

What Australian Listed Companies Spend on
R&D
An Analysis of ASX Data

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Confidential Draft for Discussion

This Paper reports on an analysis of corporate financial statements to identify how much they spend on R&D. The data is captured by searching the global S&P company reporting database.

From this analysis it was possible to capture R&D expenditure details of all 2,200 companies listed on the ASX as well as international companies that have a major presence in Australia for sales, marketing, and representative purposes.

The analysis indicates how little Australian publicly listed companies invest in R&D.

What the ASX tells us

Analysis of ASX listed companies reveals that only 353 Australian-headquartered companies reported expenditure on R&D in 2022-23. A further 54 companies, headquartered overseas but also listed on the ASX reported R&D expenditure. Most of these companies are headquartered in New Zealand, the USA, Israel, Ireland and Singapore.

The total reported R&D spend through the ASX amounted to \$14.66 billion.

Australian headquartered investors

Australian-headquartered R&D Investors that spent more than \$25m on R&D in 2022-2023, together with total revenues and calculated R&D intensity (the ratio of R&D to revenue), are listed in Table 1.

Table 1: What Australian-headquartered ASX listed companies spend on R&D

Company Name	GICs industry group ¹	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)
CSL	Pharmaceuticals, Biotechnology & Life Sciences	1,854.000	19.984	9.3
Aristocrat Leisure	Consumer Services	834.700	6.296	13.3
Fortescue Ltd	Materials	830.300	25.330	3.3
Computershare	Commercial & Professional Services	577.000	4.806	12.0
TPG Telecom.	Telecommunication Services	405.000	5.533	7.3
Cochlear	Health Care Equipment & Services	244.900	1.936	12.6
Wisetech Global	Software & Services	185.800	0.816	22.7
Opthea ²	Pharmaceuticals, Biotechnology & Life Sciences	183.400	0.001	...
Seek	Media & Entertainment	151.700	1.225	12.4
Telix Pharma	Pharmaceuticals, Biotechnology & Life Sciences	128.800	0.502	25.6
Nufarm	Materials	97.508	3.481	2.8
Webjet	Consumer Services	74.900	0.364	20.6
Nuix	Software & Services	58.382	0.183	32.0
Paradigm Biopharma	Pharmaceuticals, Biotechnology & Life Sciences	52.679	0.000	...
Pexa Group ³	Real Estate Management & Development	50.604	0.282	18.0
Appen	Software & Services	49.233	0.402	12.3
Codan	Technology Hardware & Equipment	46.547	0.457	10.2
Ainsworth Games	Consumer Services	45.712	0.285	16.0
Whitehaven Coal	Energy	41.497	6.072	0.7
Mesoblast	Pharmaceuticals, Biotechnology & Life Sciences	40.822	0.011	362.5
PYC Therapeutics	Pharmaceuticals, Biotechnology & Life Sciences	35.146	15.806	222.4
Technology One	Software & Services	34.055	0.429	7.9
Bigtincan Holdings	Software & Services	33.441	0.122	27.3
Domino's Pizza	Consumer Services	31.645	2.361	1.3
Clarity Pharma	Pharmaceuticals, Biotechnology & Life Sciences	31.459	9.801	321.0
Imugene	Pharmaceuticals, Biotechnology & Life Sciences	30.865	0.012	262.1
Incitec Pivot	Materials	30.600	5.444	0.6
Siteminder	Software & Services	29.823	0.152	19.7
Nanosonics	Health Care Equipment & Services	29.500	0.166	17.8
Bluescope Steel	Materials	29.000	18.242	0.2
Imdex	Materials	27.400	0.411	6.7

¹ GICS refers to the Global Industry Classification Standard— a method for assigning companies to a specific economic sector and industry group that best defines its business operations. GICS was developed jointly by Morgan Stanley Capital International (MSCI) and Standard & Poor's. This is similar to Industry Classification Benchmark (ICB) developed by Dow Jones and the Financial Times Stock Exchange.

² Opthea Limited, is a clinical stage biopharmaceutical company, that engages in the development and commercialisation of therapies primarily for eye disease in Australia. The company was formerly known as Circadian Technologies and changed its name to Opthea in December 2015. Opthea was incorporated in 1984 and is based in South Yarra, Australia

³ PEXA Group Limited operates a digital property settlements platform in Australia. It was founded in 2010 and is based in Melbourne.

Company Name	GICs industry group ¹	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)
Objective Corporation	Software & Services	27.208	0.110	24.7
Ansell	Health Care Equipment & Services	26.875	2.485	1.1
Downer EDI	Commercial & Professional Services	26.800	11.640	0.2
G.U.D. Holdings	Automobiles & Components	26.798	1.037	2.6
Neuren Pharma	Pharmaceuticals, Biotechnology & Life Sciences	26.751	0.232	11.5
Weebit Nano Ltd	Semiconductors & Semiconductor Equipment	26.695	N/A	-
Sg Fleet Group	Commercial & Professional Services	26.624	1.053	2.5
Radiopharm Theranostics	Pharmaceuticals, Biotechnology & Life Sciences	25.316	0.006	407.7

Table 1 reports only 10 companies that invested more than \$100m in R&D in 2023-24. Four of these are in the Health/Pharmaceutical area, one in mining, which is heavily engaged in the development renewable energy, and one in supporting Australia's gambling industry.

It is unknown how much of the reported R&D in Table 1 takes place in Australia.

Table 1 does not include Australian company Atlassian, which is listed on the Nasdaq, but not the ASX. Its R&D spend in 2022-23 was reported at \$2.8 billion of revenues of \$5.307 billion—an R&D intensity of 52.9%.

Australian technology companies are drawn to Nasdaq listing because the exchange offers better access to the types of investors who understand and value technology companies, given its reputation as a tech-focused exchange. By focusing solely on the Nasdaq listing, companies can prioritise engagement with investors who have a strong interest in technology and innovation.

The Nasdaq typically offers deeper liquidity and a larger pool of potential investors compared to the ASX, particularly for technology companies. Nasdaq listing can offer enhanced liquidity and potentially higher trading volumes, which can be advantageous for its shareholders.

Global technology companies with a significant presence in international markets, particularly in the United States, can reinforce their global profile and positioning as a leading technology company with a focus on serving a diverse, global customer base.

Many of Australia's largest companies, including the Banks, Qantas, the big Retailers, and Telstra, do not report any R&D in their financial statements. There are many possible reasons for this—

- Companies are not undertaking a large amount of R&D, preferring to invest in other capital expenditure areas.
- In addition, companies may not consider technology development as a core business; although almost all businesses now are technology-intensive they many prefer to acquire software, hardware, and systems from specialised external vendors rather than developing their bespoke solutions.
- Market analysts see R&D as risky and mark down the share price.
- Boards may prefer to allocate profits to dividends and share buybacks to satisfy institutional investors and keep the share price high.

It is also the case that a substantial but unknown amount of R&D may be undertaken by non-listed companies, including companies like Visy (sales of \$7billion), or by start-ups.

Global R&D-intensive companies do not undertake any substantial amounts of R&D in Australia.

Interestingly, AirNZ reports R&D, but Qantas doesn't—the shareholders probably want dividends and share buy-backs rather than R&D.

Oversees headquartered investors

Table 2 below lists the largest overseas-headquartered companies on the ASX, together with total R&D expenditure, revenues, and R&D intensity.

Table 2: Oversea-headquartered ASX listed companies spend on R&D

Company Name	GICS industry group	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)	HQ
Block Inc.	Financial Services	4,099.000	32.155	12.7	California
Xero Limited	Software & Services	495.800	1.310	37.9	NZ
Resmed Inc	Health Care Equipment & Services	431.900	6.340	6.8	California
Rio Tinto Limited	Materials	359.500	79.239	0.5	UK
Light & Wonder Inc.	Consumer Services	334.500	4.258	7.9	Nevada
Newmont Corporation	Materials	293.400	17.331	1.7	Colorado
Fisher & Paykel	Health Care Equipment & Services	163.100	1.479	11.0	NZ
Amcpr Plc	Materials	151.600	22.060	0.7	Switzerland
Life360 Inc.	Software & Services	148.100	0.447	33.2	California
Fineos Corporation	Software & Services	69.900	0.205	34.1	Ireland
James Hardie Industries	Materials	62.524	5.650	1.1	Ireland
Altium Limited	Software & Services	44.336	0.395	11.2	California
Air New Zealand	Transportation	38.700	5.833	0.7	NZ
Serko Limited	Software & Services	36.820	0.043	84.6	NZ
Vista Group	Software & Services	36.444	0.133	27.5	NZ
Avita Medical Inc.	Pharmaceuticals, Biotech & Life Sciences	30.549	0.074	41.5	California
Marley Spoon Se	Consumer Staples Distribution & Retail	23.872	0.532	4.5	Germany
EROAD	Technology Hardware & Equipment	23.670	0.164	14.5	NZ
EBR Systems Inc.	Health Care Equipment & Services	23.215	N/A	N/A	California
Gentrack Group Limited	Software & Services	20.934	0.158	13.2	NZ

The largest reported expenditure was by Block Inc (formerly known as Square Inc), the owner of Australian company AfterPay with an R&D spend of \$4.1 billion. This reflects Australia's strengths in financial services technologies.

The amount of R&D that these companies undertake in Australia is also not reported.

Total ASX reported R&D

Table 3 shows how the total R&D spend for ASX listed companies is distributed across GICS categories.

Table 3 Summary of ASX listed companies according to the Global Industry Classification Standard

GICS industry group	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)	% of total R&D spend
Automobiles & Components	59.222	1.902	3.1%	0.4%
Capital Goods	55.598	11.527	0.5%	0.4%
Commercial & Professional Services	657.127	18.806	3.5%	4.5%
Consumer Discretionary Distribution & Retail	17.080	1.789	1.0%	0.1%
Consumer Durables	26.535	2.270	1.2%	0.2%
Consumer Services	1,365.823	15.108	9.0%	9.3%
Consumer Staples Distribution & Retail	46.670	24.570	0.2%	0.3%
Defence
Energy	52.573	6.174	0.9%	0.4%
Financial Services	4,185.640	35.753	11.7%	28.5%
Food, Beverage & Tobacco	15.526	3.902	0.4%	0.1%
Health Care Equipment & Services	1,121.967	14.043	8.0%	7.7%
Household & Personal Products	2.251	0.012	18.6%	0.0%
Materials	1,941.170	181.732	1.1%	13.2%
Media & Entertainment	198.145	3.775	5.2%	1.4%
Pharmaceuticals, Biotechnology & Life Sciences	2,781.586	54.359	5.1%	19.0%
Real Estate Management & Development	50.897	0.297	17.2%	0.3%
Semiconductors & Semiconductor Equipment	42.026	0.023	181.4%	0.3%
Software & Services	1,463.426	13.392	10.9%	10.0%
Technology Hardware & Equipment	124.861	1.576	7.9%	0.9%
Telecommunication Services	406.381	5.565	7.3%	2.8%
Transportation	45.253	6.088	0.7%	0.3%
Utilities	2.629	0.000		0.0%

GICS industry group	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)	% of total R&D spend
	14,662.386	402.664	3.6%	100.0%

A full list of ASX companies reporting R&D is at Attachment 1.

The big-ticket items in Materials category are for the miners Fortescue (which is actually for green energy), Rio and Newmont. Amcor is a significant player, but there is no information for non-listed Visy Corporation, which has revenues of \$7 billion.

The low research intensity Food, Beverage & Tobacco follows from the main manufacturers in Australia being brands of overseas-owned corporations which do little or no R&D in Australia. These corporations also have low reported R&D intensity, but the food and beverage manufacturers reported in Attachment 2, have a total R&D spend of \$11.7 billion. A handful of niche food producers are doing R&D in Australia, but it doesn't add to much.

Non-listed companies that may be undertaking R&D

Analysis of the AFR list of the 500 largest private companies does not indicate how many of the 54 manufacturing companies that can be identified undertake R&D. The largest companies in terms of sales are Visy (\$7billion), the Manildra group (\$1.64 billion), several meat processing companies, and a handful of specialised food manufacturers.

Overseas research-intensive companies doing business in Australia

There are numerous global research-intensive companies operating in Australia with very substantial R&D investments, but only a small amount of that R&D occurs in Australia, if at all. An overview of those companies, classified according to the S& P Global Industry Classification Standard is provided in Table 4.

Table 4: Largest overseas research-intensive companies doing business in Australia

GICS industry group	R&D (\$B)	Revenue (\$B)	R&D Intensity (%)
Automobiles & Components	89.06	2,123.23	4.2%
Capital Goods	39.69	987.51	4.0%
Commercial & Professional Services	2.08	225.61	0.9%
Consumer Durables	0.82	228.63	0.4%
Consumer Services	136.70	1,292.17	10.6%
Consumer Staples Distribution & Retail	9.07	1,094.44	0.8%
Defence	40.69	865.85	4.7%
Energy	9.95	1,928.32	0.5%
Financial Services	-	997.56	0.0%
Food, Beverage & Tobacco	11.67	1,384.41	0.8%
Health Care Equipment & Services	74.44	634.44	11.7%
Household & Personal Products	7.62	318.63	2.4%
Materials	2.85	741.65	0.4%
Media & Entertainment	222.11	2,143.42	10.4%
Pharmaceuticals, Biotechnology & Life Sciences	261.48	1,140.00	22.9%
Real Estate Management & Development	0.05	97.27	0.0%
Semiconductors & Semiconductor Equipment	146.57	973.47	15.1%
Software & Services	388.01	2,831.14	13.7%
Technology Hardware & Equipment	32.58	563.92	5.8%
Telecommunication Services	10.57	1,235.54	0.9%
Transportation	0.54	266.36	0.2%
Utilities	
Total sample	1,486.55	22,073.55	6.7%

The R&D spend by Australia's listed companies amounts to 1.2% of the total of the sample companies listed in Table 2.

A more complete list of overseas research-intensive companies doing business in Australia is at Attachment 2.

The most research-intensive industries are Automobiles & Components, Capital Goods, Consumer Services, Defence, Health Care Equipment and Services, Media and Entertainment, Pharmaceuticals, Biotechnology & Life Sciences, Semiconductors & Semiconductor Equipment, Software & Services, and Technology Hardware & Equipment.

Implications of the analysis

There is an apparent split in terms of R&D intensity between companies that develop technologies and use it on their business models (automotive, consumer services, Health care equipment, media and entertainment, pharmaceuticals, semiconductors, software), and those that simply adopt and apply technology (commercial and professional services, consumer staples and distribution, household products, telecommunications, transport and utilities).

Changing trends in the way R&D is undertaken

In the area of R&D the once-large corporate R&D labs are disappearing, and R&D is becoming more distributed and networked. It is part of a trend towards “unbundling” the corporation⁴ and innovation sourcing⁵.

Corporations source R&D in global technology markets, where multiple suppliers provide expertise and capability across global value chains⁶. They are moving towards being knowledge and technology integrators in regional, national, and global innovation ecosystems.

Global corporations are coming to believe that in this increasingly an interconnected and interdependent world that their core skills lie in identifying the challenges, visioning the future, and coordinating the resources to best attack a problem and capture opportunities. At the same time, there will be a continuing and dynamic emergence of gaps and prospects for globally facing new technology-based businesses to create new networks and value chains.

For Australia, and Australian businesses, a critical task is working out what their distinctive capabilities are in these technology marketplaces are, and which ones should be developed, to participate in effectively—and profitably.

Policy issues

From a policy perspective, these trends mean that Australian and State governments must think less about creating complex products, like motor vehicles, wind turbines, and solar farms and thinking more about which parts of these products the country has a distinctive capability—something that is unique and difficult to replicate. It is likely that these will be in the R&D area.

Australian governments also have an important role to ensure that Australian technology suppliers, particularly new technology-based firms (NTBFs), have every opportunity to participate in the prime contractor networks through procurement processes, particularly in

⁴ Hagel, J., & Singer, M. 1999. Unbundling the Corporation. *McKinsey Quarterly*, 3(3).

⁵ For example, see Howells, J., & James, A. 2001. Corporate Decision-Making on the Sourcing of Technological Knowledge, Discussion Paper Series. Manchester: PREST, Linder, J. C., Jarvenpaa, S., & Davenport, T. 2003a. Innovation Sourcing Matters, *Accenture Institute for Strategic Change*. Boston, Linder, J. C., Jarvenpaa, S., & Davenport, T. 2003b. Toward an Innovation Sourcing Strategy. *Sloan Management Review*, 44(4): 43-49.

⁶ See, for example Arora, A., Fosfuri, A., & Gambardella, A. 2001. *Markets for Technology: The Economics of Innovation and Corporate Strategy* (1st ed.): The MIT Press. Arora, A., Landau, R., & Rosenberg, N. 1999. Dynamics of Comparative Advantage in the Chemical Industry. In D. C. Mowery, & R. R. Nelson (Eds.), *Sources of Industrial Leadership: Studies of Seven Industries*. Cambridge: Cambridge University Press. Bresnahan, T. F., & Gambardella, A. 2004. *Building high-tech clusters: Silicon Valley and beyond*. Cambridge, UK ; New York: Cambridge University Press.

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Defence, Capital Goods purchases, Health and hospital services delivery, Information Technology purchases (hardware, software and systems), Renewable Energy, and Transport.

Whatever happens in the future, the wider network of businesses suppliers, public research organisation, specialised research and technology organisations, and world-class universities will have to rise to the challenge we collectively face.

It is a reality that many large global R&D-intensive businesses have a sales and marketing presence in Australia, but not for undertaking R&D. Where there is a presence, the scale of operations is small.

For example, few global agtech corporations undertake R&D in Australia or have relationships with Australian public research organisations and universities—apart from students. In the Agriculture sector, companies like Bayer, Syngenta, and BASF have global R&D programs, and competition between countries to access them is intense⁷.

Australia is currently uncompetitive in the global R&D marketplace. Although this issue was recognised many years ago, Australia has not developed a Foreign Direct Investment (FDI) policy to attract R&D investment. Instead, the Australian States compete with each other to attract FDI to “create jobs” (“any jobs”), possibly sending mixed messages to investors.

Other issues

So called “manufacturing” companies, or companies “making things” source technology from a wide range of external sources as part of global sourcing strategies. It is unreasonable to assume, or expect, that all of those technologies will be developed in-house.

It is time for policy to move away from thinking about “objects” or “things you can drop on your foot”. In the global technology marketplace, policy should focus on those supporting the companies developing distinctive technological capabilities, rather than companies adopting and applying it (the technology integrators or assemblers).

Manufacturers have always been assemblers of multiple components—hence the name assembly line. But the assembly line has been undergoing fundamental change in its structure and performance.

Limitations of the classification

The classification of companies into industries can only tell us so much. In recent years, the relevance of GICS and ICB classification (and the ANZIC Classification) has been questioned. Many of the current economic categories and measurements are products of the Industrial Age, when the companies that were growing and shaping the world were giants with huge physical plants and plenty of material products.

These days manufacturing corporations are linking their production activity with higher value service offerings. This is recognised in GICS classification titles of *Consumer services*, *Healthcare equipment and services*, *Software and services*, and *Telecommunication services*. Technology hardware and equipment providers also embed a significant service element.

In many technology-oriented “manufacturing” corporations the manufacturing process itself is extensively outsourced to a growing segment of contract manufacturers. These “manufacturers” capture value from design, research and innovation, market positioning,

⁷ In 2022 Bayer reported over 700 collaborations, twelve of which were in Australia but none involved Agriculture. This compares with 14 in Canada, two of which involved crop science. <https://www.bayer.com/en/sustainability/transparency-in-science-collaborations> In 2019, Bayer generated sales of A\$1.3 billion in Australia and New Zealand.

brand awareness, and distribution strategies. This is often reflected in the so-called “smiling curve”.

In the digital economy, global corporations cross boundaries between hardware and software and beyond. Apple makes phones and computers and sells entertainment products. Amazon creates hardware, produces entertainment programming, sells cloud services, and delivers just about everything. General Electric has interests in NBC, Telemundo, and Universal Pictures.

Perhaps it is time to move from a vertical industry classification emphasis to one centred on *business models* to reflect the wider scope of today’s corporate giants. New measures and standards would help investors, customers, and employees manage new strategic landscapes with greater insight.

In this digital age, definitions and standards should reflect the way businesses operate in global value chains where “primes” source the diverse elements required in production and delivery processes from all over the world.

A note on the differences between ASX and ABS reported R&D

There is a gap between the R&D reported through the ASX (\$A14.7 billion in 2022-23) and the ABS (\$A20.6 billion in 2019-20). Several reasons might account for the

The ABS figures include R&D by Australian companies with an ABN and R&D performed overseas by Australian businesses. Therefore, the data includes R&D by Australian companies that perform most of their R&D overseas (e.g., Atlassian, Fortescue). The ABS estimates that in 2019-20, \$A1.17 billion of R&D was performed overseas (8.3%). If the companies have an ABN, they would be included in the ABS data.

The ASX figures only include R&D by Australian companies listed on the ASX, including companies that are dual listed on other exchanges. Australian companies listed only on overseas exchanges, like Atlassian, are not included in the ASX numbers, but companies that are dual listed, including those that do not do much R&D in Australia, are – including those undertaking R&D in California, Israel, Singapore, etc.

The ASX data does not include private companies that are not listed on the ASX, such as Visy. It would not include unlisted start-ups.

In both collections, respondents make their own interpretations of definitions for the ABS, the Frascati Manual, and for the ASX, the AASB financial reporting definitions. Many companies do not report R&D in their financial statements, so it doesn’t make it into the ASX data. Telstra does not report any R&D and is not mentioned in its annual report, except to say, “Research costs are expensed when incurred,” but not how much.

But it could also be the case Telstra has not done much R&D since privatisation—having closed its R&D labs and probably buying embedded R&D in its technology purchasing strategies. However, TPG has a big commitment to R&D, which probably would have disappeared if Telstra had been allowed to take it over.

It is not possible to cross-check which companies received the RDTI, but I suspect that in many cases, the RDTI rebate would be the only revenue source.

The ABS reports that the three industries with the greatest contribution to BERD are Professional, scientific, and technical services (\$6,972 million or 34%), Manufacturing (\$5,203 million or 25%), and Financial and insurance services (\$3,072 million or 15%). Together, these three industries accounted for nearly three-quarters (74%) of total BERD.

The ASX also reports that 28% of R&D goes to financial services, 27% to Health, pharmaceuticals, biotech and the life sciences, 13.2% to Materials (mainly mining) and 11% to “technology”—software and services, semiconductors and semiconductor equipment, technology hardware and equipment).

But, from looking at the company bios, a very significant amount of technology goes into other areas, including consumer discretionary, distribution, durables, services and staples, and health care equipment in other words, “ICT is everywhere”, like electricity. This re-enforces the need to think differently about the present industrial classifications of companies.

Of the 2200 ASX listings, a third (769) are mining exploration companies whose only assets are mining leases. So Australians not only bet on horses or Tattsлото, they take bets on mining companies, waiting for the next Poseidon. Only a handful of the rare earth or lithium explorers report investments in R&D.

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Attachment 1: ASX listed companies reporting R&D Expenditure

Table 5 below provides information on the ASX listed companies that reported R&D in 2022-23.

Table 5: ASX listed companies reporting R&D expenditure

Company Name	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)
Automobiles & Components			
G.U.D. Holdings Limited	26.798	1.037	2.6
Arb Corporation Limited.	16.608	0.674	2.5
PWR Holdings Limited	10.058	0.118	8.5
Vmoto Limited	4.166	0.069	6.0
Sprintex Limited	1.590	0.001	156.6
Datadot Technology Limited	0.002	0.003	0.1
Capital Goods			
Reliance Worldwide Corporation Limited	17.786	1.867	0.0
Dronesield Limited	11.062	0.055	20.1
Fletcher Building Limited	4.608	7.805	0.1
FBR Ltd	4.518	0.002	271.7
Fluence Corporation Limited	4.390	0.103	4.3
Amaero International Ltd	3.323	0.000	420.4
Silex Systems Limited	2.783	0.967	28.8
Nightingale Intelligent Systems Inc	2.612	0.003	102.1
Quickstep Holdings Limited	0.908	0.094	1.0
Aml3d Limited	0.730	0.000	115.0
Roots Sustainable Agricultural Technologies Ltd	0.548	0.000	242.2
Laserbond Limited	0.453	0.039	1.2
Rectifier Technologies Ltd	0.382	0.039	1.0
Korvest Ltd	0.306	0.108	0.1
Zicom Group Limited	0.291	0.104	0.3
Veem Ltd	0.283	0.059	0.5
Excelsior Capital Ltd	0.224	0.104	0.0
Aurora Labs Limited	0.212	0.000	157.8
Xrf Scientific Limited	0.094	0.056	0.2
K-Tig Limited	0.079	0.003	2.6
Remsense Technologies Limited	0.004	0.002	0.2
Verbrec Limited	0.003	0.118	0.0
Commercial & Professional Services			
Computershare Limited.	577.000	4.806	12.0
Downer Edi Limited	26.800	11.640	0.2
Sg Fleet Group Limited	26.624	1.053	2.5
Mcmillan Shakespeare Limited	10.529	0.464	2.3
Count Limited	4.865	0.091	5.3
Iph Limited	2.403	0.483	0.5
Ras Technology Holdings Limited	2.174	0.011	18.5
Synertec Corporation Limited	1.652	0.015	11.2
Clean Teq Water Limited	1.252	0.012	10.2
Ypb Group Ltd	0.805	0.001	18.7
Smart Parking Limited	0.698	0.045	1.5
Openn Negotiation Limited	0.641	0.000	102.7
Energy Action Limited	0.517	0.011	4.5
Aeris Environmental Ltd	0.442	0.002	21.0
Environmental Clean Technologies Limited.	0.437	N/A	0.0
Intelligent Monitoring Group Limited	0.199	0.033	0.6
Hiremii Limited	0.065	0.021	0.3
Inventis Limited	0.016	0.016	0.0
Veris Limited	0.008	0.101	0.0
Consumer Discretionary Distribution & Retail			
Articore Group Limited	6.349	0.555	1.1
Cettire Limited	3.824	0.416	0.9
Bod Science Limited	3.691	0.003	111.2
Kogan.Com Ltd	3.069	0.490	0.6
Joyce Corporation Ltd	0.105	0.144	0.0
Kaddy Limited	0.040	0.000	28.1
Adore Beauty Group Limited	0.002	0.181	0.0

Company Name	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)
Consumer Durables & Apparel			
Breville Group Limited	15.464	1.490	1.0
Atomos Limited	4.618	0.043	10.800
Audio Pixels Holdings Limited	3.434	0.000	16,466.600
Waterco Limited	2.005	0.134	1.5
Gale Pacific Limited	0.432	0.188	0.0
Fleetwood Limited	0.301	0.411	0.1
Cycliq Group Ltd	0.281	0.005	5.4
Consumer Services			
Aristocrat Leisure Limited	834.700	6.296	13.3
Light & Wonder Inc.	334.500	4.258	7.9
Webjet Limited	74.900	0.364	20.6
Ainsworth Game Technology Limited	45.712	0.285	16.0
Domino's Pizza Enterprises Limited	31.645	2.361	1.3
Pointsbet Holdings Limited	15.000	0.210	7.1
3p Learning Limited..	14.383	0.107	13.4
G8 Education Limited	7.004	0.983	0.7
Jumbo Interactive Limited	5.736	0.119	4.8
8vi Holdings Limited	1.255	0.018	6.8
Mad Paws Holdings Limited	0.562	0.025	2.3
Mighty Craft Limited	0.426	0.083	0.5
Consumer Staples Distribution & Retail			
Marley Spoon Se	23.872	0.532	4.5
Metcash Limited	19.500	15.803	0.1
Graincorp Limited	3.200	8.229	-
My Foodie Box Limited	0.098	0.006	1.8
Energy			
Whitehaven Coal Limited	41.497	6.072	0.7
Otto Energy Limited	8.767	0.050	17.5
Matrix Composites & Engineering Limited	2.190	0.047	4.6
SJR Technologies Group Plc	0.119	0.004	2.7
Financial Services			
Block Inc.	4,099.000	32.155	12.7
Pepper Money Limited	23.800	0.418	5.7
Plenti Group Limited	10.390	0.057	18.3
Moneyme Limited	8.570	0.076	11.3
Fleetpartners Group Limited	8.340	0.676	1.2
Solvar Limited	6.710	0.209	3.2
Harmony Corp Limited	6.640	0.034	19.3
Platinum Asset Management Limited	6.479	0.217	3.0
Quickfee Limited	3.898	0.012	32.1
Regal Partners Limited	3.872	0.105	3.7
Australian Finance Group Ltd	1.544	1.000	0.2
Halo Technologies Holdings Ltd	1.295	0.013	9.6
8i Holdings Ltd	1.255	0.016	7.9
Selfwealth Limited	0.827	0.029	2.8
Change Financial Limited	0.721	0.013	5.5
Liberty Financial Group	0.704	0.629	0.1
Earlypay Ltd	0.563	0.061	0.1
Fintech Chain Limited	0.551	0.013	4.3
Beforepay Group Limited	0.306	0.013	0.0
Australian Bond Exchange Holdings Limited	0.115	0.005	2.4
K2 Asset Management Holdings Ltd	0.060	0.002	3.0
Food, Beverage & Tobacco			
Ridley Corporation Limited	9.878	1.260	0.8
Noumi Limited	2.073	0.552	0.4
Ricegrowers Limited	1.868	1.638	0.1
Live Verdure Ltd	0.584	0.002	25.9
Beston Global Food Company Limited	0.317	0.170	0.0
New Zealand King Salmon Investments Limited	0.301	0.174	0.2
The Original Juice Co. Ltd	0.188	0.042	0.0
Yowie Group Ltd	0.141	0.020	0.1
Pure Foods Tasmania Limited	0.095	0.009	1.7
Seafarms Group Limited	0.074	0.026	0.3

Company Name	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)
NuChev Limited	0.007	0.009	0.1
Health Care Equipment & Services			
Resmed Inc	431.900	6.340	6.8
Cochlear Limited	244.900	1.936	12.6
Fisher & Paykel Healthcare Corporation Limited	163.100	1.479	11.0
Nanosonics Limited	29.500	0.166	17.8
Ansell Limited	26.875	2.485	1.1
EBR Systems Inc.	23.215	N/A	N/A
Anteris Technologies Ltd	22.850	0.411	555.8
Volpara Health Technologies Limited	18.998	0.033	58.0
Imricor Medical Systems Inc.	11.620	0.000	1,286.5
Cogstate Ltd	10.662	0.061	17.6
Next Science Limited	10.105	0.033	31.1
Doctor Care Anywhere Group Plc	9.883	0.080	13.7
Microba Life Sciences Limited	9.337	0.005	172.3
Medadvisor Limited	7.507	0.098	7.7
Polynovo Limited	7.429	0.066	11.3
Neurotech International Limited	6.453	0.001	540.2
Compumedics Limited	5.461	0.042	12.7
Imagion Biosystems Limited	5.251	0.005	101.4
Universal Biosensors Inc.	4.974	0.007	75.0
Adherium Limited	4.725	0.003	147.9
Austco Healthcare Limited	4.304	0.042	10.3
4dmedical Limited	4.037	0.001	561.7
Cardiex Limited	3.908	0.006	68.7
Painchek Ltd	3.817	0.002	195.2
Cyclopharm Limited	3.689	0.027	13.6
Rhythm Biosciences Limited	3.648	0.003	117.8
Lbt Innovations Limited	3.338	0.002	156.6
Inoviq Ltd	3.224	0.002	207.9
Global Health Limited	2.687	0.008	34.4
Heramed Limited	2.634	0.000	445.7
Impedimed Limited	2.517	0.113	22.2
Sdi Limited	2.467	0.108	23.0
Optiscan Imaging Limited	2.437	0.003	93.1
Emvision Medical Devices Ltd	2.012	0.007	28.8
Emyria Limited	1.841	0.002	116.5
Paragon Care Limited	1.719	0.038	0.6
Beamtree Holdings Limited	1.679	0.006	7.4
Osteopore Limited	1.571	0.002	70.8
Osteopore Limited	1.571	0.002	70.3
Imexhs Limited	1.481	0.020	7.4
Inhalerx Limited	1.448	0.001	120.3
Allegra Medical Technologies Limited	1.370	0.001	198.200
Atomo Diagnostics Limited	1.052	0.003	41.4
Resonance Health Limited	1.040	0.005	23.2
Visioneering Technologies Inc.	0.883	0.013	6.9
Somnomed Limited	0.880	0.084	1.1
Hitiq Limited	0.855	0.003	28.5
Cleanspace Holdings Limited	0.748	0.012	6.2
Lumos Diagnostics Holdings Limited	0.632	0.016	4.0
Nova Eye Medical Limited	0.617	0.017	3.6
Curvebeam Ai Limited	0.588	0.002	7.3
Apiam Animal Health Limited	0.410	0.192	0.2
Singular Health Group Ltd	0.394	0.001	38.2
Respiri Limited	0.378	0.000	57.4
Trivarx Ltd	0.307	0.000	32.0
Oneview Healthcare Plc	0.285	0.015	1.9
Control Bionics Limited	0.233	0.006	4.7
Pro Medicus Limited	0.155	0.023	0.8
Tali Digital Limited	0.120	0.000	15.5
Careteq Limited	0.105	0.006	1.6
Truscreen Group Limited	0.080	0.002	41.6
Uscom Limited	0.048	0.000	1.8

Company Name	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)
Intelicare Holdings Limited	0.014	0.000	3.5
Household & Personal Products			
Skin Elements Limited	1.690	0.000	870.7
Nutritional Growth Solutions Ltd	0.430	0.004	9.8
Holista Colltech Limited	0.129	0.006	2.2
The Calmer Co International Limited	0.002	0.002	0.1
Materials			
Fortescue Ltd	830.300	25.330	3.3
Rio Tinto Limited	359.500	79.239	0.5
Newmont Corporation	293.400	17.331	1.7
Amcor Plc	151.600	22.060	0.7
Nufarm Limited	97.508	3.481	2.8
James Hardie Industries Plc	62.524	5.650	1.1
Incitec Pivot Limited	30.600	5.444	0.6
Bluescope Steel Limited	29.000	18.242	0.2
Imdex Limited	27.400	0.411	6.7
Calix Limited	14.532	0.019	78.1
Champion Iron Limited	13.129	1.544	0.9
Arcadium Lithium Plc	8.510	1.295	0.7
Iperionx Limited	8.409	NA	-
Andromeda Metals Limited	2.839	N/A	N/A
Ecograp Limited	2.823	N/A	N/A
Clover Corporation Limited	2.572	0.080	3.2
Latrobe Magnesium Limited	1.015	N/A	N/A
Alpha Hpa Limited	0.869	0.000	5,383.0
Sparc Technologies Limited	0.825	0.000	87.0
Ionic Rare Earths Limited	0.774	0.003	28.0
Quantum Graphite Limited	0.648	N/A	N/A
Orexplore Technologies Limited	0.505	0.003	15.3
Minbos Resources Limited	0.500	0.000	9,998,540.0
Zeotech Limited	0.456	0.001	70.5
Sunrise Energy Metals Limited	0.333	0.000	38.9
Neometals Ltd	0.304	N/A	N/A
Prl Global Ltd	0.150	1.151	0.0
Ausgold Limited	0.063	0.000	127.7
Altech Batteries Ltd	0.037	0.000	18,015.7
Big River Industries Limited	0.024	0.449	0.0
Beacon Minerals Limited	0.021	0.000	29.4
Media & Entertainment			
Seek Limited	151.700	1.225	12.4
Airtasker Limited	13.114	0.044	29.6
Straker Limited	10.532	0.056	18.9
Hipages Group Holdings Ltd	10.473	0.067	15.6
Ovanti Limited	4.712	0.010	-
Rma Global Limited	2.291	0.018	13.0
Streamplay Studio Limited	1.051	0.002	59.7
Icandy Interactive Limited	0.992	0.026	3.8
Mighty Kingdom Limited	0.977	0.007	14.1
Kneomedia Limited	0.889	0.001	75.2
Swift Networks Group Limited	0.799	0.002	4.2
Incentiapay Limited	0.288	0.172	1.7
Sportshero Limited	0.215	0.000	2,052.4
The Market Limited	0.051	0.082	0.1
Roolife Group Ltd	0.043	0.012	0.3
Applyflow Limited	0.018	2.052	0.900
Pharmaceuticals, Biotech & Life Sciences			
CSLLimited	1,854.000	19.984	9.3
Opthea Limited	183.400	0.001	31,699.0
Telix Pharmaceuticals Limited	128.800	0.502	25.6
Paradigm Biopharmaceuticals Limited	52.679	0.000	112,658.7
Mesoblast Limited	40.822	0.011	362.5
Pyc Therapeutics Limited	35.146	15.806	222.4
Clarity Pharmaceuticals Ltd	31.459	9.801	321.0
Imugene Limited	30.865	0.012	262.1

Company Name	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)
Avita Medical Inc.	30.549	0.074	41.5
Neuren Pharmaceuticals Limited	26.751	0.232	11.5
Radiopharm Theranostics Limited	25.316	0.006	407.7
Ecs Botanics Holdings Ltd	21.559	0.015	0.0
Dimerix Limited	20.474	0.009	227.9
Mayne Pharma Group Limited	20.139	0.184	11.0
Starpharma Holdings Limited	18.870	0.004	448.4
Pacific Edge Limited	17.020	0.020	86.5
Chimeric Therapeutics Limited	14.432	0.004	320.3
Alterity Therapeutics Limited	13.199	0.004	337.0
Cynata Therapeutics Limited	12.674	0.002	766.1
Noxopharm Limited	10.647	0.006	177.1
Percheron Therapeutics Limited	10.162	0.002	643.3
Aroa Biosurgery Limited	9.928	0.059	16.7
Actinogen Medical Limited	8.900	0.005	182.1
Syntara Limited	8.713	0.019	45.4
Orthocell Limited	7.598	0.004	179.1
Race Oncology Ltd	7.596	0.003	242.3
Invex Therapeutics Ltd	7.400	0.000	1,612.0
Patrys Limited	7.250	0.003	263.9
Recce Pharmaceuticals Ltd	7.167	4.365	164.2
Little Green Pharma Ltd	6.595	0.199	33.2
Nyrada Inc.	6.411	0.004	448.4
Prescient Therapeutics Limited	6.222	0.002	256.2
Arovela Therapeutics Limited	6.105	0.005	419.7
Aft Pharmaceuticals Limited	6.032	0.147	4.1
Anteotech Ltd	5.842	0.000	1,597.5
Botanix Pharmaceuticals Ltd	5.727	0.003	158.8
Ecofibre Limited	4.925	0.033	15.1
Bcal Diagnostics Limited	4.750	0.003	156.9
Amplia Therapeutics Limited	4.687	0.001	394.0
Argenica Therapeutics Limited	4.308	0.002	246.2
Cann Group Limited	4.289	0.206	20.8
Firebrick Pharma Limited	4.091	0.000	18,140.2
Neuroscientific Biopharmaceuticals Ltd	4.026	0.005	81.3
Acrux Limited	3.865	0.008	45.9
Adalta Limited	3.646	0.003	105.1
Biotron Limited	3.232	0.001	225.8
Invion Limited	2.898	0.004	70.6
Oncosil Medical Ltd	2.851	0.001	194.3
Tissue Repair Ltd	2.612	0.000	268.8
Immuron Limited	2.592	0.002	143.6
Argent Biopharma Limited	2.262	0.003	66.8.
Avecho Biotechnology Limited	2.117	0.000	447.1
Proteomics International Laboratories Ltd	2.077	0.003	65.3
Vectus Biosystems Limited	1.958	0.001	144.5
Anatara Lifesciences Ltd	1.602	N/A	N/A
Memphasys Limited.	1.469	0.000	235.3
Algorae Pharmaceuticals Limited	1.310	0.000	31,116.9
Genetic Technologies Limited	1.281	0.010	12.4
Clinuvel Pharmaceuticals Limited	1.268	0.078	1.6
Medlab Clinical Limited	1.225	0.004	27.8
Dorsavi Ltd	1.146	0.008	65.5
Island Pharmaceuticals Limited	1.141	0.000	10,308.6
Pharmaust Limited	1.032	0.004	27.0
Hexima Limited.	0.884	1.485	59.5
Probiotec Limited	0.513	0.214	0.0
Epsilon Healthcare Limited	0.376	0.007	5.3
Nanollose Limited	0.354	0.000	85.9
Medical Developments International Limited	0.236	0.032	0.7
BPH Global Ltd	0.049	0.000	14,726.3
Auscann Group Holdings Ltd	0.049	0.002	31.6
Vita Life Sciences Limited..	0.017	0.742	0.0
Real Estate Management & Development			

Company Name	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)
Pexa Group Limited	50.604	0.282	18.0
Sietel Limited	0.293	0.015	2.0
WOTSO Property	0.214	0.049	0.0
Semiconductors & Semiconductor Equipment			
Weebit Nano Ltd	26.695	N/A	-
Revasum Inc.	8.878	0.022	41.0
4DS Memory Limited	3.487	N/A	-
Archer Materials Limited	2.966	0.001	179.9
Software & Services			
Xero Limited	495.800	1.310	37.9
Wisetech Global Limited	185.800	0.816	22.7
Life360 Inc.	148.100	0.447	33.2
Fineos Corporation Holdings Plc	69.900	0.205	34.1
Nuix Limited	58.382	0.183	32.0
Appen Limited	49.233	0.402	12.3
Altium Limited	44.336	0.395	11.2
Serko Limited	36.820	0.043	84.6
Vista Group International Limited.	36.444	0.133	27.5
Technology One Limited	34.055	0.429	7.9
Bigtincan Holdings Limited	33.441	0.122	27.3
Siteminder Limited	29.823	0.152	19.7
Objective Corporation Limited	27.208	0.110	24.7
Integrated Research Limited	23.695	0.070	33.9
Infomedia Ltd	22.899	0.129	17.6
Gentrack Group Limited	20.934	0.158	13.2
Hansen Technologies Limited	14.222	0.311	4.6
Catapult Group International Ltd	13.341	0.126	10.6
Reckon Limited	13.269	0.053	24.8
Envirosuite Limited	12.059	0.058	20.8
Brainchip Holdings Ltd	11.789	0.000	3,463.3
Macquarie Technology Group Limited	8.936	0.345	2.6
Nextdc Limited	8.292	0.364	2.3
Shekel Brainweigh Ltd	6.280	0.040	15.7
Janison Education Group Limited	5.938	0.042	14.5
Identitii Limited	3.425	0.001	251.3
Yojee Limited	3.408	0.002	164.2
Firstwave Cloud Technology Limited	3.198	0.013	31.4
Livehire Limited	3.094	0.008	38.4
Energy One Limited	3.045	0.045	6.8
Adslot Ltd.	2.827	0.009	31.6
Etherstack Plc	2.422	0.014	17.5
Beonic Ltd	2.239	0.024	9.5
Netlinkz Limited	2.075	0.207	10.0
Archtis Limited	2.058	0.006	32.3
Pointerra Limited	2.033	0.007	27.7
Way 2 Vat Ltd.	1.888	0.003	62.8
Connexion Mobility Ltd	1.769	0.010	17.8
Pharmx Technologies Limited	1.661	0.006	27.1
Spacetalk Ltd	1.587	0.013	11.8
Dropsuite Limited	1.442	0.031	4.7
Whitehawk Limited	1.248	0.003	47.2
Linus Technologies Limited	1.172	0.000	512.1
Kinatico Ltd	0.924	0.028	3.3
Data#3 Limited	0.874	2.561	-
Frugl Group Limited	0.871	0.000	536.1
Credit Clear Limited	0.870	0.036	2.4
Vinyl Group Ltd	0.844	0.000	136.5
Urbanise.Com Limited	0.809	0.013	6.3
Adacel Technologies Limited	0.754	0.409	1.8
Schrole Group Ltd	0.694	0.006	10.8
Activeport Group Ltd	0.690	0.019	3.6
8common Limited	0.675	0.007	9.3
Readcloud Limited	0.665	0.010	6.4
Knosys Limited	0.500	0.108	4.6

Company Name	R&D (\$M)	Revenue (\$B)	R&D Intensity (%)
Acusensus Limited.	0.450	0.420	1.1
Love Group Global Ltd	0.354	0.004	8.9
Novatti Group Limited	0.328	0.039	0.8
Advanced Health Intelligence Ltd	0.257	0.001	39.300
Opyl Limited	0.249	0.000	40.4
Zoom2u Technologies Limited	0.240	0.005	5.1
Openlearning Limited	0.218	0.002	9.5
I Synergy Group Limited	0.157	0.001	15.1
Prophecy International Holdings Limited	0.155	0.020	0.8
Digitalx Limited	0.090	0.002	3.9
Dxn Limited	0.069	0.005	0.8
Adisyn Ltd	0.039	2.818	1.4
Norwood Systems Limited	0.028	0.000	2.9
Bridge Saas Limited	0.027	0.001	1.9
Livetiles Limited	0.009	0.031	-
Technology Hardware & Equipment			
Codan Limited	46.547	0.457	10.2
Eroad Limited	23.670	0.164	14.5
Ikegps Group Limited	12.665	0.288	44.0
Novonix Limited	8.700	0.012	73.7
Audinate Group Limited	8.679	0.069	12.5
Nuheara Limited	3.967	0.002	205.400
Harvest Technology Group Ltd	3.965	0.006	70.7
Birddog Technology Limited	3.781	0.029	13.1
Beam Communications Holdings Limited	2.223	0.396	5.6
Elsight Limited	2.122	0.003	93.8
Dotz Nano Limited	1.797	0.000	2,309.5
Ava Risk Group Limited	1.767	0.029	6.2
Zimi Limited	1.527	0.000	694.7
Senetas Corporation Limited	0.859	0.029	2.9
Structural Monitoring Systems Plc	0.792	0.004	3.5
Bluechiip Limited	0.651	0.000	71.1
Tz Limited	0.439	0.014	3.2
Spectur Limited	0.296	0.007	4.0
Constellation Technologies Limited	0.163	0.001	130.6
Dti Group Ltd	0.135	0.013	1.0
Rubicon Water Limited	0.099	0.055	0.0
Nanoveu Limited	0.018	0.000	17.3
Telecommunication Services			
Tpg Telecom Limited.	405.000	5.533	7.3
Douugh Limited	0.959	0.000	656.0
Flexiroam Limited	0.342	0.006	3.8
Hubify Limited	0.080	0.026	0.3
Transportation			
Air New Zealand Limited	38.700	5.833	0.7
Jayride Group Limited	4.371	0.005	86.0
Carly Holdings Limited	1.051	0.021	50.0
Traffic Technologies Ltd.	0.861	0.058	1.5
Saferoads Holdings Limited	0.163	0.146	1.1
Harris Technology Group Limited	0.107	0.024	0.4
Utilities			
Kalina Power Limited	2.283	N/A	0.0
Carnegie Clean Energy Limited	0.346	0.000	90.2
	14,662.600	402.712	3.6%

Attachment 2: Global technology intensive companies with a marketing, sales and distribution presence in Australia

Below is a list drawn from a profile of 475 global companies, which report R&D in their financial statements, and which undertake marketing, sales and distribution activities in Australia. As observed earlier in this Paper, very little of this R&D is undertaken in Australia.

The data draws mainly on NYSE and NASDAQ listings, even though a company may be headquartered in another country. European companies, particularly that do not list on these exchanges, are not included in the data analysis below.

Table 6: Global technology intensive companies with a marketing, sales, and distribution presence in Australia

Company name	R&D (\$B)	Revenue (\$B)	R&D Intensity (%)
Automotive			
Borgwarner	1.26	20.83	6.0%
Daimler Truck Holding AG	3.00	90.53	3.3%
Ford Motor Company	12.03	258.50	4.7%
General Motors (GM)	14.53	252.10	5.8%
Honda Motor Co., Ltd.	9.93	190.50	5.2%
Hyundai Motor Company	4.05	184.20	2.2%
Mitsubishi Motors Corporation	0.58	28.27	2.1%
Nissan Motor Corporation	5.88	119.40	4.9%
Toyota Motor Corporation	12.18	456.90	2.7%
Volkswagen Group	25.63	522.00	4.9%
Capital Goods			
3M Company	2.70	47.95	5.6%
ABB Ltd	1.93	47.30	4.1%
Alstom SA	1.21	29.16	4.2%
Atlas Copco AB	0.97	25.12	3.9%
Caterpillar Inc.	3.09	98.39	3.1%
Cummins Inc.	2.32	49.98	4.6%
Eaton Corporation plc	1.11	34.03	3.3%
Emerson Electric Co.	0.81	23.59	3.4%
General Electric Company (GE)	2.80	99.70	2.8%
Honeywell International Inc.	2.14	53.79	4.0%
Illinois Tool Works Inc. (ITW)	0.42	23.63	1.8%
Ingersoll Rand Inc.	0.16	10.09	1.6%
ITT Inc.	0.15	4.82	3.1%
John Deere	3.44	96.64	3.6%
Komatsu Ltd.	1.02	39.92	2.6%
Kone Corporation	0.30	17.74	1.7%
Parker-Hannifin Corporation	0.50	28.62	1.7%
Schlumberger Limited	1.04	48.62	2.1%
Schneider Electric SE	3.14	58.15	5.4%
Siemens	10.45	127.90	8.2%
Consumer Services			
Airbnb, Inc.	2.53	14.55	17.4%
Amazon.com, Inc.	125.60	843.30	14.9%
Netflix, Inc.	3.93	49.48	7.9%
Uber Technologies, Inc.	4.64	54.70	8.5%
Defence			
Airbus Defence and Space	5.54	106.00	5.2%
BAE Systems plc	4.31	43.17	10.0%
Boeing Company	4.96	114.10	4.3%
General Dynamics Corporation	0.75	62.02	1.2%
L3Harris Technologies	0.70	28.49	2.5%
Leidos Australia	1.59	22.65	7.0%
Leonardo S.p.A.	3.62	24.77	14.6%
Lockheed Martin Corporation	2.20	99.10	2.2%
Northrop Grumman Corporation	1.76	57.65	3.1%
Nova Systems	0.14	0.76	18.6%
QinetiQ Australia	0.61	2.92	21.0%

Company name	R&D (\$B)	Revenue (\$B)	R&D Intensity (%)
RTX (Raytheon Technologies Corporation)	10.65	101.10	10.5%
Rheinmetall Defence Australia	0.72	11.63	6.2%
Saab AB	1.31	7.51	17.4%
Thales Group	1.83	29.85	6.1%
Energy			
BP plc	0.44	305.70	0.1%
Chevron Corporation	0.47	285.80	0.2%
ConocoPhillips Company	0.12	84.89	0.1%
DEC (Dongfang Electric Corporation)	0.57	12.313	4.6%
Exxon Mobil Corporation	1.29	496.30	0.3%
GE Renewable Energy	1.32	48.768	2.7%
Goldwind	0.39	10.430	3.7%
Mingyang (Mingyang Smart Energy)	0.03	1.023	3.3%
Nordex	0.06	10.551	0.6%
Rio Tinto Limited:	0.36	79.29	0.5%
SEwind (Shanghai Electric Wind Power Group Co)	0.14	2.090	6.5%
Shell plc	1.89	464.50	0.4%
Siemens Energy	2.30	51.18	4.5%
Vestas Wind Systems	0.60	24.916	2.4%
Windey Energy Technology Group	0.12	3.871	3.0%
Food, Beverage & Tobacco			
Anheuser-Busch InBev SA/NV:	0.38	87.12	0.4%
Campbell Soup Company:	0.14	14.07	1.0%
Danone S.A.:	0.64	44.74	1.4%
Diageo plc:	0.10	32.63	0.3%
Fonterra	0.11	22.73	0.5%
Campbell Soup Company:	0.14	14.07	1.0%
Danone S.A.:	0.64	44.74	1.4%
Diageo plc:	0.10	32.63	0.3%
General Mills, Inc.:	0.40	30.83	1.3%
Heineken N.V.:	0.41	49.18	0.8%
JBS	0.01	110.00	0.0%
Kellogg Company:	0.04	4.05	0.9%
Nestlé S.A.:	2.89	162.80	1.8%
General Mills, Inc.:	0.40	30.83	1.3%
Mondelez International, Inc.:	0.56	52.26	1.1%
Nestlé S.A.:	2.89	162.80	1.8%
PepsiCo, Inc.:	1.18	134.20	0.9%
The Kraft Heinz Company:	0.22	39.09	0.6%
Unilever PLC:	1.54	96.55	1.6%
Health Care Equipment & Services			
Abbott Laboratories	4.02	58.85	6.8%
Baxter International Inc.	0.98	21.73	4.5%
Becton, Dickinson and Company (BD)	1.92	30.14	6.4%
Boston Scientific Corporation	2.08	20.89	9.9%
Fresenius Medical Care AG & Co. KGaA	0.38	31.51	1.2%
Intuitive Surgical, Inc.	1.47	10.45	14.0%
Johnson & Johnson (J&J)	22.59	124.90	18.1%
Medtronic plc	4.07	47.19	8.6%
Koninklijke Philips N.V.	3.27	29.43	11.1%
ResMed Inc.	0.43	6.34	6.8%
Roche Holding AG	24.77	105.40	23.5%
Siemens Healthineers AG	3.22	35.65	9.0%
Smith & Nephew plc	0.56	8.14	6.9%
Stryker Corporation	2.04	30.08	6.8%
Thermo Fisher Scientific Inc.	1.96	62.88	3.1%
Zimmermet Holdings, Inc.	0.67	10.85	6.2%
Media and Entertainment			
Alphabet Inc. (Google)	66.65	451.00	14.8%
Amazon.com, Inc.	125.60	843.30	14.9%
AT&T Inc.	1.40	179.60	0.8%
Netflix, Inc.	3.93	49.48	7.9%
Sony Corporation	8.29	130.00	6.4%
Spotify Technology S.A.	2.79	21.46	13.0%

Company name	R&D (\$B)	Revenue (\$B)	R&D Intensity (%)
Tencent Holdings Limited	13.25	125.90	10.5%
Vivendi SA	0.21	17.02	1.2%
Pharmaceuticals, Biotech & Life Sciences			
AbbVie Inc.	12.40	79.70	15.6%
Amgen Inc.	7.02	41.36	17.0%
AstraZeneca plc	16.16	67.21	24.0%
Bayer AG	9.12	77.16	11.8%
Biogen Inc.	3.97	14.43	27.5%
Bristol Myers Squibb Company	14.98	66.03	22.7%
Eli Lilly and Company	19.24	50.07	38.4%
Gilead Sciences, Inc.	10.16	39.79	25.5%
GlaxoSmithKline plc	11.64	56.73	20.5%
Johnson & Johnson (J&J)	22.59	124.90	18.1%
Merck & Co., Inc.	44.80	88.20	50.8%
Novartis AG	16.68	68.46	24.4%
Pfizer Inc.	15.67	85.83	18.3%
Regeneron Pharmaceuticals, Inc.	7.05	19.25	36.6%
Roche Holding AG	24.77	105.40	23.5%
Sanofi S.A.	10.90	74.56	14.6%
Takeda Pharmaceutical Company Limited	7.40	43.20	17.1%
Teva Pharmaceutical Industries Limited	1.53	23.25	6.6%
Vertex Pharmaceuticals Incorporated	5.41	14.48	37.4%
Advanced Micro Devices, Inc. (AMD)	8.62	33.28	25.9%
Analog Devices, Inc.	2.62	19.42	13.5%
Applied Materials, Inc.	4.90	41.86	11.7%
ASML Holding N.V.	6.54	44.64	14.7%
Broadcom Inc.	8.29	56.54	14.7%
Cadence Design Systems, Inc.	2.12	6.00	35.3%
Infineon Technologies AG	4.06	26.82	15.1%
Intel Corporation	25.36	79.56	31.9%
KLA Corporation	1.95	15.76	12.4%
Micron Technology, Inc.	4.81	23.98	20.0%
NVIDIA Corporation	13.18	92.58	14.2%
Qualcomm Incorporated	13.69	55.61	24.6%
Renesas Electronics Corporation	2.43	15.29	15.9%
Samsung Electronics Co., Ltd.	32.19	293.20	11.0%
STMicroelectronics N.V.	3.13	25.36	12.4%
Taiwan Semiconductor Manufacturing	8.72	103.30	8.4%
Teradyne, Inc.	0.61	3.93	15.6%
Texas Instruments Incorporated (TI)	2.73	25.70	10.6%
United Microelectronics Corporation	0.63	10.64	6.0%
Software & Services			
Adobe Inc.	5.21	29.09	17.9%
Alphabet Inc. (Google)	66.65	451.00	14.8%
Amazon.com, Inc.	125.60	843.30	14.9%
Apple Inc.	46.54	596.20	7.8%
Atlassian Corporation Plc	2.81	5.31	52.9%
Cisco Systems, Inc.	11.35	85.68	13.2%
Dropbox, Inc.	1.37	3.67	37.4%
Meta (Facebook), Inc.	56.46	197.90	28.5%
IBM Corporation	9.94	90.76	11.0%
Intuit Inc.	4.02	21.39	18.8%
Microsoft Corporation	40.83	318.20	12.8%
Oracle Corporation	14.48	76.81	18.8%
Salesforce.com, Inc.	8.60	53.14	16.2%
SAP SE	(10.12)	50.55	-20.0%
ServiceNow, Inc.	3.12	13.16	23.7%
Twilio Inc.	1.38	6.10	22.7%
Workday, Inc.	3.76	11.07	33.9%
Zoom Video Communications, Inc.	1.22	6.90	17.7%
Technology Hardware & Equipment			
Canon Inc.	3.45	43.51	7.9%
Dell Technologies Inc.	4.94	135.70	3.6%
HP Inc.	2.49	84.68	2.9%

Company name	R&D (\$B)	Revenue (\$B)	R&D Intensity (%)
Lenovo Group Limited	3.28	92.66	3.5%
Micron Technology, Inc.	4.81	23.98	20.0%
Ricoh Company, Ltd.	1.11	23.80	4.7%
Seagate Technology plc	1.20	11.09	10.8%
Sony Corporation	8.29	130.00	6.4%
Western Digital Corporation	3.02	18.49	16.3%
Telecommunication Services			
AT&T Inc.	1.40	179.60	0.8%
BT Group plc	1.26	38.16	3.3%
Deutsche Telekom AG	0.04	185.80	0.0%
KDDI Corporation	0.30	63.90	0.5%
Nippon Telegraph and Telephone	2.85	148.00	1.9%
SoftBank Group Corp.	3.60	74.03	4.9%
Swisscom AG	0.44	19.31	2.3%
Telenor Group	0.12	11.62	1.0%
Telia Company AB	0.16	12.92	1.3%
TPG Telecom Limited	0.41	5.53	7.3%
Transportation			
Air New Zealand Limited	0.04	5.83	0.7%
Delta Air Lines, Inc.	0.50	85.17	0.6%
Singapore Airlines Limited	0.00	19.98	0.0%

Summary

GICS industry group	R&D Intensity (%)
Automobiles & Components	4.2%
Capital Goods	4.0%
Commercial & Professional Services	0.9%
Consumer Durables	0.4%
Consumer Services	10.6%
Consumer Staples Distribution & Retail	0.8%
Defence	4.7%
Energy	0.5%
Financial Services	0.0%
Food, Beverage & Tobacco	0.8%
Health Care Equipment & Services	11.7%
Household & Personal Products	2.4%
Materials	0.4%
Media & Entertainment	10.4%
Pharmaceuticals, Biotechnology & Life Sciences	22.9%
Real Estate Management & Development	0.0%
Semiconductors & Semiconductor Equipment	15.1%
Software & Services	13.7%
Technology Hardware & Equipment	5.8%
Telecommunication Services	0.9%
Transportation	0.2%
Utilities	...
All Industries	6.7%

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