Office of the **Queensland Chief Scientist**

Queensland Government research and development expenditure report 2021–22

Queensland Government

#32571 | 0523

Key findings

Around **$394 million** was spent by the Queensland Government (the government) on research and development (R&D) in 2021–22, which represents a slight moderation of 11 per cent following a relatively strong outcome of $444 million in 2020–21. The largest dollar amount decrease was reported by Queensland Health at $25 million (50 per cent) of the yearly decrease. Queensland Health confirmed that over the last four years the R&D expenditure was on an upward trajectory. This year, the expenditure fell to a similar level to the 2019–20 figure.

Around $273 million (69 per cent) of the total R&D expenditure for the year was conducted at Queensland Government sites.

R&D expenditure for 2021–22 includes capital and current expenditure:

- **capital expenditure** refers to infrastructure spending such as buildings, land, and equipment
- **current expenditure** refers to operational spending such as employee expenses, salaries, and other R&D related expenditure.

Approximately $369 million (93 per cent) of the total expenditure was related to current expenditure.

Out of the $394 million that was spent on R&D, leveraged funds from external sources made up approximately **$177 million** (45 per cent) of the reported expenditure. By comparison, in 2020–2021 leveraged funds made up approximately **$202 million** (45 per cent) of the reported expenditure.

The department reporting the highest R&D expenditure was Queensland Health (not including QIMR) totalling **$127 million** (32 per cent) of the total R&D expenditure for the year followed by the Department of Agriculture and Fisheries at **$107 million** (27 per cent) of the reported R&D expenditure.

Queensland Heath and the Department of Agriculture and Fisheries were also the two highest spending departments in 2020–21 at $152 million (34 per cent) and $101 million (23 per cent) respectively of the total R&D expenditure for the year, and in 2019–20 at $125 million (32 per cent) and $95 million (25 per cent) respectively of the total R&D expenditure for the year.

Report overview

The Queensland Government R&D expenditure report is published annually. This report provides information on:

- government's longitudinal R&D expenditure displaying research investment trends over time
- the research fields with the highest R&D expenditure as well as their alignment with the government's socio-economic priorities
- the collaborations between the government and partner organisations
- the benefits of R&D to Queenslanders.

R&D is one of the major driving forces behind economic growth, as shown by the existence of a positive correlation between a country's R&D intensity and gross domestic profit (GDP) per capita.

R&D directly influences the strength and competitiveness of industry by providing a basis for technological change and thereby encouraging economic development.

Investment in R&D not only monetises benefits to the economy but addresses various societal challenges faced in today's world, such as climate change, waste minimisation, food security, etc., resulting in good jobs, better services, and great lifestyle.

Defining research and development

For the purpose of this report, and in line with the guidelines provided by the Organisation for Economic Cooperation and Development (OECD), the definition of R&D used by the government is:

> *'... creative and systematic work undertaken in order to increase the stock of knowledge—including knowledge of humankind, culture and society—and to devise new applications of available knowledge'*
>
> (Frascati Manual, 2015)

To fall under this definition, and therefore being eligible as R&D, an activity must be:

- novel
- creative
- uncertain
- systematic
- transferable and/or reproducible.

Some examples of R&D activities include (and are not limited to):

- laboratory research aimed at discovery of new knowledge
- searching for applications of new research findings or other knowledge
- conceptual formulation and design of possible product or process alternatives
- evaluation of product or process alternatives
- modification of the formulation or design of a product or process
- design, construction, and testing of preproduction prototypes and models
- design and development of tools used to facilitate R&D or components of a product or process undergoing R&D activities.

R&D excludes:

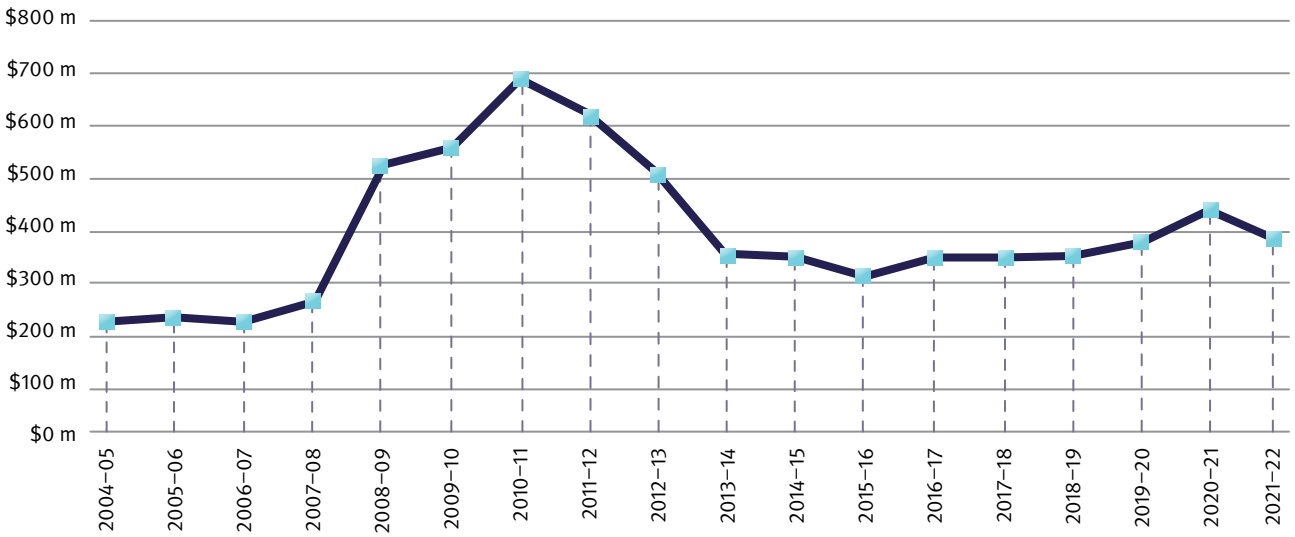
- market surveys
- extension or commercialisation of R&D
- routine computer programming and maintenance
- general purpose data collection using standard techniques without a research question
- policy-related studies using existing methodologies
- any other related activities that do not consist of elements of novelty or understanding causal relationship.

Expenditure over time

In 2021–22, Queensland Government agencies reported spending $394 million on R&D, which represents an 11 per cent decrease from the previous year's expenditure of $444 million. The largest dollar amount decrease was reported by Queensland Health at $25 million (50 per cent) of the yearly decrease.

The graph below shows the R&D expenditure by the government over the last 18 years. Through the Smart State strategies which ran from 1998 to 2012, there was significant R&D expenditure on major research infrastructure that peaked at $701 million in 2010–11. These projects included: the Ecosciences Precinct at Dutton Park, Health and Food Sciences Precinct at Coopers Plains, QIMR Berghofer Medical Research Institute, and the Translational Research Institute, to name a few.

The decline in R&D expenditure from 2012 to 2015 partly relates to the completion of various infrastructure projects and the cessation of the Smart State strategies. Since 2015, investment in R&D by the government has been on a consistently increasing trend. In 2021–22, the data show a slight moderation following a relatively strong outcome in 2020–21.

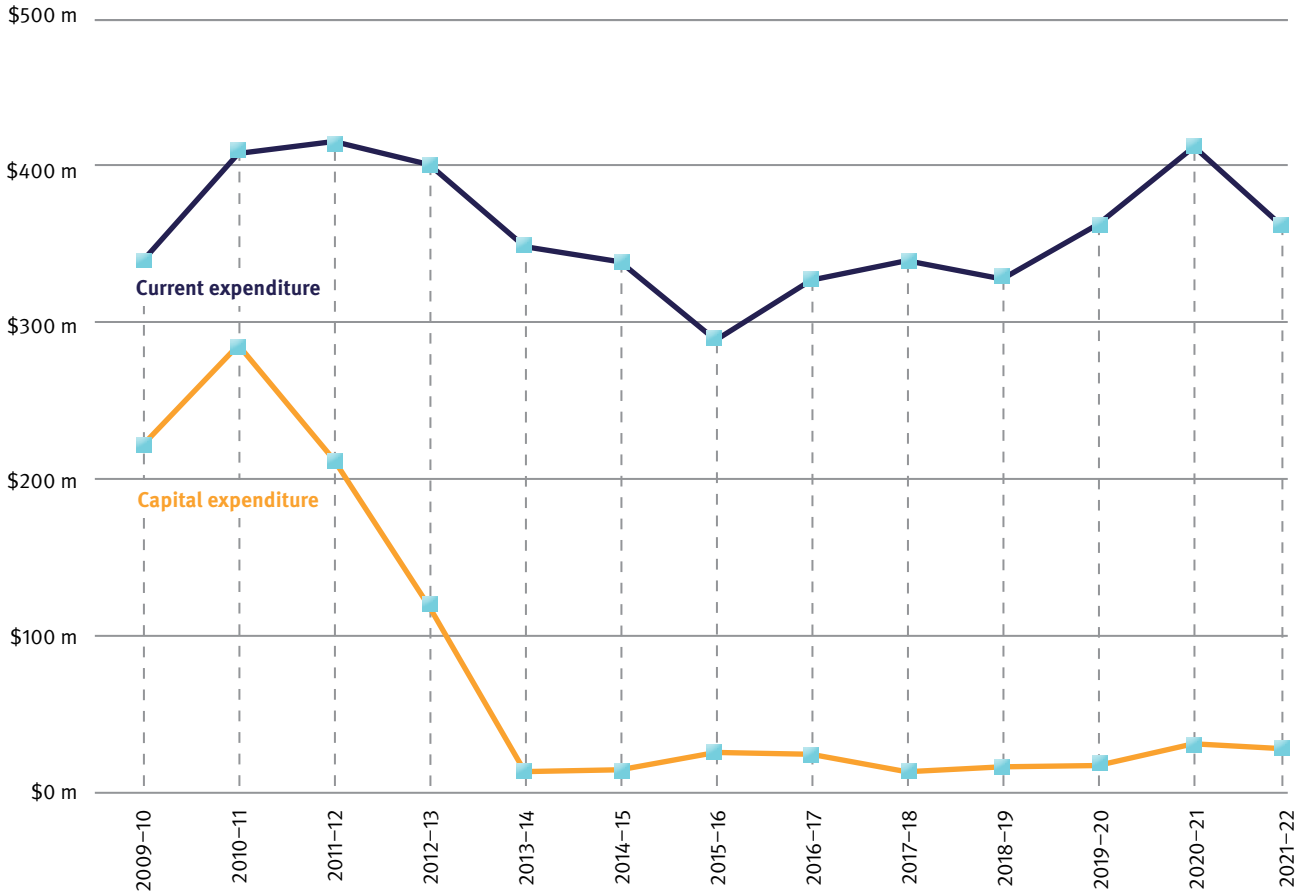


Capital and current expenditure over time

In 2021–22, out of the $394 million spent on R&D by the Queensland Government, capital expenditure accounted for $24 million while current expenditure accounted for $370 million of the total budget. The largest amount spent on capital expenditure was reported by the Department of Transport and Main Roads at $13 million (51 per cent) of the total capital expenditure for the year, followed by Queensland Health at $6 million (25 per cent) of the total capital expenditure for the year.

Capital expenditure refers to infrastructure spending such as buildings, land and equipment, while current expenditure refers to operational spending such as employee expenses, salaries and other R&D related expenditure.

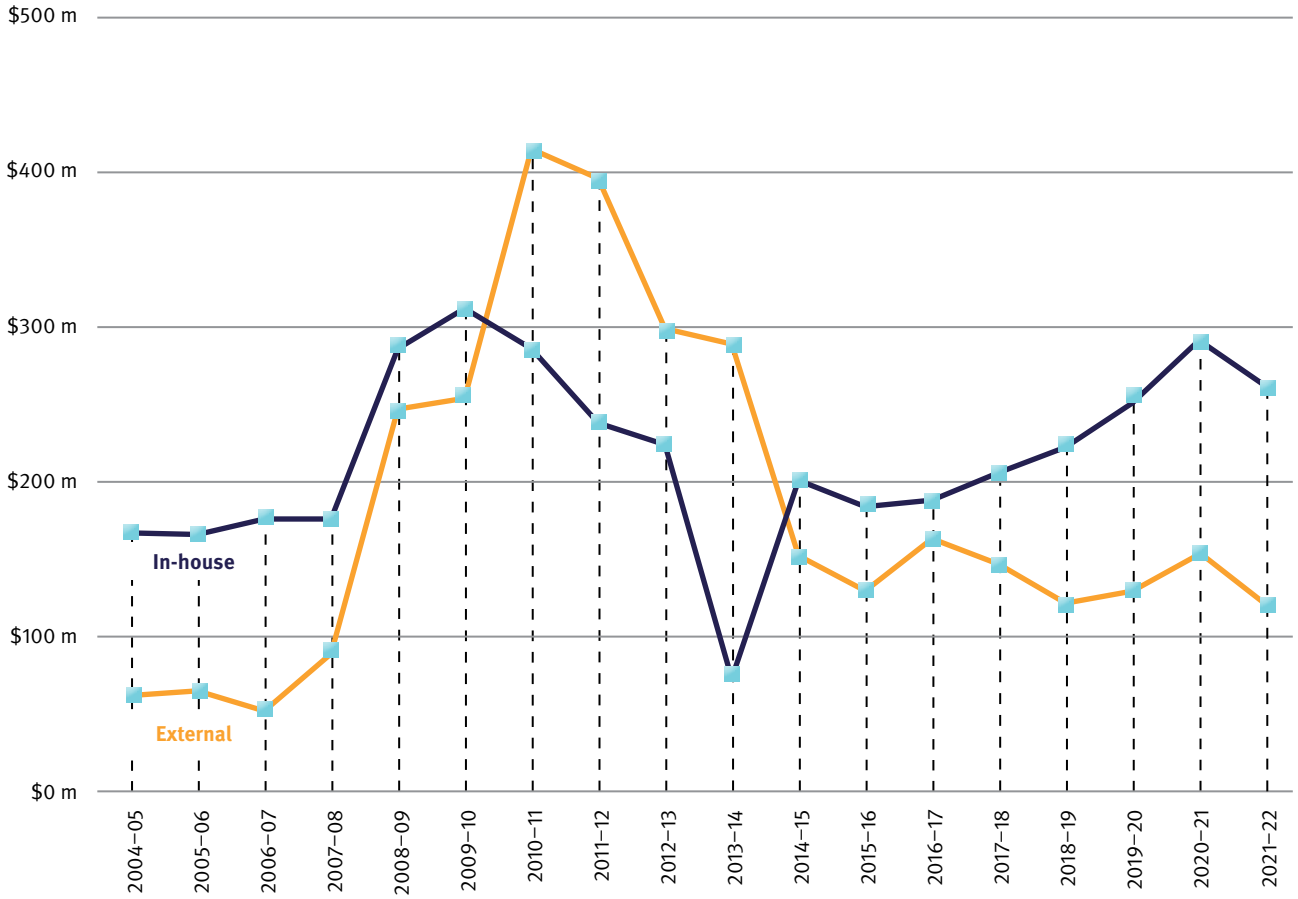
The year 2009–10 was the first year where capital and current expenditure were reported separately. Prior to this period, they had always been reported as a combined total amount.



Research location over time

The graph below reports the location where the R&D funding was spent as either in-house or external. In-house refers to R&D being conducted at Queensland Government sites. R&D activity occurring at non-Queensland Government facilities has been categorised as external.

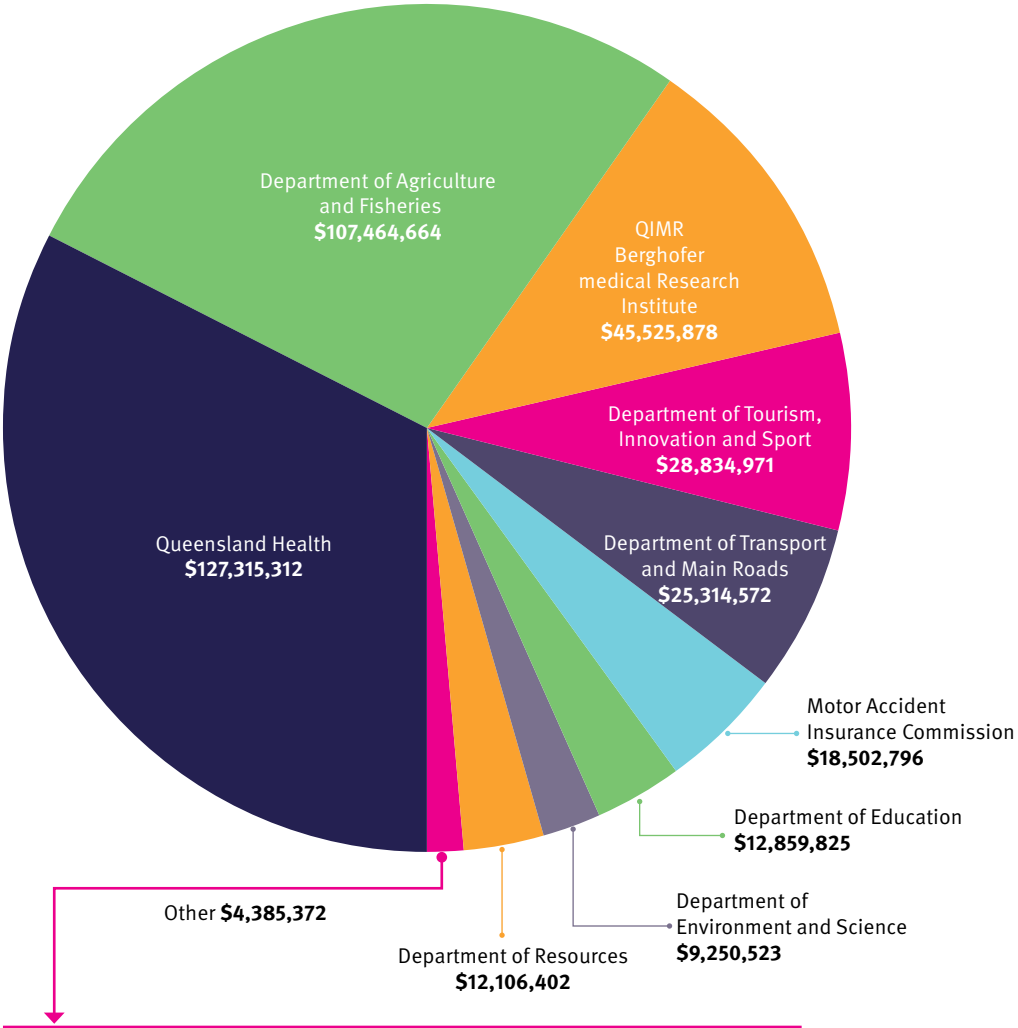
From 2004 to 2010, R&D carried out in government facilities exceeded R&D at external sites. From 2010 to 2014, in line with the increase in capital expenditure, the trend shifted to having the larger portion of R&D expenditure being more at external sites. From 2014 onwards, the trend reverts to higher expenditure on in-house R&D activities.



Total expenditure by agency in 2021–22

Queensland Government agencies reported spending a total of $394 million on R&D in 2021–22. The three agencies with the highest expenditure were:

- Queensland Health—$127 million accounting for 32 per cent of total R&D expenditure
- Department of Agriculture and Fisheries—$107 million accounting for 27 per cent of total R&D expenditure
- QIMR Berghofer Medical Research Institute—$46 million accounting for 11 per cent of total R&D expenditure

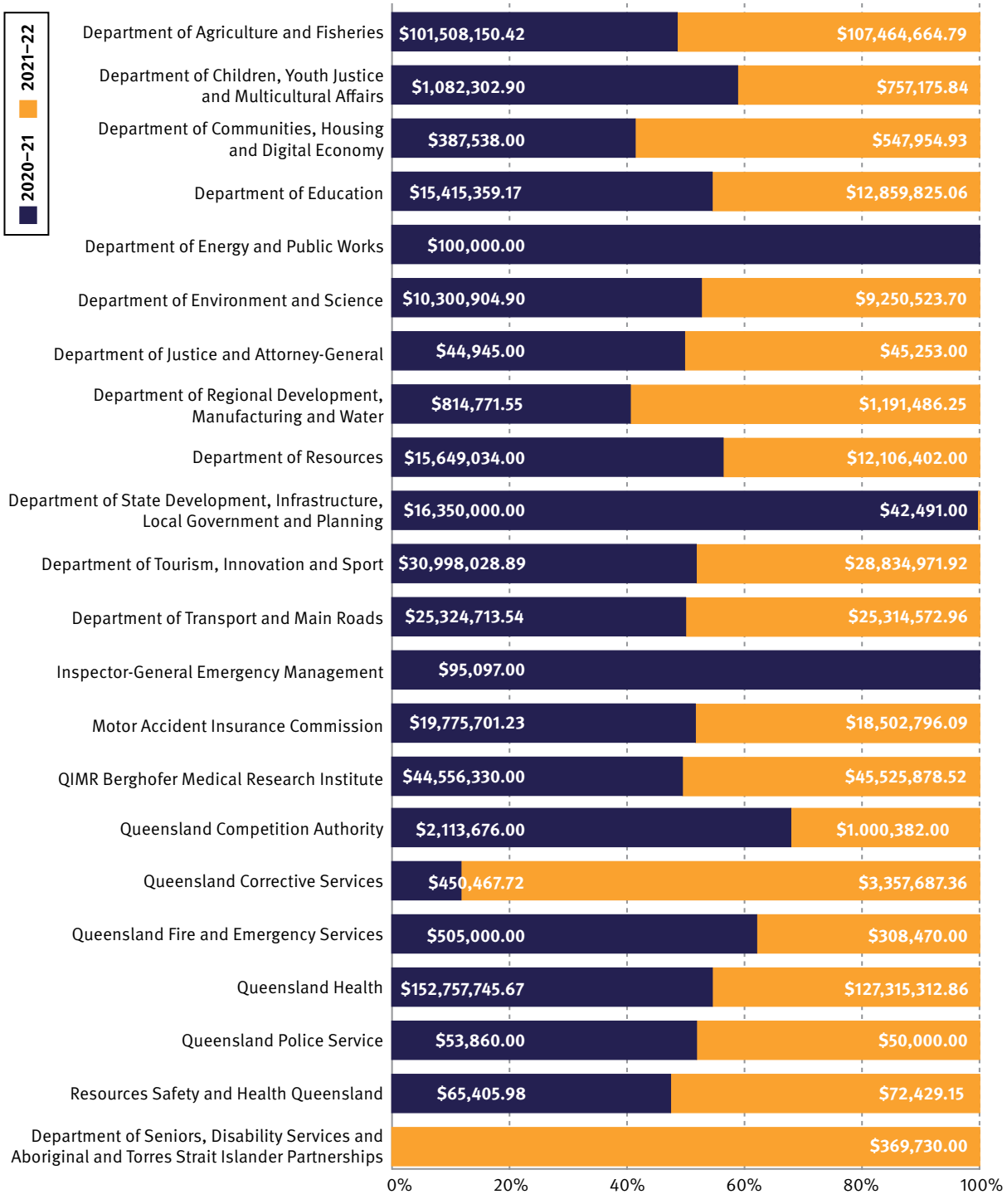


Queensland Corrective Services	$3,357,687
Department of Regional Development, Manufacturing and Water	$1,191,486
Queensland Competition Authority	$1,000,382
Department of Children, Youth Justice and Multicultural Affairs	$757,175
Department of Communities, Housing and Digital Economy	$547,954
Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Parnerships	$469,730
Queensland Fire and Emergency Services	$308,470
Resource Safety and Health Queensland	$72,429
Queensland Police Service	$50,000
Department of Justice and Attorney-General	$45,253
Department of State Development, Infrastructure, Local Government and Planning	$42,491

Year-on-year expenditure by agency

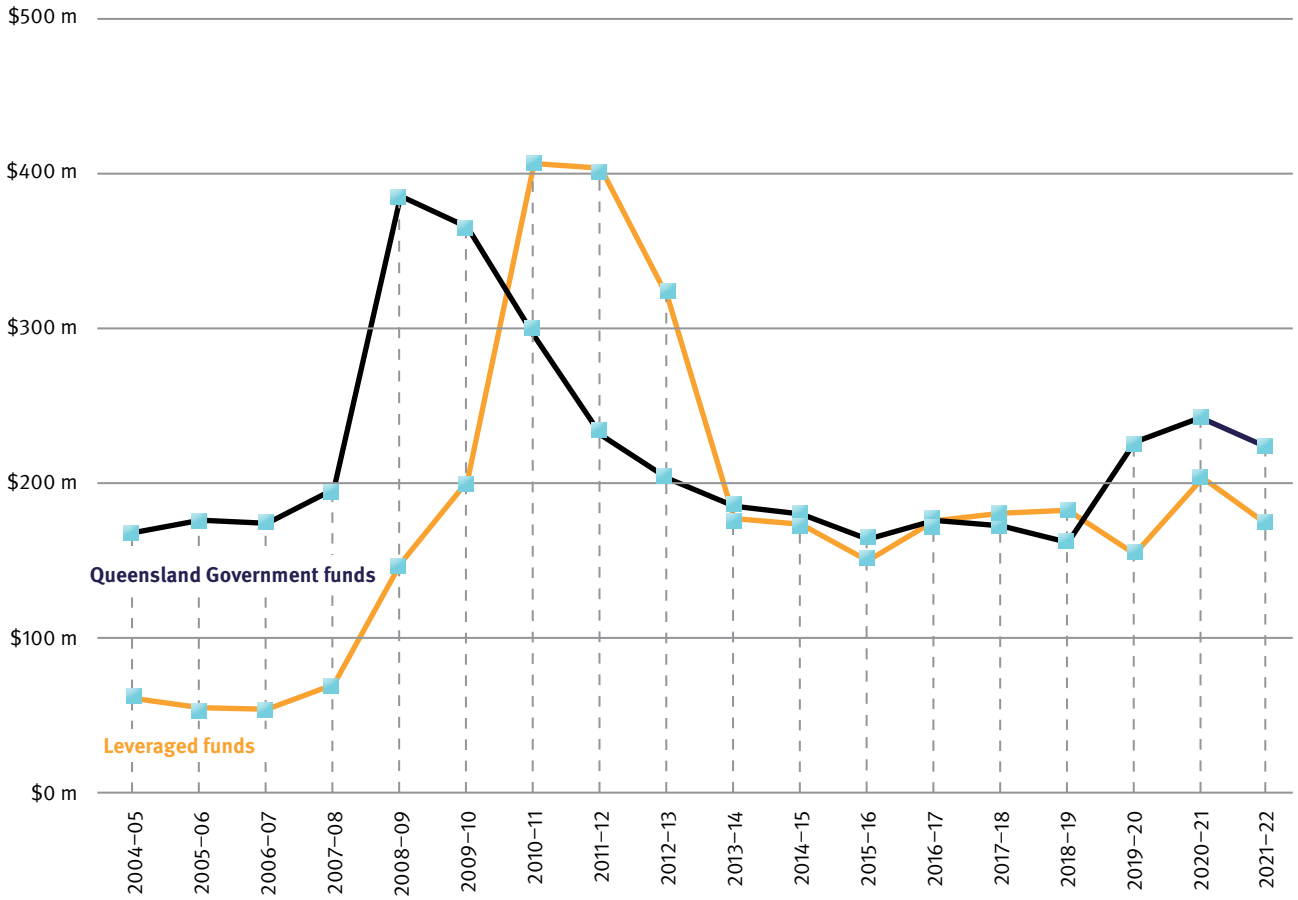
The table below reports the year-on-year (YoY) expenditure by agency. The largest dollar amount increase was reported by the Department of Agriculture and Fisheries at $6 million YoY, followed by Queensland Corrective Services at $3 million YoY, and QIMR Berghofer Medical Research Institute at $1 million YoY.

The largest dollar amount decrease was reported by Queensland Health at $25 million YoY. Queensland Health confirmed that over the last four years the R&D expenditure was on an upward trajectory. This year the expenditure fell to similar level to 2019–20 figure. Out of the 23 departments involved in this report, 15 agencies reported a decrease in YoY R&D expenditure, while eight agencies reported an increase.



Queensland Government
funds and leveraged funds by year

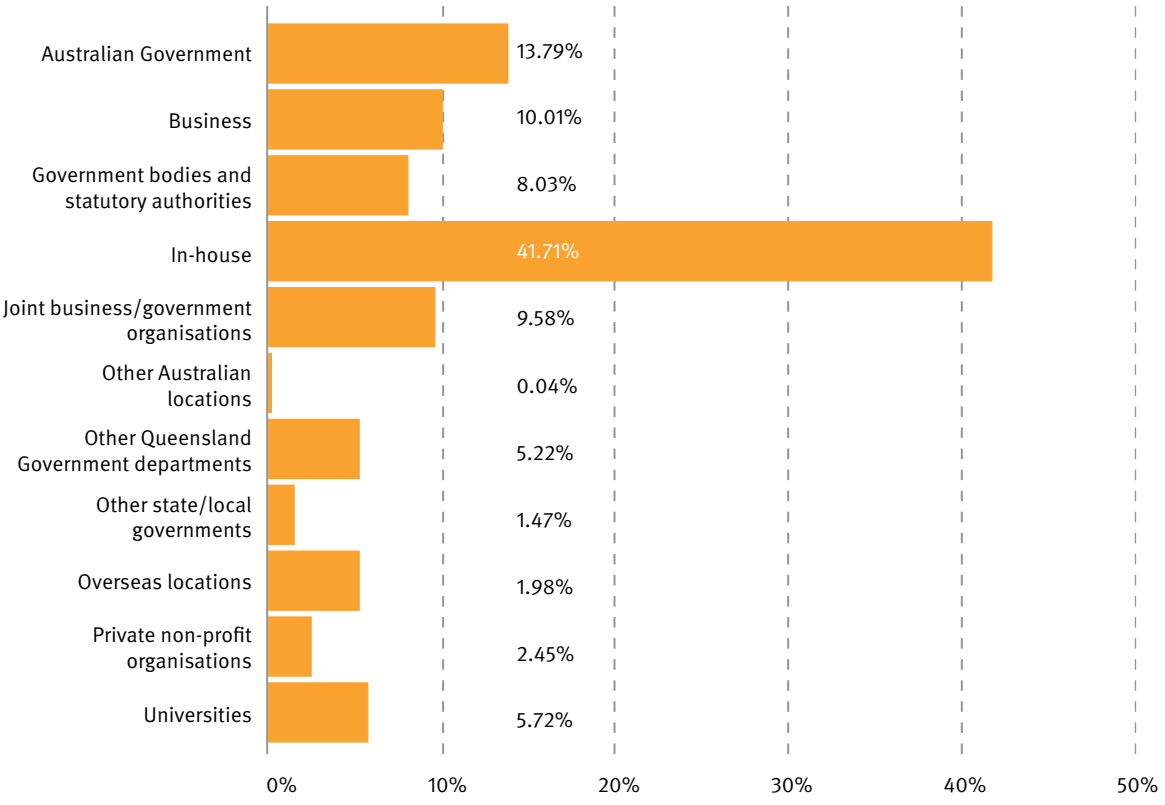
Queensland Government funds are those spent directly from the state budget allocation. Leveraged funds refer to cash contributions from external organisations towards R&D projects funded or performed by the government. The trend reported below shows that leveraged funds have often been slightly lower than Queensland Government investment. A significant exception to this trend occurred from 2009–10 to 2012–13, where leveraged funds were used for the construction of research infrastructure.



Source of funds in 2021–22

In 2021-22, out of the $394 million that was spent on R&D, the Queensland Government leveraged **$177 million** (45 per cent) of the yearly R&D expenditure from external sources. This proportion of leveraged funds was exactly the same as for 2020–21, where 45 per cent of the $202 million was from external sources.

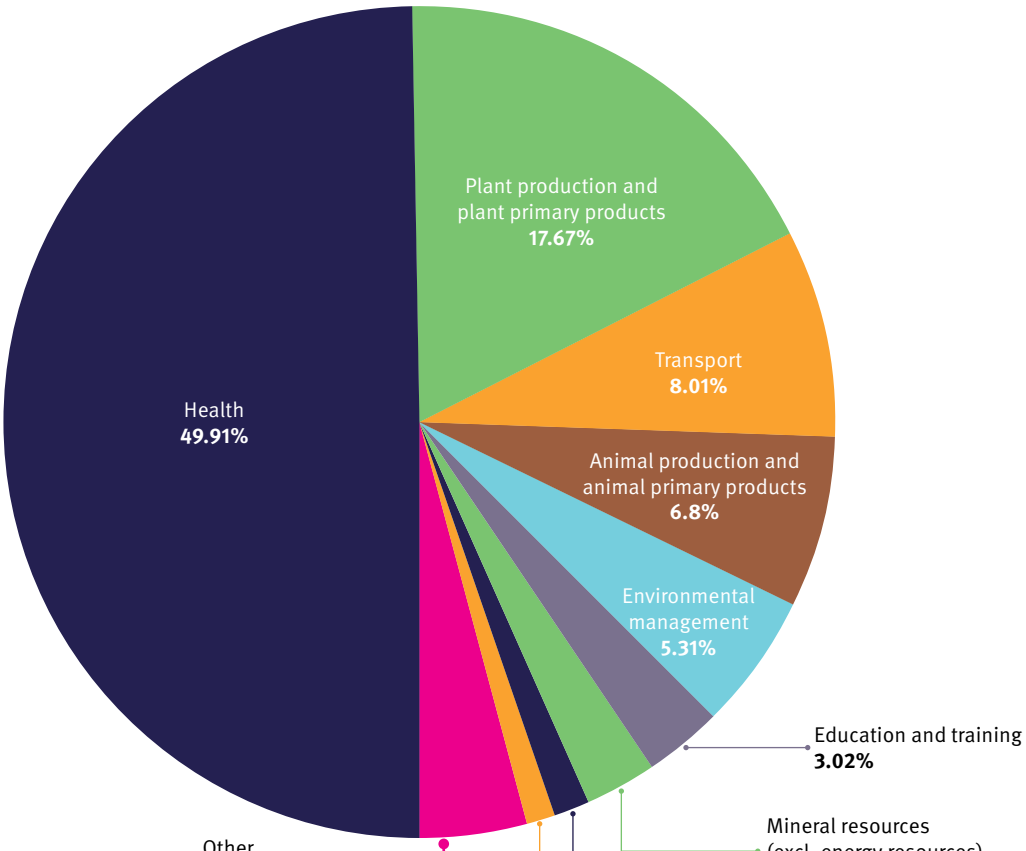
Queensland Government's funds include in-house, government bodies and statutory authorities, and other government departments. External sources include funding from the Australian Government, universities, private non-profit organisations, overseas locations, other state/local government, other Australian locations, joint business/ government organisations, e.g. Cooperative Research Centres (CRCs), and businesses.



Socio-economic objectives

Agencies classify R&D investment according to the Australian Bureau of Statistics' socio-economic objectives. The objectives relate to the impact of the research and are standardised fields. The distribution of expenditure reflects the socio-economic focus of the government policy priorities at the time.

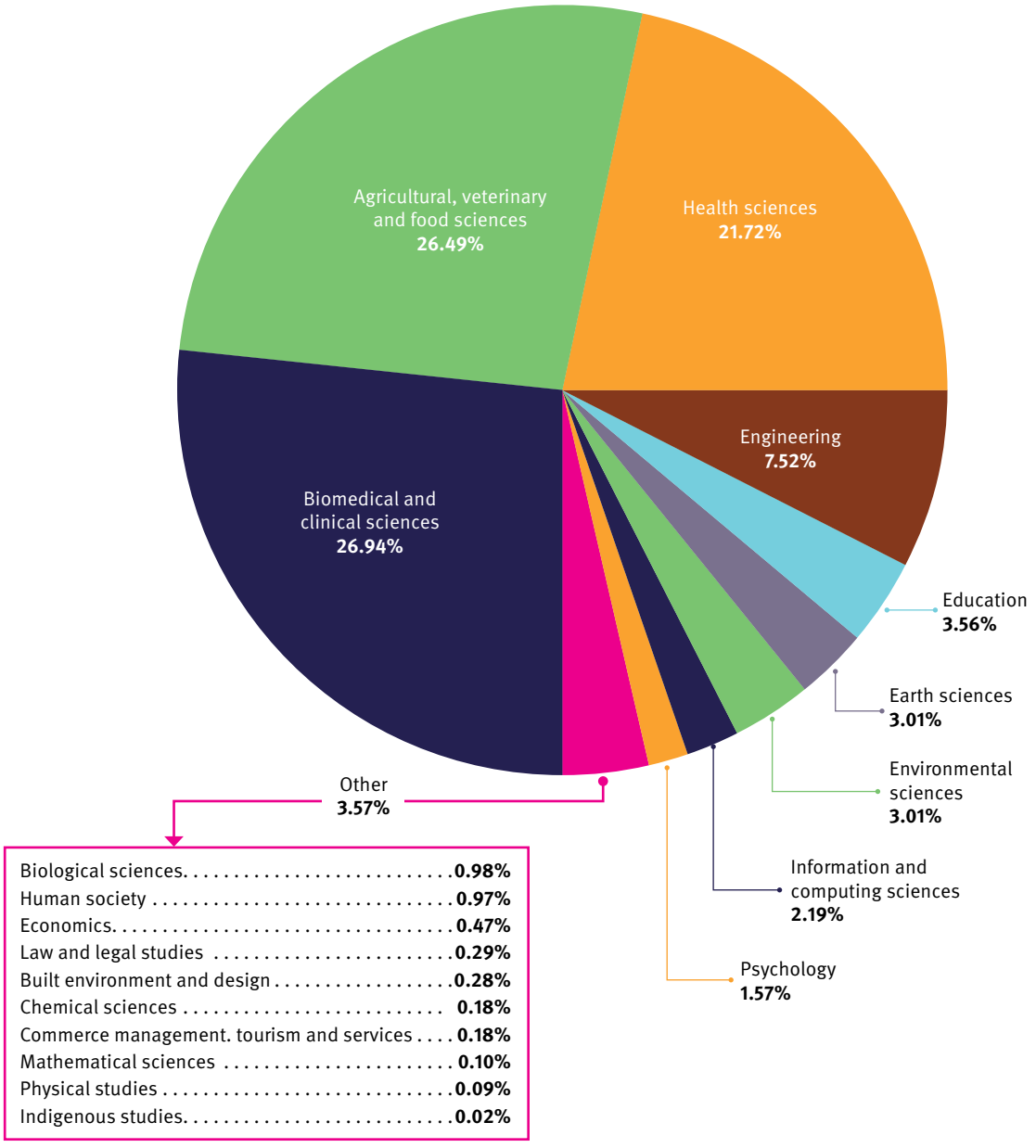
In 2021–22, the greatest reported expenditure was allocated to health objectives. This investment accounted for 50 per cent ($197 million) of the R&D expenditure for the year. The second largest expenditure at 18 per cent ($69 million) was for research on plant production and plant primary products followed by transport accounting for 8 per cent ($31 million). This allocation is in line with what happened in 2020–21 where health accounted for 52 per cent ($230 million) of the overall R&D expenditure, followed by plant production and plant primary products at 15 per cent ($65 million). However, the third ranked socio-economic objective in 2020–21 was environmental management at 7.5 per cent ($33 million) while transport only accounted for 5 per cent ($24 million) and was ranked fifth.



Field of research

Similar to socio-economic objectives, fields of research are also defined by the Australian Bureau of Statistics.

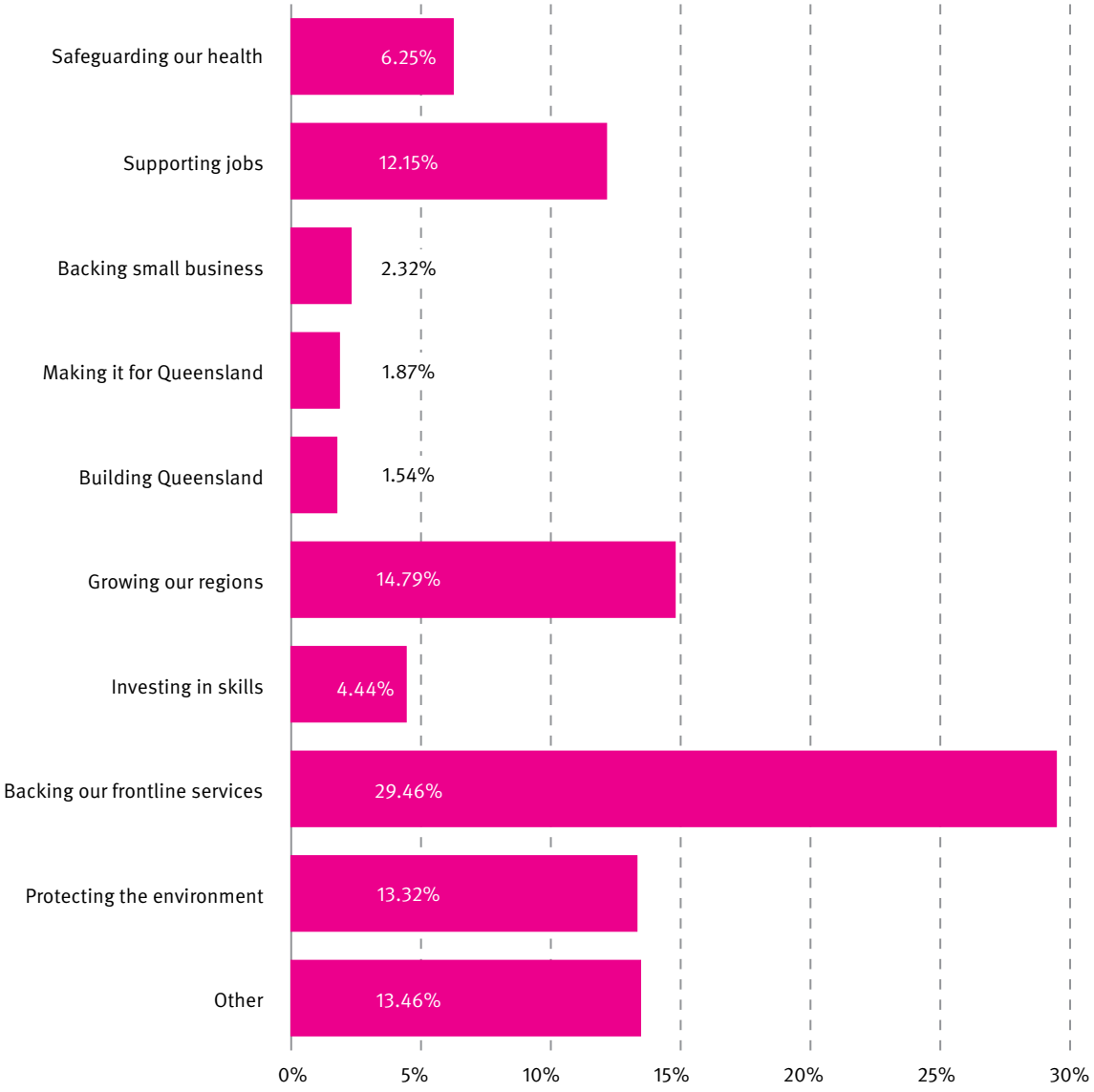
In 2021–22, the top three reported fields of research were: biomedical and clinical sciences accounting for 27 per cent ($106 million), followed by agricultural, veterinary and food sciences accounting for 26 per cent ($104 million) and health sciences accounting for 22 per cent ($85 million). This categorisation shows that 75 per cent of the total expenditure is concentrated in just three of the 23 fields of research. This concentration mirrors the highest spending agencies, namely Queensland Health, the Department of Agriculture and Fisheries, and QIMR Berghofer Medical Research Institute. This trend is in line with what was reported in 2020–21 where biomedical and health sciences accounting for 51 per cent ($227 million) of the overall expenditure, followed by Agricultural and Veterinary Sciences at 22 per cent ($97 million).



Queensland Government priorities

The chart below reports the weighted percentage of Queensland Government priorities for the community in 2021–22. The highest percentage was for backing our frontline services accounting for 29 per cent, followed by growing our regions at 15 per cent, and protecting the environment at 13 per cent. The chart reports a similar distribution to what was reported in 2020–21 where backing our frontline services accounted for 22 per cent, protecting the environment at 15 per cent, and safeguarding our health at 11 per cent.

Other stands for projects that did not align with government priorities and in 2021–22 accounted for 13 per cent of the overall projects. This allocation is in line with what was reported in 2020–21 where other also accounted for 13 per cent of the overall projects.



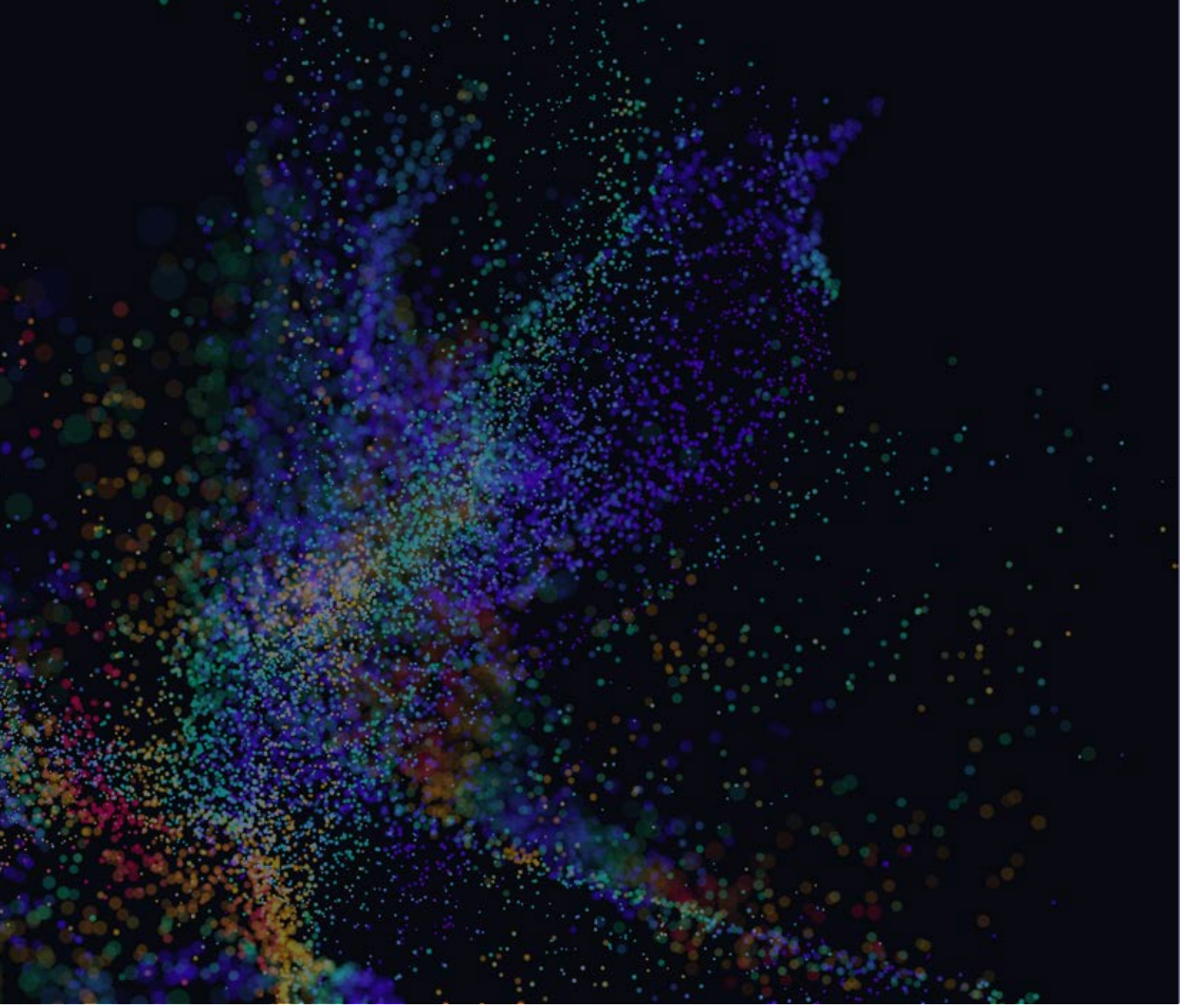
Thank you

The Office of the Queensland Chief Scientist has been working with Queensland Government departments and organisations since 2004 to identify and report R&D that is carried out or funded by the Queensland Government.

The data is used to monitor R&D investment and record the partnerships and research priorities across agencies.

Thank you to all the staff—internal and external to government—for assisting the Office of the Queensland Chief Scientist with gathering and validating the extensive data. Collection and finalisation of robust data is an intense process that requires a high level of accuracy.

Past reports are published on the Office of the Queensland Chief Scientist website, and detailed data from all the reports is available on the Queensland Government open data portal.



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Acknowledgement:

Thanks to Nicolo Agliata for his involvement in the preparation of this report