	0.907	10.8
		(0.083)	(0.084)	(0.030)	(0.045)	(2.3)
	Pump,compressor,heating & ventilation manuf	0.361	0.346	0.340	0.568	34.5
		(0.110)	(0.111)	(0.112)	(0.114)	(8.7)

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Any innovation in last year	Undertook or funded R&D in last year	Entered new export market in last year	Protects intellectual property in any way	Exports as % of sales in last year
		Specialised machinery & equip manuf	0.594 (0.052)	0.350 (0.049)	0.203 (0.042)	0.683 (0.049)	20.0 (2.4)
		Other machinery & equip manuf	0.396 (0.033)	0.206 (0.028)	0.088 (0.018)	0.573 (0.034)	10.4 (1.4)
	Furniture & other manuf		0.553 (0.030)	0.131 (0.015)	0.073 (0.016)	0.564 (0.030)	8.7 (1.4)
		Information media & telecommunications		0.537 (0.019)	0.140 (0.012)	0.053 (0.017)	0.7 (0.6)
		Publishing (excl internet & music)	0.498 (0.036)	0.130 (0.022)	0.039 (0.014)	0.743 (0.034)	5.5 (1.2)
		Motion picture & sound	0.496 (0.034)	0.073 (0.016)	0.068 (0.015)	0.602 (0.032)	4.8 (0.9)
		Broadcasting (excl internet)	0.501 (0.057)	0.141 (0.042)	0.008 (0.008)	0.763 (0.055)	0.1 (0.0)
		Telecom services	0.628 (0.047)	0.183 (0.035)	0.054 (0.038)	0.731 (0.047)	3.7 (1.3)
		ISPs & other info services	0.686 (0.033)	0.279 (0.034)	0.088 (0.026)	0.886 (0.022)	8.56 (1.8)
		Library & other info services	1.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.773 (0.202)	1.6 (1.4)
		Professional, scientific & technical services	0.406 (0.014)	0.130 (0.008)	0.051 (0.005)	0.587 (0.014)	6.8 (0.6)
		Professional & technical serv	0.364 (0.016)	0.086 (0.009)	0.031 (0.005)	0.525 (0.017)	4.3 (0.6)
		Scientific research serv	0.311 (0.115)	0.416 (0.133)	0.184 (0.085)	0.435 (0.129)	49.7 (14.5)

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Any innovation in last year	Undertook or funded R&D in last year	Entered new export market in last year	Protects intellectual property in any way	Exports as % of sales in last year
		Engineering design & consulting serv	0.464 (0.050)	0.225 (0.043)	0.069 (0.023)	0.718 (0.045)	13.2 (3.4)
		Scientific testing & analysis serv	0.507 (0.106)	0.118 (0.037)	0.072 (0.029)	0.720 (0.096)	14.8 (3.9)
	Computer systems design		0.621 (0.021)	0.356 (0.020)	0.155 (0.016)	0.906 (0.012)	19.4 (1.4)
	Health care & social assistance		0.393 (0.015)	0.034 (0.006)	0.002 (0.001)	0.413 (0.015)	0.2 (0.1)
	Hospitals		0.340 (0.049)	0.040 (0.014)	0.004 (0.004)	0.354 (0.045)	0.0 (0.0)
	Medical care services		0.392 (0.021)	0.032 (0.007)	0.002 (0.002)	0.467 (0.022)	0.2 (0.2)
		Pathology & diagnostic imaging serv	0.341 (0.071)	0.004 (0.004)	0.000 (0.000)	0.378 (0.068)	0.0 (0.0)
	Residential care services		0.340 (0.028)	0.022 (0.009)	0.001 (0.001)	0.328 (0.025)	0.0 (0.0)
Observations			24,381	24,657	25,062	25,068	22,869
Pop size			116,190	118,200	119,082	119,022	108,699

Notes: This table presents estimates of industry innovation and other activities from the pooled 2005-2015 BOS innovation module surveys. Standard errors are in parentheses. Proportions are calculated from firm-level data and are weighted by sample weights only. Hence an estimated export intensity of 5% means the average firm in the industry has an export intensity of 5%, and not that industry exports make up 5% of industry sales.

Table 5: Nascent and growing industries

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Proportion of firms aged 2 years or younger	% change in sales, 2005-2015	Average no. of firms in a year
Agriculture, forestry & fishing					
	Agriculture		0.107	14.3	22,269
	Aquaculture		0.104	-14.5	72
	Forestry & logging		0.191	37.4	660
	Fishing & hunting		0.117	14.9	468
	Agr support services		0.207	31.3	2,961
Mining					
	Coal mining		0.134	-12.7	21
	Metal ore mining		0.296	263.7	39
	Non-metallic mining		0.121	6.5	138
Manufacturing					
	Food product manuf		0.240	22.1	2,049
	Beverage & tobac manuf		0.154	8.0	318
	Textile manuf		0.123	-30.0	999
	Wood product manuf		0.104	-11.8	1,218
	Pulp & paper manuf		0.094	-23.8	66
	Printing		0.140	-36.7	840
	Petrol & coal product		0.197	-27.9	21
	Basic chemical manuf		0.151	-20.0	315
		Chemical manuf	0.137	-7.1	27
		Basic polymer manuf	0.240	-44.8	36

Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Proportion of firms aged 2 years or younger	% change in sales, 2005-2015	Average no. of firms in a year
		Fertiliser & pesticide manuf	0.133	-42.5	54
		Pharma & med product manuf	0.133	65.5	81
		Cleaning compound & toiletry prep manuf	0.139	-46.3	84
		Other chemical product manuf	0.165	11.5	36
	Polymer & rubber manuf		0.094	-19.3	510
	Non-metallic product		0.172	0.0	456
	Metal product manuf		0.122	29.7	132
	Fabricated metal product		0.102	-5.6	1,941
	Transport equip manuf		0.134	-16.1	795
	Machinery & equip manuf		0.131	-11.1	2,046
		Prof & science equip manuf	0.127	-5.0	207
		Comp & electr equip manuf	0.097	-2.8	165
		Electrical equip manuf	0.122	-12.3	183
		Domestic appliance manuf	0.227	-44.9	36
		Pump,compressor,heating & ventilation manuf	0.113	7.2	48
		Specialised machinery & equip manuf	0.089	3.0	345
		Other machinery & equip manuf	0.150	-9.1	1,062
	Furniture & other manuf		0.124	-29.0	1,200
Information media & telecommunications					
	Publishing (excl internet & music)		0.182	15.0	426
	Motion picture & sound		0.202	34.7	534
	Broadcasting (excl internet)		0.423	2482.2	36
	Telecom services		0.367	13.5	135
	ISPs & other info services		0.289	-15.2	249
	Library & other info services		0.123	-83.4	24

Professional, scientific & technical services					
Lvl 1 industry	Lvl 2 industry	Lvl 3/4 industry	Proportion of firms aged 2 years or younger	% change in sales, 2005-2015	Average no. of firms in a year
	Professional & technical serv		0.175	3.4	14,895
		Scientific research serv	0.196	27.2	219
		Engineering design & consulting serv	0.207	53.0	1,629
		Scientific testing & analysis serv	0.138	4.1	240
	Computer systems design		0.208	52.3	3,000
Health care & social assistance					
	Hospitals		0.063	43.0	99
	Medical care services		0.131	52.4	6,042
	Residential care services		0.094	55.1	765
	Social assistance services		0.183	1.9	1,986

Observations

Pop size

Notes: This table shows indicators of how young the firms in different industries are, and of industry growth in sales and employment (weighted by sales and employment respectively). Statistics are shown separately for industries of interest. No standard errors are presented as this is population data - there is no uncertainty in extrapolating from sample statistics to population statistics. Industries classified by the ANZSIC 2006 system.