Australian Government

Australia's Tech Future

AUSTRALIA'S TECH FUTURE

Delivering a strong, safe and inclusive digital economy

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Minister's Foreword

Around the world, digital technologies are changing the way we live and work in ways we could not predict just a generation ago.

In order to continue our run of over 27 years of uninterrupted economic growth, Australia must seize the significant economic and social opportunities that digital technologies bring.

We are already well on the way. Businesses are improving their productivity by adopting and adapting new technologies including autonomous systems, robotics, artificial intelligence and remote sensors into their current operations. They are improving output and safety and competing on the world stage.

New industries are being created, for all sorts of new products and services, both for the Australian market and for the increasingly accessible global market.

The adoption of new technologies is also bringing well-paying jobs for people of all qualifications, improvements in quality of life, increased connectedness and benefits for consumers.

Australia's Tech Future sets out the opportunities and the challenges in maximising the benefits on offer. It highlights the significant work already happening across Government and identifies further action required to ensure all Australians can thrive in a global digital economy.

To reap the benefits that new technologies provide and make sure no-one is left behind we must work together. The Government will continue to engage with all Australians to ensure we are forward looking but also flexible and responsive as new opportunities and challenges arise.

Hon Karen Andrews MP
Minister for Industry, Science and Technology

Contents

Minister's Foreword **3**

Introduction **6**
- Digital technologies will deliver benefits across the economy and society 6
- Understanding emerging technologies 8

Skills **11**
- Why do skills matter? 11
- What are the opportunities in skills? 11
- Where do we need to focus our attention in skills? 13
- What is the Government doing in skills? 15
- In their own words – small business owners on going digital 17

Inclusion **18**
- Why does inclusion matter? 18
- What are the opportunities in inclusion? 19
- Where do we need to focus our attention to improve inclusion? 21
- What is the Government doing to improve inclusion? 23

Digital Government **25**
- Why does digital Government matter? 25
- What are the opportunities in digital government? 25
- Where do we need to focus our attention in digital government? 26
- What is the Government doing in digital government? 26

Digital Infrastructure **29**
- Why does digital infrastructure matter? 29
- What are the opportunities in digital infrastructure? 29
- Where do we need to focus our attention in digital infrastructure? 30
- What is the Government doing in digital infrastructure? 30

Data **33**
- Why does data matter? 33
- What are the opportunities in data? 34
- Where do we need to focus our attention? 37
- What is the Government doing in Data? 38

Cyber Security **41**
- Why does cyber security matter? 41
- What are the opportunities in cyber security? 42
- Where do we need to focus our attention in cyber security? 42
- What is the Government doing in Cyber Security? 42

Regulation **45**
- Why does regulation matter? 45
- What are the opportunities in regulation? 46
- Where do we need to focus our attention in regulation? 47
- What is the Government doing in regulation? 48

Implementing the Strategy **50**
- We all have a role to play 50
- This is an ongoing conversation 50

Introduction

VISION: That Australians enjoy an enhanced quality of life and share in the opportunities of a growing, globally competitive modern economy, enabled by technology.

Countries around the world are investing heavily to take advantage of the significant economic and social opportunities that a digital economy can bring.

Australia's ongoing economic success depends on our ability to harness technological advances to improve existing businesses, create new products and markets, and enhance daily life.

A report by Data61 estimates that improvements to existing industries and growth of new ones could be worth $315 billion to the Australian economy over the next decade.

Australia's Tech Future details how Australia can maximise the opportunities of technological change by focusing on four key areas:

- **People**: developing Australia's digital skills and leaving no one behind
- **Services**: how government can better deliver digital services
- **Digital assets**: building infrastructure and providing secure access to high-quality data
- **The enabling environment**: maintaining our cyber security and reviewing our regulatory systems

Under each of these elements, the agenda sets clear outcomes, identifies opportunities and areas that need further focus, and outlines corresponding Government plans of action.

By working together we can ensure Australians can share in the opportunities of a growing, globally competitive modern economy, enabled by technology.

Digital technologies will deliver benefits across the economy and society

The opportunities afforded by digital technologies are not constrained to technology-based companies and start-ups – they can add value across all parts of the economy.

For businesses, these technologies have the potential to help develop new products, access new markets, work more efficiently and improve the bottom-line, better target consumer preferences through use of data, and deliver safer working environments.

Agriculture

While agriculture is one of the world's oldest industries, farmers are some of our best leaders in the uptake of new technologies. Self-steering, GPS-guided tractors and other high-tech farming equipment have already become a normal part of farming in Australia, helping our farmers be more efficient and save on chemicals and other high-cost inputs. Into the future, the combination of satellite technologies, drones and better use of data will deliver even more support for farmers making decisions on planting, fertilising and watering crops (see Yield Technology case study). Blockchain also holds the potential to transform supply chain management and biosecurity outcomes (see AgriDigital case study).

Manufacturing

Australian manufacturers are using digital technologies to modernise their systems and processes (see Astor Industries case study). From robotics and artificial intelligence to advanced modelling software and 3D printing, technology has become an integral part of doing business. Digital technologies will help Australian manufacturers thrive into the future, as they use 3D printers for rapid prototyping, collaborate with cloud-based tools on component design and production and implement sensors connected using Internet of Things (IoT) technology to monitor production processes. These technologies help to ensure only the highest quality products leave the factory, while better use of data, including from customers about their experience, will be used to anticipate demand and inform new product development.

Mining

The resources and mining sector is undergoing an intense period of change as mining companies embrace digital technologies to drive productivity and improve safety. It is already commonplace to see driverless trains and trucks moving large volumes of iron ore around the clock in mines across Western Australia. Looking ahead, emerging technologies will become further embedded in mine operations. Technology such as 3D printing can be used to quickly deliver critical spare parts in remote locations reducing delays in production. Drones and sensors will be used to collect real time data, particularly in dangerous or inaccessible locations, and this will be used to support better planning and management of mining operations which will reduce the cost of extraction and improve the safety of mine workers.

Tourism

Australia is now a top 10 global destination and digital technologies are increasingly used by both travel operators and consumers at all stages of the travel experience. Tourist operators have invested in cutting edge virtual reality and 360 degree mobile technologies- there is nothing like a life-like experience of snorkelling the Great Barrier Reef to attract tourists to our shores. Consumers are increasingly planning and booking travel online and then rating their experiences. In the near future, greater use of data combined with machine learning will enable travel companies to predict when and where travellers may want to travel allowing them to better target travel experiences and to generate personalised offers for the travelling public.

Services

The services sector makes up a large part of the Australian economy, employing four out of five Australians. Advances in technology such as artificial intelligence, data, analytics, machine learning and robotics are driving competitiveness and productivity. Digital commerce continues to grow in use and popularity, technology is enabling frontline engagement with customers in stores and businesses are realising increased sales through online sales and creating digitally connected stores. In financial services credit card companies are using data to detect fraudulent transactions, and insurance companies are using data to set fairer and more accurate policy premiums.

For the Australian community, digital technologies are improving health and education outcomes and, making services, particularly government services more accessible. Advances in technology are also improving how we manage emergency situations and making our cities more liveable including through better transport.

Health

The opportunities to use digital technologies to improve health outcomes are continually expanding (see case studies on Helimods and iOrthotics). Hospitals are using software developed by CSIRO to better manage patient flows and reduce waiting times and some remote communities are gaining increased access to specialised services via digital channels. Healthcare professionals are using robotics to improve surgery outcomes, radiographers are using computers that are trained to recognise patterns in images to identify irregularities in scans. But consumers are also being empowered to better manage their own health. As well as accessing health information online, devices that monitor blood pressure and heart rate are saving lives and those that track activity and diet are also improving health and wellbeing. In the future, our ability to tailor healthcare solutions to individual needs will see further improvements in health outcomes. Increased use of sensors will enable greater use of devices that can monitor the health of older Australians within their homes, notifying medical authorities if required. This will increase independence and quality of life while providing peace of mind.

Education

We all know that a good education provides a great start in life. Digital technologies are not only changing what we need to teach our children (see case studies on Swinburne University and the esmart library Program), they are changing how we teach them. The pace of change in technology also means that we have to keep learning throughout our lives, keeping up-to-date with how technology can help us at home and at work. Students are increasingly using digital tools to access information and educational resources, many are completing qualifications largely online. As well as increasing access, particularly for people in regional and remote locations (see Mobile Black Spot Program case study), digital tools can provide all students with more tailored educational solutions that meet their particular needs.

Everyday services

A whole range of services that people use every day, including banking, shopping and entertainment are available online. Access to goods and services online is particularly important for Australians living in rural and remote areas. Data about the availability, cost and customer experience of services is helping us choose a restaurant for dinner, an energy provider or where to holiday. Government services are also increasingly available online with the aim to deliver seamless, painless and efficient services that protect people's privacy and security. Services including myGov and myTax are good examples of how the government is transforming the way Australians deal with government.

Emergency services

Better management of emergency response situations through the use of digital technologies including accidents, floods and bushfires is helping save our environment, people's homes and lives. Emergency services including Police, Fire and Ambulance and are using digital tools to improve data collection and sharing of intelligence in complex situations. Authorities are also using mobile phones to alert people of local emergency situations to keep people informed and safe. In the future, people calling 000 on a mobile phone will automatically relay locational details. This will allow emergency services to be immediately despatched saving time and potentially lives, particularly in places where the caller may find it hard to identify the specific location, for example on a country road. CSIRO's bushfire prediction tool 'Spark' (see Spark Platform case study) is a great example of how digital technologies are being used to predict the behaviour of bushfires thereby making communities safer, stronger and more resilient.

Transport

Many Australians travel to and from home, work, the shops or school each day. Not only are digital technologies making our cars, trains and buses safer and more efficient, but improved collection and use of data is helping manage our transport systems and traffic flows in our cities. In the future, increasing automation of vehicles will support people to become or stay independently mobile while potentially reducing the number of cars on the road and sitting in car parks. Widespread implementation of improved safety features such as automatic emergency braking and sensors to detect driver alertness will lead to fewer accidents on our roads. Better management of public transport, based on detailed analysis of data about how and when we move around the city, will reduce commuting time and make our cities more liveable.

To secure these benefits requires a strategy for Australia's technology future which embraces emerging technologies, and creates the environment for Australian's to have their quality of life improved by a modern digital economy.

Understanding emerging technologies

A range of emerging technologies are forecast to change and improve many fundamental tasks and interactions in the coming years, including how we work, travel, and communicate with each other. Technologies such as artificial intelligence, blockchain and quantum computing present significant opportunities for people, businesses and the broader economy.

Artificial Intelligence

Artificial intelligence (AI) is a broad term used to describe a collection of technologies that can solve problems and perform tasks to achieve defined objectives without explicit human guidance.

Central to AI are automation and machine learning that underpin applications such as natural language processing (Apple Siri or Amazon Alexa), computer vision (Tesla Autopilot), and optimisation and decision support (Google Maps).

AI has the potential to automate repetitive or dangerous tasks, increase productivity and allow the development of innovative consumer products. It is forecast to add trillions of dollars to the global economy in the coming decades. Examples include:

- Using advanced data analytics techniques to diagnose diseases at earlier and more treatable stages

- Using automated machines for hauling and drilling on mine sites, increasing productivity and reducing risks to workers
- Enabling greater use of smart forms that can tailor legal information to assist individuals to draft a will or settle financial arrangements following a break-up
- Tailoring content on entertainment platforms to meet user preferences

There is considerable effort, both in Australia and internationally, focused on ensuring that AI is applied ethically and delivers broad societal benefits.

Blockchain

Blockchain is a digital platform that records, verifies and stores transactions shared across a network of computers according to an agreed set of rules. This removes the need for verification by a central authority, such as a bank.

Cryptography is used to keep transactions secure, and costs are shared among network participants. The fact the transaction history is viewable and verifiable by all network participants allows for much higher levels of transparency and auditability than is otherwise possible.

Although blockchain is still an emerging technology, it can be applied across a wide range of industries and to almost any transaction that involves a value, including:

- Financial transactions
  - Faster clearing and settlement times could reduce credit risk and capital requirements, lowering transaction costs across the board. This could have practical benefits for real estate transactions
  - Significantly reduced contracting, compliance and enforcement costs can make low-value transactions economically viable through use of auto-executed 'smart contracts'. This would allow for faster and easier transfer of royalties from digital platforms to digital content creators, such as musicians, writers and vloggers.
- Government services
  - Validating the identity of a person without revealing personal information
  - Allowing for government to reduce fraud, corruption, errors and the cost of paper-intensive processes.
- Tracing the history of a product
  - Tracking the provenance and trade of digital and physical goods. This would help ensure consumers are receiving genuine items that are otherwise susceptible to fraud, such as ethically sourced diamonds and luxury food items.

Internet of Things (IoT)

The Internet of Things (IoT) refers to the increasing use of sensors that record thing such as sounds, touch, movement, temperature and even chemical composition that are being used to automatically collect data about people, the environment and objects and transmit this information over the Internet.

The increasing application of this technology has been made possible by the availability of cheaper and better sensors, the wide availability of internet connectivity and increased computing power.

Examples of how IoT is delivering benefits to the community include:

- Smart health care devices that can monitor patients and alert medical authorities if required
- Sensors in energy and water infrastructure that enable providers to better track and manage maintenance
- Sensors in the soil that can measure moisture levels and help farmers better manage water use and improve harvest.

Quantum computing

Quantum computing is an emerging technology that would exponentially increase available computing power to help us solve problems that we cannot tackle with existing computers. Quantum computers, will be able to crack codes easily and they have the potential to disrupt existing security methods that use encrypted data, such as in banking and other industries. Quantum computers also have applications in scientific fields and could help answer questions that have baffled scientists for generations.

Australia is recognised as a world leader in silicon-based quantum computing research, which is one of the most promising pathways to developing a commercially viable quantum computer.

As part of the National Innovation and Science Agenda, the Government invested $25 million in the Silicon Quantum Computing Pty Ltd venture, in partnership with leading academic institutions and businesses.

PEOPLE

Skills

Australians are equipped with the skills required to thrive in an evolving job market, and grow their businesses into the future.

Outcomes:

- Australians have access to the education and training they need throughout their lives, to build new skills and adapt quickly as opportunities change
- Australian businesses are embracing new technologies and investing in training to ensure their workforces have the digital skills to support growth and job creation.

Why do skills matter?

The changing demand for skills will transform some jobs Australians have relied on for decades. The key challenge is for Australians to build the skills necessary to evolve with jobs as they change and as new ones are created.

Australian businesses success depends on the skills of their workforce. As technology continues to change what businesses do and how they operate, so too will the skills in demand.

While it is hard to predict the skills in demand in the future, we know employers are looking for workers who have a combination of transferrable digital skills and collaborative, creative, communication and entrepreneurial and problem-solving skills.

"...businesses want more than hard technical skills. Enterprise skills such as complex and creative problem solving, innovative thinking, communication skills, teamwork and collaboration and an understanding of the business and industry context are what many ... are looking for from new employees."

JOINT SUBMISSION TO THE DIGITAL ECONOMY STRATEGY CONSULTATION PAPER BY AUSTRALIAN INFORMATION INDUSTRY ASSOCIATION, AUSTRALIAN MOBILE TELECOMMUNICATIONS ASSOCIATION AND COMMUNICATIONS ALLIANCE, NOVEMBER 2017

We also know that most jobs will require some digital skills. More than 90 per cent of Australians will need to use some level of digital skills at work within the next five years. But this won't all be computer programmers and coders. All jobs will increasingly require the basic skills required to communicate and find information online.

Individuals, businesses, and governments need to work together to support a workforce with the skills in demand so we can have a modern, competitive economy. Australians all have a role to play:

- workers should identify opportunities to continue to update and develop new skills
- businesses need to invest in their workforce
- the Government will support people to evolve with their jobs and transition to new ones.

What are the opportunities in skills?

Access to skills and technologies will enable Australia's existing industries to stay competitive, new industries to emerge, and our labour market to be flexible and diverse.

Maintaining a strong national curriculum

Education plays a critical role in shaping the lives of young Australians.

The Australian Curriculum provides schools, teachers, parents, students, and the community an understanding of what students should learn, while recognising that children are different. Children develop at different rates, have different learning preferences and areas of interest, and have different aspirations. The curriculum covers the

knowledge and skills required by Australian students to live and work successfully in the 21st century, regardless of where they live or what school system they are in.

Australia will build on the strengths of the Australian Curriculum to ensure young Australians are well-prepared for changes in the way we live and work.

Building on Australia's highly-educated population

Australians have high levels of education compared to other OECD nations and have strong skills such as creative problem solving, teamwork and communication.

The 2017 Employer Satisfaction Survey, which reports the views of over 4,000 employers of recent graduates, found employers have high levels of satisfaction with a wide range of graduate skills including collaborative (86 per cent) and adaptive skills (90 per cent).

By combining these with specific technical capabilities, we can create a modern workforce with rewarding career paths for Australians.

Our capable, skilled people will continue to attract international investment in technology-driven industries that will in turn create opportunities for the next generation of Australians.

Creating jobs and growth by embracing technology

In 2015, AlphaBeta estimated that automation, harnessing the power of machines to perform tedious and less valuable tasks, could significantly boost Australia's productivity and national income, by up to $2.2 trillion by 2030.

These benefits depend on encouraging more firms to intensify their efforts to embrace technology and Australia's ability to create new opportunities for those workers at risk of being displaced by automation.

This is an opportunity for Australia to leverage our highly educated and digitally literate workforce and build capability in a broad range of technologies including artificial intelligence, robotics and the Internet of Things. This capability can help grow existing industries and develop exciting new ones.

Increasing flexibility in the education and training system

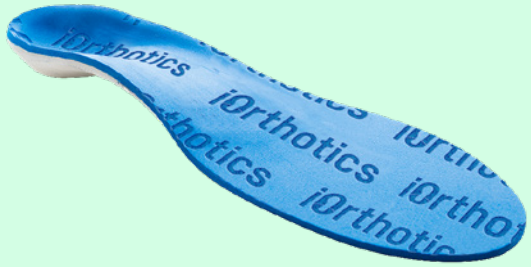
Technology is transforming the education sector, increasing flexibility for students and has the potential to reduce the costs of delivery. This includes increased options for both formal and informal education such as the growth of Massive Open Online Courses.

To help workers to transition or reskill, the education sector needs to embrace non-traditional forms of study. This could include micro-credentials, which recognise informal and formal learning in specific areas and offer an efficient way to ensure that employees are keeping their skills relevant and certified.

Anticipating industry needs

Understanding skills within occupations and industries and mapping transition pathways will help individuals and businesses make informed decisions on labour market trends. It also assists Government to target support to industries where transitions may be more difficult. By working with industry, the Government will build on the regular research it currently collects on industry and occupation trends to better understand future skills requirements.

Case study: iOrthotics embraces digital and expands into global markets



iOrthotics designs and manufactures custom-made orthotic devices. By collaborating with the University of Queensland, iOrthotics learnt new digital nesting techniques. These allow for increased productivity and material cost savings while delivering better patient outcomes.

Investment in 3D printing solutions has allowed iOrthotics to increase its production while eliminating over 30 tonnes of plastic landfill waste annually. The company plans to grow its exports considerably and expand its reach into the United States, UK and Canada, generating up to 13 new skilled jobs.

Case study: Swinburne University of Technology and Adobe partner up to transform the digital technology curriculum

Adobe has established digital initiatives and symposiums throughout Australia, including a world-first strategic partnership with Swinburne University of Technology to assist in the university's digital transformation.

Swinburne's digital advertising technology major and minor, which can be undertaken as part of a Bachelor of Business, Arts or Media and Communications, will incorporate the Adobe Marketing Cloud platform. This includes training materials and accredited teaching practices, allowing students to immerse themselves in digital technology whilst directly addressing the digital skills gap.

Students enrolled in the major learn digital analytics, search marketing, social media marketing and video marketing; skillsets that are in increasingly high demand.

Supplementing existing skillsets and increasing skills transfer

Australia is in a global contest for talent and has shortages in some digital skills. Skilled migration offers an important way of attracting highly-skilled people who can help grow new opportunities and address short-term gaps. Our visa system needs to support Australia compete for global talent in fields where suitably skilled Australians are not available. This will assist with our economic transition and help transfer skills to Australian workers.

Where do we need to focus our attention in skills?

Improved labour market information

In times of change, individuals and businesses need to make important decisions about training, study, and planning their workforce. To assist in these decisions, they need credible information about the industries that will grow in the future, the skills needed, and the pathways to future jobs.

The Australian Government is committed to improving dynamic user-friendly information on jobs, skills and education in the Australian labour market.

Building business capability and adoption of technology

To remain competitive in the global marketplace, businesses increasingly need to:

- identify the skills and capabilities they need to further harness the benefits of digital technology
- upgrade to modern cloud-based business solutions
- use the web and social media to extend their markets
- embrace emerging technologies as they evolve.

Despite efforts from all levels of government, evidence suggests that digital capability and the adoption of digital technologies by small and medium businesses is still low.

Barriers to digital adoption in business include:

- low digital skills
- lack of awareness of benefits
- lack of time to research and trial new technology
- concerns about cost
- unreliable internet access.

Further information challenges faced by small business can be found in the report of the Small Business Digital Taskforce.

Case study: Astor Industries upskilled staff as they diversified from automotive decorative badges to eyewear

The end of car manufacturing in Australia could have been the end of Astor Industries, but the company is thriving by branching out into new markets.

A long-time industry leader in automotive decorative badges, Astor diversified its operations and now makes frames for Australian eyewear retailer Dresden Optics.

The company retrained its factory staff and invested in digital printing technology and plastic injection moulding machines. Together Astor and Dresden developed an intelligent mixed waste re-manufacturing system. This enabled them to produce frames for glasses from recycled plastics such as milk bottle lids, beer keg caps, and even plastic rubbish washed up on the beach.

Supporting workers impacted by automation

The impact of technological change on current and future jobs is likely to be uneven. Different industries and regions will be impacted in different ways. Many Australians fear ongoing technological change means that they will be left unemployed or underemployed without the skills required to secure one of the new well-paid jobs on offer.

Governments and industry need to provide support for workers needing to up-skill, re-skill or transition into new areas of employment, whether this be early in their career or when the person is closer to retirement.

Ensuring skills remain relevant and up-to-date

Individuals need to shift their thinking from having a 'career for life', to maintaining the skills needed to adapt to changing opportunities.

To maintain a skilled workforce that can keep up with rapid technology change and seize job opportunities, Australia needs to establish a culture of lifelong learning that provides us with access to flexible learning options.

Addressing shortages in key digital skills

Rapid change means Australia faces current shortages in key digital skills including:

- data management and analysis
- cyber security
- cloud computing
- artificial intelligence and machine learning
- robotics
- digital design
- software design
- advanced mathematics and statistics.

Department of Education and Training statistics show that approximately 5,500 Australians graduated with an ICT degrees in 2016. The demand for digital skills is increasing as businesses across all industries embrace digital systems and services. The occupations that require digital skills are not just traditional ICT roles. For example, people in marketing and sales now also need data analysis skills and digital design skills.

Businesses, employees and entrepreneurs are keenly aware that not having the right digital capability in their workforce will hinder business innovation and growth, putting Australian businesses at a competitive disadvantage in the global economy.

Case study: Helimods transforms industry with technology and innovation driven approach

HeliMods is a specialist engineering company in regional Queensland that delivers integrated and customised helicopter solutions.

HeliMods developed a 'Powered Aero Loader' (PAL), a world-first automated product that allows, at the push of a button, paramedics to lift stretchers into helicopters in under 30 seconds. Installing the PAL device removes manual lifting for the paramedics, minimises stress on critically ill patients during transport, and saves valuable time unloading patients.

Balancing digital with other essential skills

While there's a focus on encouraging individuals to study in science, technology, engineering and maths (STEM) related disciplines, there needs to be the right balance between specialist technical skills and other transferrable skills including creative, problem solving, communication skills and human or user centred design and social science skills. This balance is important to consider when developing education and training curriculums, but also for employers when considering the skill sets they need for particular jobs.

Exporting digital capability

Australia is a major exporter of education, and education in digital skills is an area of strong potential growth.

Supporting economic growth and development in our region is in Australia's national interest. By building capability of our regional neighbours to engage securely in the global digital economy, we support Australia's own capability to do the same. Australia is active in raising the bar of cyber awareness and skills in the Indo-Pacific. As our neighbours become more cyber resilient, more secure digital trade opportunities will arise, contributing to economic growth in Australia.

What is the Government doing in skills?

Below is a summary of major government work on digital skills; for a list of all government initiatives, refer to Australia's Tech Future website.

Delivering future-focused, flexible and responsive education and training systems

The Government is working collaboratively with industry and the education sector to deliver broad reforms to the education and training systems so that Australians can build skills and adapt quickly as opportunities change.

The Quality Schools Package is focussing the Government's investment in schools on quality teaching and programs that give students the skills and knowledge they need to live and work in the future.

The Government's higher education policies are improving the sustainability of the higher education sector, supporting student career aspirations, and ensuring industry has a skilled workforce.

The Government is also reviewing the Australian Qualifications Framework. This review will look at how tertiary requirements could respond flexibly to changing industry and skills needs. It will also consider how micro-credentials could be combined and built upon throughout a person's career to support lifelong learning. In addition, a review of the Higher Education Provider

Category Standards will assess the effectiveness of the standards as a framework to ensure the tertiary system is responsive to the evolving learning and skills needs of students and employers.

The Government is ensuring that the opportunities and benefits of vocational education and training (VET) are shared with the community through a national VET information strategy and by improving information resources for students so they can make better informed decisions about their future.

The Government is also working with industry on projects to meet industry needs. For example, a partnership of industry, governments and RMIT University, has successfully developed Australia's first university short course on blockchain technology has been developed.

Supporting reskilling and transitioning workers

The Government is engaging with affected industries and communities to ensure workers are equipped to reskill or transition into new areas of employment.

The Government provides support for mature age workers transitioning into roles in growth industries through the Job Change initiatives. This includes the provision of information and development of a new interactive Skills Transferability Tool to source job opportunities specifically tailored to the skills of the individual.

From 1 July 2018, the Retrenchment Rapid Response Framework is available to connect transitioning workers to supports and services. Through the Retrenchment Rapid Response Framework, the Government supports retrenched workers to make sure they can find a new job as soon as possible. The framework also aims to help employers though the retrenchment process, including how they can meet their obligations and provide their workers the support they need.

Supporting Australian regions

To support sustainable long-term economic growth, we must ensure that the impacts of growth are shared across the country, including to the regions.

Some regional areas, particularly those impacted by structural change in the economy, are facing challenges in terms of employment opportunities and industry growth. In response to this, the Government will introduce the Regional Employment Trials program in 10 selected disadvantaged regions.

Employment Facilitators will work with Regional Development Australia (RDA) committees in trial regions to develop projects to help tackle local employment challenges. The projects will bring together stakeholders and employment services providers.

The Regional Employment Trials start from 1 October 2018. The trial will deliver strong connections between regional stakeholders, tailored employment initiatives that meet local needs, and the potential for improved regional employment outcomes.

Case Study: Australian start-up AgriDigital embraces blockchain to make agricultural supply chains simple

AgriDigital is an Australian agricultural start-up that uses blockchain technology to track produce across the grain supply chain. This gives growers and buyers a way to receive fair compensation and increases transparency, efficiency and trust for farmers.

Using this commodity management platform, agricultural businesses can better manage supply chains and ensure the origin of their products. Users can stay ahead of digital supply chain developments and meet the demands of their customers and partners.

Since the first deal in 2016, over 2,400 people have used the cloud platform, with more than 1.6 million tonnes of grain transacted totalling $360 million in grower payments.

With the initial focus on the grains industry, AgriDigital intends to expand into livestock, cotton and other agricultural markets. It also plans to export its digital technology to Canada and the US.

Supporting life-long learning

Supporting a culture of life-long learning and improving linkages between vocational education and training, the university sector and industry will help people develop the right skills at the right time in a way that suits them. That is why the Government is exploring mechanisms to better support life-long learning, including ways to overcome perceived barriers restricting people from engaging in further education and training.

The Government is considering new ways of delivering qualifications that meet the changing needs of the workforce in key sectors undergoing transition. This includes discussing with the business community how a student entitlement account model might operate.

Encouraging small business to embrace digital technology

Small and medium businesses with higher levels of digital engagement are significantly more likely to be growing revenue, creating jobs, exporting and innovating new products or services. Despite these benefits, many businesses are still a long way off adopting digital technology.

The Government is building small businesses digital capability through the *Small Business Digital Champions* initiative. The program will assist selected small businesses to transform their operations using hardware, software and digital training. Case studies of 'Digital Champions' and their mentors, will document and showcase their digital transformation to inspire and help other small businesses to 'go digital'.

The Government will continue to working closely with industry to ensure businesses are enabled to take advantage of rapid and global technological changes and opportunities.

In their own words – small business owners on going digital

"If you want to be self-employed, digital is the way to go."

MARTINA BLAIR, OWNER, M.ARTY HAIRDESIGN

"Without digital technology, we wouldn't have grown like we did .....You've gotta open up your horizon a bit and open up your thinking to what is out there and how that can help and benefit your business."

SEAN RALPH, MANAGING DIRECTOR, THE POPS GROUP PTY LTD, POOL PRO PRODUCTS

"Digital technology plays an incredibly important part of our business – it runs our office, it runs our tradesmen, and to be honest we couldn't do our business without it anywhere near the high standards that we currently do"

TOM MARTIN, OWNER, WATER TIGHT CANBERRA

See more Going Digital stories from small business

Accelerating and coordinating efforts to address priorities

The Government will continue to work closely with industry, the community and academia on a range of digital economy issues, including the importance of ensuring that Australian businesses have access to the digital skills they need. Through this collaboration, the Government will encourage industry-led work to consider the digital skills challenges experienced by different industry sectors and the broader community, and to boost digital skills across the sectors.

Inclusion

All Australians are able to engage with technology and participate in the modern economy.

Outcomes:

- Increased interaction with technology amongst disadvantaged and underrepresented groups.

Why does inclusion matter?

Advances in technologies have revolutionised the way Australians live, work and interact with each other. For the majority of Australians, technology supports how we:

- communicate and socialise
- teach and learn
- recruit staff and look for work
- do our jobs.

However for lower income earners, those with poor access to the internet, or those who lack the skills to use technology, these opportunities are harder to access. ABS data have shown that Indigenous households are about 75 per cent more likely than non-Indigenous households to not have an internet connection. Indigenous Australians face additional barriers around skills, affordability and access to culturally appropriate technology. Even in urban areas, where access to the internet is higher, measures of digital inclusion are lower than the Australian average.

Groups that only access the internet through mobile phones have lower levels of digital inclusion, due to higher costs of accessing data through this means. The greater prevalence of mobile-only connectivity among Indigenous Australians contributes to the lower digital inclusion score for this group.

Exclusion from the digital world can exacerbate other forms of social exclusion such as unemployment, low education and poverty.

All Australians need access to the technologies and the skills required to use them if they're to fully take part in social and economic life. Digital inclusion has the potential to support and improve the quality of life for some of the most disadvantaged and excluded in our community.

Governments, business and the community all have important roles to play to address the digital divide.

"We want to see every Australian benefit in our shared digital future – that means enabling every member of the community to take part, and designing engagement processes and interfaces to the digital world that take account of the different life stages and levels of digital ability."

SUBMISSION TO THE DIGITAL ECONOMY STRATEGY CONSULTATION PAPER BY MYOB, NOVEMBER 2017

What are the opportunities in inclusion?

The more socially inclusive Australia's digital transformation is, the stronger our economy will be. As connectivity, access and inclusion improves, the ability to provide government services online and direct to people's homes will increase. This will reduce the cost of services like education, healthcare and improve rural and remote access.

Providing universal broadband services

The National Broadband Network (NBN) is helping to bridge the digital divide, by providing regional Australians with the tools they need to grow and prosper in their local area.

By mid 2018, the rollout of the NBN in regional areas was approximately 86 per cent complete, with the remainder under construction or in planning.

The NBN will assist businesses in these areas to improve their productivity, reduce costs and increase access new markets. The NBN will enable more businesses to make the move out of the cities and into our rural towns and communities. Access to the network is expected to help create an additional 20,000 jobs in regional Australia by 2021.

The existing Sky Muster satellite service provides enough capacity for advanced applications such as distance education and e-health services.

The Government prioritised work with NBN Co to develop a special product using the Sky Muster satellite so that distance education students have additional data they need to get the most out of their studies. As of 4 July 2018, 743 students across regional Australia were benefiting from this product.

The NBN is enabling e-health to help regional Australians manage their health condition with the help of remote access to city specialists.

NBN Co has also developed a Public Interest Premise (PIP) policy which allows schools, emergency services, Indigenous organisations, Government facilities and health facilities in the Sky Muster footprint to access to additional data of up to 300 Gigabytes (GB) per month. In addition, individual buildings belonging to the same complex may be classed as separate premises, which allows additional installations.

These initiatives are part of the Government's ongoing commitment to increase the opportunities for inclusion, which access to fast broadband can provide for regional and rural parts of Australia.

Telehealth boost for people living in rural and remote regions

The Government is providing $9.1 million over 4 years from 2017-18 into a telehealth initiative.

The initiative helps Australians who live in rural and regional Australia access psychologists and health professionals via video consultations. Health professionals will be able to connect sooner and more regularly with patients in need of services, narrowing the gap in health equity for people in rural and remote locations

Increasing accessibility

Developments in artificial intelligence, machine learning and cloud computing are rapidly improving voice recognition and translation technology. Over time, this will make digital content more accessible to people of all cultural and linguistic backgrounds.

Advances in assistive digital technologies will continue to improve the daily lives of people with disabilities. Technologies such as biometric access and voice recognition may make accessing online services and information far easier than traditional delivery and interaction methods.

Case studies: Digital entrepreneurship for social inclusion

The partnership between the **University of Wollongong SMART Infrastructure Facility** and **Briometrix** has developed a crowd-sourced, real-time mapping system using Internet of Things and advanced data analytics to provide wheelchair users with greater freedom of movement. Users will be able to track journeys, log key features of physical environments, and access interactive maps.

Remarkable is Australia's first accelerator providing funding, mentorship and master-classes to disability-focused start-ups. As of October 2018, Remarkable's 16-week accelerator program has supported a total of 19 ventures whose technologies have a strong potential to positively impact the life of people with disabilities.

The ***Ask Izzy*** mobile website provides access to a directory of over 360,000 services for people who are homeless or at risk of homelessness, including where to find food, legal advice, health services and accommodation. Since it was launched in early 2016, Ask Izzy has fulfilled more than 1.5 million searches, helping thousands of people access the help they need.

SUBMISSION TO THE DIGITAL ECONOMY STRATEGY CONSULTATION PAPER BY INTERNET OF THINGS ALLIANCE AUSTRALIA, NOVEMBER 2017

Improving healthcare access

Digital healthcare models are improving accessibility, quality, safety and efficiency. By early 2019, every Australian will have a My Health Record (unless they choose not to). This will deliver significant improvements in both the quality and efficiency of healthcare, and puts patients at the centre of their healthcare.

Case study: Using digital technology to improve the health of Australians

Government health departments have begun to see significant improvements in health outcomes through their investments in digital health. These are being complemented by a new wave of non-government innovations in digital health for example:

1. A mobile health pilot program in Canberra for type 2 diabetes helped motivate patients to record their health metrics using mobile devices, and found significant increases in patients' confidence in managing their chronic illness.
2. A CSIRO trial screened more than 1200 people in their communities for diseases such as diabetic retinopathy. Images were digitised and reviewed by ophthalmologists in Brisbane and Perth, providing specialist services to those who would not otherwise have access to them.
3. CSIRO's Care Assessment Platform smartphone app is alleviating the need for patients to travel to outpatient clinics for rehabilitation appointments by bringing the rehabilitation program to the patients' homes. The smartphone app demonstrated the same, if not better, health outcomes compared to the traditional rehabilitation program.

Enhancing democratic freedoms

Freedom of expression is a fundamental part of a vibrant democracy and a culture of accountability. It underpins good governance and stronger institutions. The Internet provides an unparalleled opportunity for the exercise of the freedoms of expression, peaceful assembly and association, and the promotion and protection of human rights.

Where do we need to focus our attention to improve inclusion?

Addressing barriers to digital literacy and access to technology is key to ensuring participation in the economy and for social inclusion, particularly for:

- older Australians
- women
- Indigenous Australians
- people with disabilities
- people in low socio-economic groups
- people living in regional and remote areas.

The Australian Digital Inclusion Index (ADII) measures three dimensions of digital inclusion: access, affordability, and digital ability.

The 2018 ADII reports that overall levels of digital inclusion have improved in Australia across all demographics. However, this increase has been uneven between groups, with slower growth rates among Indigenous Australians, older Australians and those with low incomes, education and employment.

Ensuring ongoing affordability

Australian households' ability to access digital services has improved with communications services becoming increasingly affordable. According to research by the Bureau of Communications and Arts Research (BCAR), consumers are getting better value as prices stay the same or fall, and product inclusions increase. Ninety-five per cent of Australian adults now use mobile phones, with more than 80 per cent owning smartphones; more than 99 per cent have mobile network coverage.

For home broadband services, the NBN is improving choice and availability. The Government's investment in the NBN rollout is reducing prices, including for regional consumers. There are NBN plans available for as low as $30 or $40 per month.

NBN Co's decision to offer a temporary promotional discount on its 50 Mbps speed tier in late 2017 had a significant impact on the affordability and take-up of higher speeds. In 2017, retailers were only managing to sell 50 Mbps or higher speed plans to about 16 per cent of customers – that grew dramatically to around 50 per cent by September 2018. Retailers have moved large numbers of existing customers onto higher speed plans in the first half of 2018, reflecting the increased affordability of these plans.

This also compares favorably with services in other countries. A household with broadband speeds of 25 Mbps or more and 200 GB of monthly data pays less in Australia than the UK, New Zealand, Canada and the US.

However, new digital services need to remain accessible to Australians. While the BCAR found the share of households spending a lot of their income on communications services was declining, the lowest 10 per cent of households by income have seen their share of disposable income spent on communications services increase in recent years.

Increasing rural and remote participation

ADII scores show higher levels of disadvantage for people in rural Australia compared to those living in urban areas. While the gap has narrowed over the past three years, rural areas still have lower levels of access and affordability than capital cities. ABS data have shown that rural and remote households are twice as likely to not have an internet connection as those in major cities.

The NBN rollout will enable all Australian premises to access broadband services with peak wholesale download speeds of at least 25 Mbps by 2020. The vast majority of the 2.5 million fixed line premises outside major urban areas and the over 600,000 premises covered by fixed wireless will be able to access 50 Mbps services. Some fixed line premises will also be able to access higher speeds.

The Government is working with NBN Co Limited to design new products using the Sky Muster service for those groups with particular needs in regional and rural Australia.

This includes a range of products, including enterprise satellite services to support business applications, mobility solution, enhanced services such as multicast, and Wi Fi solutions for remote Indigenous communities.

NBN Co Limited is partnering with the Royal Flying Doctor Service (RFDS) to provide broadband connectivity to support this essential service across the most remote areas of Australia. The partnership will provide broadband to RFDS bases and 300 remote area clinics including higher data allowances for those sites using Sky Muster services.

While the NBN rollout and increasing mobile coverage will create greater opportunities for participation, this increased access needs to be leveraged to ensure it is accompanied by increased participation in the digital economy that will maximise the benefits to all Australians, especially disadvantaged groups.

Supporting older Australians to go digital

People aged over 65 are Australia's least digitally included age group with a digital score of 46. The gap between this group and younger Australians is substantial and has widened since 2015.

Being able to access online information and services and interact online offers significant benefits for older Australians who may be socially isolated or may have mobility issues. It is therefore important to support this group to become and stay connected online.

Additionally, Australia's Digital Pulse reports:

- only 28 per cent of ICT workers are women, compared to 45 per cent in all professional industries
- only 12 per cent are over the age of 55, compared to 15 per cent in all professional industries.

Reducing the gender divide

There is a global digital divide, a difference in technology access, between men and women. The proportion of women using the internet is 12 per cent lower than the proportion of men (ITU Facts and Figures 2017).

The Gender Equality Scorecard indicates Australia has a significant digital gender divide, with women making up only 39 per cent of information media and telecommunications graduates.

The gender divide is more evident amongst older Australians, with women aged 65+ facing lower levels of overall digital inclusion than their male counterparts. The digital gender gap widens further as age increases.

Protecting human rights, democracy and peace online

There is a risk that the internet and digital technologies can be used by foreign governments to undermine human rights. For example, freedoms can be restricted through politically motivated internet censorship, internet shutdowns, illicit monitoring, targeted hacking and the arrest and intimidation of online activists, journalists and others. There is also growing international concern about malicious and criminal cyber activity. This includes online child exploitation, discrimination, intimidation, harassment and violence facilitated by digital technologies, and the promotion of violent extremism.

What is the Government doing to improve inclusion?

Below is a summary of major government work on digital inclusion; for a list of all government initiatives, refer to Australia's Tech Future website.

Governments, at all levels, are investing in digital inclusion in Australia and the Indo-Pacific Region. The Government is working with businesses and the community sector to ensure no-one is left behind, by creating an enabling environment for industry investment and ensuring adquate protections are in place for citizens and consumers.

Initiatives include:

- Universal Service Guarantee which will ensure all Australians have access to voice and broadband services into the future, regardless of their location, and which will be complemented by an up-to-date consumer protection framework. The Guarantee will be underpinned by the rollout of the NBN, which will mean that all premises will have access to fast, affordable broadband by 2020. The expansion and improvement of mobile coverage via the Mobile Black Spot Program is also enhancing access to digital services
- improving access for people with chronic conditions through the Health Care Homes program
- yearly funding through the Telephone Allowance and requires Telstra to maintain the Low Income Measures Assessment Committee to provide assistance for some of the more vulnerable members of the community
- the Digi House initiative which improves digital inclusion for people living in social housing
- the NISA 'Women in STEM' package has expanded to encourage more women into STEM education and careers. The 2018-19 Budget provides for an additional $4.5 million over four years to progress a Women in Science Strategy, a Roadmap for sustained increases in women's STEM participation, a Women in STEM Ambassador to promote STEM in schools and the development of a STEM Choices resources kit
- Towards 2025: An Australian Government Strategy to boost women's workforce participation, the Government's roadmap to reduce the gender participation gap by 25 per cent by 2025
- the Be Connected program that helps older Australians participate in their communities, including in the workforce, by improving their digital confidence, skills and online safety
- advocating that all peoples' human rights apply online as they do offline, through Australia's membership of the Human Rights Council, as well as our support of the Freedom Online Coalition and the Digital Defenders.

The Government believes all Australians should have the opportunity to acquire digital skills regardless of their age, level of education or previous experience. The Government will collaborate with key stakeholders to explore initiatives to reduce the digital inclusion divide and support greater life-long engagement in evolving technological resources.

SERVICES

Digital Government

Australians can access Government services that are simple, clear and fast.

Outcomes:

- It is easy and safe to interact with Government online
- Government's ICT infrastructure promotes the transformation and delivery of modern, future-proof digital services.

Why does digital Government matter?

Government delivers a wide range of services that support businesses and the broader Australian community. Digital approaches free-up people from the business of dealing with government and allow them to focus on what's important. People expect digital services from government that keep pace with their technology and services from other sectors.

Australia fares well on the world stage – for instance, the latest United Nations e-Government Development Index ranks Australia second in the world for the third time running. Millions of Australians are already securely accessing a range of government services online everyday through platforms such as myGov. These services include myTax (ATO), Medicare rebates and a range of Centrelink claims and benefits.

Technology allows Government to more easily engage with the community through a variety of digital channels. This ensures the views of people who use government services can more effectively be understood and addressed in developing new policy.

Government services need to keep pace with the opportunities of digital transformation and provide value for money to the community.

What are the opportunities in digital government?

Emerging technologies, data and analytics, and artificial intelligence present significant opportunities for the Government to deliver better outcomes for the public and the ability to do so more efficiently and effectively.

By harnessing the opportunities of digital technologies the Government can continue to improve citizen and business experience.

Millions of Australians are already securely accessing a range of government services online everyday:

- myGov has about 14 million active accounts. It provides access to 11 services with one login: My Health Record, the National Disability Insurance Scheme (NDIS), Medicare, MyTax, Centrelink, Child Support, Australian Job Search, Department of Veterans Affairs, HousingVic Online Services and National Redress Scheme and My Aged Care
- myTax usage has increased from 1.7 million people lodging their tax return online in 2014–15 to over 3.5 million in 2017-18
- My Health Record is used by more than 6.3 million consumers as of November 2018, enabling them to securely share their key health information about medical conditions, treatments and medicines with their healthcare providers
- Over 97 per cent of health and aged care claims are submitted digitally, equating to around 610 million payment transactions per year to a range of small, medium and large enterprises. This equates to over $50 billion in payments each year directly to businesses on behalf of Government and consumers.

Data analytics and artificial intelligence capability can also help governments to improve services and create a more valuable experience for individuals and businesses by using existing data insights to tailor services.

Greater data sharing across government via secure structures increases control, transparency and confidence for individuals about what data is held and how it is used which contributes to greater trust in the use of government services.

Advances in technology such as cloud computing services are making it easier and more cost effective for governments to upgrade old IT systems to make sure they have the right platforms to deliver simple and easy to use digital services.

Where do we need to focus our attention in digital government?

Improving the digital experience

The Government has already made significant progress to transform government services and ICT infrastructure, but needs to keep improving online services delivery to address the gap in service experience between the private and public sector.

There are many challenges that impact on a government's ability to adopt innovative digital technologies. These challenges include:

- cultural barriers to engaging digitally
- regulatory and legislative barriers that restrict data sharing between government agencies
- resource barriers such as technology costs
- capability barriers in terms of staff skills and knowledge.

Building trust

As the custodian of extensive data holdings about citizens and businesses, the Government is responsible for protecting the privacy of that data, as well as maintaining and increasing the trust of the community. Government takes this issue very seriously, and there is more to do to increase transparency and build trust in both the use of data and decision-making in government.

The Government is committed to delivering a reliable, effective experience and learning, adapting and improving its approach.

Supporting increased use of digital services

Government digital services need to be simple and easy for everyone to use (noting that some people may need support to use digital services).

Government services need to be responsive to the culture, language and beliefs of different communities in our diverse country, and be written in plain English. Overcoming these challenges is critical to providing good services.

What is the Government doing in digital government?

Below is a summary of major work on digital government; for a list of all government initiatives, refer to Australia's Tech Future website.

Delivering the Digital Transformation Agenda

The Government's Digital Transformation Strategy complements *Australia's Tech Future*. It identifies what the government needs to deliver to be a world-leading digital government. It shows how we will deliver better services with greater flexibility, more responsive policy, less red tape, all enhanced by digital technology.

The Digital Transformation Strategy articulates three strategic priorities that guide where the government will focus its digital transformation. These are:

- Government that's easy to deal with
- Government that's driven by you
- Government that's fit for the digital age

Improving digital services

The Government is making more services available 24/7 online and using feedback to continually improve services. This includes looking at how data already held by government is used to incorporate information for future claims or services, in turn making the process simpler, clearer and faster.

In 2017, significant improvements were made to myGov. The Government is now working on a new digital identity solution, GovPass, which will make it simple, safe and secure to prove who you are when accessing government services online.

The replacement of Australia's ageing welfare payment ICT system is well under way – driving big improvements in the delivery of student payments.

Significant improvements to services for business have already been made, including the release of the Business Registration Service. This brings all Commonwealth business registrations together in one place, reducing the average time taken to register for an Australian Business Number (ABN) from over an hour to less than 15 minutes.

The Government is transforming and simplifying trade flows through Australia's international supply chain, and providing businesses with a single window for international trade.

Using artificial intelligence

The Government is also exploring opportunities to use technologies such as artificial intelligence and blockchain to enhance government service delivery.

The Government is using artificial intelligence to increase administrative efficiency, improve policy development, deliver new and improved services, and analyse complex datasets. Some of its uses include:

- IP Australia using a virtual assistant, named Alex, to help answer customer's queries, decreasing phone calls by 50 per cent and costs by 66 per cent
- GeoScience Australia analysing satellite data to detect physical changes in soil and coastal erosion, crop growth and water quality.

Ensuring services provide value for money

It is important that taxpayer money is invested wisely to deliver benefits and value to the community.

The Digital Marketplace is making it easier for businesses – particularly smaller businesses – to provide common ICT services to Government. The DTA is also undertaking ICT Procurement reform. As at October 2018, $300 million in contracts were awarded through the Digital Marketplace, with around 75 per cent being awarded to small and medium businesses.

The Government's Secure Cloud Strategy is helping agencies to move to the cloud, reducing costs and freeing up effort to focus on better service delivery.

Ensuring people have the right skills to deliver great services

To design, build and deliver great digital services Australia needs the right people with the right skills. The DTA is working on a three-year Building Digital Capability program including talent attraction and retention strategies and a program to support staff to transition into digital careers.

DIGITAL ASSETS

Digital Infrastructure

Australians have access to world-class digital infrastructure in their personal and working lives.

Outcomes:

- Australians have reliable, secure and affordable access to high-speed broadband and mobile communications
- Australia's communications sector is sustainable and competitive
- Australia's world-leading navigation and positioning infrastructure supports emerging technologies
- Australia's researchers have the specialised high-performing computing and data infrastructure needed to stay ahead in everything from health to agriculture.

Why does digital infrastructure matter?

Just as power, water and roads infrastructure enable us to go about our everyday lives, digital equipment and systems are core to our everyday lives – they help make sense of the vast amount of data we are faced with.

The most obvious face of digital infrastructure is having reliable and fit–for-purpose mobile and fixed phone and broadband services. Without this, we could not access the digital services we use every day like banking, healthcare, entertainment, and communicating with family, friends and at work.

Digital infrastructure also includes location-based technologies, such as GPS, which are increasingly driving the development of new products and services around the world. The applications of GPS technology are much greater than just navigating from A to B or identifying which road you are on. Advances in location-based technology are needed to support emerging applications that require highly precise location information including automated vehicles and drones.

In regional areas, improved broadband services and location-based technology is supporting innovation in the farming, construction and mining industries. Digital infrastructure is also critical for delivery of services to remote areas.

In urban and regional cities, new technologies are being used to improve the efficiency, sustainability and services of infrastructure networks from transport to energy services.

Building enabling physical infrastructure requires significant upfront and ongoing investment to maintain and upgrade. This is seen with power and road networks and the same is true for communications, satellite and high-power computing infrastructure. It is crucial that regulatory drivers incentivise well-targeted investment that is able to respond to changing business and community needs.

What are the opportunities in digital infrastructure?

Getting digital infrastructure right allows us to:

- connect people and places
- improve productivity
- increase economic growth
- improve sustainability
- adopt new technologies.

This, in turn, allows us to:

- solve complex problems
- improve the sustainability of our cities
- build new businesses
- create new jobs.

The growth of the Internet of Things (IoT) is taking shape and accelerating. Australians are already investing in technology to enable smart homes where lighting, heating and security systems can all be controlled with mobile phones. Continuing private sector and government investment as well as government facilitation of behind-the-scenes infrastructure will determine how fast Australia can adopt further advances such as automated vehicles and drones.

Modern research laboratories are extremely reliant on technology. They depend on access to high-performance computers and data stores, just as much as physical workshops and labs. Australian researchers and businesses depend on access to supercomputers to crack computational problems standard computers can't handle. Investing in this infrastructure in Australia will grow our national capability in fields such as genetics, cyber security and climate science. By ensuring businesses and scientists have access to the right tools to do their work, they are more likely to stay here in Australia.

Where do we need to focus our attention in digital infrastructure?

Planning to meet future needs

Infrastructure that does not meet reasonable consumer expectations will impact our daily lives and Australia's economic growth. Delivering infrastructure requires major investments and long lead times, so it is crucial to plan ahead to meet changing business and community needs.

Australia faces some unique challenges in delivering infrastructure due to its vast size and distributed population. The Government is enabling the right conditions for investment to support delivery of digital infrastructure that meets the needs of all Australians now and into the future.

Ensuring our digital infrastructure is secure

Our national digital infrastructure also needs to be secure. A key way to reduce national security risks of adopting new technologies (including infrastructure such as 5G and the Internet of Things) is by promoting security-by-design where technologies are designed from the ground up to be secure, rather than as a future consideration. You can read about what the Government is doing to keep Australians safe online in the section on cyber security.

"Australian businesses also need access to infrastructure that allows them to thrive in a digital economy. This includes access to reliable, fast and inexpensive telecommunications and mobile networks. Over 70 per cent of all businesses have identified mobile internet and access to high speed broadband as either moderately or extremely important for their businesses."

SUBMISSION TO THE DIGITAL ECONOMY STRATEGY CONSULTATION PAPER BY AUSTRALIAN CHAMBER OF COMMERCE AND INDUSTRY, NOVEMBER 2017

What is the Government doing in digital infrastructure?

The Government's role is creating the right enabling environment to ensure Australia's digital infrastructure supports changing business and community needs.

Below is a summary of major government work on digital infrastructure; for a list of all government initiatives, refer to Australia's Tech Future website.

Building communications infrastructure

Australia's digital infrastructure is rapidly transforming due to one of the largest infrastructure projects ever undertaken. The National Broadband Network (NBN) is on track for completion by 2020 and improvements are being made to the consumer experience for all Australians. By mid-2018, over 60 per cent of all Australian premises could access NBN services.

Benefits are already flowing from the NBN rollout. NBN Co Limited commissioned data analytics and economic research firm AlphaBeta to investigate the social and economic impacts of the network rollout. The research found that access to the NBN helped drive an estimated $1.2 billion in additional economic activity in 2017 and had helped create up to 5,400 businesses and 9,700 new jobs. The same research estimates that the benefits to Australia once the NBN rollout is complete include up to $10.4 billion of additional annual Gross Domestic Product (GDP) as well as the creation of up to 80,000 new businesses and up to 148,000 additional digital jobs by 2021.

The new Universal Service Guarantee for broadband services as well as voice services will be implemented following the NBN rollout. Separately, a review is being conducted of the general Telecommunications Consumer Safeguards that apply to all services, to assess what safeguards may be needed in the future. Recommendations are expected to be made to government by the end of 2018.

An open and competitive mobile market already exists, and the Government is making the allocation of a critical input, spectrum, more efficient. Australia's mobile network operators—Optus, Telstra and Vodafone—already provide more than 99 per cent of Australians with access to world-class mobile coverage. Vodafone and TPG have announced their intention to merge (subject to regulatory approval), potentially forming stronger competition in the sector. The extent of Australia's mobile coverage, affordability, investment and innovation is recognised by the GSM Association, which has ranked Australia first of 150 nations on its Mobile Connectivity Index. These world-leading networks have been delivered by industry investment in a competitive environment.

Through the Mobile Black Spot Program the Government is improving mobile phone coverage across Australia.

Case study: Mobile Black Spot Program

The Australia Government's $220 million Mobile Black Spot Program is already delivering improved coverage outcomes and benefits to regional and remote communities.

Under the first three rounds of the program the Government's commitment has leveraged a total investment of more than $680 million, which will deliver a total of 867 new base stations across Australia. As of 10 September 2018, 601 base stations have been completed.

The village of Murringo, New South Wales, is one community experiencing social and economic benefits from a funded base station for mobile communications.

Students at the Murringo Public School now have better access to the internet to do their homework and stay in touch with their friends. The base station, which was activated in May 2017, is also opening up new opportunities in the village for the small businesses, farmers and families who previously had no mobile reception.

Leading economies are focussed on 5G as the next step in the evolution of mobile technology. 5G is the next step in the evolution of mobile wireless communications technology, promising improved connectivity, greater network speeds and bandwidth, and very low latency. The Government is working with industry to support the timely rollout of 5G in Australia.

Getting this rollout right will:

- give the right signals for industry investment
- give consumers better services
- enable new applications in industry, especially with massive scale automation delivered through multiple connected devices
- support critical communications assured by low latency and ultra-reliable networks (Government actions are detailed in the 5G – Enabling the future economy report)
- improve competition between providers
- support economic productivity and growth (detailed in the Impacts of 5G on productivity and economic growth report).

The Government is ensuring that Australia's communications sector is sustainable and competitive. That is why the Government is implementing the Telecommunications Reform Package. This will provide a regulatory framework that promotes investment and competition in the telecommunications market and improves access to broadband services in regional, rural and remote Australia.

Supporting navigation and positioning infrastructure

The Government is providing $224.9 million to upgrade to world-class navigation and positioning infrastructure to support emerging technologies. These initiatives will:

- provide better GPS for regional Australia with an accuracy of 10cm
- build a network of ground stations to provide GPS data with an accuracy of 3-5cm in major population centres.

Improving the accuracy, integrity and availability of satellite navigation will deliver significant benefits to Australians on the ground, particularly those in the agricultural, logistics, mining, aviation, maritime and fishing industries.

Funding high performance research infrastructure

In response to the 2016 National Research Infrastructure Roadmap, the Government has committed $1.9 billion over 12 years to support national-scale research facilities. A further $140 million has been provided to upgrade Australia's two Tier 1 high performance computing facilities. This will ensure our top high-performance computing infrastructure gets the ongoing and significant investment required for areas such as aviation safety and climate science.

"Throughout our consultations to develop the 2016 National Research Infrastructure Roadmap the critical importance of Australia's two high-performance computers was manifestly clear."

DR ALAN FINKEL, CHIEF SCIENTIST – DECEMBER 2017

Enable Smart Cities

Through the Smart Cities Plan, new technology is revolutionising how cities are planned and function, and how Australia's economy grows. To succeed in the 21st century economy our cities need to be productive, accessible and liveable.

Technology can make cities more prosperous and sustainable. Real time data and smart technology will lead to better utilisation of infrastructure, clean energy and energy efficiency, improving of service and better benchmarking of cities performance. The Smart Cities Plan also supports investment in sectors commercialising new innovations to grow Australia's economy.

Data

Australians are confident that their quality of life is enhanced and businesses benefit from more effective, efficient and responsible use of data.

Outcomes:

- Australians, businesses and governments are using high-quality, well-managed data to help deliver economic and social benefits
- Australians are making informed decisions about how their data is shared and used.

Why does data matter?

Data is valuable because it enables better, more connected services, improved policies and decision making, and the development of new, innovative products.

Collecting and analysing data is not a new thing, but the tools businesses and consumers use to quickly interact with data from multiple sources are changing rapidly. Seven out of the top 10 companies in the world rely on the data they collect to deliver services and create value.

"Data is a spectrum that runs from open, through to shared, through to closed—from public to personal ... Empowering individuals, both as consumers and citizens, with their own data is an important cause. It helps support participation and inclusiveness, reduces inequality and enables people to make a fair judgement as to what is in their interest."

SIR NIGEL SHADBOLT, CHAIRMAN OF THE UK OPEN DATA INSTITUTE, JANUARY 2018

Helping businesses to grow

Businesses can use data to help create new technologies, products and processes. This creates jobs, improves productivity and grows the economy.

Data can help businesses:

- drive and target growth opportunities
- design innovative goods and services
- improve pricing
- operate more efficiently.

Delivering social benefits

Analysing data can lead to significant benefits for the community. Data improves government's ability to understand complex issues and to make better decisions and design more targeted programs. This has applications for a range of social policy areas including health, education, welfare, and the environment. For example, by:

- analysing health data the health sector can better diagnose and treat conditions
- using locational data from mobile phones to better plan public transport and roads
- using meteorological and climate data to predict natural disasters.

Case study: Latrobe Sports Park - community participation and world-class research

Optus partnered with La Trobe University in 2016 to develop a state-of-the art regional sporting precinct that will embed data collection and analytics into research in sport performance, rehabilitation and community engagement.

The data analytics and research at the Latrobe Sports Park will help:

- elite athletes improve their performance change sport management practices
- inform government policies
- Austrlians live longer by combatting inactivity, chronic disease and movement disorders.

Providing consumer choices

Online comparison and review services are everywhere, and services like Dimmi, Uber, AirBnB and energymadeeasy.gov.au use rating systems to give consumers valuable advice. Information, news and entertainment services increasingly analyse individuals' preferences and behaviour to provide improved services and targeted offerings.

Data enables consumers to:

- access quicker and cheaper services
- receive more targeted and personalised service offerings
- make more informed decisions.

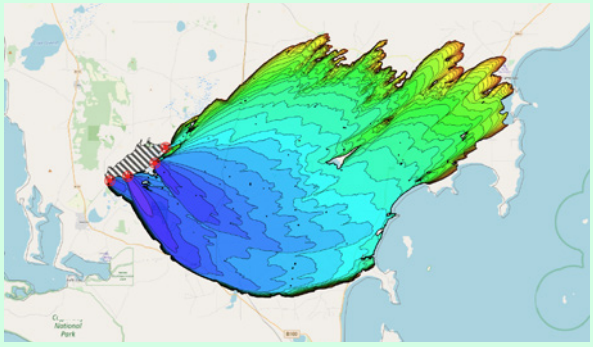
What are the opportunities in data?

Capitalising on our strength in data science

Data science is becoming an area of competitive strength for Australia. For example, Data61, part of CSIRO, is home to more than 1100 staff, including over 415 PhDs, focused on data science, engineering and design. As the data revolution continues, Australia has an opportunity to build on these strengths.

By continuing to build our national data science capability and setting appropriate regulatory frameworks that enable responsible and transparent access to data (with appropriate data safeguards), Australia will become an attractive destination for investment, which will reduce loss of our talent overseas. Artificial intelligence and machine learning are key areas in data science attracting hundreds of billions of dollars of investment globally.

Case study: Spark - using big data and geospatial intelligence to save lives in bushfires



Data61's Spark platform uses state-of-the-art science and new generation computing to predict and visualise the spread of bushfires. It draws from a wide range of geospatial data sources including weather, geography and environmental information.

This knowledge is critical to improved emergency management operations, risk prediction and timely warnings to threatened areas. Spark has particularly helped us understand how power lines impact the potential for bushfires to spread, which was a significant factor in the 2009 Black Saturday bushfires that claimed 173 lives and cost an estimated $7 billion.

Case studies: Australian agriculture start-ups making their mark in data science

- Based in Armidale, NSW, **SmartShepherd** was named Most Innovative International Farm Tech Start-up at the 2018 World Agri-Tech Innovation Summit. SmartShepherd's innovative electronic tag, attached to both the mother animal and her offspring, makes it possible for farmers to record and monitor their behaviour and better inform decisions about their stock. The smart tag uses low-cost Bluetooth technology and is powered by a small battery.
- The **Yield Technology Solutions** won the 2017 'Big Data/ Machine Learning Innovation of the Year' award for its integrated sensor, data analytics and app product tailored for aquaculture. Now expanded to agriculture, The Yield's microclimate sensing and predictive system helps farmers improve their decision making and agricultural output. Using The Yield's app, oyster farmers collect real-time data from sensors that measure salinity and analyse water quality. The data is then converted through predictive modelling into a three-day harvest area forecast, which reduces the risk of uncertainty from weather. With these hyper-local forecasts, farmers enjoy greater visibility over their harvest areas and have data-backed evidence to help them make important decisions.

Leading in open data

Australia is leading the way on opening up its datasets to the public – the 2017 Global Open Data Index ranked Australia 2nd out of 94 countries. By increasing access to data, while maintaining appropriate privacy and security settings, businesses have the chance to use data to create new products, processes and services.

Enabling data-driven businesses

The generation and use of vast amounts of data is a new source of market power in the digital economy.

Data is a key economic commodity that can make existing businesses more efficient and is driving new business models and industries. Data-driven businesses can now easily access powerful data analytics to gain valuable insights about their customers or potential markets which can help them grow.

Businesses such as Google, Amazon and Facebook generate immense amounts of data from their daily operations that they analyse to generate knowledge, and insights of value for themselves and others.

There are considerable opportunities for Australian businesses in all industries that recognise the value of the data they hold and use it to create value for themselves and their customers while protecting citizens' privacy and confidentiality.

In key industries including agriculture, mining and health, Australia has an opportunity to build on its strengths by using the power of data to further drive productivity gains and deliver world first innovations.

There are also opportunities for new businesses that primarily focus on the analysis and application of data to drive value.

Case study: AgriWebb - the rise of data-driven farming in Australia

AgriWebb's software is helping farmers across Australia to simplify their record keeping, meet their audit and accreditation requirements, and increase their productivity.

The software allows farmers to access best practice farming tools from their tablets, phones or computers. It incorporates record-keeping and reporting, operational calendars, compliance and accreditation programs, livestock market valuations and core decision-making tools.

Using satellite imagery

Australia has a great opportunity to capitalise on its world-class satellite imagery data through the Digital Earth Australia program.

Satellite imagery data was previously only available in archives and to big business. Making that information available through a smartphone gives anyone access to 30 years of satellite images over any location in Australia. This data can be used to build new products and services for commercial purposes, and to interpret and analyse changes to Australia's physical landscape. This creates a wealth of opportunities in land planning, agriculture, mining, environmental analysis and research.

Case study: GeoVision© - unlocking a wealth of opportunities through satellite data

Global technology company Pitney Bowes partnered with geospatial data supplier PSMA to create GeoVision©, a suite of datasets combining data on the 3D built environment with information such as addresses, postcodes and ABS Census data across Australia. This is a powerful asset for companies looking to expand nationally, helping them target customers and deliver services locally.

For public services such as emergency management and response planning, GeoVision© can rapidly deliver critical information about which buildings are under threat, where people are located and where to find water resources such as swimming pools and dams.

Where do we need to focus our attention?

Capturing the value of data

Government and businesses are generating and storing huge volumes of data. Treating data as an asset: using it; valuing it; and protecting it appropriately, could drive significant economic and social benefits for Australia.

Data is the "oil" of the modern economy and a critical enabler of digital innovation. Action is needed to increase access to data assets, including access to spatial data, build public trust in the use and management of data, and to build a versatile data science workforce for private and public growth sectors.

While information-rich companies are trading off the data they are collecting from consumers, they are not able to include the value of that data on their balance sheet. Australia needs to develop ways of accounting for data as an asset of a business. This is particularly important for companies seeking investors to help them grow their business. Measuring the value of the data and considering who owns the data are significant issues that countries around the world are grappling with.

Enhancing access to data

Substantial value can be extracted from data assets, however in order to do so they need to be discoverable, accessible, and of high quality. Enhancing access to data has been identified as a top five priority for the digital economy across OECD countries, and its importance is expected to increase in the next five years.

Managing privacy and security

As the use of data expands, trust is critical. For the most part, this trust relies on confidence in those collecting, securing and using this data, and the regulatory systems around them.

Governments businesses and organisations need to build trust through improved transparency, accountability and building in privacy and security safeguards from the outset when designing new services.

Businesses are increasingly focused on data trust issues as they understand the potential damage to their market share and reputation if they get this wrong, as demonstrated by the recent Facebook - Cambridge Analytica scandal.

Data from the Office of the Australian Information Commissioner (OAIC) indicates that 58 per cent of Australians avoid dealing with a business if they have privacy concerns about that business.

We all need to ensure adequate protections for personal data are in place while enabling the use of data to drive growth, productivity, and benefits for society. Access to data underpins many beneficial technology solutions including:

- precision health solutions that are tailored to individual genetics
- connected devices that monitor a person's health and notify health practitioners or family members if needed
- online counselling and therapeutic services for people with mental health issues
- tailored educational options that can guide a person through the material at their own pace in an online environment
- increased safety through better management of emergency response situations including floods and bushfires.

The processes around seeking permission for sharing data need to be clear, transparent and nuanced. People are more likely to share their data if there is a clear benefit - whether this be a personal benefit or a benefit to society more broadly.

There is an important distinction between sharing data that allows an individual to be personally identified and data that it is de-identified and cannot be traced back to an individual. Improving clarity through public communications on this distinction will be important to encourage consent for useful data sharing. This will help governments and businesses to deliver the greatest data-driven products and services to Australians.

Removing unhelpful barriers

The Productivity Commission Inquiry Report into Data Availability and Use found a number of cultural, legislative and technical barriers to data sharing – including over 500 secrecy provisions restricting the sharing of public sector data.

Standards and regulations for data collection, sharing and use vary across jurisdictions. Different rules can prevent businesses and government from innovating.

Governments need to reduce unnecessary regulatory barriers to data sharing in a responsible and safe way, and address the barriers to industry, businesses and the community in sharing their own data, while maintaining appropriate privacy provisions for identifiable data.

Addressing capability gaps at all levels

Having people with the right skills in data science is a challenge. Australia needs to build expertise at all levels, from small business owners wanting to analyse their customer data to researchers identifying new ways to treat diseases.

At the moment, less than half of Australian businesses are using their data resources in marketing, or the design of new goods and services. Given the significant opportunities for businesses to use data to grow and improve, any barriers to accessing and using this data, including capability, need to be addressed.

There's a growing demand for data skills and global competition is rising. If Australia doesn't increase its skills in this area, businesses may miss out on opportunities for innovation and growth, or may take their potential overseas.

What is the Government doing?

The Government is seeking to help Australians unlock the value of data by improving the way data is shared and released, and by ensuring our regulatory framework does not create unnecessary barriers to data use.

Below is a summary of major government work on data; for a list of all government initiatives, refer to Australia's Tech Future website.

Building trust in the use of data

To build confidence in how government and business use data, the Australian Government is:

- implementing a Consumer Data Right to give customers greater control over their data and transaction activities, initially starting with the banking, energy and telecommunications industries. As part of the Consumer Data Right, the Government will ensure all major banks make data available on credit and debit card, and deposit and transaction accounts by 1 July 2019, and on mortgages by 1 February 2020. All other banks will be requires to implement these measures within the following 12 months
- developing an ethics framework in partnership with industry and research organisations around the use of data, with a focus on artificial intelligence and machine learning
- delivering legislative reforms to help streamline the sharing and release of public sector data, while protecting Australians' privacy and confidentiality
- undertaking inclusive consultation around the new data sharing and release framework
- supporting the work of the Office of the Australian Information Commissioner which provides advice to the public, government agencies and business with regard to the *Privacy Act 1988* and freedom of information matters
- shaping international rules that facilitate the free flow of information and data across borders while allowing governments to respond to legitimate public policy concerns, including consumer and privacy protection (read more in the Digital Trade Chapter of Australia's International Cyber Engagement Strategy)
- developing and championing global governance standards relating to misuse of data by social media companies and the management of harmful online content.

Increasing data accessibility

The Government is increasing data availability, and supporting use of high-quality, well-managed data by:

- working with industry to identify valuable public datasets and increasing the number of datasets on data.gov.au
- providing open access to spatial data through the Geocoded National Address File
- providing $36.9 million to give governments, businesses, researchers and individuals access to reliable standardised satellite imagery data through Digital Earth Australia
- implement a framework to guide how to use data from the My Health Record system
- appointing a National Data Commissioner with a mandate to promote greater use of data, and build national frameworks and guidelines that build trust in the way government uses data
- establishing Accredited Data Authorities to support efficient and safe sharing and release of data
- establishing a National Data Advisory Council to advise the National Data Commissioner on ethical data use, community expectations, technical best practice, and industry and international developments.

Building data science capability

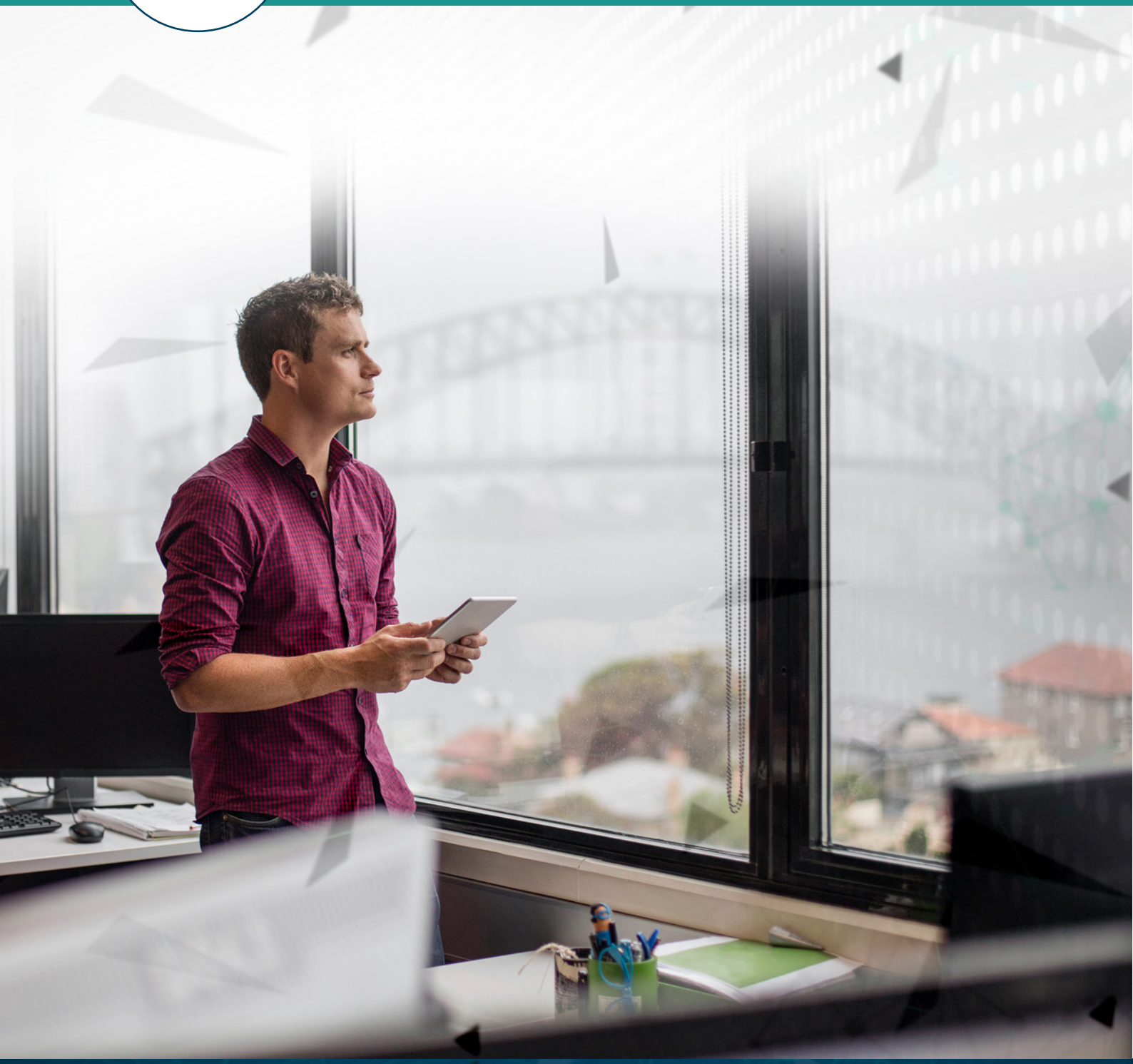
The Government is building Australia's national capability in data analytics through the cutting edge work of Data61. Established in 2016, this leading data innovation group within CSIRO has helped connect and concentrate Australia's data-driven research and technology capability.

The Government has added extra funding to the Cooperative Research Centres (CRC) program to support projects that use artificial intelligence and machine learning capabilities to solve problems identified by industry.

Data61

A recent example of Data61's work is the Platforms for Open Data initiative. The initiative improves access to public data and high-value datasets. In this initiative, Data61 partners with Commonwealth agencies to work on research projects that improve privacy protections, perform advanced analytics, and to improve access to public data.

THE ENABLING ENVIRONMENT



Cyber Security

Australians feel safe online, the modern economy is protected from cyber security threats and Australia is home to a globally competitive cyber security industry.

Outcomes:

- Australians have confidence in the ability of our digital infrastructure to stand up to cyber security threats
- The cost of cybercrime to the Australian economy is mitigated.

Why does cyber security matter?

Australians are becoming more connected online. Eight in 10 Australians access the internet daily and have social media accounts. From our communications to surfing the web, nearly everyone is leaving digital footprints, often without being aware of it.

As people and systems become more connected, the amount and value of information online has increased. At the same time, efforts to steal and exploit information have also increased risks to our privacy, safety, economy and potentially our national security. Mitigating these risks is critical to increasing community trust and confidence in enjoying the benefits of technology in their everyday life. Importantly, this also protects Australia from serious and organised crime that presents a real economic risk and harm to the community.

Cybercrime is currently estimated to cost Australians more than $1 billion each year. Both public and private sector organisations have been compromised by state sponsored or non-state actors.

Beyond the upfront losses, this trend erodes public trust in the online ecosystem, preventing participation in the digital economy and detracting from its immense economic potential. For Australians to reap the benefits of the digital world, industry and governments need to work to improve trust, confidence and security in the cyber resilience of our digital infrastructure.

"The foundation elements of the digital economy, as for the 'traditional' economy, must be security and reliability. If people cannot rely on digital transactions they will be left behind as the economy increasingly becomes digital in nature. Trust is the key enabler of the digital economy. This implies strong cyber security, strong identity security, and strong financial security – and the accompanying services, platforms and protocols to support these three things."

SUBMISSION TO THE DIGITAL ECONOMY STRATEGY CONSULTATION PAPER BY AUSTRALIA POST, NOVEMBER 2017

What are the opportunities in cyber security?

Building our reputation as a safe place to do business

Australia already has a reputation as a secure, stable country with a robust regulatory framework and legal protections. We can build on this reputation to position our country as a safe online environment for business and industry to operate. This will attract investment and develop our cyber security industry.

Winning our share of a growing global industry

Global spending on cyber security is expected to almost double from around US$126 billion in 2016 to US$251 billion by 2026. Australian businesses can tap into the growing need for cyber security products and services. A greater focus on cyber security by Australian businesses will see significant benefits to the wider economy, and could lift business investment by 5.5 per cent by 2030, creating 60,000 new jobs.

To take advantage of these opportunities and reduce Australia's exposure to cyber threats, the Government, industry and the education sector need to work together to inform the workforce and address the significant shortage of cyber skilled experts.

Where do we need to focus our attention in cyber security?

Trust, confidence and security in Australia's digital infrastructure can be undermined by cybercrime, insider threats, data breaches and other types of malicious, negligent or accidental actions online.

Protecting Australia's economic interests from malicious cyber activity

The Australian Cyber Security Centre Threat Report 2017 reveals there is an increase in frequency, scale, sophistication and severity of malicious cyber activity against Australia's national and economic interests. The reach and diversity of cyber adversaries is expanding, and their operations against both government and private networks is constantly evolving.

Reducing the risk of being a target for hackers

Australians often expose themselves to unnecessary risks online. Two-thirds of Australians don't read online privacy policies and almost half don't adjust their privacy settings on social media platforms.

Many businesses don't realise they could be an attractive target for cybercrime and underestimate the potential harm it could cause. Businesses need to protect themselves and their customers, but often don't know how to obtain, implement and maintain good cyber security systems and practices.

For many small businesses, the cost of purchasing and maintain digital systems can be an issue.

"Cyber security threats are a significant challenge for small business owners. Recent global attacks through ransomware and other hacking have exposed the vulnerability of Australian small business."

SUBMISSION TO THE DIGITAL ECONOMY STRATEGY CONSULTATION PAPER BY COUNCIL OF SMALL BUSINESS AUSTRALIA, DECEMBER 2017

What is the Government doing?

While much of Australia's digital infrastructure is owned by the private sector, cyber security is a shared responsibility between governments, the private sector and individuals.

The Government is committed to driving Australia's national cyber partnership effort to mitigate cyber security risks and to reduce any risk to Australia's national security that result from large scale sophisticated cyber threats.

Below is a summary of major government work on cyber security; for a list of all government initiatives, refer to Australia's Tech Future website.

Implementing the Cyber Security Strategy

In 2016, the Government released Australia's Cyber Security Strategy to secure our prosperity in a connected world. The strategy includes investments of more than $230 million across five themes of action for the period up to 2020, these include:

- national cyber partnership
- stronger cyber defences
- global responsibility and influence
- growth and innovation
- a cyber smart nation.

The Government's recent review of the Cyber Security Strategy has found that two years in, significant progress has been made across its five pillars, and that Australia's comprehensive approach to cyber security has yielded economy-wide benefits. Importantly, it has also found that as the world becomes more connected, online security also becomes more important. As such, securing Australia's interests online will remain a priority.

The Academic Centres of Cyber Security Excellence (ACCSE) is one initiative under the Cyber Security Strategy. It aims to address the national shortage of highly-skilled cyber security professionals by encouraging more students to undertake studies in cyber security and related courses. The ACCSE program gives recognition to Australian universities that successfully demonstrate high-level cyber security education and training competencies, research capability and strong connections to government and the business sector. The Government is providing funding of $1.9 million over four years (2016-17 to 2019-20) shared equally between the University of Melbourne and Edith Cowan University to assist with establishment and operation of their ACCSE.

Implementing the International Cyber Engagement Strategy

International cyber issues present challenges and opportunities for all Australians, every day. Australia's interests in cyberspace are diverse and interconnected: from capturing the economic prosperity promised by digital trade, to combating cybercrime and preserving peace in cyberspace. Australia's International Cyber Engagement Strategy has seven key themes, outlining Australia's plans to:

- maximise opportunities for economic growth and prosperity through digital trade
- foster good cyber security practices
- reduce the risk of cybercrime
- promote peace and stability in cyberspace
- advocate for multi-stakeholder Internet governance
- promote respect for human rights and democratic principles online
- encourage the use of digital technologies to achieve sustainable development.

The global nature of cyberspace means Australia must engage internationally to advance and protect our shared interests in cyberspace. Australia's international cyber engagement champions an open, free and secure Internet which drives economic growth, protects national security and fosters international stability.

Building domestic capability

To raise awareness of these risks in Australia and what to do about them, the Government has created the Cyber.gov.au portal. Cyber.gov.au links to simple, easy to understand advice on how individuals and businesses can protect themselves online, and shares up-to-date information on how to respond to the latest online threats. It also includes advice for big business, infrastructure and government. The Stay Smart Online portal assists with outreach and advice, but will soon be merged into Cyber.gov.au to form a one-stop-shop for cyber reporting, information and tailored advice.

Case study: Increasing cyber security awareness

More than 75 per cent of Australia's 1,500 libraries participate in the eSmart libraries program, an initiative of the Alannah and Madeline Foundation. The program has received $8 million in funding from the Telstra Foundation and is supported by the Australian Public Library Alliance.

Since the launch of the program in 2012, participating libraries have introduced the concept of online safety to thousands of Australians of all ages every year, providing them with the skills they need to safely and responsibly use digital technology.

While work is already under way, greater collaboration on cyber security between government, industry, academia and the community will help safeguard Australia's national security and economy in the future.

Cyber security qualifications

To increase the number of skilled cyber security professionals, Box Hill Institute with industry support have developed two national cyber security qualifications: a Certificate IV in Cyber Security and an Advanced Diploma of Cyber Security. These are the first nationally-recognised cyber security vocational education qualifications in Australia.

The courses were developed with a range of industry partners, including ANZ Bank, BAE Systems, Cisco Australia and New Zealand, Commonwealth Bank, Deloitte, NBN Co, Telstra and the Australian Information Security Association.

Box Hill Institute delivered the first courses at its Melbourne campus in early 2018, with student numbers doubling at each intake. TAFEs across other states and territories have partnered with Box Hill Institute to deliver these qualifications. The increased availability of courses will provide students with highly sought-after skills and help bridge the cyber security skill gap.

Australia is also engaging with partners within the Indo-Pacific to align efforts and share best practice to ensure Australia remains at the forefront of technological innovation and cyber security.

Growing Australia's cyber security industry

Good cyber security not only protects Australia's existing economic assets, but also can create new ones.

Building greater local capacity would make Australia a trusted supplier in this rapidly growing industry. Thanks to Government support, the Australian Cyber Security Growth Network, or AustCyber, is making significant progress in this effort, including:

- releasing its 2017 Sector Competitiveness Plan
- establishing Cyber Security Innovation Nodes across Australia
- working with stakeholders to develop Australia's first national skills-based cyber security Certificate and Diploma level qualifications.

This work will contribute to positioning Australia as a trusted global leader in cyber security research, education, products and services.

Regulation

Australia's regulatory systems are fit for purpose, promote digital innovation and safeguard the Australian community.

Outcomes:

- Regulatory systems help Australians benefit from digital technologies, while safeguarding social, environmental and competition outcomes for the Australian community
- Regulation is fit for purpose and technology neutral, allowing businesses and industry to quickly adopt beneficial technologies
- Global rules and standards affecting digital technologies and digital trade support Australia's interests
- Australian businesses are supported by effective tools and systems to help them succeed on the world stage

Why does regulation matter?

Regulation is needed to protect the legitimate interests of businesses and the community. Strong, responsive regulatory systems help keep the Australian economy as efficient and flexible as possible, and they also help our industries compete in the global economy.

Australia is well-recognised internationally for the strength of its regulatory and governance arrangements. Our regulations provide essential safeguards for the Australian community, ensuring the safety, social, environmental and competition outcomes that underpin our way of life. Strong regulations also provide the confidence, both here and overseas, that Australian products and services are safe, consistent and reliable.

However, there is a trade-off. If the regulatory system unnecessarily impedes business innovation, they may not adopt new technologies to grow and create jobs.

In a rapidly moving digital economy, getting the balance right is harder than ever. Technology is developing much faster than new regulations can be written. Business models can change rapidly. Regulations can quickly become redundant and the impacts of new technologies and business models can be particularly difficult to forecast.

Technological innovation and disruptive business models are displacing established firms, products and alliances. They have the potential to change the nature of work, and also to provide more consumer choice, improved products and services, and productivity benefits.

What are the opportunities in regulation?

Having the right regulatory settings helps Australia tap into emerging technologies, provides innovative businesses with the social licence to operate as they need, and protects consumers and the community.

Developing flexible regulatory approaches

A one-size fits all traditional regulatory approach does not work – governments need to work with industry, academia and the community to identify the right tools and approaches to address the particular risks, issues and challenges of regulating new technologies.

For example, in the financial technology (FinTech) industry, the Government is creating a defined space to test new products and services without too much up-front regulation. These 'regulatory sandboxes' help businesses see if their product works without having to meet current regulations or impacting customers.

Fintech start-ups welcome robust regulation as this promotes consumer confidence and there is an opportunity for Australia to pursue a best practice regulatory approach. This will enhance the potential for global mobility and position Australia as an attractive FinTech hub for international investment in emerging technologies.

With technologies that are still in their infancy such as quantum computing, the Government needs to ensure regulatory settings:

- assist industry–research collaboration
- facilitate the development of supportive ecosystems in Australia
- protect intellectual property and commercial advantage.

Increasing market share

The digital economy provides access to far bigger markets. By getting the international and domestic regulatory settings right, there's an enormous opportunity to grow and scale Australian businesses on the world stage.

The use of online channels to sell and buy products and services (ecommerce) increases export opportunities for Australian businesses. Platforms such as Amazon and Alibaba mean that even the smallest businesses can access, compete in and export to global markets alongside multinationals.

Internationally consistent standards can help businesses boost efficiency, increase productivity and growth by ensuring technology can be used across borders.

Case study: Australia's Ego Pharmaceuticals is Succeeding in World Markets

Ego Pharmaceuticals, a family-owned Victorian dermatological products manufacturer established in 1953, won the Australian Exporter of the Year award in 2017 and the Governor of Victoria Exporter of the year in 2016.

Ego has invested heavily in innovation, automating much of its manufacturing process, as well as pursuing serious e-commerce and digital marketing strategies. Ego's growth both in Australia and internationally helped it open a new $15 million expansion of its manufacturing facility in 2016 and its new $35 million global headquarters in 2017, creating 63 new jobs in outer-Melbourne.

Nowhere is the potential for digital trade greater than in the Indo-Pacific region. In 2017, for the first time, more than 50 per cent of global Internet users were located in the Indo-Pacific. Yet, only 46.4 per cent of households in the region were connected to the internet in 2016. There are vast untapped opportunities for digital trade. Successfully harnessing this opportunity promises economic growth for countries in the region as well as new market opportunities for Australian businesses.

Australia can continue building on its existing reputation in the region as a stable, secure and modern provider of goods and services. Programs like the National Business Simplification Initiative modernise the way businesses interact with government and keep Australia attractive to investors.

Where do we need to focus our attention in regulation?

Getting regulation right where it is needed can be challenging. It's hard to predict how new technologies will be developed and applied, and change happens quickly. This makes it hard for regulation to keep up.

The role of Government as a domestic regulator is evolving to:

- be more closely linked to citizens and businesses
- adapt faster to change
- minimise negative impacts on innovation
- ensure maximum access to international markets.

Designing fit-for purpose regulatory approaches

To build on our existing strengths, the Government will work with industry to re-think regulatory approaches.

Legislation needs to be tailored to innovative digital practices, including through technology-neutral and principles-based approaches. Regulation needs to be fit for purpose, outcomes-focused, adaptable and prepared for rapid change.

Case Study: Uber in Australia

Uber's launch in Australia in October 2012 was met with enthusiasm from consumers and prospective drivers but also resistance from the taxi industry. State and territory governments considered issues like customer safety, transport access, competition, impact on the taxi industry, and productivity implications in their response to the emergence of ridesharing.

In 2015 the ACT Government became the first jurisdiction in Australia to incorporate ridesharing into regulatory frameworks, followed shortly by New South Wales. Today, every state and territory have established ridesharing regulatory regimes. As part of the reforms, most jurisdictions also created assistance packages for owners of taxi licences. The ACT Government's review of its ridesharing reform package suggests benefits in 2016/17 for consumers of $6.4 to 8.8 million.

The Uber example shows that, while important, consulting the public and carefully considering the regulatory issues raised by digital disruption takes time. It also demonstrated that Governments must identify trends early to ensure regulatory regimes can keep up with the pace of technological advancement. One way governments can resolve this challenge and balance the need for speed and due care is to regulate iteratively and ensure legislation is sufficiently broad to incorporate future developments, as has broadly been the case in ridesharing.

Work is under way on responses to disruption in specific sectors, such as automated vehicles. Consideration will be given to whether an overall framework to guide government responses to emerging technologies is required.

Ensuring consistency in standards

Inconsistent regulations and standards are costly to those businesses that need to operate across multiple jurisdictions.

Having consistent or equivalent regulations and standards across the country, especially where these are aligned with international standards, helps researchers and businesses to quickly apply new technologies.

What is the Government doing in regulation?

The Government is continuing to ensure that regulatory frameworks across all areas of the modern economy are fit-for-purpose. This includes key regulatory reforms in telecommunications, and data sharing and privacy that are mentioned in the Infrastructure and Data sections of this agenda.

Below is a summary of major government work on getting regulatory settings correct; for a list of all government initiatives, refer to Australia's Tech Future website.

Improving the quality of regulation

The Government is continuously improving the quality of its regulation, including minimising the regulation on businesses, community organisations and individuals. The Deregulation Agenda established in 2013 has put in place frameworks to help ensure regulatory regimes remain fit for purpose in the 21st century.

Harmonising Australian regulations and standards

The Government encourages and supports Australia's states and territories to adopt, or recognise as equivalent, each other's regulations and standards. This lowers the costs for businesses. It also promotes innovation and growth. One-third of the 5,600 Australian Standards are referenced in Commonwealth, state and territory regulation.

The Government will continue the ongoing effort to ensure that Australia has the right regulatory environment to enable legislation that is 'digital ready'.

Implementing Australia's Trade Modernisation Agenda

The Government's Trade Modernisation Agenda is supporting businesses, particularly micro and small businesses, to engage and compete on a global scale. This 10-year agenda will transform and simplify Australia's international supply chain, and will provide businesses with a single window for international trade.

The Government has mature artificial intelligence capabilities to support visa application assessment functions and is exploring how blockchain distributed ledger technology could be integrated into Australia's trade ecosystem.

Shaping international standards and digital trade rules

International standards and digital trade rules are important for maximising the benefits for Australian businesses in the modern economy (read more in the Digital Trade Chapter of Australia's International Cyber Engagement Strategy).

Australia is at the forefront of shaping international rules and standards through many channels including:

- the World Trade Organization (WTO)
- free trade agreements
- the Asia-Pacific Economic Cooperation (APEC) forum
- the G20
- the OECD.

Australia's Leadership on International Digital Trade Rules and Standards

For example, the Government is working:

- to update international trade rules on e-commerce through the WTO and Australia's FTAs to ensure they keep pace with technological change, including as part of the WTO Joint Statement on Electronic Commerce to build trust and confidence in the online marketplace and ensure effective protection for personal information
- with ASEAN Member States to develop, adopt and use international standards that promote digital trade and support inclusive economic growth in the region (the ASEAN–Australia Digital Trade Standards initiative was announced in March 2018)

Case Study: Standards Australia leading the development of international standards for blockchain

Standards Australia is leading the development of international blockchain standards. Having already produced a blockchain and industry standards roadmap, Standards Australia was appointed by the International Organisation for Standardisation (ISO) to lead a technical committee on the development of international standards for blockchain. The Committee already has 39 different contributing countries, with 11 Standards currently at various stages of development. The Australian Government is contributing funding to the development of these standards.

Leading the development of international Blockchain standards

Good industry standards for blockchain technology are critical to fostering an innovative and competitive environment and establishing market confidence in the technology.

Australia is leading the development of new international standards for blockchain technologies.

The Government is also supporting research to better understand the technological and legal risks associated with blockchain. An industry led Blockchain Roadmap will outline how blockchain technologies can be used to investment opportunities for Australia.

Reviewing Australia's corporate tax system for the digital economy

The Government is working to address the challenges the digital economy presents to the tax system. Much of the current international tax framework was developed in the 1920s, and is based on the location of physical assets and income sources. We now live in a world where businesses operate in a global market that is increasingly digital – they may not even have a physical office or staff here in Australia.

The Government is consulting broadly and exploring options to move towards a fairer and more sustainable tax system that address the way that digital technology is transforming our economy.

Implementing the Strategy

We all have a role to play

To reap the benefits that new technologies provide and make sure no-one is left behind we must work together.

Many Australian businesses are taking action to take advantage of the opportunities and to compete internationally in a global digital economy. This includes:

- planning for an increasingly digital future
- developing new business models and driving the uptake of new technologies
- investing in digital infrastructure to support their productivity and competitiveness
- investing in their people by developing the digital skills of their staff; and/or
- investing in protecting their business and customers from cybercrime and data breaches.

Individuals also have a role to play to maximise opportunities in a digital economy. Many Australians are:

- increasing their use of digital technology to interact with each other, businesses and governments
- seeking educational and skills development that will position them for future jobs
- protecting themselves from online threats and misuse of their data.

The Government provides the enabling environment for the Australian economy. To spread the benefits of the digital economy and maximise the opportunities for all Australians, the Government will:

- ensure education and training meets current and future needs, to help businesses take advantage of digital opportunities and leave no Australian behind
- facilitate investment in enabling digital infrastructure
- improve access to, and use of, data while maintaining strong data safeguards
- improve trust, confidence and security around digital activities
- ensure regulatory frameworks are flexible, adaptable and fit-for-purpose
- deliver digital government services that are secure, fast and easy to use
- champion an open, free and secure cyberspace internationally.

This is an ongoing conversation

The Australia's Tech Future agenda has been developed with help from members of the community, businesses, industry groups, states and territories and the research sector.

This partnership will continue.

The Government will build on the momentum created by the launch of Australia's Tech Future to drive meaningful and lasting engagement by:

1. Maintaining collaboration with industry, community groups and academia
2. Working closely with the governments of states and territories
3. Tracking Australia's performance.

These actions are interdependent and collectively form an ongoing plan to both communicate and engage on Australia's Tech Future.

Collaborating with industry, community groups and academia

The Government will continue to work with key industry, community and academia stakeholders to discuss, coordinate and collaborate on activities to strengthen Australia's tech future. The purpose of this will be to work together to coordinate action, inform the development of future government policies, and encourage further investment.

This collaboration will identify opportunities where industry expertise can drive benefits for Australian businesses that also flow to the broader community. The community sector will also have the opportunity to engage with Government on key issues including on action to reduce the digital divide for people with lower levels of participation in the digital economy. The Government will work with academia to capture the expertise that the sector can bring to a range of digital economy issues.

This work will be closely connected to digital economy work already under way across government to ensure it can contribute in a meaningful way to address priority areas for Government.

Working closely with states and territories

The Commonwealth Government will continue to engage with states and territories both bilaterally and through the COAG Industry and Skills Council to progress the agenda for Australia's Tech Future. By sharing ideas and working together governments can boost the opportunities for businesses and the community.

Tracking Australia's performance

The implementation of *Australia's Tech Future* will include monitoring how Australia is tracking against our stated objectives and outcomes to identify where to further focus efforts.

The Government will track Australia's performance relative to other countries in key areas where global metrics exist.

This is essential to ensure the Government's agenda remains fit for purpose, with a nuanced approach that delivers the best results for Australians. Doing so represents global best practice for capturing benefits of technology. For example, the European Commission tracks the performance of EU Member States in digital connectivity, digital skills online activity, the digitisation of businesses and digital public services.

Our shared success will be measured by Australians' ability to engage with technology, ensuring Australia's economic base is diverse, resilient and dynamic to secure jobs and prosperity.

01 Mathematical Sciences 104

02 Physical Sciences 111

03 Chemical Sciences 118

04 Earth Sciences 126

05 Environmental Sciences 133

06 Biological Sciences 138

07 Agricultural and Veterinary Sciences 146

08 Information and Computing Sciences 154

09 Engineering 162

10 Technology 175

11 Medical and Health Sciences 183

SECTION 3

Results by Fields of Research Code

12 Built Environment and Design 196

13 Education 202

14 Economics 207

15 Commerce, Management, Tourism and Services 212

16 Studies in Human Society 220

17 Psychology and Cognitive Sciences 227

18 Law and Legal Studies 231

19 Studies in Creative Arts and Writing 235

20 Language, Communication and Culture 242

21 History and Archaeology 249

22 Philosophy and Religious Studies 254

Section 3 provides a summary of ERA 2015 results and activity by aggegated four–digit FoR code.
The four–digit codes that sit within each two–digit FoR are listed at the beginning of each discipline in this section.

Comparative information is presented for each discipline at the four–digit level and includes:

- Fields of Research overview with the aggregated four–digit data for each ERA indicator
- the distribution table and chart showing the number of UoEs per rating scale score (including the two– and four–digit ratings for that FoR)
- research outputs submitted by type (chart and table)
- research income by year–all categories ($) (chart and table)
- staffing profile by academic level (chart and table)
- patent profile (where applicable) (table only)
- research commercialisation income by year ($) (chart and table)

Following these summary charts, an overview table for each individual four–digit FoR code is presented as well as doughnut charts showing the distribution of output types and the number of UoEs by rating for that four–digit code.

Notes:

- *Where an indicator does not apply to a particular discipline '–' is shown. A '0' represents that the indicator applies to the discipline, but no data was submitted.*
- *Percentages <1 not shown on doughnut charts for research outputs by type.*
- *Totals in the doughnut charts may not sum to 100% due to rounding.*

01 MATHEMATICAL SCIENCES

Mathematical Sciences is comprised of the following four–digit codes:

0101 Pure Mathematics
0102 Applied Mathematics
0103 Numerical and Computational Mathematics
0104 Statistics
0105 Mathematical Physics
0199 Other Mathematical Sciences

18 out of 26 two–digit UoEs and 48 out of 59 four–digit UoEs assessed were rated above world standard

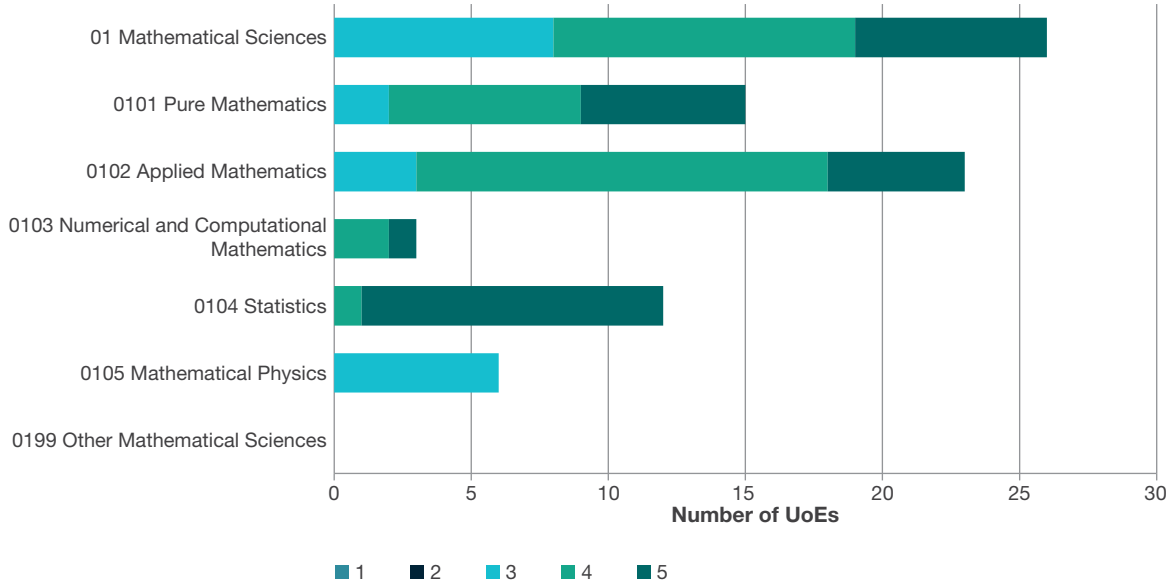
FoR Overview

Mathematical Sciences (01) accounted for approximately two per cent of the research outputs submitted to ERA 2015. The most common research output type in Mathematical Sciences was journal articles. The staffing profile showed similar staffing levels and spread for Pure Mathematics (0101) and Applied Mathematics (0102) for academic levels B–E. These two four–digit codes showed the highest number of research outputs and research income. Research commercialisation income was particularly strong in Applied Mathematics (0102).

Indicator	No.
Research outputs	10,632.6
Research income	$150,725,932
FTEs	922.6
Esteem count	147.2
Patents	0.2
Research commercialisation income	$162,956

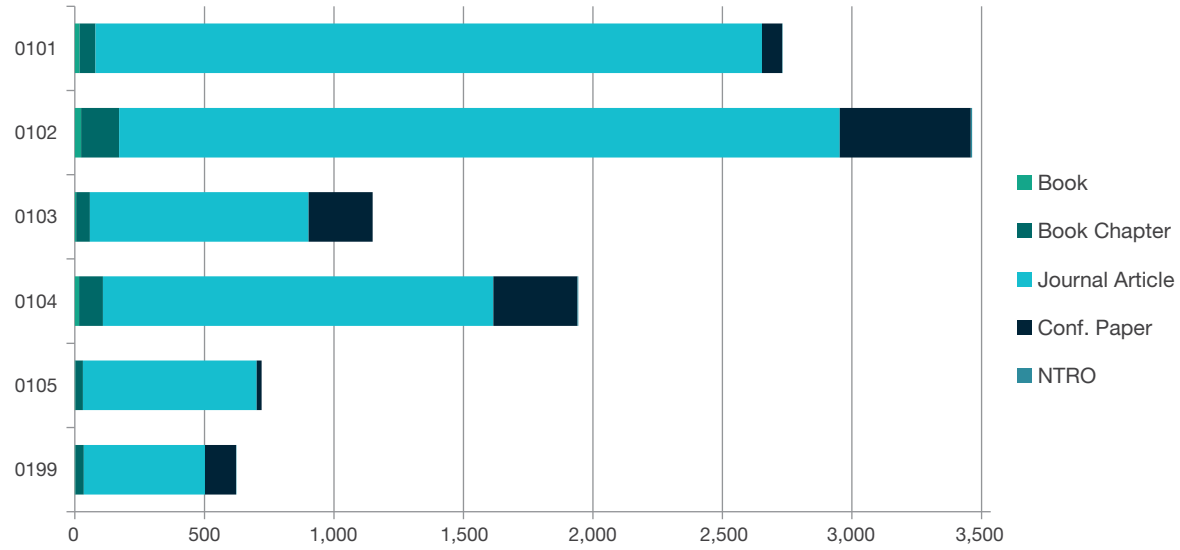
Rating	Distribution	
	Two–digit	Four–digit
5	7	23
4	11	25
3	8	11
2	0	0
1	0	0
Total	**26**	**59**

NUMBER OF UOES PER RATING SCALE SCORE



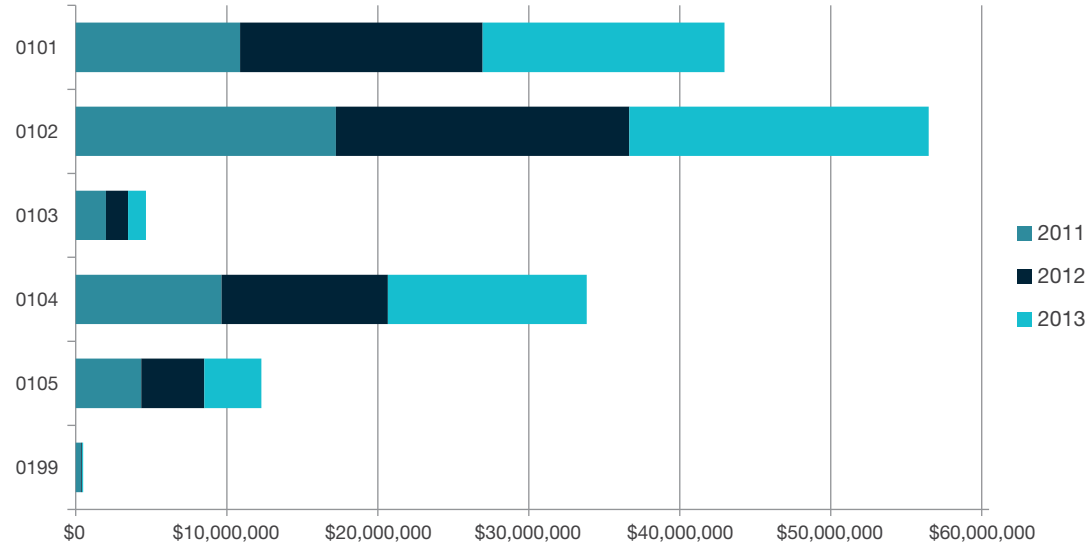
Note: 01 Mathematical Sciences shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
0101 Pure Mathematics	17.7	61.6	2,573.3	78.5	1.0	2,732.0
0102 Applied Mathematics	23.9	146.6	2,782.0	506.3	5.0	3,463.8
0103 Numerical and Computational Mathematics	4.5	52.9	844.8	247.1	0.0	1,149.4
0104 Statistics	16.4	91.6	1,507.5	324.4	3.3	1,943.3
0105 Mathematical Physics	1.8	28.7	670.9	19.0	0.0	720.3
0199 Other Mathematical Sciences	2.0	32.3	467.7	119.8	2.0	623.8
Total	**66.3**	**413.6**	**8,846.3**	**1,295.2**	**11.3**	**10,632.6**

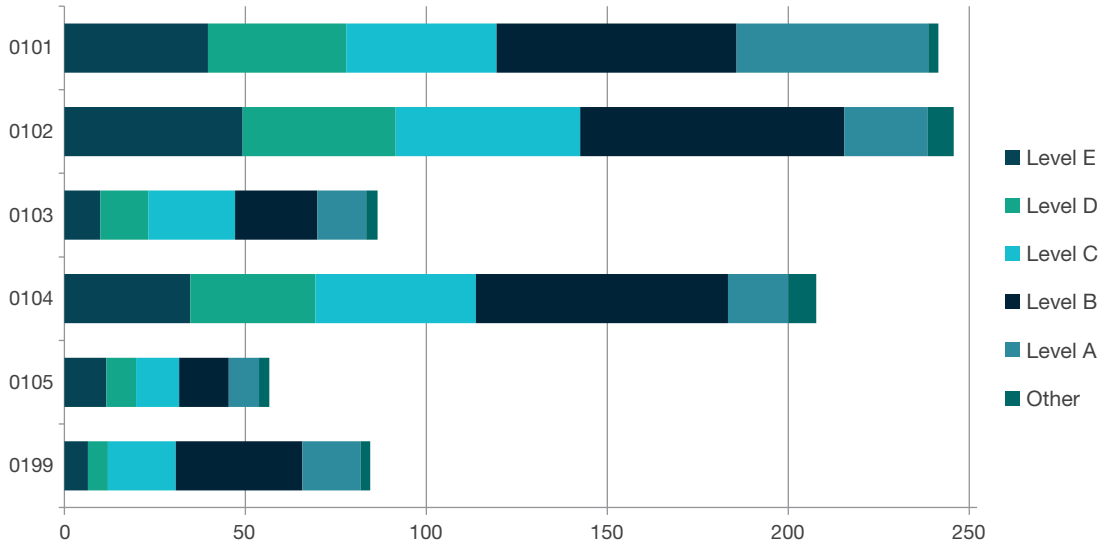
RESEARCH INCOME BY YEAR — ALL CATEGORIES ($)



Continued

FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0101 Pure Mathematics	10,879,050	16,063,937	16,021,651	42,964,638
0102 Applied Mathematics	17,232,269	19,421,834	19,838,752	56,492,855
0103 Numerical and Computational Mathematics	1,996,702	1,470,959	1,175,071	4,642,731
0104 Statistics	9,649,913	11,019,106	13,165,920	33,834,938
0105 Mathematical Physics	4,342,354	4,168,538	3,786,661	12,297,553
0199 Other Mathematical Sciences	366,382	53,676	73,158	493,216
Total	**44,466,669**	**52,198,050**	**54,061,213**	**150,725,932**

STAFFING PROFILE BY ACADEMIC LEVEL

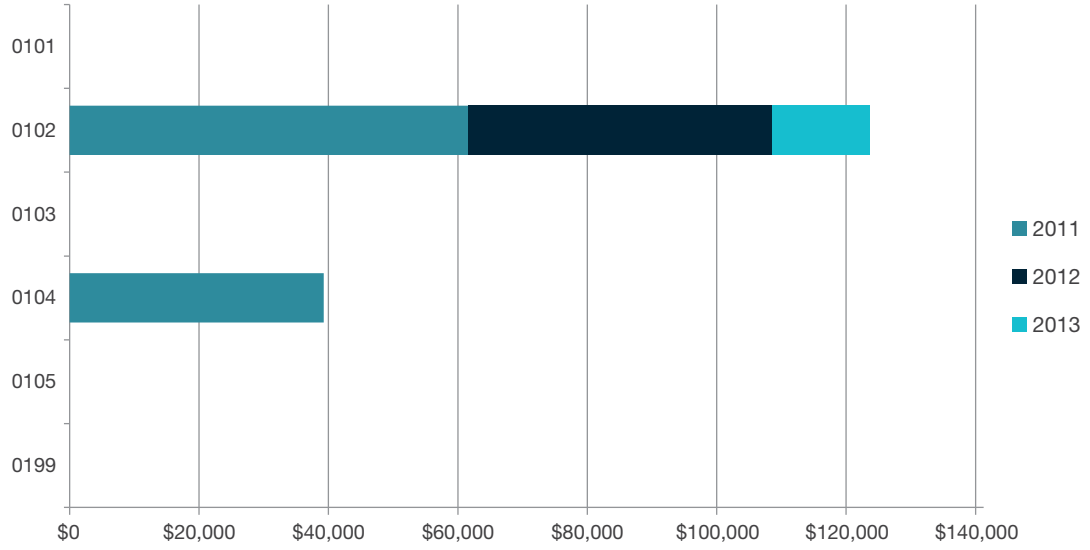


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
0101 Pure Mathematics	39.7	38.2	41.5	66.4	52.9	2.8	241.5
0102 Applied Mathematics	49.3	42.2	51.0	72.9	23.0	7.2	245.7
0103 Numerical and Computational Mathematics	10.0	13.2	24.0	22.8	13.5	3.1	86.5
0104 Statistics	34.8	34.6	44.3	69.6	16.7	7.8	207.8
0105 Mathematical Physics	11.6	8.2	11.9	13.7	8.4	2.9	56.6
0199 Other Mathematical Sciences	6.5	5.5	18.8	35.0	16.1	2.7	84.5
Total	**151.8**	**142.0**	**191.5**	**280.3**	**130.5**	**26.4**	**922.6**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total
0101 Pure Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0102 Applied Mathematics	0.0	0.0	0.0	0.0	0.2	0.0	0.2
0103 Numerical and Computational Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0104 Statistics	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0105 Mathematical Physics	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0199 Other Mathematical Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.0**	**0.2**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



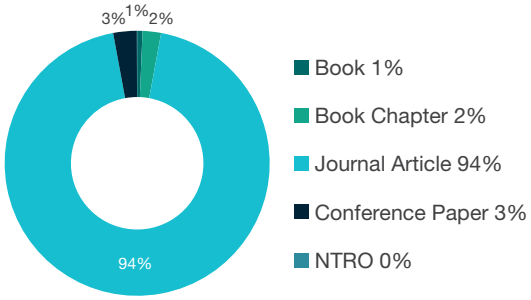
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0101 Pure Mathematics	0	0	0	0
0102 Applied Mathematics	61,674	47,025	14,980	123,679
0103 Numerical and Computational Mathematics	0	0	0	0
0104 Statistics	39,278	0	0	39,278
0105 Mathematical Physics	0	0	0	0
0199 Other Mathematical Sciences	0	0	0	0
Total	**100,952**	**47,025**	**14,980**	**162,956**

0101 Pure Mathematics

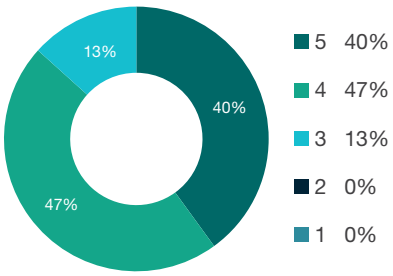
Indicator	No.
Research outputs	2,732.0
Research income	$42,964,638
FTEs	241.5
Esteem count	67.2
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	6
4	7
3	2
2	0
1	0
Total	**15**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

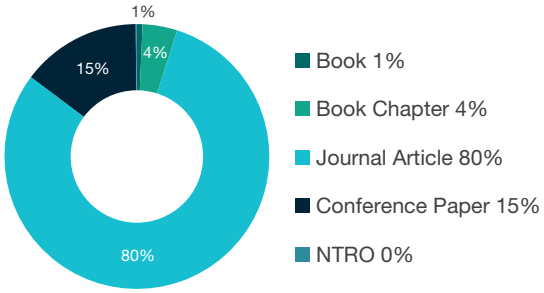


0102 Applied Mathematics

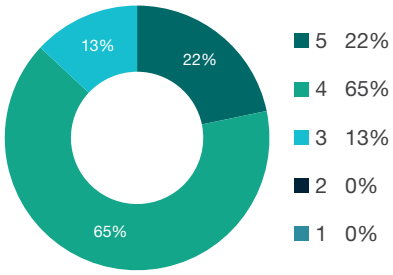
Indicator	No.
Research outputs	3,463.8
Research income	$56,492,855
FTEs	245.7
Esteem count	38.0
Patents	0.2
Research commercialisation income	$123,679

Rating	Distribution
5	5
4	15
3	3
2	0
1	0
Total	**23**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

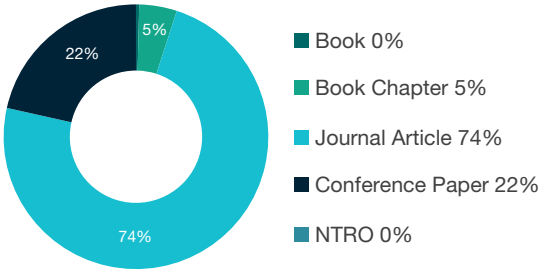


0103 Numerical and Computational Mathematics

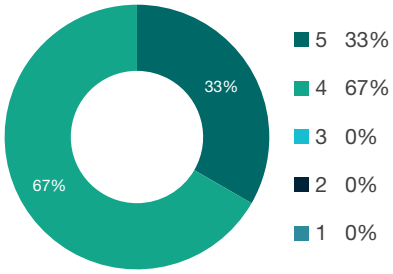
Indicator	No.
Research outputs	1,149.4
Research income	$4,642,731
FTEs	86.5
Esteem count	5.8
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	1
4	2
3	0
2	0
1	0
Total	**3**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

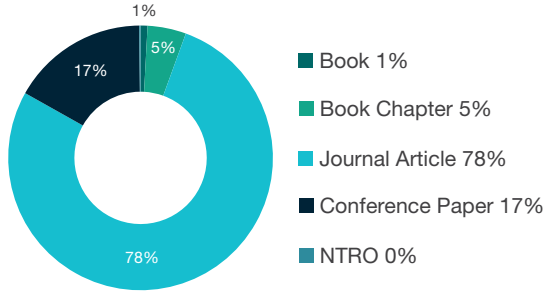


0104 Statistics

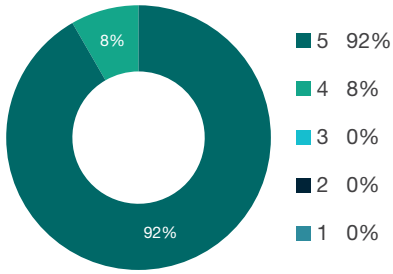
Indicator	No.
Research outputs	1,943.3
Research income	$33,834,938
FTEs	207.8
Esteem count	20.2
Patents	0.0
Research commercialisation income	$39,278

Rating	Distribution
5	11
4	1
3	0
2	0
1	0
Total	**12**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

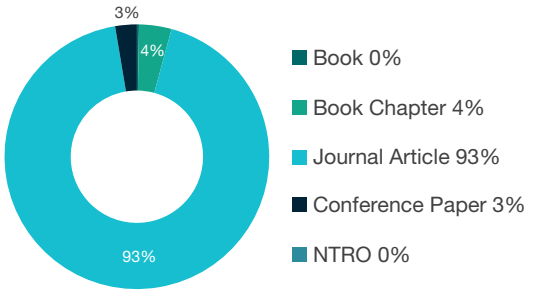


0105 Mathematical Physics

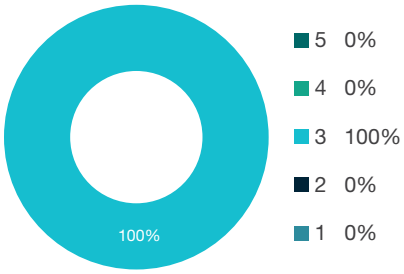
Indicator	No.
Research outputs	720.3
Research income	$12,297,553
FTEs	56.6
Esteem count	15.1
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	6
2	0
1	0
Total	**6**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

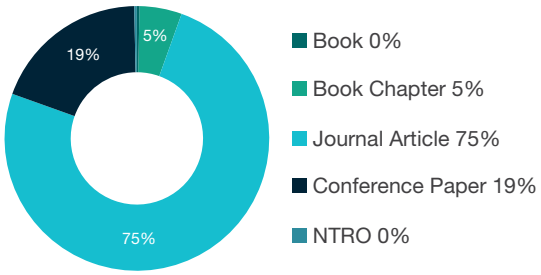


0199 Other Mathematical Sciences

Indicator	No.
Research outputs	623.8
Research income	$493,216
FTEs	84.5
Esteem count	1.0
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 0199.

02 PHYSICAL SCIENCES

Physical Sciences is comprised of the following four–digit codes:

0201 Astronomical and Space Sciences
0202 Atomic, Molecular, Nuclear, Particle and Plasma Physics
0203 Classical Physics
0204 Condensed Matter Physics
0205 Optical Physics
0206 Quantum Physics
0299 Other Physical Sciences

15 out of 23 two–digit UoEs and 60 out of 65 four–digit UoEs assessed were rated above world standard

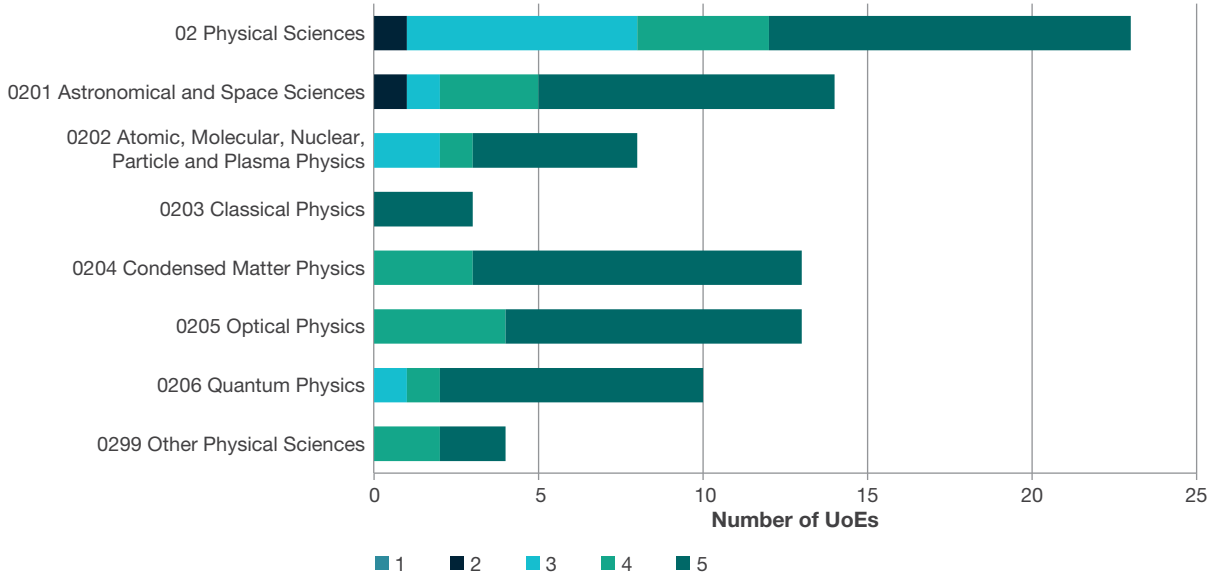
FoR Overview

Physical Sciences (02) accounted for approximately four per cent of the research outputs submitted to ERA 2015. The majority of Physical Sciences outputs were journal articles (84 per cent), while 15 per cent of the research outputs were conference papers. Astronomical and Space Sciences (0201) had the highest number of research outputs, research income levels, number of staff, and research commercialisation income. Optical Physics (0205) was the next highest four–digit code for these indicators, and in addition, almost half of the patents submitted in Physical Sciences were assigned to Optical Physics (0205).

Indicator	No.
Research outputs	16,990.8
Research income	$354,091,710
FTEs	1,148.8
Esteem count	243.9
Patents	44.6
Research commercialisation income	$2,593,697

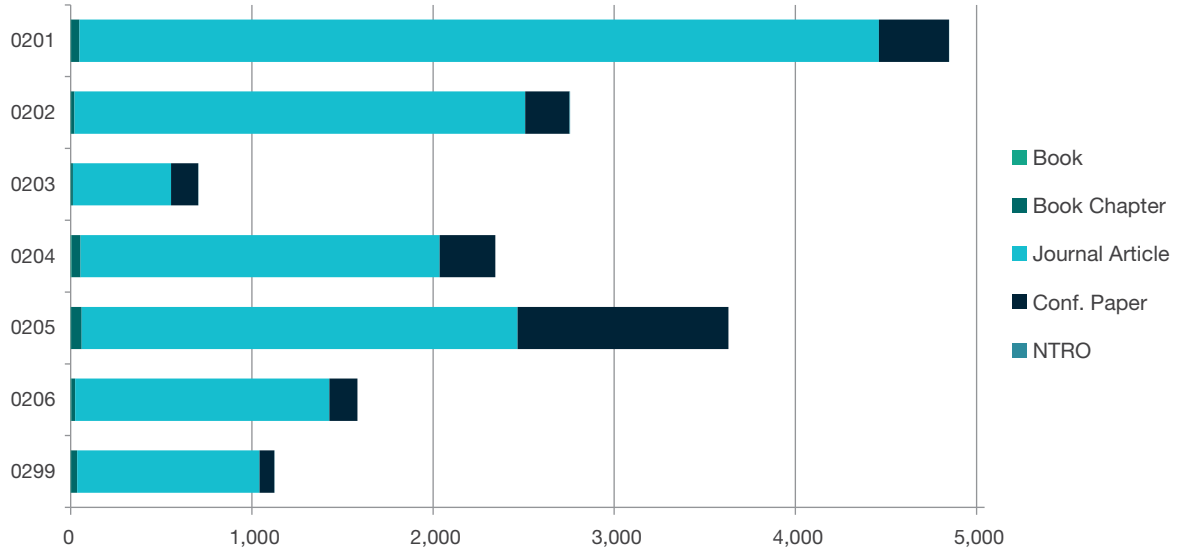
Rating	Distribution	
	Two–digit	Four–digit
5	11	46
4	4	14
3	7	4
2	1	1
1	0	0
Total	**23**	**65**

NUMBER OF UOES PER RATING SCALE SCORE



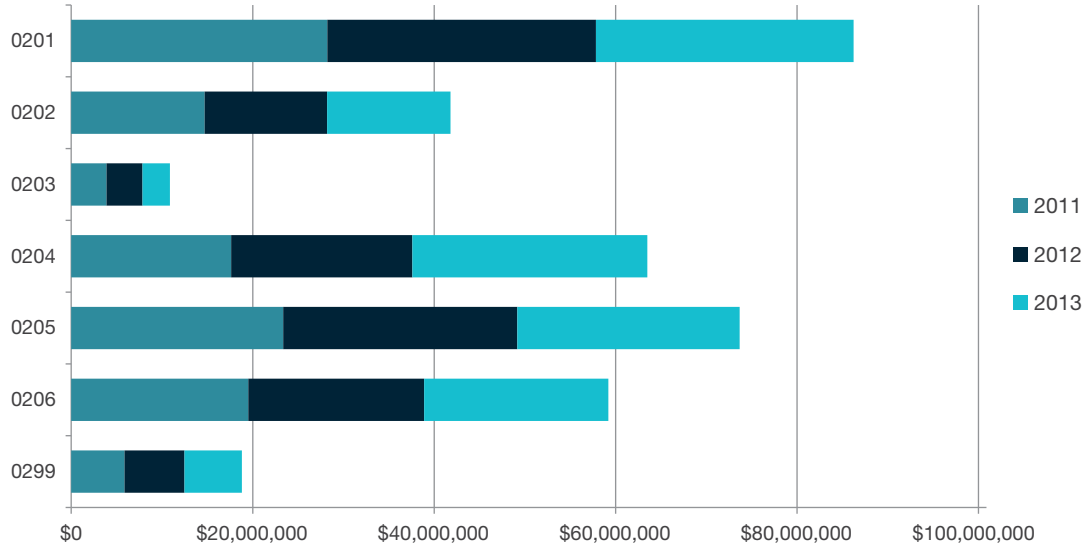
Note: 02 Physical Sciences shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



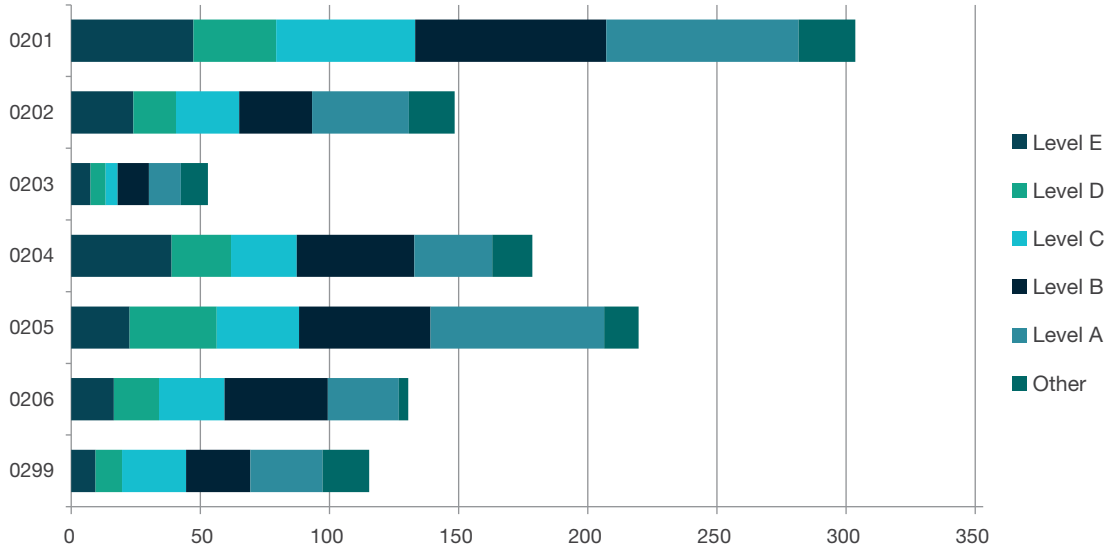
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
0201 Astronomical and Space Sciences	2.3	44.9	4,413.6	387.3	1.0	4,849.1
0202 Atomic, Molecular, Nuclear, Particle and Plasma Physics	2.5	17.6	2,488.3	243.9	4.0	2,756.4
0203 Classical Physics	2.0	10.3	540.8	150.1	1.0	704.2
0204 Condensed Matter Physics	4.5	49.8	1,982.2	306.9	0.0	2,343.4
0205 Optical Physics	2.2	57.9	2,406.6	1,163.6	0.0	3,630.3
0206 Quantum Physics	3.4	21.0	1,403.7	154.0	0.0	1,582.0
0299 Other Physical Sciences	2.3	33.0	1,007.4	81.8	1.0	1,125.4
Total	**19.2**	**234.4**	**14,242.6**	**2,487.6**	**7.0**	**16,990.8**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0201 Astronomical and Space Sciences	28,217,940	29,612,560	28,396,820	86,227,319
0202 Atomic, Molecular, Nuclear, Particle and Plasma Physics	14,697,295	13,503,247	13,592,588	41,793,129
0203 Classical Physics	3,883,590	3,977,099	3,020,368	10,881,057
0204 Condensed Matter Physics	17,630,495	19,974,680	25,895,499	63,500,674
0205 Optical Physics	23,357,147	25,803,275	24,505,585	73,666,007
0206 Quantum Physics	19,516,724	19,374,514	20,318,763	59,210,001
0299 Other Physical Sciences	5,866,610	6,619,185	6,327,727	18,813,523
Total	**113,169,800**	**118,864,560**	**122,057,349**	**354,091,710**

STAFFING PROFILE BY ACADEMIC LEVEL

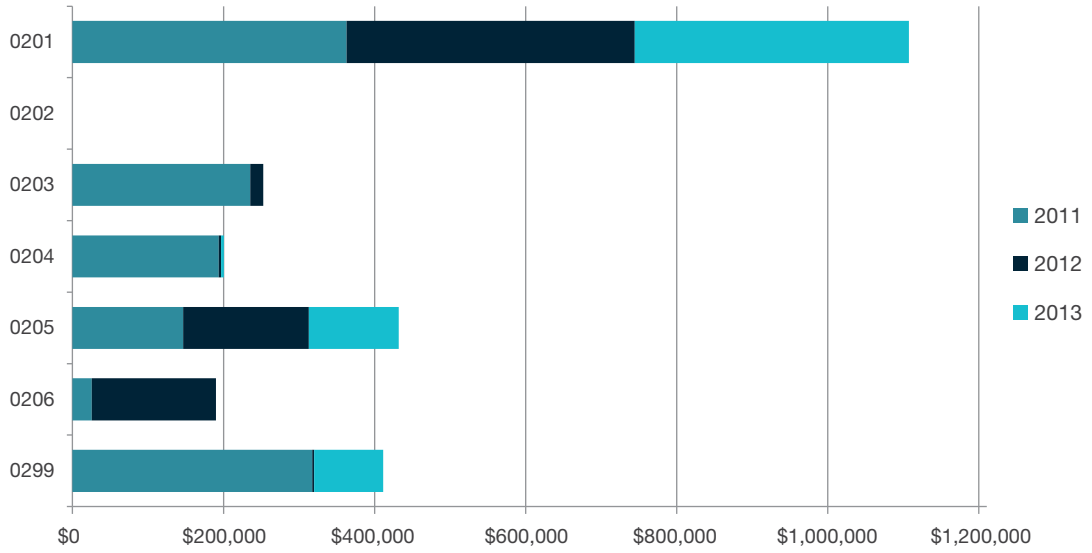


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
0201 Astronomical and Space Sciences	47.3	32.0	53.8	73.9	74.5	22.0	303.6
0202 Atomic, Molecular, Nuclear, Particle and Plasma Physics	24.0	16.6	24.4	28.2	37.4	17.8	148.4
0203 Classical Physics	7.4	5.9	4.6	12.1	12.4	10.5	52.9
0204 Condensed Matter Physics	38.9	23.0	25.5	45.5	30.1	15.6	178.5
0205 Optical Physics	22.6	33.7	31.9	50.9	67.3	13.3	219.6
0206 Quantum Physics	16.4	17.5	25.3	40.0	27.5	3.6	130.4
0299 Other Physical Sciences	9.4	10.2	24.8	24.9	27.9	18.0	115.3
Total	**166.0**	**138.8**	**190.4**	**275.6**	**277.2**	**100.8**	**1,148.8**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total
0201 Astronomical and Space Sciences	0.0	0.0	0.0	0.0	1.0	0.0	1.0
0202 Atomic, Molecular, Nuclear, Particle and Plasma Physics	1.3	1.5	0.5	1.3	0.8	0.0	5.5
0203 Classical Physics	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0204 Condensed Matter Physics	1.2	1.7	2.5	1.0	0.5	0.0	6.8
0205 Optical Physics	8.0	6.0	1.0	1.6	4.3	0.0	20.9
0206 Quantum Physics	1.3	1.0	0.0	0.3	0.3	0.0	3.0
0299 Other Physical Sciences	0.7	3.7	0.0	0.0	3.0	0.0	7.4
Total	**12.5**	**13.8**	**4.0**	**4.3**	**10.0**	**0.0**	**44.6**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



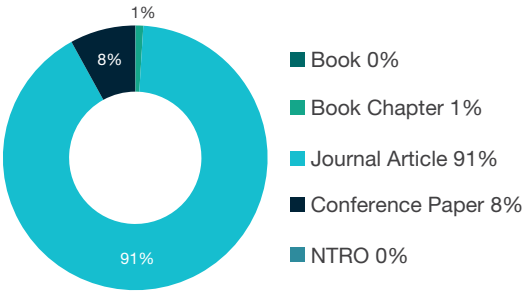
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0201 Astronomical and Space Sciences	362,927	381,467	363,002	1,107,396
0202 Atomic, Molecular, Nuclear, Particle and Plasma Physics	0	0	0	0
0203 Classical Physics	235,414	17,057	0	252,472
0204 Condensed Matter Physics	193,594	3,289	3,524	200,406
0205 Optical Physics	146,606	166,316	119,059	431,981
0206 Quantum Physics	25,656	164,415	0	190,071
0299 Other Physical Sciences	317,338	2,661	91,372	411,371
Total	**1,281,535**	**735,205**	**576,957**	**2,593,697**

0201 Astronomical and Space Sciences

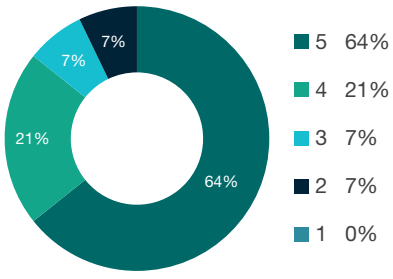
Indicator	No.
Research outputs	4,849.1
Research income	$86,227,319
FTEs	303.6
Esteem count	59.4
Patents	1.0
Research commercialisation income	$1,107,396

Rating	Distribution
5	9
4	3
3	1
2	1
1	0
Total	**14**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

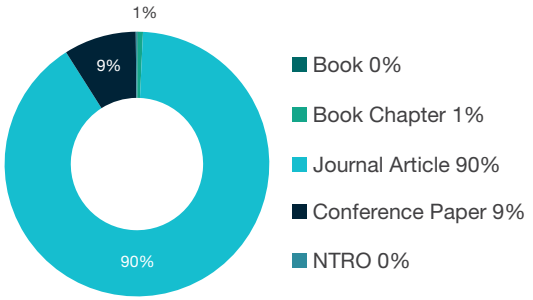


0202 Atomic, Molecular, Nuclear, Particle and Plasma Physics

Indicator	No.
Research outputs	2,756.4
Research income	$41,793,129
FTEs	148.4
Esteem count	32.2
Patents	5.5
Research commercialisation income	$0

Rating	Distribution
5	5
4	1
3	2
2	0
1	0
Total	**8**

RESEARCH OUTPUTS BY TYPE



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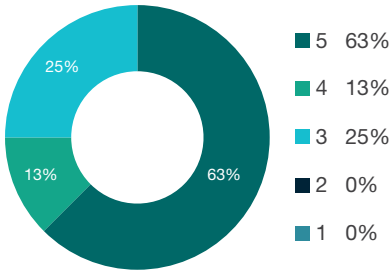
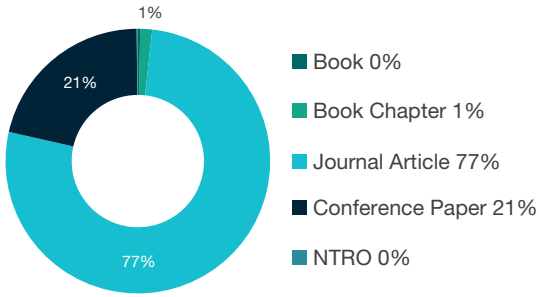


0203 Classical Physics

Indicator	No.
Research outputs	704.2
Research income	$10,881,057
FTEs	52.9
Esteem count	7.5
Patents	0.0
Research commercialisation income	$252,472

Rating	Distribution
5	3
4	0
3	0
2	0
1	0
Total	**3**

RESEARCH OUTPUTS BY TYPE



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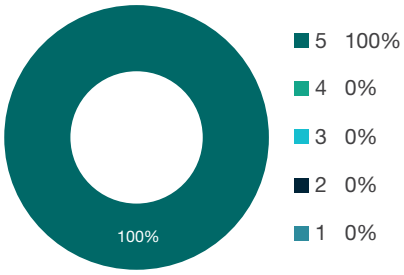
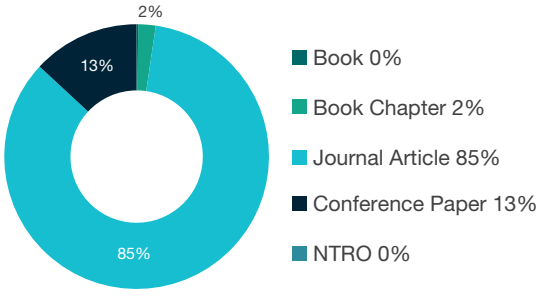


0204 Condensed Matter Physics

Indicator	No.
Research outputs	2,343.4
Research income	$63,500,674
FTEs	178.5
Esteem count	47.0
Patents	6.8
Research commercialisation income	$200,406

Rating	Distribution
5	10
4	3
3	0
2	0
1	0
Total	**13**

RESEARCH OUTPUTS BY TYPE



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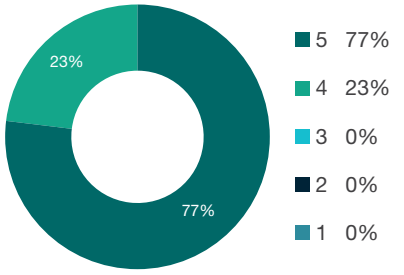
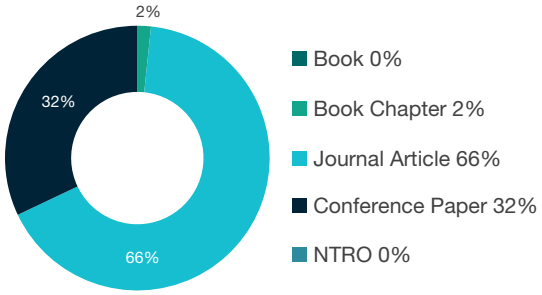


0205 Optical Physics

Indicator	No.
Research outputs	3,630.3
Research income	$73,666,007
FTEs	219.6
Esteem count	54.1
Patents	20.9
Research commercialisation income	$431,981

Rating	Distribution
5	9
4	4
3	0
2	0
1	0
Total	**13**

RESEARCH OUTPUTS BY TYPE



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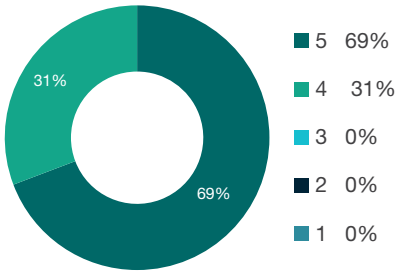
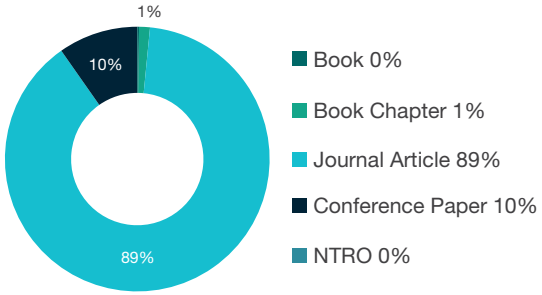


0206 Quantum Physics

Indicator	No.
Research outputs	1,582.0
Research income	$59,210,001
FTEs	130.4
Esteem count	39.3
Patents	3.0
Research commercialisation income	$190,071

Rating	Distribution
5	8
4	1
3	1
2	0
1	0
Total	**10**

RESEARCH OUTPUTS BY TYPE



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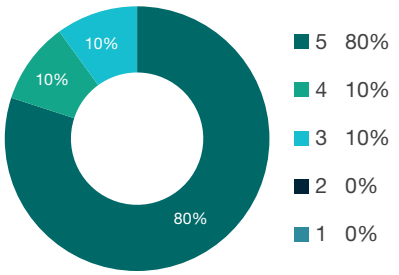
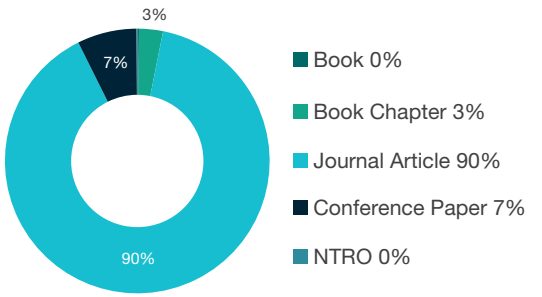


0299 Other Physical Sciences

Indicator	No.
Research outputs	1,125.4
Research income	$18,813,523
FTEs	115.3
Esteem count	4.3
Patents	7.4
Research commercialisation income	$411,371

Rating	Distribution
5	2
4	2
3	0
2	0
1	0
Total	**4**

RESEARCH OUTPUTS BY TYPE



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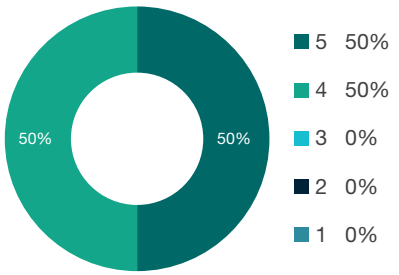


03 CHEMICAL SCIENCES

Chemical Sciences is comprised of the following four–digit codes:

0301 Analytical Chemistry

0302 Inorganic Chemistry

0303 Macromolecular and Materials Chemistry

0304 Medicinal and Biomolecular Chemistry

0305 Organic Chemistry

0306 Physical Chemistry (Incl. Structural)

0307 Theoretical and Computational Chemistry

0399 Other Chemical Sciences

19 out of 26 two–digit UoEs and 79 out of 94 four–digit UoEs assessed were rated above world standard

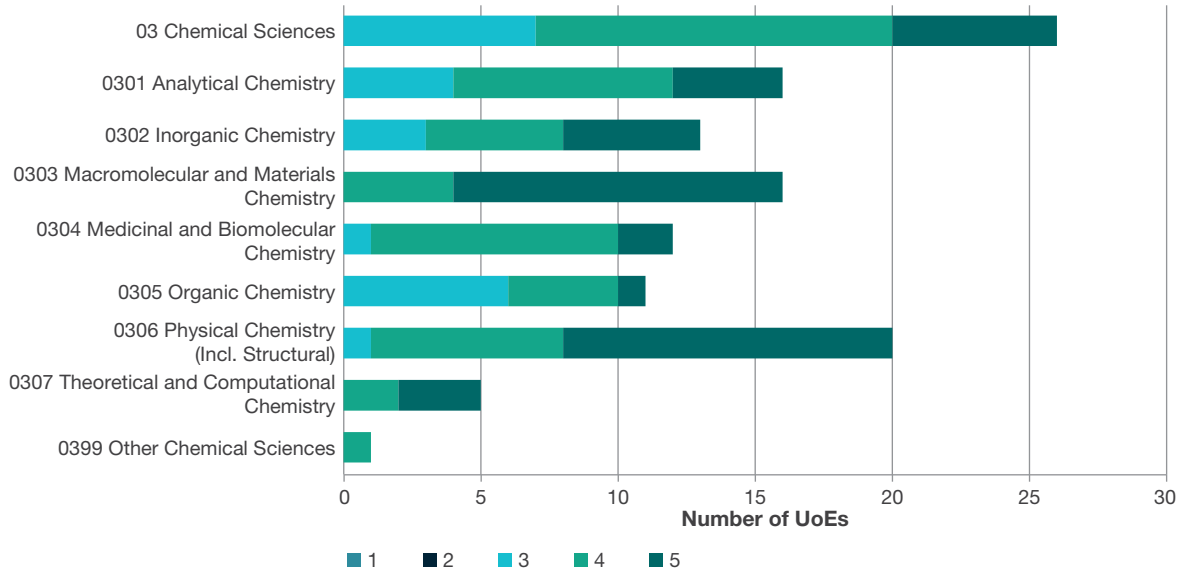
FoR Overview

Chemical Sciences (03) accounted for approximately four per cent of research outputs submitted to ERA 2015. Journal articles were the predominant research output type. Almost 10 per cent of the patents submitted to ERA 2015 were assigned to the Chemical Sciences. Medicinal and Biomolecular Chemistry (0304) and Physical Chemistry (Incl. Structural) (0306) showed the highest staffing levels and research income. Theoretical and Computational Chemistry (0307) contributed the most research commercialisation income.

Indicator	No.
Research outputs	15,288.8
Research income	$335,252,137
FTEs	1,333.9
Esteem count	209.5
Patents	92.9
Research commercialisation income	$4,158,444

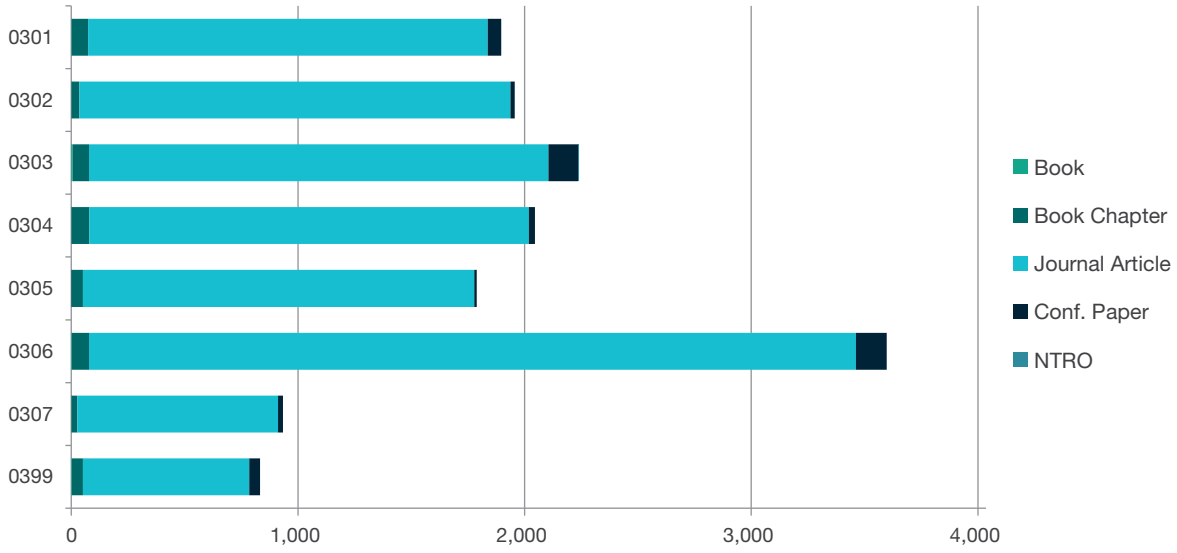
Rating	Distribution	
	Two–digit	Four–digit
5	6	39
4	13	40
3	7	15
2	0	0
1	0	0
Total	**26**	**94**

NUMBER OF UOES PER RATING SCALE SCORE



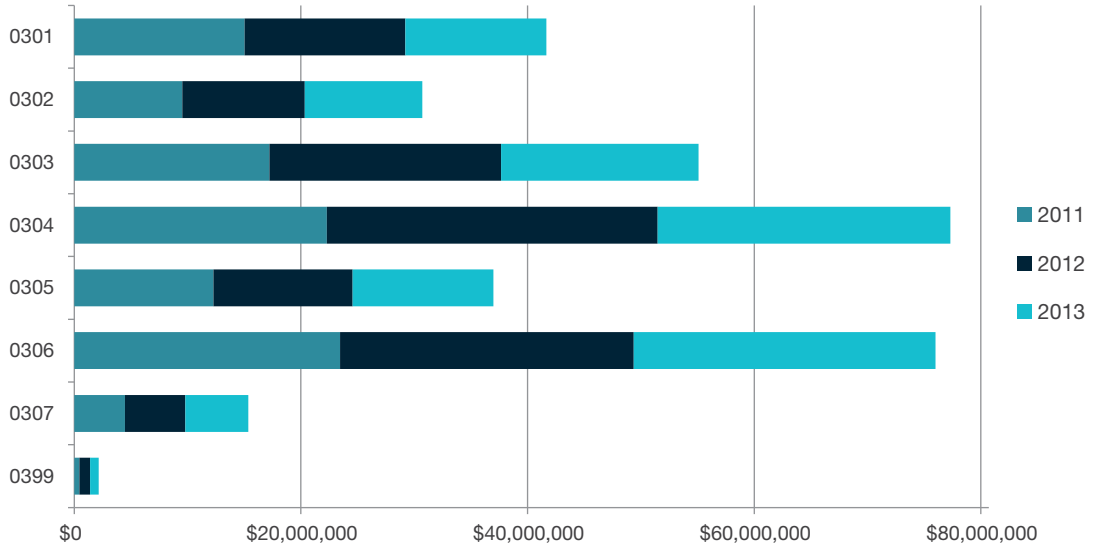
Note: 03 Chemical Sciences shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



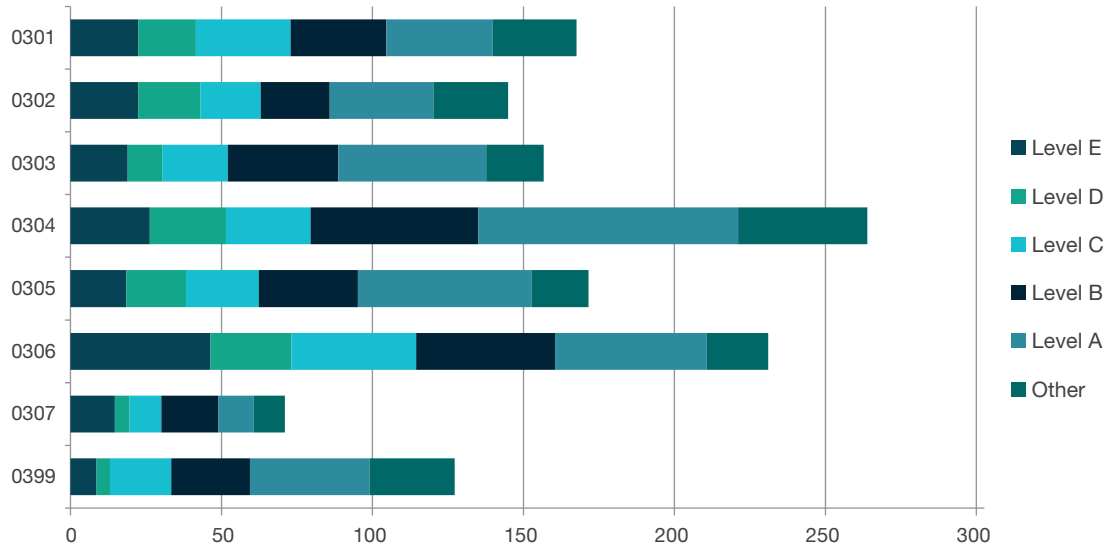
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
0301 Analytical Chemistry	2.0	71.6	1,763.4	60.4	0.0	1,897.3
0302 Inorganic Chemistry	1.0	34.4	1,901.8	19.0	0.0	1,956.2
0303 Macromolecular and Materials Chemistry	5.6	72.2	2,027.0	131.3	0.5	2,236.5
0304 Medicinal and Biomolecular Chemistry	1.0	77.5	1,940.2	27.1	0.0	2,045.9
0305 Organic Chemistry	0.0	51.0	1,726.4	11.5	0.0	1,788.9
0306 Physical Chemistry (Incl. Structural)	2.5	75.3	3,384.1	135.5	0.0	3,597.4
0307 Theoretical and Computational Chemistry	1.0	25.5	885.8	21.8	0.0	934.1
0399 Other Chemical Sciences	3.0	48.3	733.8	47.5	0.0	832.6
Total	**16.1**	**455.7**	**14,362.5**	**454.1**	**0.5**	**15,288.8**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0301 Analytical Chemistry	15,031,114	14,185,840	12,436,886	41,653,841
0302 Inorganic Chemistry	9,545,438	10,794,724	10,370,406	30,710,568
0303 Macromolecular and Materials Chemistry	17,222,517	20,444,515	17,409,894	55,076,926
0304 Medicinal and Biomolecular Chemistry	22,281,634	29,196,075	25,832,156	77,309,865
0305 Organic Chemistry	12,283,906	12,279,874	12,423,681	36,987,461
0306 Physical Chemistry (Incl. Structural)	23,449,160	25,928,450	26,610,928	75,988,538
0307 Theoretical and Computational Chemistry	4,482,523	5,324,966	5,554,250	15,361,739
0399 Other Chemical Sciences	464,371	924,176	774,652	2,163,199
Total	**104,760,664**	**119,078,619**	**111,412,854**	**335,252,137**

STAFFING PROFILE BY ACADEMIC LEVEL

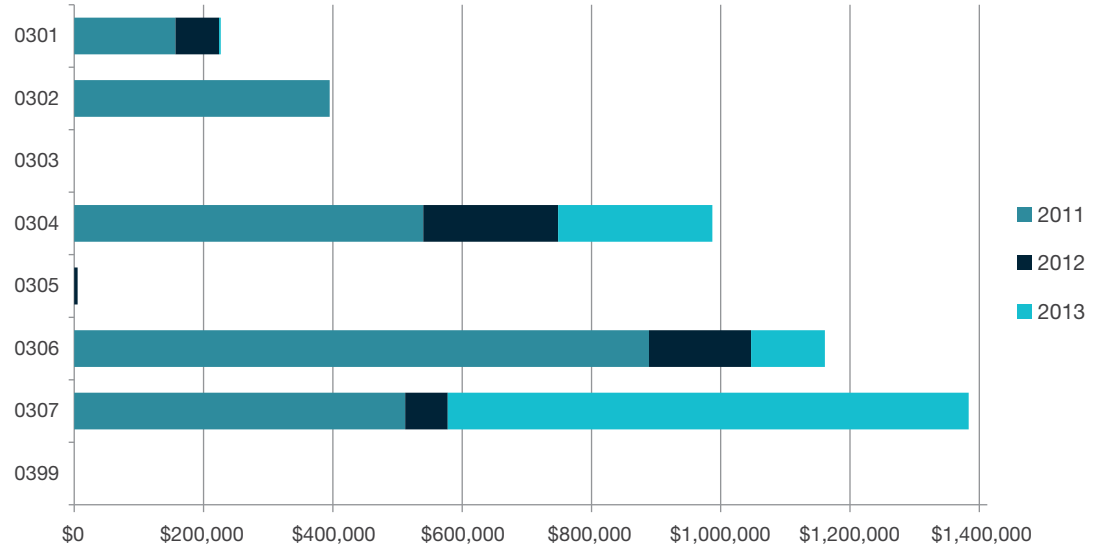


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
0301 Analytical Chemistry	22.4	19.1	31.4	31.7	35.2	27.8	167.6
0302 Inorganic Chemistry	22.4	20.6	20.0	22.8	34.3	24.7	144.9
0303 Macromolecular and Materials Chemistry	18.9	11.5	21.7	36.6	49.0	19.1	156.7
0304 Medicinal and Biomolecular Chemistry	26.3	25.2	28.0	55.6	86.0	42.8	263.9
0305 Organic Chemistry	18.4	19.8	24.1	32.9	57.4	18.9	171.6
0306 Physical Chemistry (Incl. Structural)	46.3	26.8	41.3	46.0	50.3	20.3	231.1
0307 Theoretical and Computational Chemistry	14.6	4.9	10.5	18.8	11.8	10.3	71.0
0399 Other Chemical Sciences	8.6	4.5	20.2	26.0	39.7	28.2	127.2
Total	**177.9**	**132.5**	**197.2**	**270.3**	**363.8**	**192.1**	**1,333.9**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total
0301 Analytical Chemistry	3.0	4.7	0.0	0.4	1.0	0.0	9.1
0302 Inorganic Chemistry	0.0	1.0	0.0	0.0	0.0	0.0	1.0
0303 Macromolecular and Materials Chemistry	3.4	8.1	2.9	2.0	16.5	0.0	32.9
0304 Medicinal and Biomolecular Chemistry	3.3	6.0	2.5	2.0	5.5	0.0	19.3
0305 Organic Chemistry	1.7	2.7	1.5	0.0	1.0	0.0	6.9
0306 Physical Chemistry (Incl. Structural)	6.3	4.6	2.3	1.8	8.2	0.0	23.3
0307 Theoretical and Computational Chemistry	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0399 Other Chemical Sciences	0.0	0.5	0.0	0.0	0.0	0.0	0.5
Total	**17.7**	**27.5**	**9.2**	**6.2**	**32.2**	**0.0**	**92.9**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



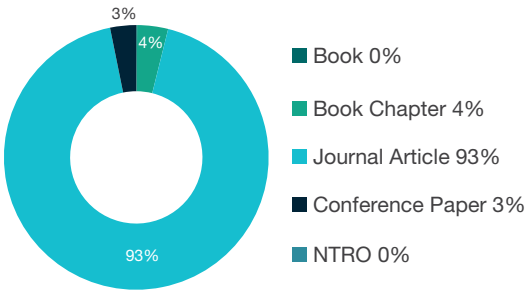
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0301 Analytical Chemistry	156,455	67,406	2,814	226,674
0302 Inorganic Chemistry	394,966	0	0	394,966
0303 Macromolecular and Materials Chemistry	0	0	0	0
0304 Medicinal and Biomolecular Chemistry	539,827	208,730	238,550	987,107
0305 Organic Chemistry	0	5,042	0	5,042
0306 Physical Chemistry (Incl. Structural)	889,011	157,804	114,392	1,161,207
0307 Theoretical and Computational Chemistry	511,865	65,920	805,662	1,383,448
0399 Other Chemical Sciences	0	0	0	0
Total	**2,492,124**	**504,903**	**1,161,417**	**4,158,444**

0301 Analytical Chemistry

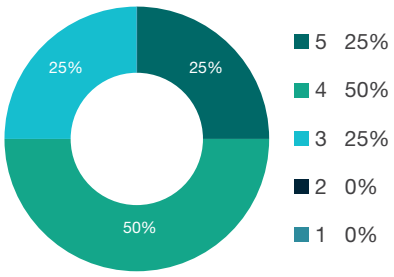
Indicator	No.
Research outputs	1,897.3
Research income	$41,653,841
FTEs	167.6
Esteem count	16.0
Patents	9.1
Research commercialisation income	$226,674

Rating	Distribution
5	4
4	8
3	4
2	0
1	0
Total	**16**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

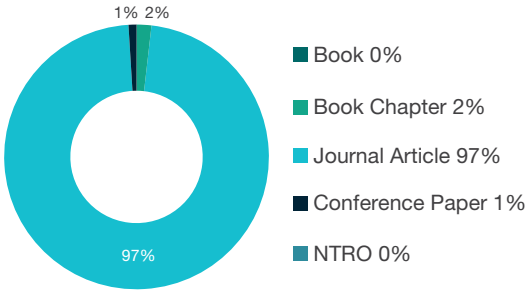


0302 Inorganic Chemistry

Indicator	No.
Research outputs	1,956.2
Research income	$30,710,568
FTEs	144.9
Esteem count	28.9
Patents	1.0
Research commercialisation income	$394,966

Rating	Distribution
5	5
4	5
3	3
2	0
1	0
Total	**13**

RESEARCH OUTPUTS BY TYPE



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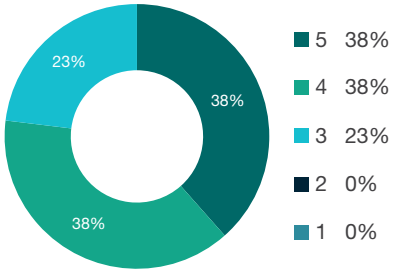
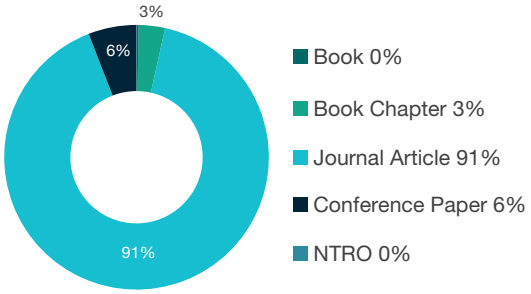


0303 Macromolecular and Materials Chemistry

Indicator	No.
Research outputs	2,236.5
Research income	$55,076,926
FTEs	156.7
Esteem count	44.9
Patents	32.9
Research commercialisation income	$0

Rating	Distribution
5	12
4	4
3	0
2	0
1	0
Total	**16**

RESEARCH OUTPUTS BY TYPE



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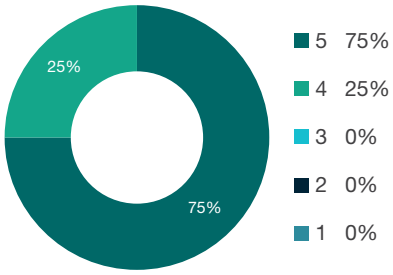
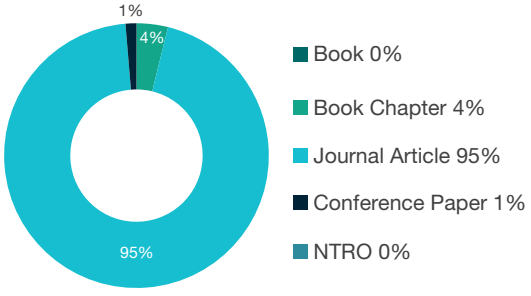


0304 Medicinal and Biomolecular Chemistry

Indicator	No.
Research outputs	2,045.9
Research income	$77,309,865
FTEs	263.9
Esteem count	38.5
Patents	19.3
Research commercialisation income	$987,107

Rating	Distribution
5	2
4	9
3	1
2	0
1	0
Total	**12**

RESEARCH OUTPUTS BY TYPE



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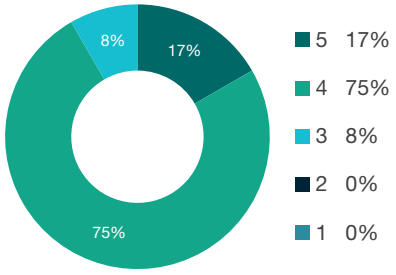
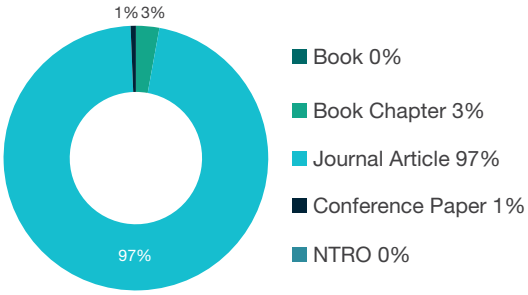


0305 Organic Chemistry

Indicator	No.
Research outputs	1,788.9
Research income	$36,987,461
FTEs	171.6
Esteem count	18.8
Patents	6.9
Research commercialisation income	$5,042

Rating	Distribution
5	1
4	4
3	6
2	0
1	0
Total	**11**

RESEARCH OUTPUTS BY TYPE



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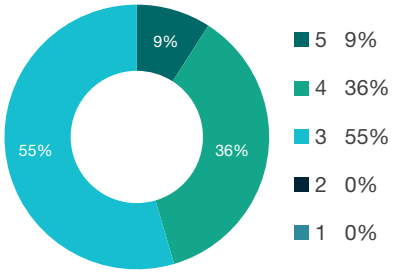
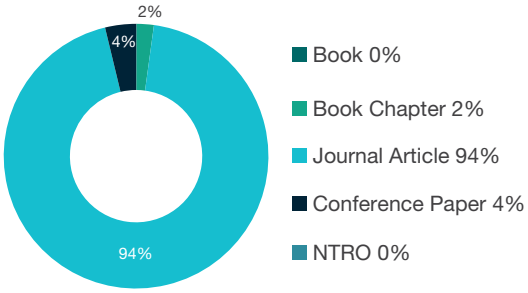


0306 Physical Chemistry (Incl. Structural)

Indicator	No.
Research outputs	3,597.4
Research income	$75,988,538
FTEs	231.1
Esteem count	47.6
Patents	23.3
Research commercialisation income	$1,161,207

Rating	Distribution
5	12
4	7
3	1
2	0
1	0
Total	**20**

RESEARCH OUTPUTS BY TYPE



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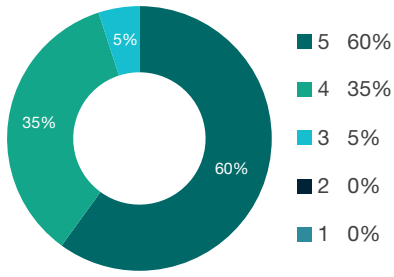
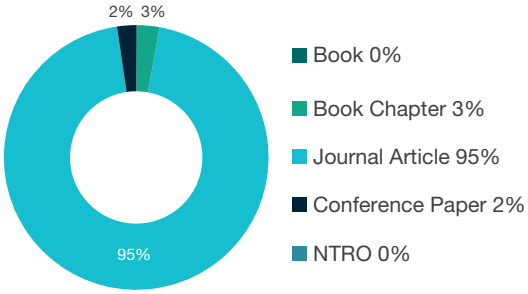


0307 Theoretical and Computational Chemistry

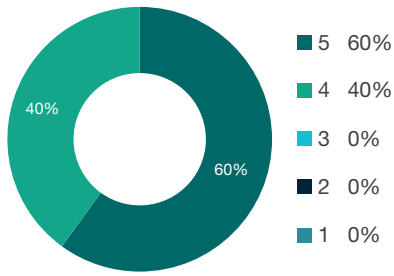
Indicator	No.
Research outputs	934.1
Research income	$15,361,739
FTEs	71.0
Esteem count	13.0
Patents	0.0
Research commercialisation income	$1,383,448

Rating	Distribution
5	3
4	2
3	0
2	0
1	0
Total	**5**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

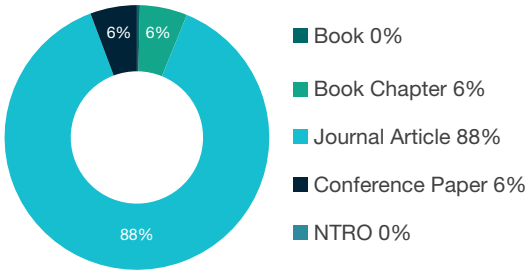


0399 Other Chemical Sciences

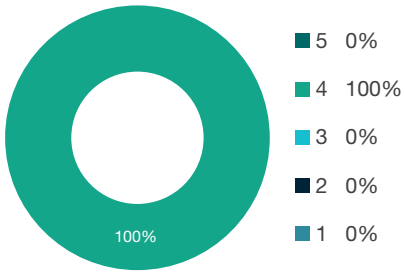
Indicator	No.
Research outputs	832.6
Research income	$2,163,199
FTEs	127.2
Esteem count	1.9
Patents	0.5
Research commercialisation income	$0

Rating	Distribution
5	0
4	1
3	0
2	0
1	0
Total	**1**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION



04 EARTH SCIENCES

Earth Sciences is comprised of the following four–digit codes:

0401 Atmospheric Sciences

0402 Geochemistry

0403 Geology

0404 Geophysics

0405 Oceanography

0406 Physical Geography and Environmental Geoscience

0499 Other Earth Sciences

15 out of 20 two–digit UoEs and 54 out of 62 four–digit UoEs assessed were rated above world standard

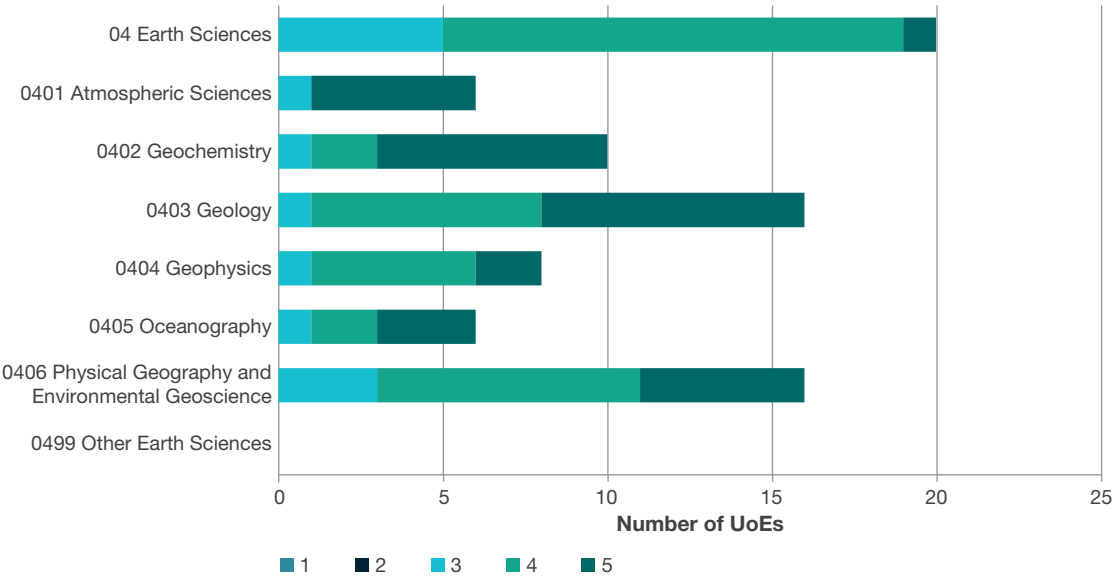
FoR Overview

Earth Sciences (04) accounted for approximately three per cent of the research outputs submitted to ERA 2015. Journal articles were the most common research output type in Earth Sciences. Geology (0403) had the highest number of research outputs, staffing levels and highest research income levels. Geochemistry (0402) had the highest research commercialisation income.

Indicator	No.
Research outputs	11,090.4
Research income	$360,562,621
FTEs	980.5
Esteem count	118.4
Patents	5.0
Research commercialisation income	$3,921,917

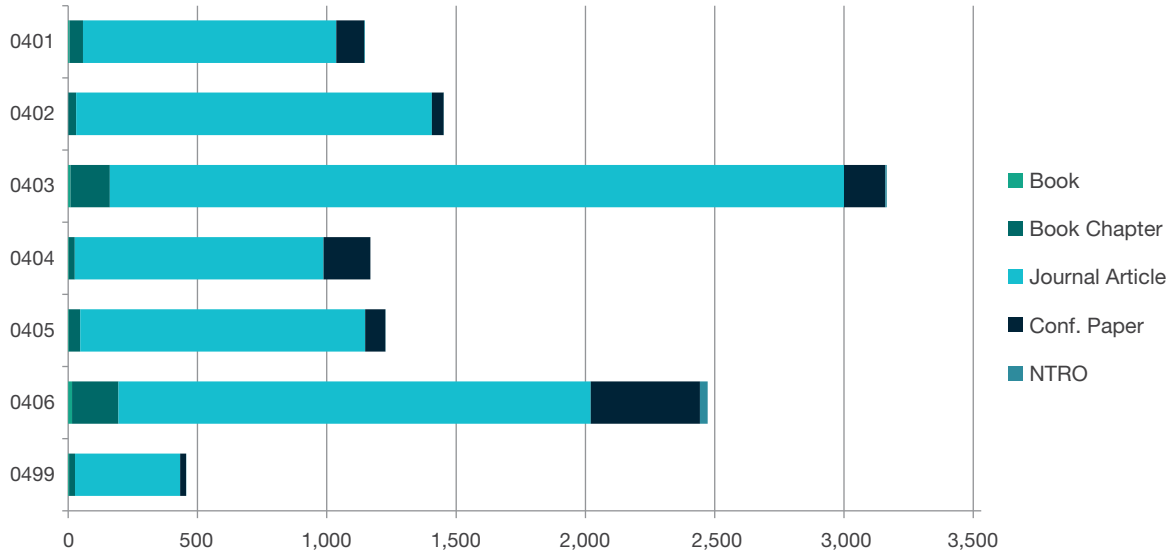
Rating	Distribution	
	Two–digit	Four–digit
5	1	30
4	14	24
3	5	8
2	0	0
1	0	0
Total	**20**	**62**

NUMBER OF UOES PER RATING SCALE SCORE



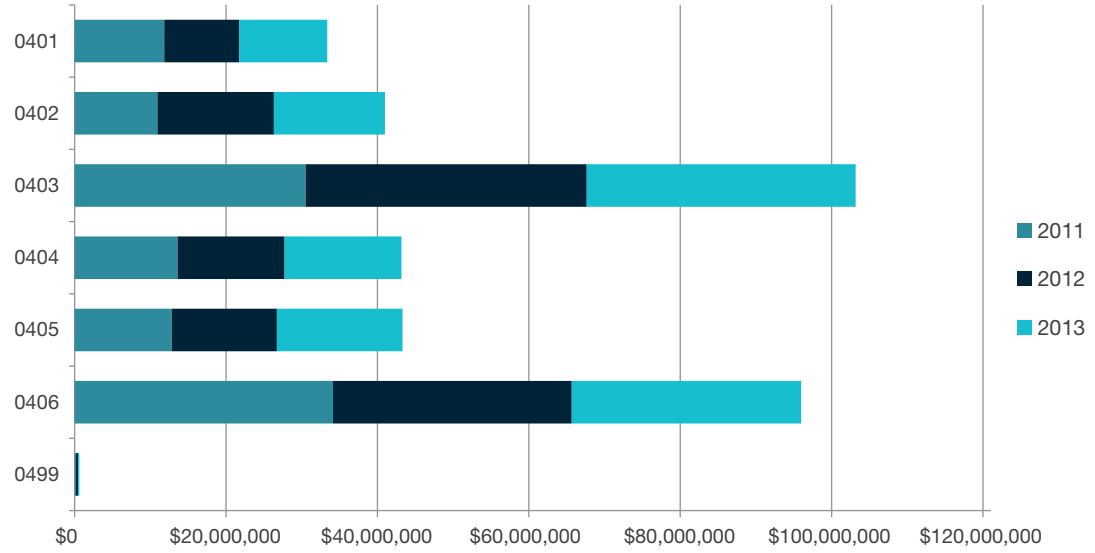
Note: 04 Earth Sciences shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



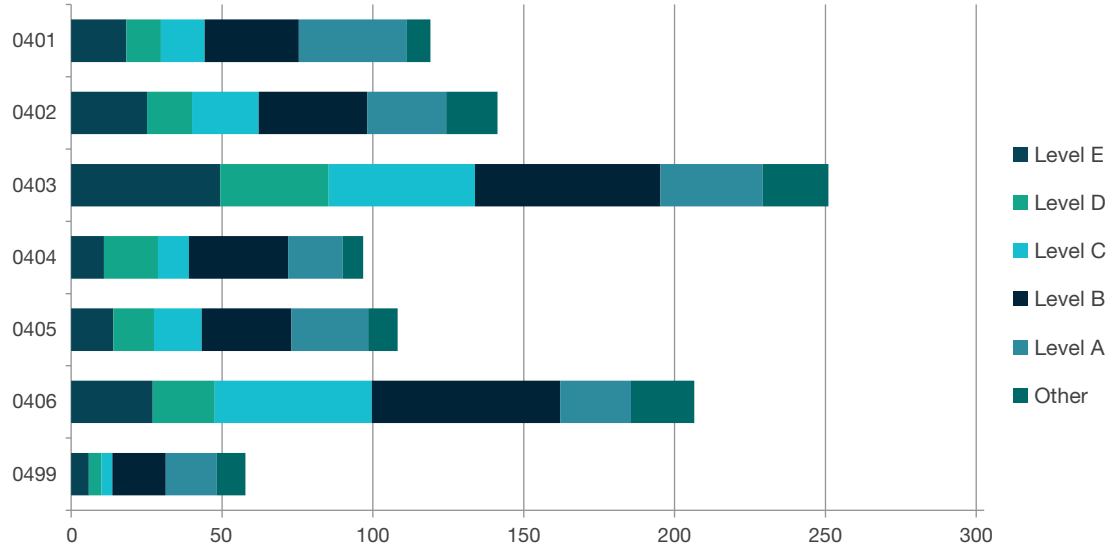
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
0401 Atmospheric Sciences	5.0	52.2	979.2	107.6	3.2	1,147.1
0402 Geochemistry	1.0	29.8	1,375.7	45.1	1.5	1,453.1
0403 Geology	8.2	152.5	2,839.6	159.5	6.0	3,165.8
0404 Geophysics	2.0	22.9	962.3	181.3	0.0	1,168.5
0405 Oceanography	2.0	44.1	1,102.4	77.8	1.0	1,227.2
0406 Physical Geography and Environmental Geoscience	14.3	179.6	1,826.8	422.3	29.6	2,472.5
0499 Other Earth Sciences	3.5	22.9	406.4	22.8	0.5	456.1
Total	**36.0**	**503.9**	**9,492.4**	**1,016.4**	**41.8**	**11,090.4**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0401 Atmospheric Sciences	11,821,744	9,909,795	11,628,174	33,359,713
0402 Geochemistry	10,909,829	15,409,186	14,663,235	40,982,251
0403 Geology	30,501,278	37,138,420	35,530,071	103,169,768
0404 Geophysics	13,586,418	14,144,304	15,440,349	43,171,071
0405 Oceanography	12,810,030	13,902,603	16,585,131	43,297,764
0406 Physical Geography and Environmental Geoscience	34,126,806	31,527,237	30,311,904	95,965,947
0499 Other Earth Sciences	123,144	305,643	187,320	616,107
Total	**113,879,250**	**122,337,188**	**124,346,184**	**360,562,621**

STAFFING PROFILE BY ACADEMIC LEVEL

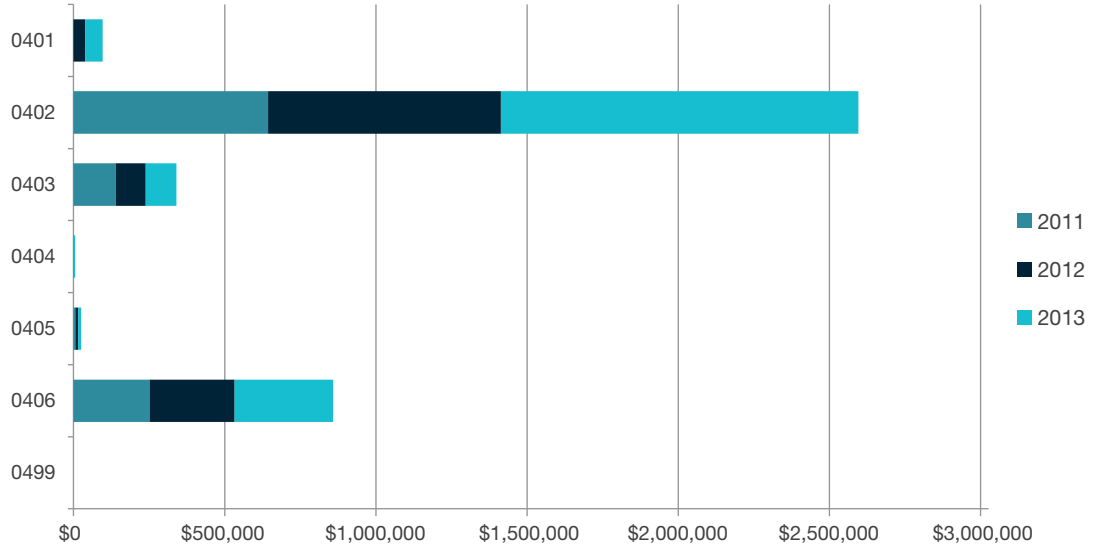


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
0401 Atmospheric Sciences	18.3	11.4	14.5	31.2	35.8	7.8	119.1
0402 Geochemistry	25.1	15.0	22.1	36.0	26.2	17.0	141.3
0403 Geology	49.4	36.0	48.5	61.5	33.8	21.8	251.0
0404 Geophysics	10.8	17.9	10.3	32.9	18.1	6.8	96.8
0405 Oceanography	14.0	13.5	15.8	29.7	25.5	9.7	108.2
0406 Physical Geography and Environmental Geoscience	27.0	20.5	52.1	62.4	23.5	21.0	206.5
0499 Other Earth Sciences	5.9	4.2	3.6	17.7	16.9	9.5	57.7
Total	**150.4**	**118.4**	**166.8**	**271.4**	**179.8**	**93.7**	**980.5**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total
0401 Atmospheric Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0402 Geochemistry	0.0	1.0	0.0	0.0	1.0	0.0	2.0
0403 Geology	0.0	1.0	0.0	0.0	2.0	0.0	3.0
0404 Geophysics	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0405 Oceanography	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0406 Physical Geography and Environmental Geoscience	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0499 Other Earth Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**0.0**	**2.0**	**0.0**	**0.0**	**3.0**	**0.0**	**5.0**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



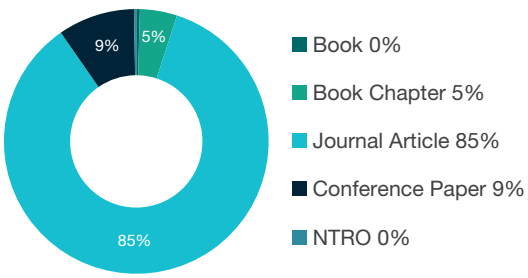
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0401 Atmospheric Sciences	0	38,969	57,200	96,169
0402 Geochemistry	643,287	770,055	1,182,884	2,596,226
0403 Geology	139,771	99,237	101,385	340,393
0404 Geophysics	924	0	4,520	5,444
0405 Oceanography	6,065	8,989	9,818	24,871
0406 Physical Geography and Environmental Geoscience	251,269	281,452	326,094	858,814
0499 Other Earth Sciences	0	0	0	0
Total	**1,041,315**	**1,198,702**	**1,681,900**	**3,921,917**

0401 Atmospheric Sciences

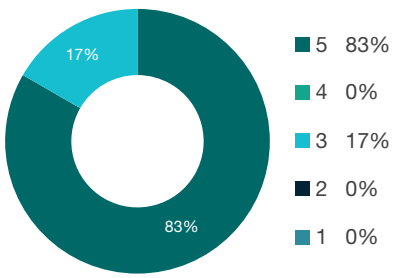
Indicator	No.
Research outputs	1,147.1
Research income	$33,359,713
FTEs	119.1
Esteem count	13.3
Patents	0.0
Research commercialisation income	$96,169

Rating	Distribution
5	5
4	0
3	1
2	0
1	0
Total	**6**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

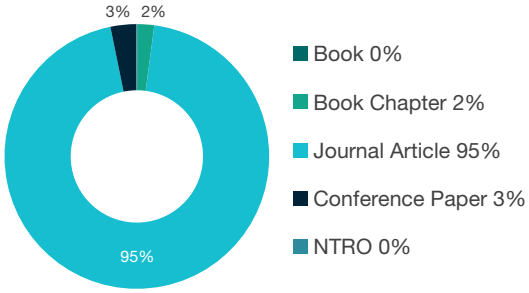


0402 Geochemistry

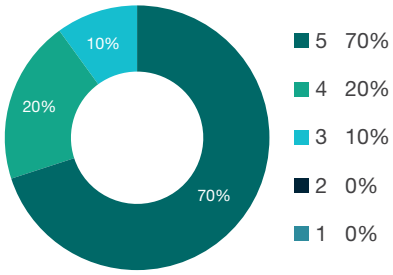
Indicator	No.
Research outputs	1,453.1
Research income	$40,982,251
FTEs	141.3
Esteem count	23.4
Patents	2.0
Research commercialisation income	$2,596,226

Rating	Distribution
5	7
4	2
3	1
2	0
1	0
Total	**10**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

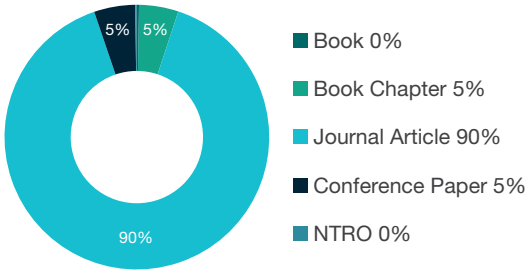


0403 Geology

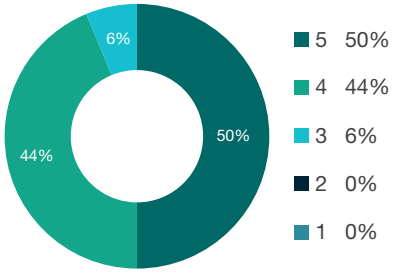
Indicator	No.
Research outputs	3,165.8
Research income	$103,169,768
FTEs	251.0
Esteem count	40.0
Patents	3.0
Research commercialisation income	$340,393

Rating	Distribution
5	8
4	7
3	1
2	0
1	0
Total	**16**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

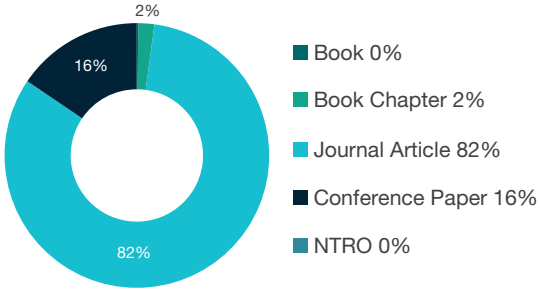


0404 Geophysics

Indicator	No.
Research outputs	1,168.5
Research income	$43,171,071
FTEs	96.8
Esteem count	8.7
Patents	0.0
Research commercialisation income	$5,444

Rating	Distribution
5	2
4	5
3	1
2	0
1	0
Total	**8**

RESEARCH OUTPUTS BY TYPE



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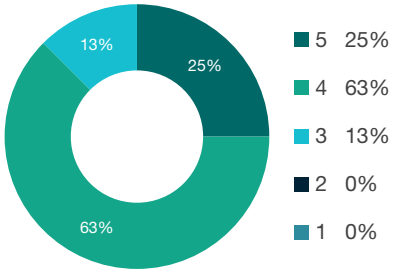
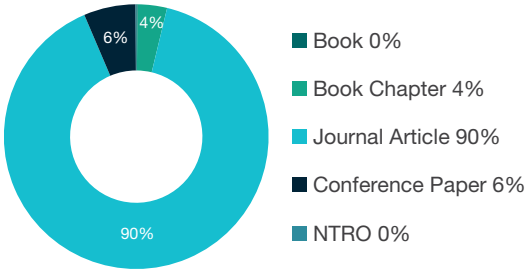


0405 Oceanography

Indicator	No.
Research outputs	1,227.2
Research income	$43,297,764
FTEs	108.2
Esteem count	17.6
Patents	0.0
Research commercialisation income	$24,871

Rating	Distribution
5	3
4	2
3	1
2	0
1	0
Total	**6**

RESEARCH OUTPUTS BY TYPE



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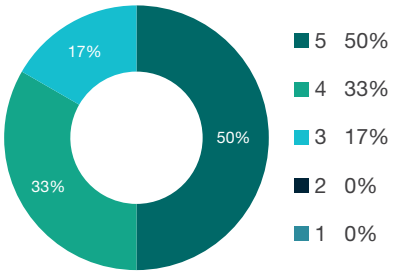
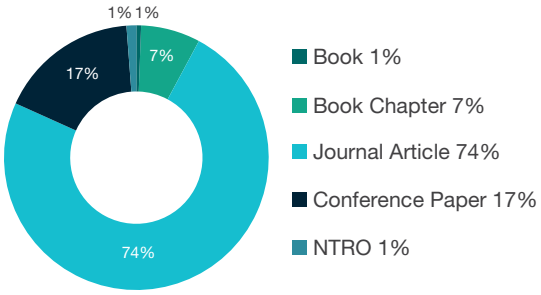


0406 Physical Geography and Environmental Geoscience

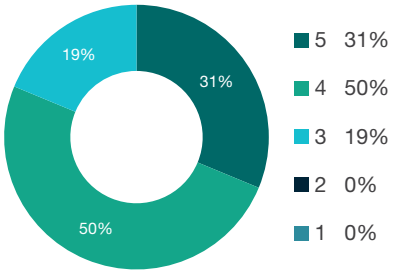
Indicator	No.
Research outputs	2,472.5
Research income	$95,965,947
FTEs	206.5
Esteem count	15.3
Patents	0.0
Research commercialisation income	$858,814

Rating	Distribution
5	5
4	8
3	3
2	0
1	0
Total	**16**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

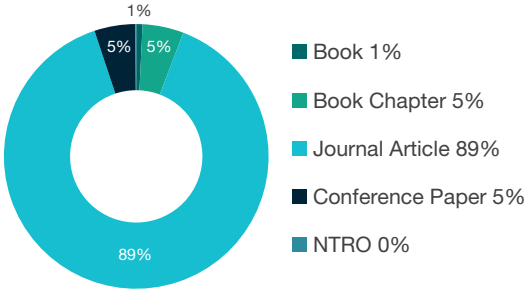


0499 Other Earth Sciences

Indicator	No.
Research outputs	456.1
Research income	$616,107
FTEs	57.7
Esteem count	0.1
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 0499.

05 ENVIRONMENTAL SCIENCES

Environmental Sciences is comprised of the following four–digit codes:

0501 Ecological Applications

0502 Environmental Science and Management

0503 Soil Sciences

0599 Other Environmental Sciences

26 out of 34 two–digit UoEs and 49 out of 53 four–digit UoEs assessed were rated above world standard

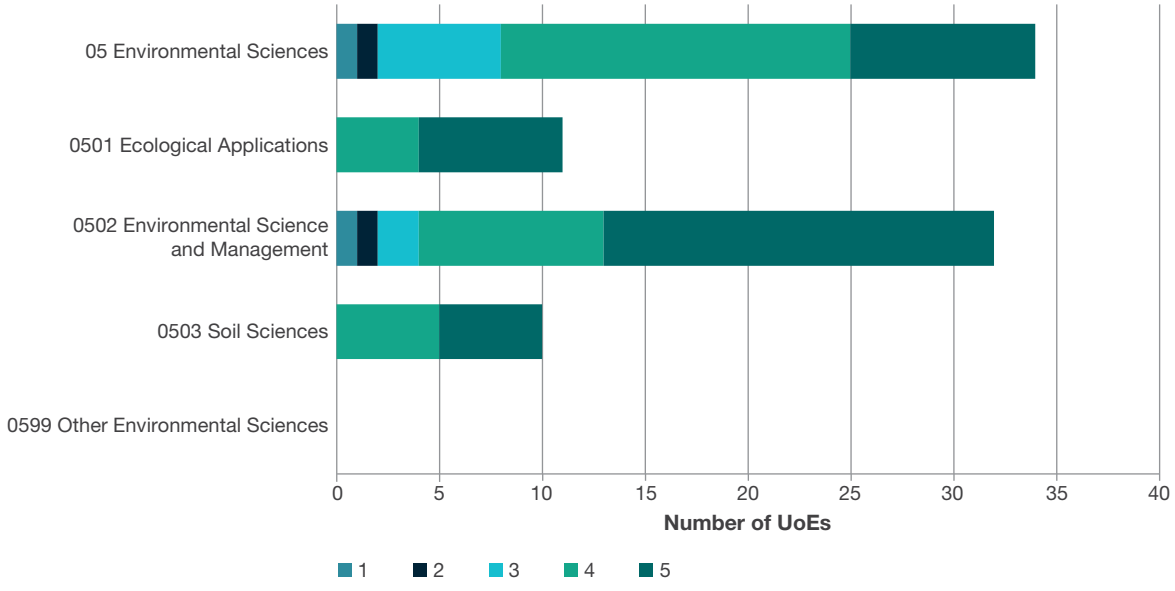
FoR Overview

Environmental Sciences (05) accounted for approximately two per cent of the research outputs submitted to ERA 2015. Journal articles comprised 74 per cent of the total research outputs submitted to Environmental Sciences, followed by book chapters (11 per cent). Environmental Science and Management (0502) is the largest sub–discipline in terms of research outputs, staffing levels, research income and research commercialisation income. Approximately two per cent of the patents submitted to ERA 2015 were in Environmental Sciences (05).

Indicator	No.
Research outputs	9,288.4
Research income	$418,507,503
FTEs	828.2
Esteem count	83.2
Patents	14.8
Research commercialisation income	$974,593

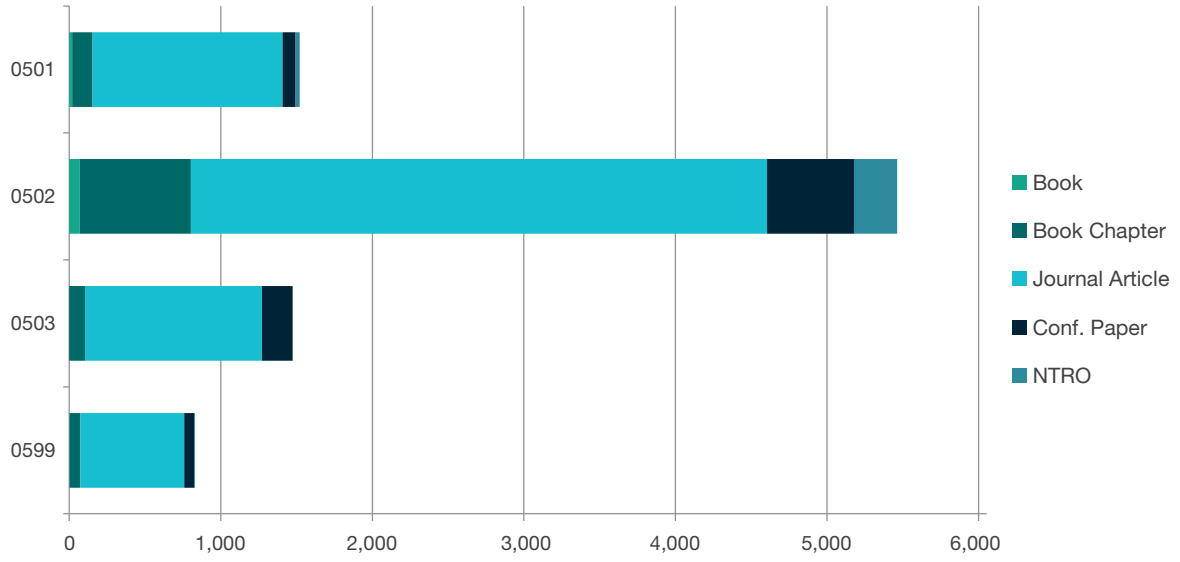
Rating	Distribution	
	Two–digit	Four–digit
5	9	31
4	17	18
3	6	2
2	1	1
1	1	1
Total	**34**	**53**

NUMBER OF UOES PER RATING SCALE SCORE



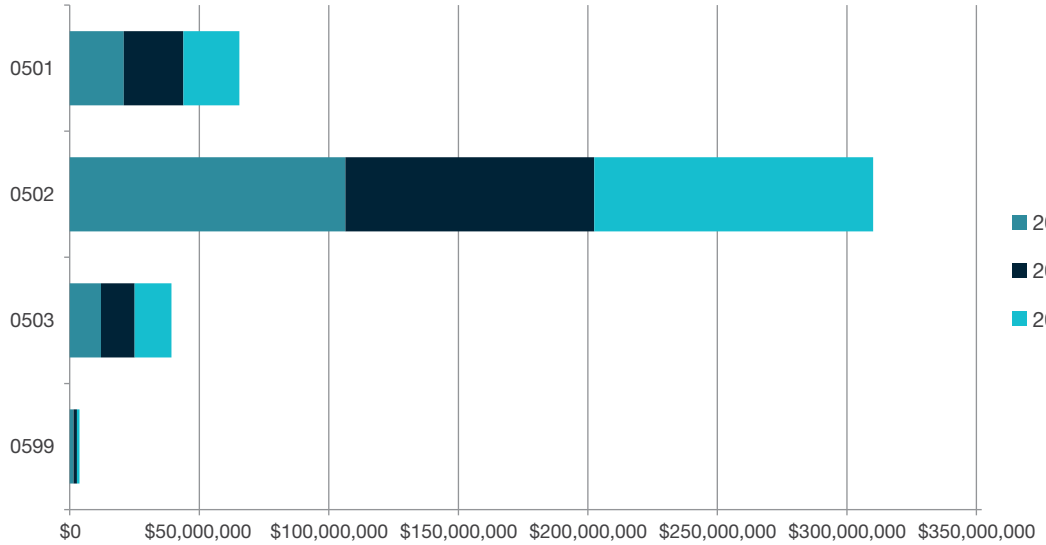
Note: 05 Environmental Sciences shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



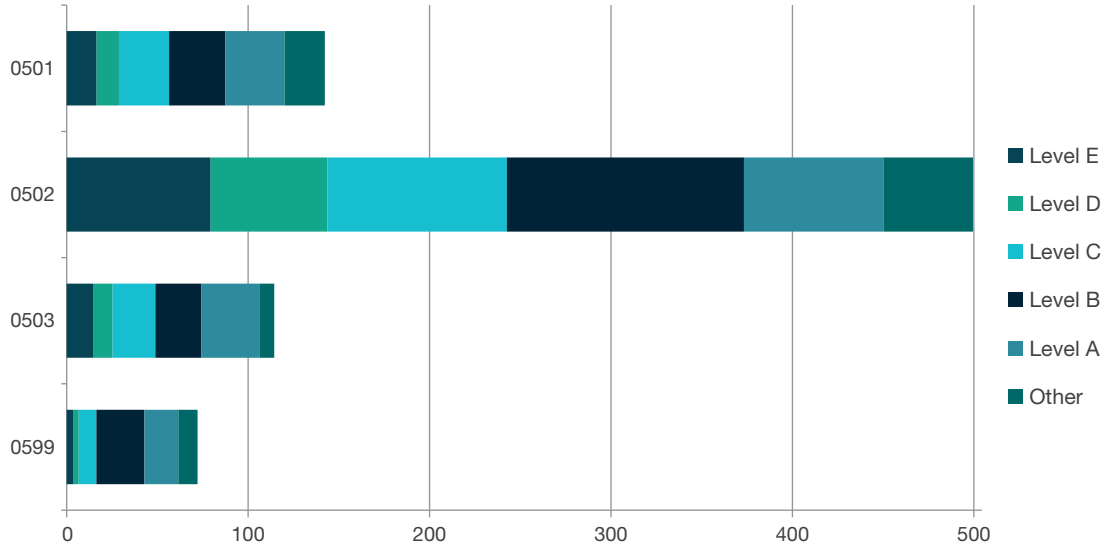
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
0501 Ecological Applications	19.1	134.8	1,254.2	86.1	26.4	1,520.5
0502 Environmental Science and Management	69.1	733.7	3,802.8	571.9	285.4	5,462.9
0503 Soil Sciences	0.5	104.2	1,167.2	201.8	1.0	1,474.7
0599 Other Environmental Sciences	3.5	70.7	684.4	65.2	6.5	830.3
Total	**92.1**	**1,043.4**	**6,908.6**	**925.0**	**319.3**	**9,288.4**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0501 Ecological Applications	20,823,143	23,036,619	21,570,877	65,430,639
0502 Environmental Science and Management	106,378,183	96,063,050	107,669,585	310,110,818
0503 Soil Sciences	12,020,506	13,035,704	14,203,218	39,259,428
0599 Other Environmental Sciences	1,426,389	1,322,866	957,363	3,706,618
Total	**140,648,221**	**133,458,239**	**144,401,043**	**418,507,503**

STAFFING PROFILE BY ACADEMIC LEVEL

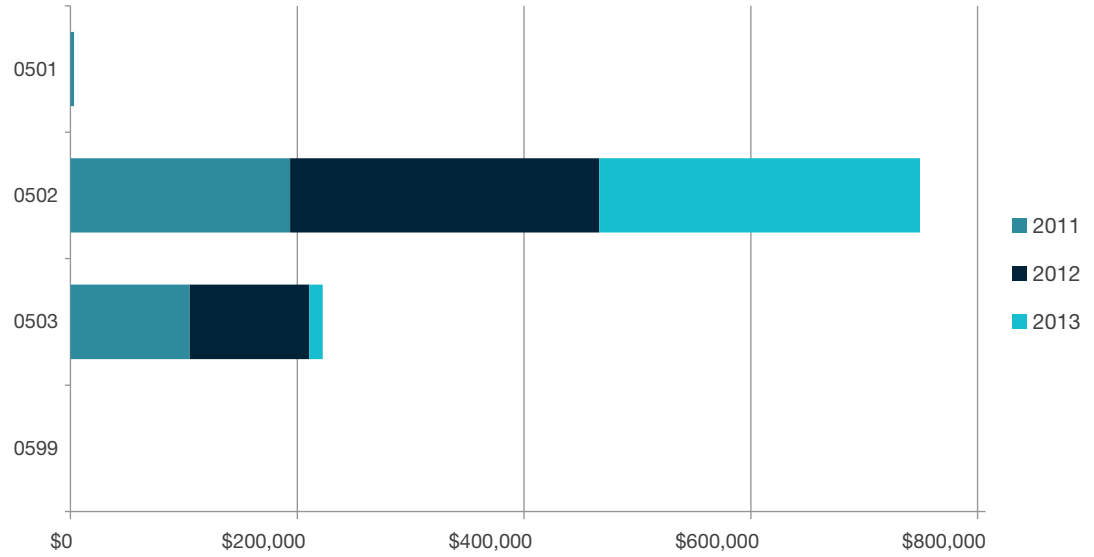


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
0501 Ecological Applications	16.4	12.3	27.6	31.0	32.6	22.2	142.2
0502 Environmental Science and Management	79.2	64.4	99.0	130.7	76.9	49.4	499.5
0503 Soil Sciences	14.5	10.8	23.6	25.2	32.4	8.0	114.4
0599 Other Environmental Sciences	3.7	2.8	9.8	26.5	18.6	10.6	72.0
Total	**113.9**	**90.2**	**160.0**	**213.4**	**160.5**	**90.2**	**828.2**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total
0501 Ecological Applications	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0502 Environmental Science and Management	1.0	2.3	0.0	0.6	5.8	0.0	9.7
0503 Soil Sciences	0.5	0.5	0.0	0.0	4.1	0.0	5.1
0599 Other Environmental Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**1.5**	**2.8**	**0.0**	**0.6**	**9.9**	**0.0**	**14.8**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



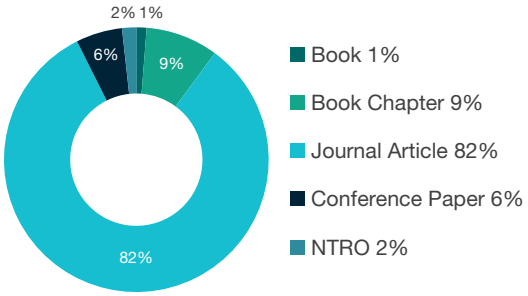
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0501 Ecological Applications	3,057	0	0	3,057
0502 Environmental Science and Management	193,634	272,783	282,749	749,166
0503 Soil Sciences	105,173	105,213	11,984	222,370
0599 Other Environmental Sciences	0	0	0	0
Total	**301,864**	**377,996**	**294,733**	**974,593**

0501 Ecological Applications

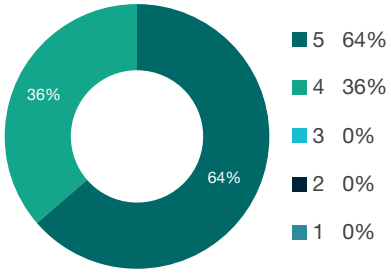
Indicator	No.
Research outputs	1,520.5
Research income	$65,430,639
FTEs	142.2
Esteem count	17.3
Patents	0.0
Research commercialisation income	$3,057

Rating	Distribution
5	7
4	4
3	0
2	0
1	0
Total	**11**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

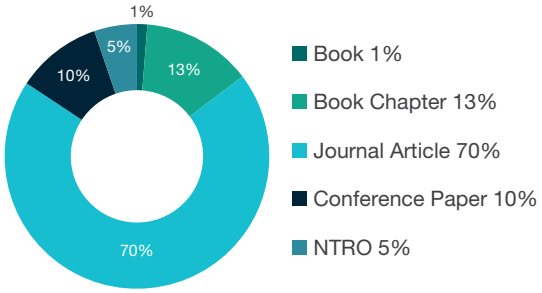


0502 Environmental Science and Management

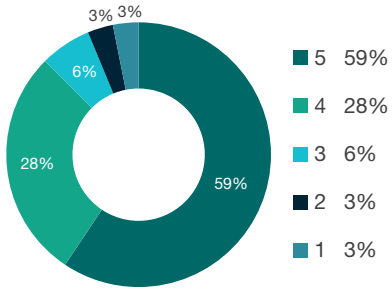
Indicator	No.
Research outputs	5,462.9
Research income	$310,110,818
FTEs	499.5
Esteem count	55.2
Patents	9.7
Research commercialisation income	$749,166

Rating	Distribution
5	19
4	9
3	2
2	1
1	1
Total	**32**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

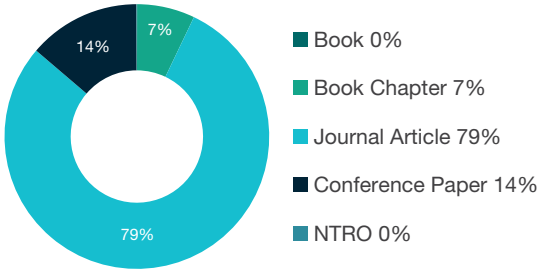


0503 Soil Sciences

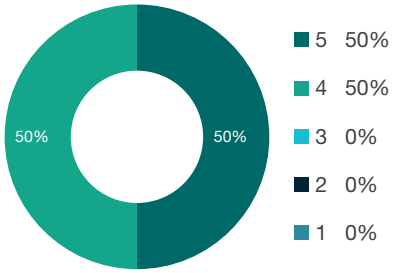
Indicator	No.
Research outputs	1,474.7
Research income	$39,259,428
FTEs	114.4
Esteem count	10.3
Patents	5.1
Research commercialisation income	$222,370

Rating	Distribution
5	5
4	5
3	0
2	0
1	0
Total	**10**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

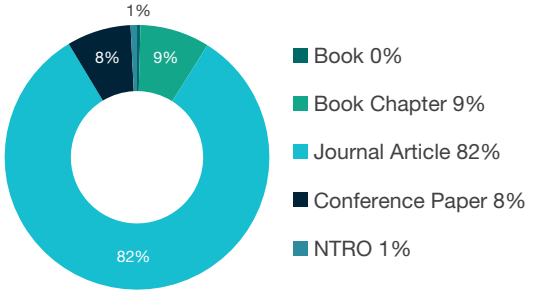


0599 Other Environmental Sciences

Indicator	No.
Research outputs	830.3
Research income	$3,706,618
FTEs	72.0
Esteem count	0.5
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 0599.

06 BIOLOGICAL SCIENCES

Biological Sciences is comprised of the following four–digit codes:

0601 Biochemistry and Cell Biology

0602 Ecology

0603 Evolutionary Biology

0604 Genetics

0605 Microbiology

0606 Physiology

0607 Plant Biology

0608 Zoology

0699 Other Biological Sciences

19 out of 33 two–digit UoEs and 101 out of 137 four–digit UoEs assessed were rated above world standard

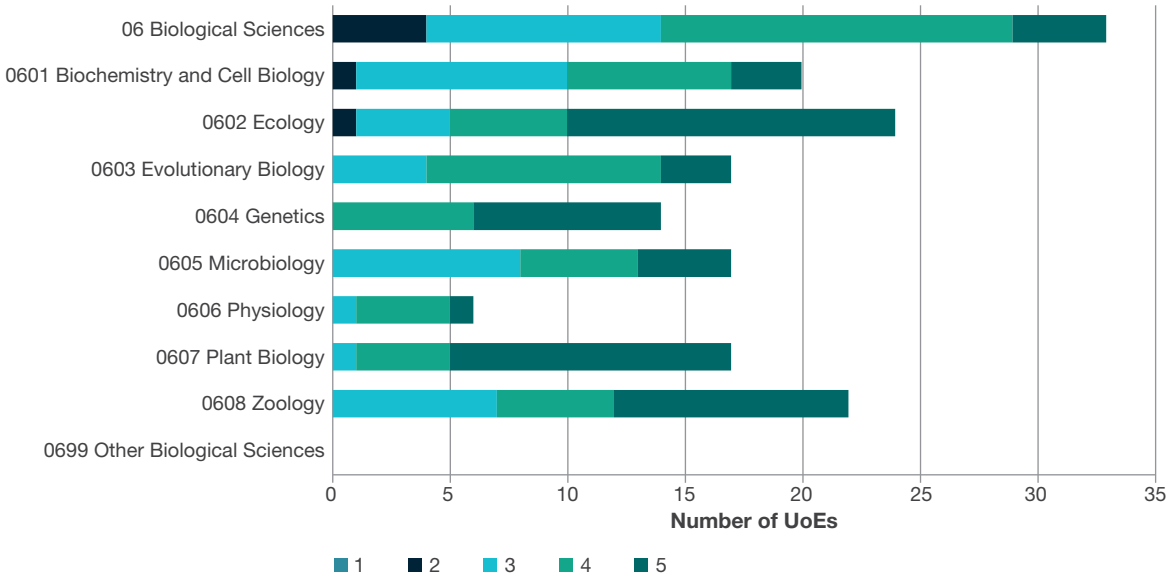
FoR Overview

Biological Sciences (06) accounted for approximately seven per cent of the research outputs submitted to ERA 2015 and approximately 13 per cent of all patents. The majority of the Biological Sciences research outputs were journal articles (93 per cent). Biochemistry and Cell Biology (0601) was the largest sub–discipline in terms of research outputs, staffing, research income and patents. Plant Biology (0607) had the highest amount of research commercialisation income.

Indicator	No.
Research outputs	28,786.3
Research income	$988,548,549
FTEs	3,294.0
Esteem count	520.5
Patents	125.2
Research commercialisation income	$4,064,145

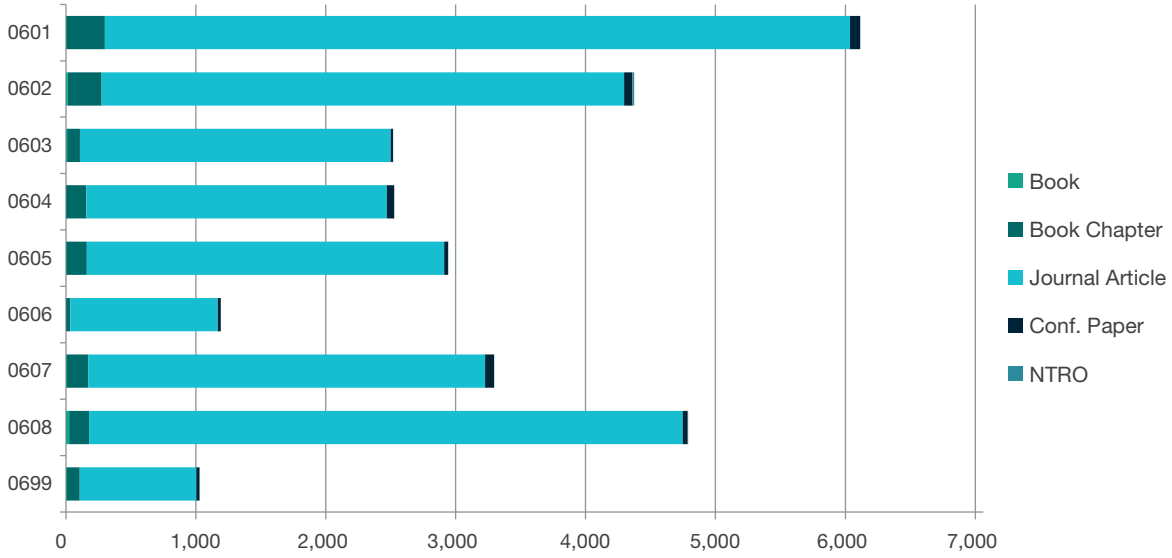
Rating	Distribution	
	Two–digit	Four–digit
5	4	55
4	15	46
3	10	34
2	4	2
1	0	0
Total	**33**	**137**

NUMBER OF UOES PER RATING SCALE SCORE



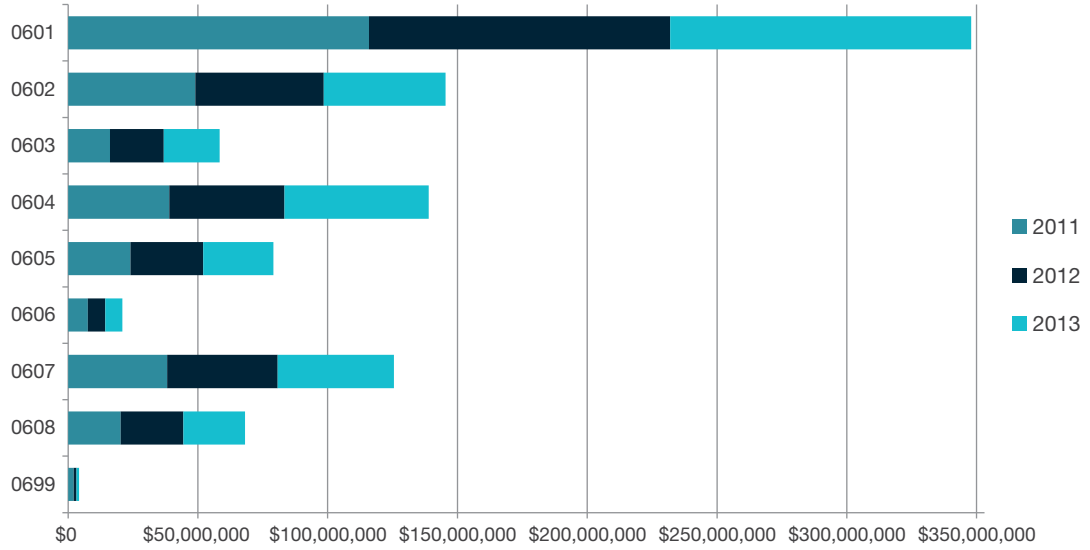
Note: 06 Biological Sciences shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



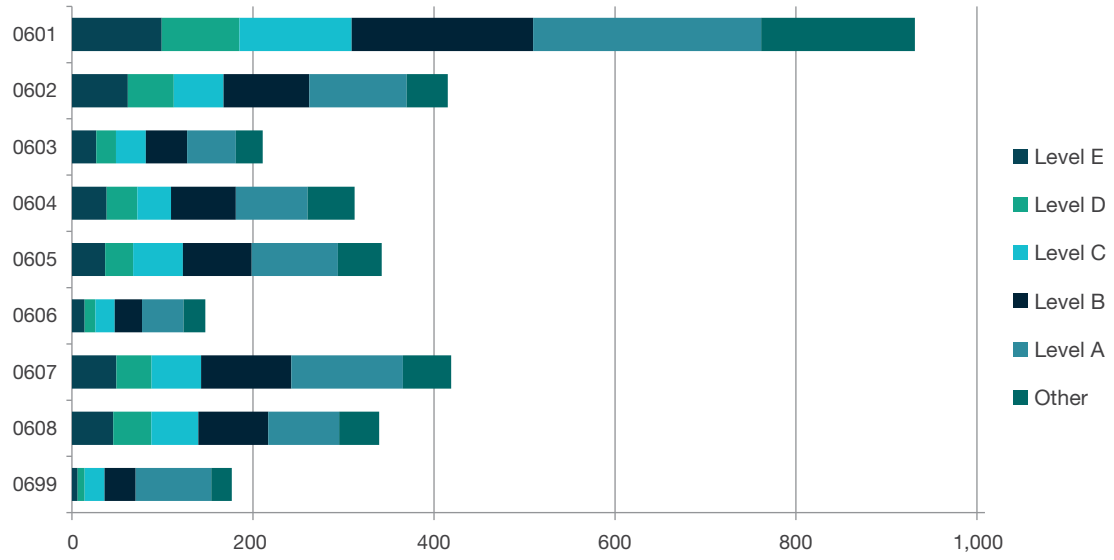
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
0601 Biochemistry and Cell Biology	3.5	295.3	5,737.2	77.3	1.0	6,114.3
0602 Ecology	13.3	261.4	4,021.8	63.6	14.6	4,374.8
0603 Evolutionary Biology	9.1	97.7	2,392.8	17.7	1.0	2,518.3
0604 Genetics	1.5	154.3	2,314.1	56.4	1.5	2,527.8
0605 Microbiology	2.8	156.8	2,752.2	29.8	1.0	2,942.7
0606 Physiology	1.5	31.1	1,137.0	22.3	0.0	1,191.9
0607 Plant Biology	6.5	164.4	3,054.9	68.9	3.0	3,297.7
0608 Zoology	24.1	152.7	4,570.2	38.9	3.5	4,789.5
0699 Other Biological Sciences	5.2	100.0	898.6	24.6	1.0	1,029.4
Total	**67.5**	**1,413.7**	**26,879.0**	**399.5**	**26.6**	**28,786.3**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0601 Biochemistry and Cell Biology	115,902,571	116,015,621	116,034,753	347,952,946
0602 Ecology	48,975,426	49,479,178	46,980,844	145,435,449
0603 Evolutionary Biology	16,165,503	20,669,157	21,553,329	58,387,989
0604 Genetics	38,943,081	44,378,249	55,573,326	138,894,656
0605 Microbiology	24,011,757	28,052,001	27,042,320	79,106,077
0606 Physiology	7,577,127	6,708,090	6,591,982	20,877,198
0607 Plant Biology	38,180,690	42,532,087	44,828,332	125,541,109
0608 Zoology	20,268,416	24,130,325	23,738,747	68,137,488
0699 Other Biological Sciences	2,162,937	1,096,229	956,470	4,215,636
Total	**312,187,509**	**333,060,937**	**343,300,103**	**988,548,549**

STAFFING PROFILE BY ACADEMIC LEVEL

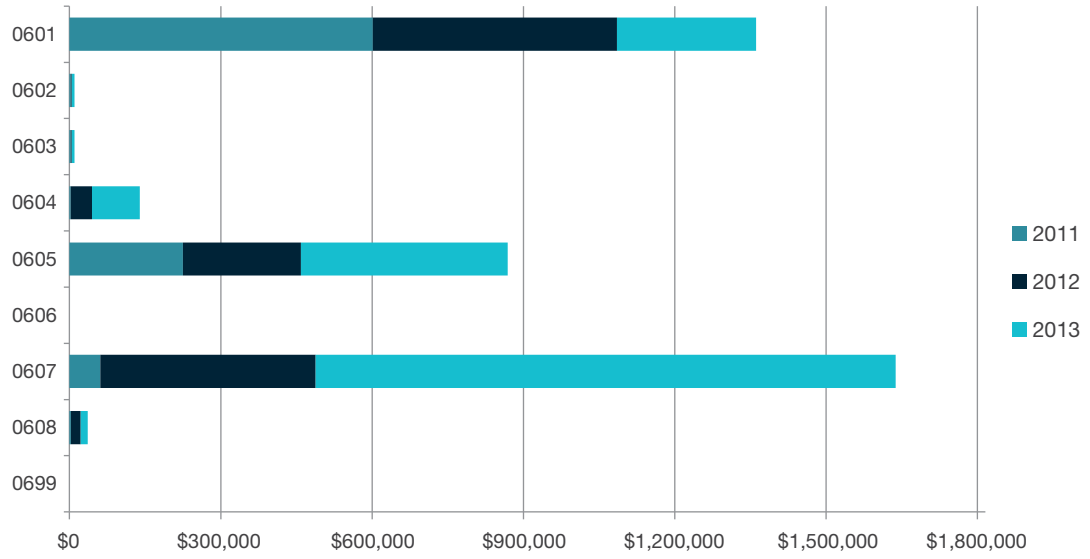


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
0601 Biochemistry and Cell Biology	99.1	86.0	124.0	200.5	252.0	169.9	931.4
0602 Ecology	61.7	50.8	54.9	94.8	107.6	45.5	415.2
0603 Evolutionary Biology	26.8	21.7	33.1	45.7	53.9	29.6	210.7
0604 Genetics	38.2	34.1	37.2	71.4	79.4	51.9	312.2
0605 Microbiology	36.6	30.8	55.0	76.1	95.3	48.4	342.2
0606 Physiology	13.9	11.9	21.5	30.2	45.7	24.2	147.3
0607 Plant Biology	49.1	38.7	54.9	99.5	123.5	53.3	419.1
0608 Zoology	45.6	42.1	51.9	77.2	78.5	44.1	339.4
0699 Other Biological Sciences	6.3	7.5	22.0	34.4	83.6	22.7	176.5
Total	**377.2**	**323.6**	**454.5**	**729.8**	**919.3**	**489.5**	**3,294.0**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total
0601 Biochemistry and Cell Biology	11.3	30.2	16.0	6.3	12.6	0.0	76.5
0602 Ecology	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0603 Evolutionary Biology	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0604 Genetics	8.0	2.5	3.0	1.0	4.2	0.0	18.6
0605 Microbiology	4.0	3.0	1.5	1.0	2.0	0.0	11.5
0606 Physiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0607 Plant Biology	4.5	3.5	1.8	0.3	6.5	0.0	16.7
0608 Zoology	0.0	2.0	0.0	0.0	0.0	0.0	2.0
0699 Other Biological Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**27.8**	**41.2**	**22.4**	**8.6**	**25.3**	**0.0**	**125.2**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



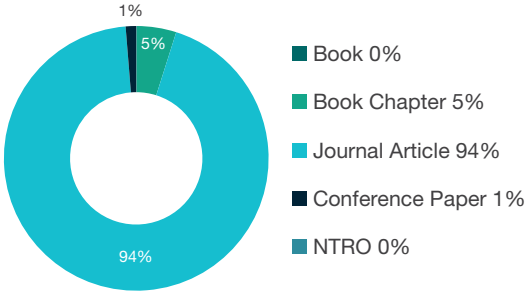
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0601 Biochemistry and Cell Biology	601,379	484,157	275,837	1,361,373
0602 Ecology	2,455	2,045	5,642	10,142
0603 Evolutionary Biology	2,455	2,045	5,642	10,142
0604 Genetics	2,455	42,387	94,562	139,404
0605 Microbiology	225,024	233,915	409,734	868,673
0606 Physiology	0	0	0	0
0607 Plant Biology	61,189	426,716	1,150,159	1,638,064
0608 Zoology	2,697	19,322	14,328	36,347
0699 Other Biological Sciences	0	0	0	0
Total	**897,654**	**1,210,586**	**1,955,904**	**4,064,145**

0601 Biochemistry and Cell Biology

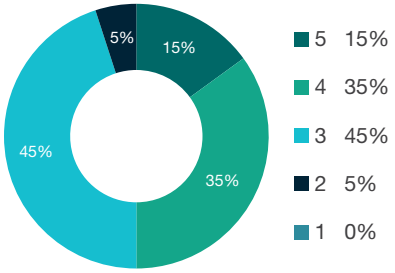
Indicator	No.
Research outputs	6,114.3
Research income	$347,952,946
FTEs	931.4
Esteem count	199.8
Patents	76.5
Research commercialisation income	$1,361,373

Rating	Distribution
5	3
4	7
3	9
2	1
1	0
Total	**20**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

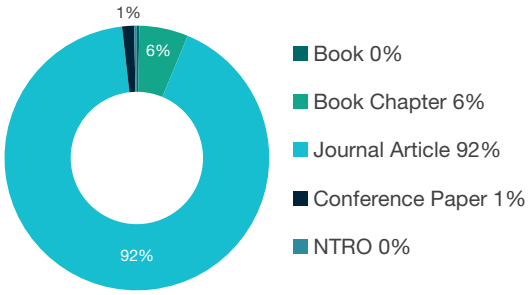


0602 Ecology

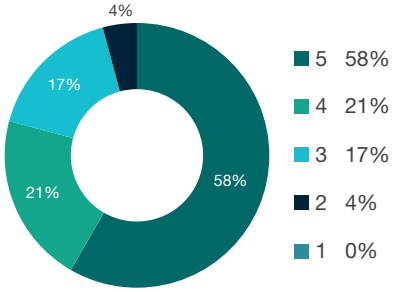
Indicator	No.
Research outputs	4,374.8
Research income	$145,435,449
FTEs	415.2
Esteem count	51.2
Patents	0.0
Research commercialisation income	$10,142

Rating	Distribution
5	14
4	5
3	4
2	1
1	0
Total	**24**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

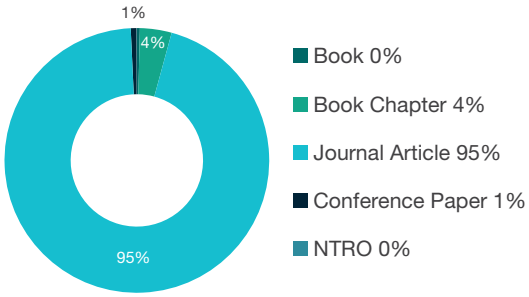


0603 Evolutionary Biology

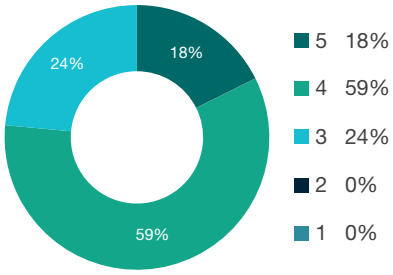
Indicator	No.
Research outputs	2,518.3
Research income	$58,387,989
FTEs	210.7
Esteem count	52.1
Patents	0.0
Research commercialisation income	$10,142

Rating	Distribution
5	3
4	10
3	4
2	0
1	0
Total	**17**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

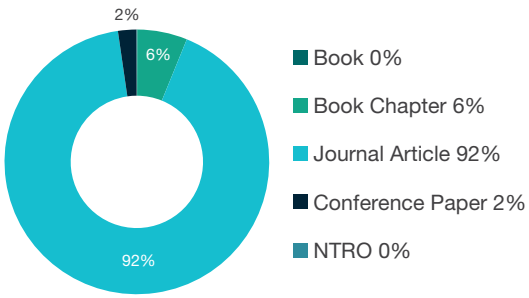


0604 Genetics

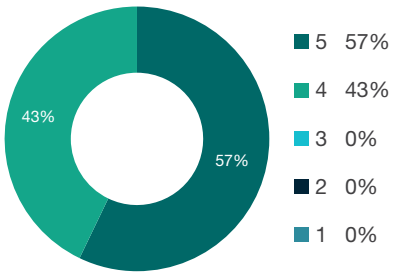
Indicator	No.
Research outputs	2,527.8
Research income	$138,894,656
FTEs	312.2
Esteem count	78.7
Patents	18.6
Research commercialisation income	$139,404

Rating	Distribution
5	8
4	6
3	0
2	0
1	0
Total	**14**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

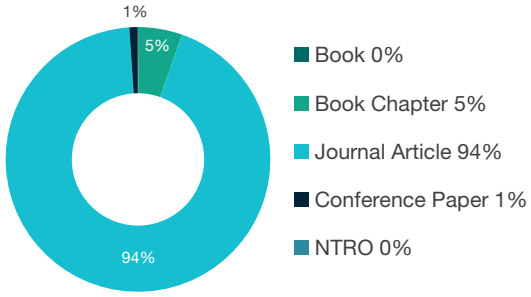


0605 Microbiology

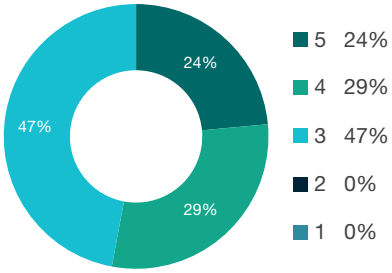
Indicator	No.
Research outputs	2,942.7
Research income	$79,106,077
FTEs	342.2
Esteem count	39.4
Patents	11.5
Research commercialisation income	$868,673

Rating	Distribution
5	4
4	5
3	8
2	0
1	0
Total	**17**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

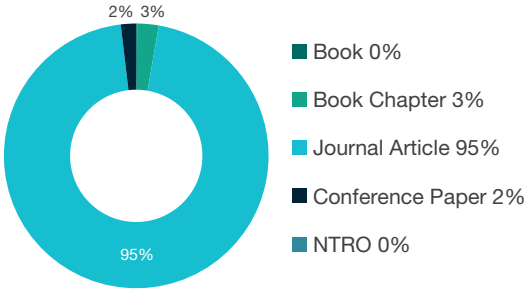


0606 Physiology

Indicator	No.
Research outputs	1,191.9
Research income	$20,877,198
FTEs	147.3
Esteem count	11.9
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	1
4	4
3	1
2	0
1	0
Total	**6**

RESEARCH OUTPUTS BY TYPE



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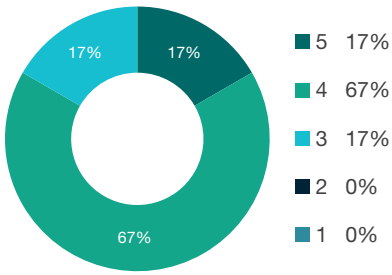
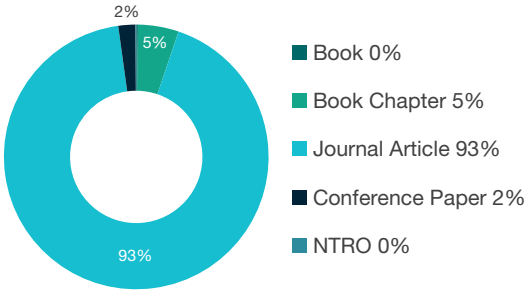


0607 Plant Biology

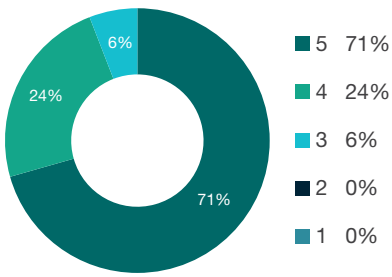
Indicator	No.
Research outputs	3,297.7
Research income	$125,541,109
FTEs	419.1
Esteem count	52.8
Patents	16.7
Research commercialisation income	$1,638,064

Rating	Distribution
5	12
4	4
3	1
2	0
1	0
Total	**17**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

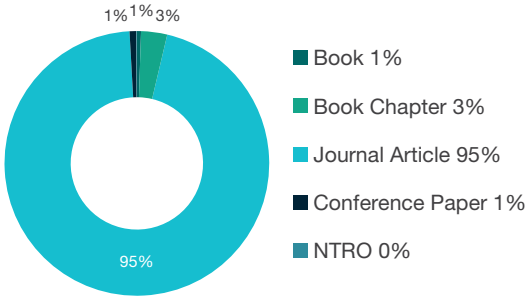


0608 Zoology

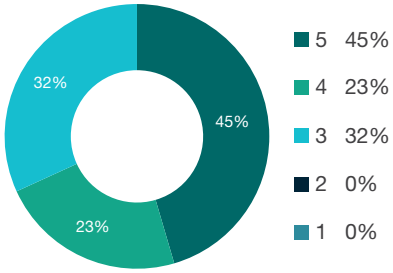
Indicator	No.
Research outputs	4,789.5
Research income	$68,137,488
FTEs	339.4
Esteem count	33.2
Patents	2.0
Research commercialisation income	$36,347

Rating	Distribution
5	10
4	5
3	7
2	0
1	0
Total	**22**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

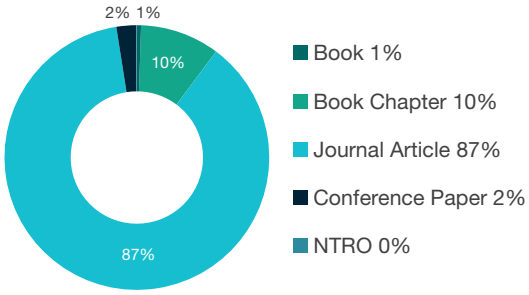


0699 Other Biological Sciences

Indicator	No.
Research outputs	1,029.4
Research income	$4,215,636
FTEs	176.5
Esteem count	1.5
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 0699.

07 AGRICULTURAL AND VETERINARY SCIENCES

Agricultural and Veterinary Sciences is comprised of the following four–digit codes:

0701 Agriculture, Land and Farm Management

0702 Animal Production

0703 Crop and Pasture Production

0704 Fisheries Sciences

0705 Forestry Sciences

0706 Horticultural Production

0707 Veterinary Sciences

0799 Other Agricultural and Veterinary Sciences

17 out of 24 two–digit UoEs and 40 out of 55 four–digit UoEs assessed were rated above world standard

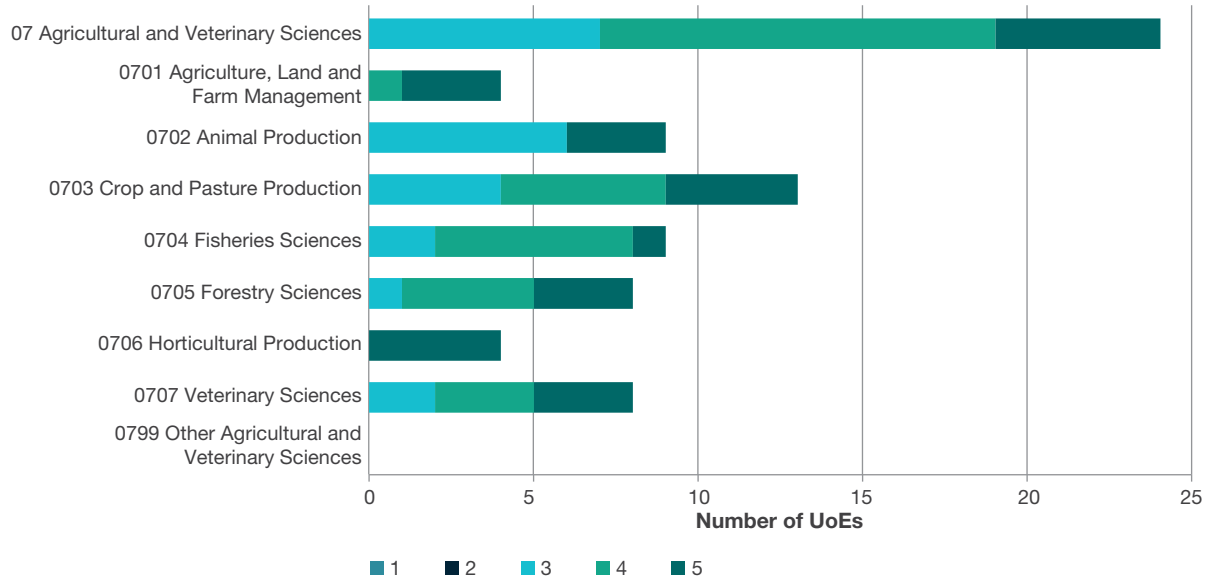
FoR Overview

Agricultural and Veterinary Sciences (07) accounted for approximately three per cent of the research outputs submitted to ERA 2015. While most of the Agricultural and Veterinary Sciences research outputs were journal articles (82 per cent), there was a significant proportion of conference papers (12 per cent). Crop and Pasture Production (0703) was the largest sub–discipline in terms of research outputs and research income. Veterinary Sciences (0707) had the highest number of staff, while Animal Production (0702) had the highest research commercialisation income.

Indicator	No.
Research outputs	12,094.8
Research income	$531,922,829
FTEs	1,287.5
Esteem count	33.2
Patents	22.3
Research commercialisation income	$35,495,083

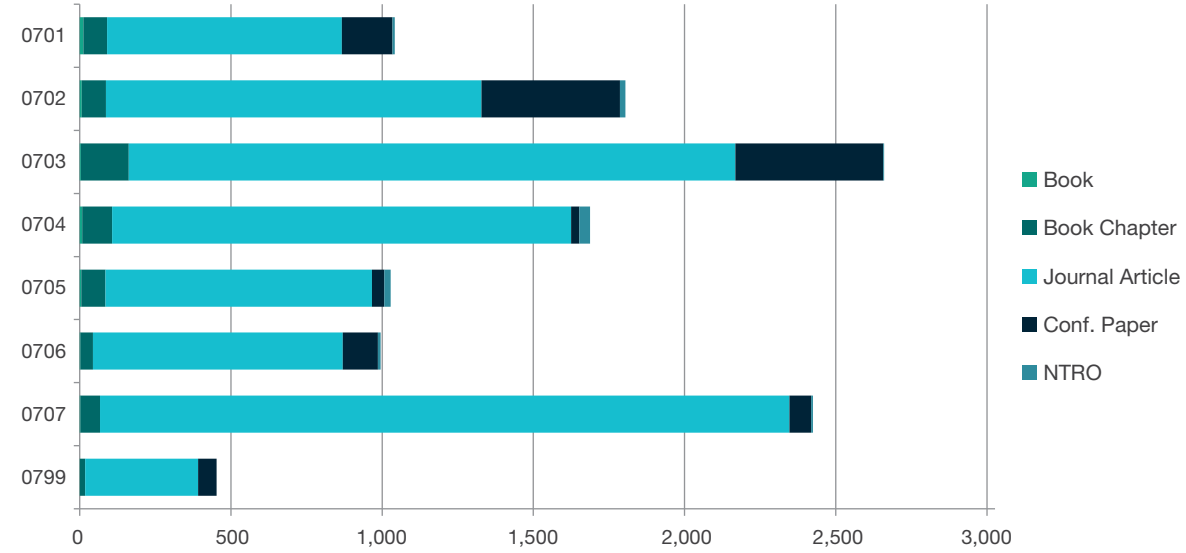
Rating	Distribution	
	Two–digit	Four–digit
5	5	21
4	12	19
3	7	15
2	0	0
1	0	0
Total	**24**	**55**

NUMBER OF UOES PER RATING SCALE SCORE



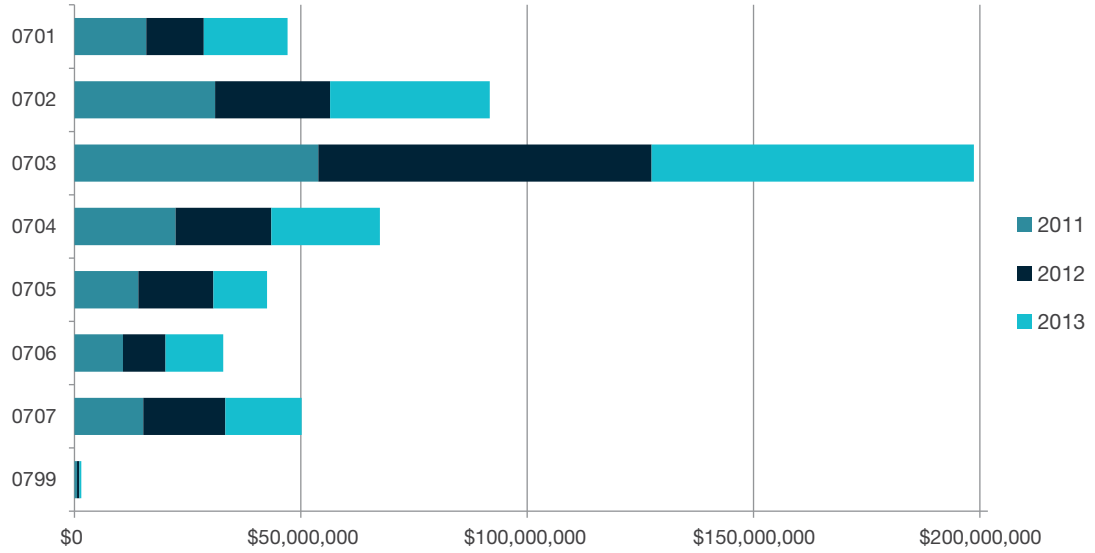
Note: 07 Agricultural and Veterinary Sciences shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



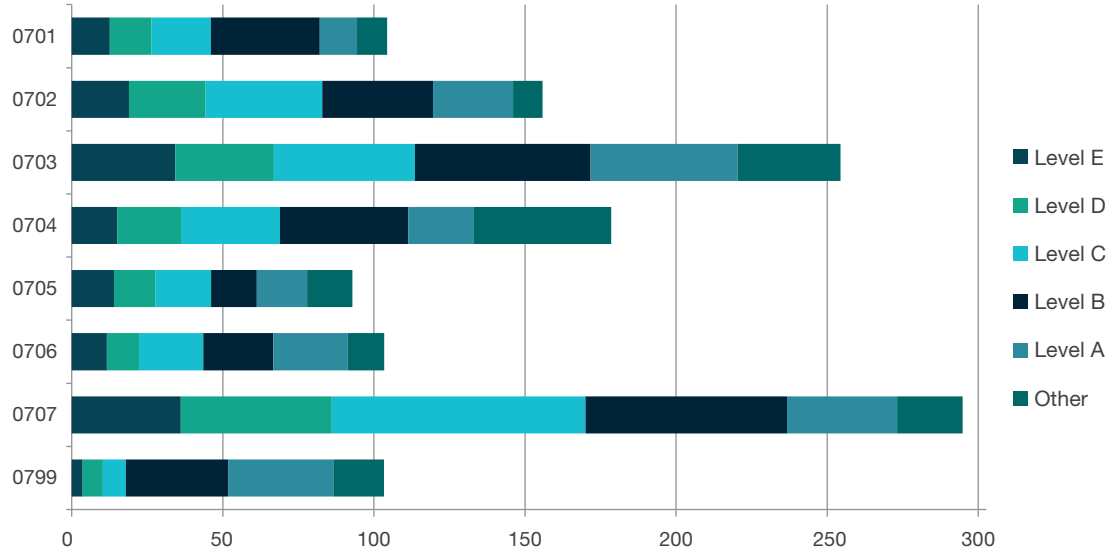
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
0701 Agriculture, Land and Farm Management	11.7	78.5	776.2	168.1	7.6	1,042.2
0702 Animal Production	6.6	80.3	1,241.5	457.8	18.0	1,804.2
0703 Crop and Pasture Production	4.0	158.2	2,006.1	488.5	3.3	2,660.0
0704 Fisheries Sciences	8.6	98.8	1,517.7	27.1	35.5	1,687.6
0705 Forestry Sciences	5.2	79.9	881.2	40.8	21.2	1,028.4
0706 Horticultural Production	2.0	41.5	826.2	116.2	8.8	994.7
0707 Veterinary Sciences	2.3	65.1	2,279.8	71.4	6.3	2,424.9
0799 Other Agricultural and Veterinary Sciences	1.0	17.3	373.3	61.3	0.0	452.9
Total	**41.3**	**619.5**	**9,902.1**	**1,431.3**	**100.7**	**12,094.8**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0701 Agriculture, Land and Farm Management	15,859,759	12,709,952	18,468,792	47,038,502
0702 Animal Production	31,033,305	25,430,549	35,260,944	91,724,799
0703 Crop and Pasture Production	53,860,611	73,608,584	71,220,981	198,690,176
0704 Fisheries Sciences	22,334,001	21,119,466	24,020,513	67,473,980
0705 Forestry Sciences	14,107,656	16,577,788	11,854,006	42,539,449
0706 Horticultural Production	10,693,349	9,405,171	12,721,622	32,820,142
0707 Veterinary Sciences	15,182,447	18,142,481	16,837,247	50,162,175
0799 Other Agricultural and Veterinary Sciences	549,051	524,855	399,699	1,473,605
Total	**163,620,179**	**177,518,845**	**190,783,805**	**531,922,829**

STAFFING PROFILE BY ACADEMIC LEVEL

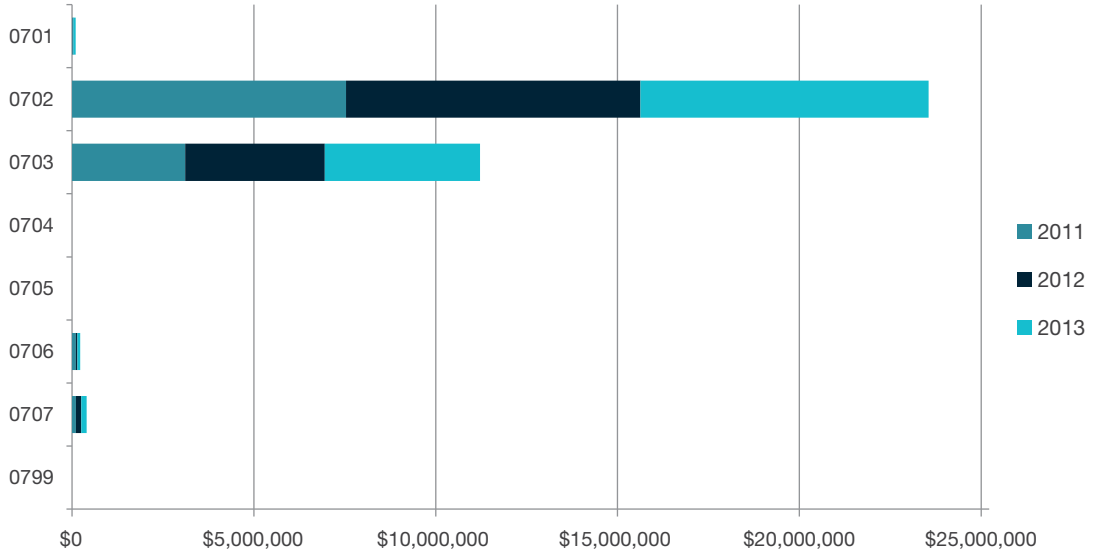


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
0701 Agriculture, Land and Farm Management	12.6	13.8	19.7	36.0	12.4	10.0	104.4
0702 Animal Production	18.9	25.3	38.6	36.7	26.5	9.7	155.8
0703 Crop and Pasture Production	34.3	32.6	46.7	58.1	48.7	34.1	254.4
0704 Fisheries Sciences	15.0	21.2	32.7	42.4	21.7	45.4	178.5
0705 Forestry Sciences	14.0	13.6	18.5	15.1	16.6	15.0	92.9
0706 Horticultural Production	11.6	10.6	21.3	23.1	24.6	12.2	103.4
0707 Veterinary Sciences	36.0	50.0	83.9	66.7	36.5	21.7	294.8
0799 Other Agricultural and Veterinary Sciences	3.6	6.7	7.6	33.9	35.0	16.6	103.3
Total	**146.0**	**173.9**	**269.0**	**312.0**	**221.9**	**164.7**	**1,287.5**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total
0701 Agriculture, Land and Farm Management	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0702 Animal Production	0.3	0.0	0.0	0.0	1.2	0.0	1.5
0703 Crop and Pasture Production	2.0	2.0	0.3	0.0	4.5	0.0	8.8
0704 Fisheries Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0705 Forestry Sciences	2.0	1.0	0.0	1.0	3.0	0.0	7.0
0706 Horticultural Production	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0707 Veterinary Sciences	1.0	1.0	1.0	0.0	2.0	0.0	5.0
0799 Other Agricultural and Veterinary Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**5.3**	**4.0**	**1.3**	**1.0**	**10.7**	**0.0**	**22.3**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



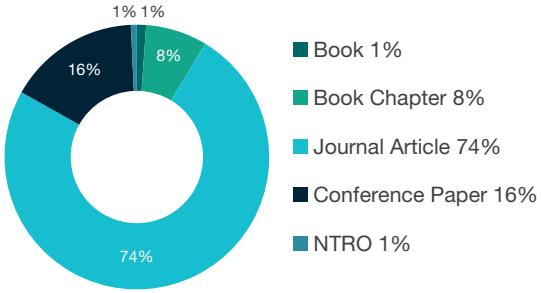
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0701 Agriculture, Land and Farm Management	23,249	11,559	61,648	96,456
0702 Animal Production	7,533,000	8,097,000	7,927,000	23,557,000
0703 Crop and Pasture Production	3,109,454	3,841,066	4,268,313	11,218,833
0704 Fisheries Sciences	0	0	0	0
0705 Forestry Sciences	0	0	0	0
0706 Horticultural Production	102,500	39,952	80,658	223,110
0707 Veterinary Sciences	102,365	149,603	147,717	399,685
0799 Other Agricultural and Veterinary Sciences	0	0	0	0
Total	**10,870,568**	**12,139,180**	**12,485,335**	**35,495,083**

0701 Agriculture, Land and Farm Management

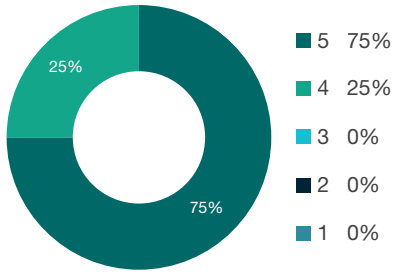
Indicator	No.
Research outputs	1,042.2
Research income	$47,038,502
FTEs	104.4
Esteem count	3.5
Patents	0.0
Research commercialisation income	$96,456

Rating	Distribution
5	3
4	1
3	0
2	0
1	0
Total	**4**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

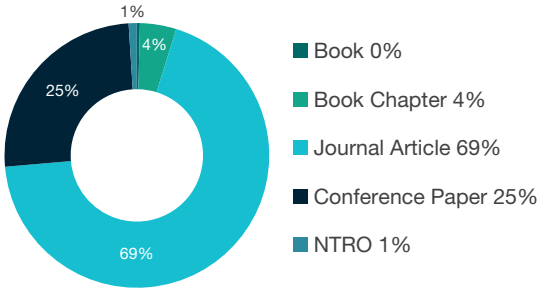


0702 Animal Production

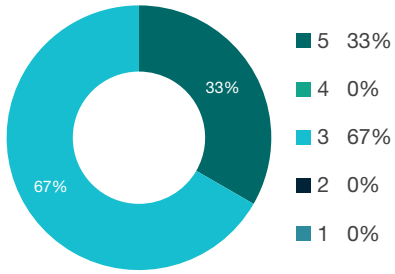
Indicator	No.
Research outputs	1,804.2
Research income	$91,724,799
FTEs	155.8
Esteem count	0.6
Patents	1.5
Research commercialisation income	$23,557,000

Rating	Distribution
5	3
4	0
3	6
2	0
1	0
Total	**9**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

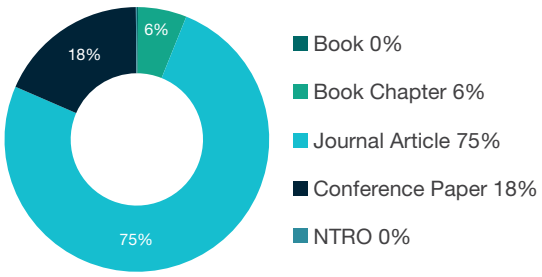


0703 Crop and Pasture Production

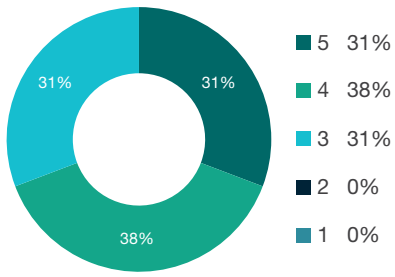
Indicator	No.
Research outputs	2,660.0
Research income	$198,690,176
FTEs	254.4
Esteem count	15.0
Patents	8.8
Research commercialisation income	$11,218,833

Rating	Distribution
5	4
4	5
3	4
2	0
1	0
Total	**13**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

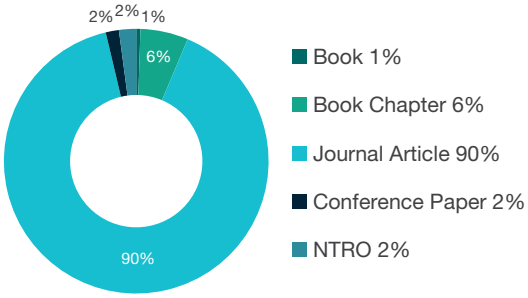


0704 Fisheries Sciences

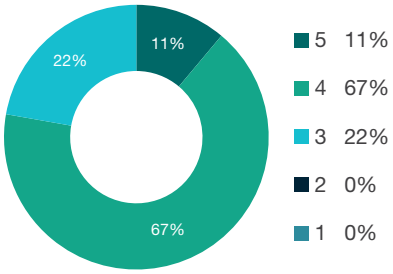
Indicator	No.
Research outputs	1,687.6
Research income	$67,473,980
FTEs	178.5
Esteem count	2.3
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	1
4	6
3	2
2	0
1	0
Total	**9**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

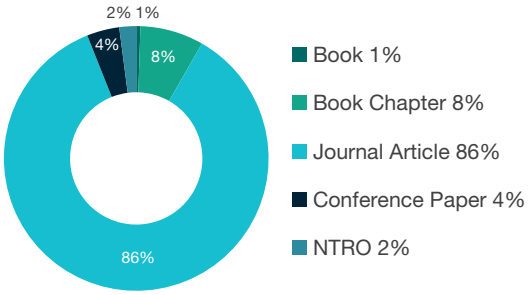


0705 Forestry Sciences

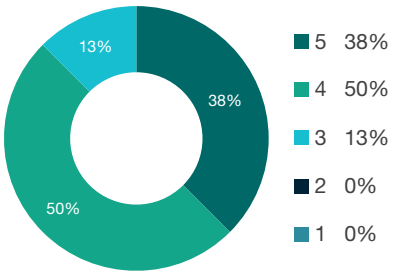
Indicator	No.
Research outputs	1,028.4
Research income	$42,539,449
FTEs	92.9
Esteem count	4.9
Patents	7.0
Research commercialisation income	$0

Rating	Distribution
5	3
4	4
3	1
2	0
1	0
Total	**8**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

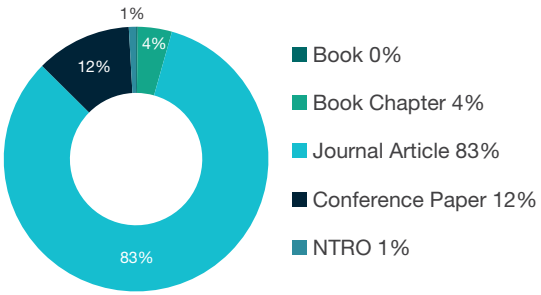


0706 Horticultural Production

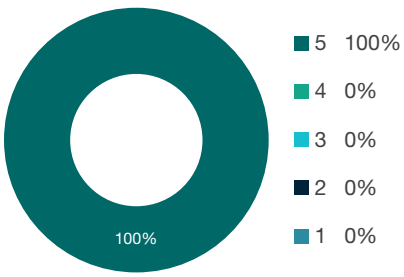
Indicator	No.
Research outputs	994.7
Research income	$32,820,142
FTEs	103.4
Esteem count	1.0
Patents	0.0
Research commercialisation income	$223,110

Rating	Distribution
5	4
4	0
3	0
2	0
1	0
Total	**4**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

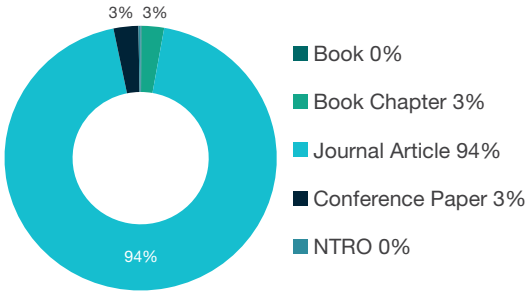


0707 Veterinary Sciences

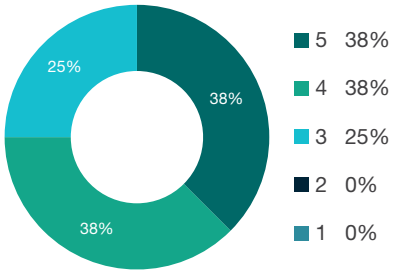
Indicator	No.
Research outputs	2,424.9
Research income	$50,162,175
FTEs	294.8
Esteem count	5.9
Patents	5.0
Research commercialisation income	$399,685

Rating	Distribution
5	3
4	3
3	2
2	0
1	0
Total	**8**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

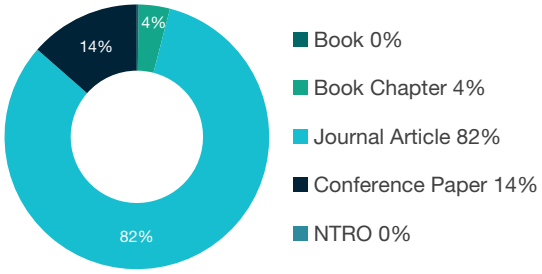


0799 Other Agricultural and Veterinary Sciences

Indicator	No.
Research outputs	452.9
Research income	$1,473,605
FTEs	103.3
Esteem count	0.0
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 0799.

08 INFORMATION AND COMPUTING SCIENCES

Information and Computing Sciences is comprised of the following four–digit codes:

0801 Artificial Intelligence and Image Processing

0802 Computation Theory and Mathematics

0803 Computer Software

0804 Data Format

0805 Distributed Computing

0806 Information Systems

0807 Library and Information Studies

0899 Other Information and Computing Sciences

9 out of 34 two–digit UoEs and 45 out of 93 four–digit UoEs assessed were rated above world standard

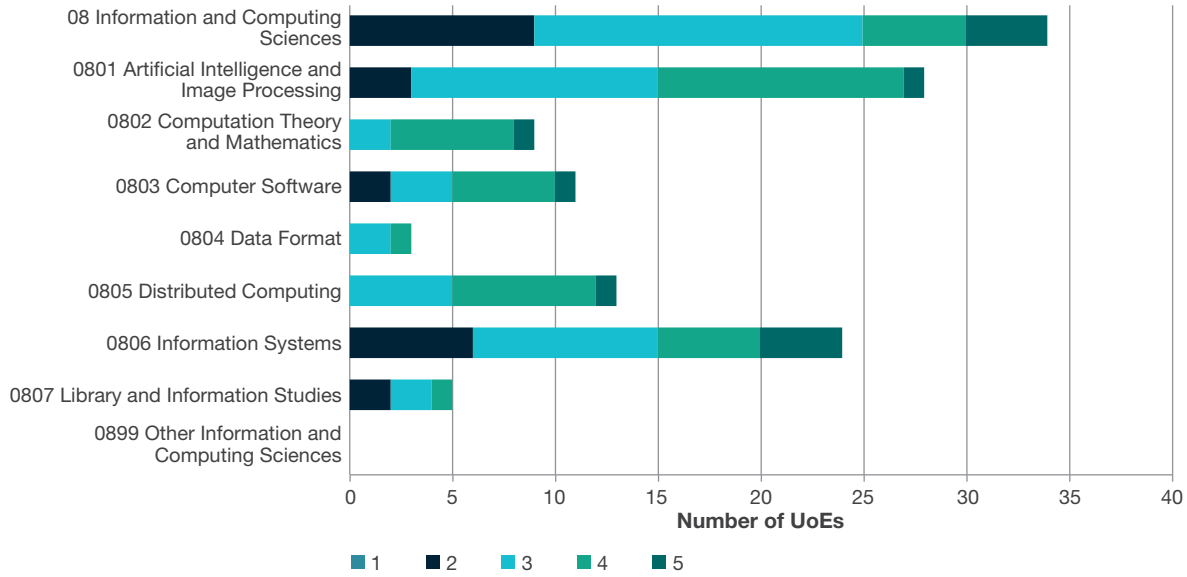
FoR Overview

Information and Computing Sciences (08) accounted for approximately six per cent of the research outputs submitted to ERA 2015. Conference papers were the most common research output type (61 per cent). Artificial Intelligence and Image Processing (0801) contributed the highest amount of research outputs, research income, staff FTE and research commercialisation income.

Indicator	No.
Research outputs	24,856.6
Research income	$248,350,121
FTEs	1,749.6
Esteem count	89.1
Patents	52.9
Research commercialisation income	$6,716,113

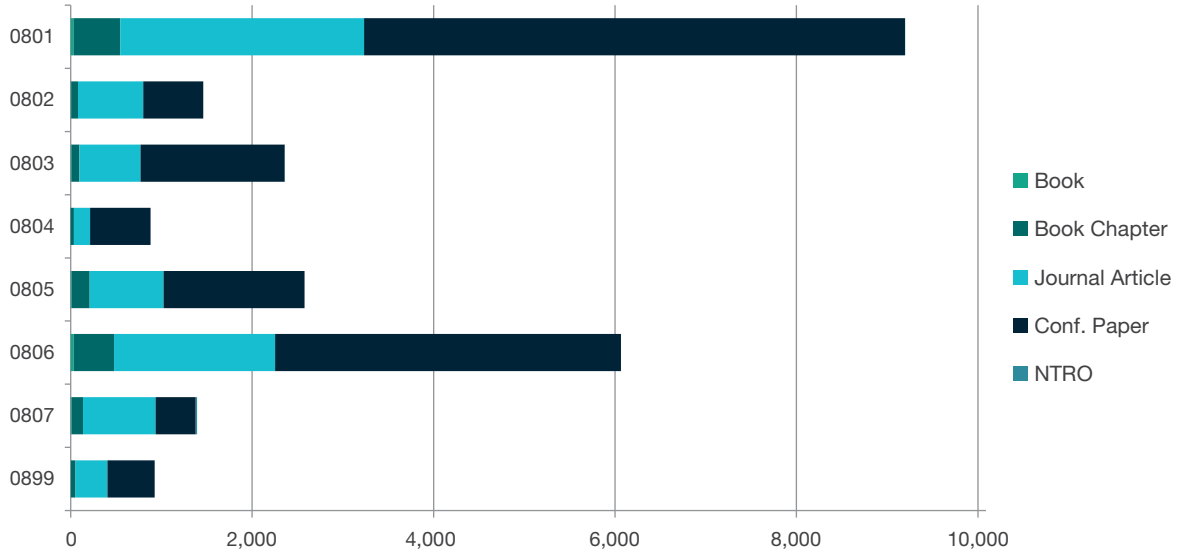
Rating	Distribution	
	Two–digit	Four–digit
5	4	8
4	5	37
3	16	35
2	9	13
1	0	0
Total	**34**	**93**

NUMBER OF UOES PER RATING SCALE SCORE



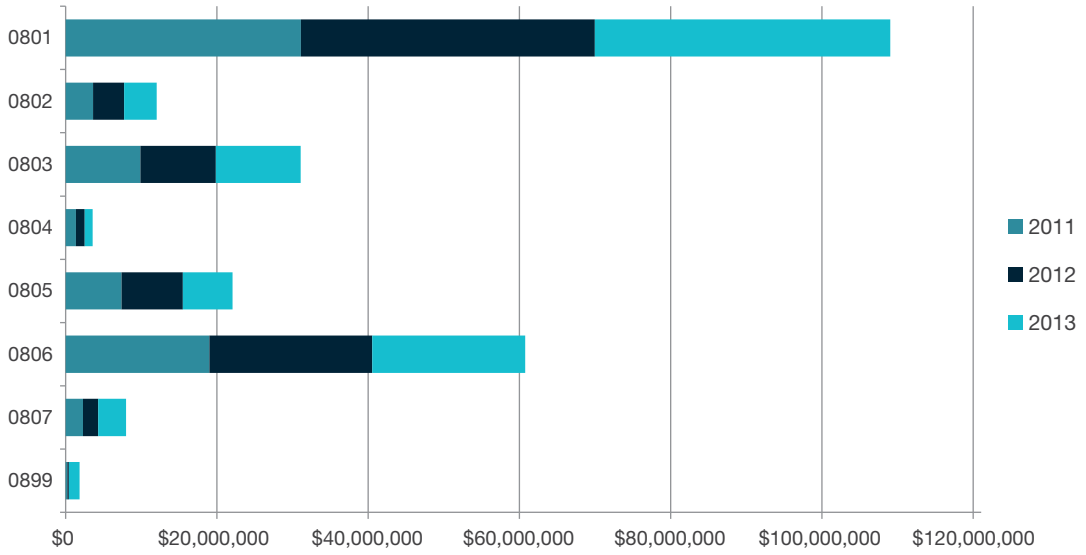
Note:08 Information and Computing Sciences shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



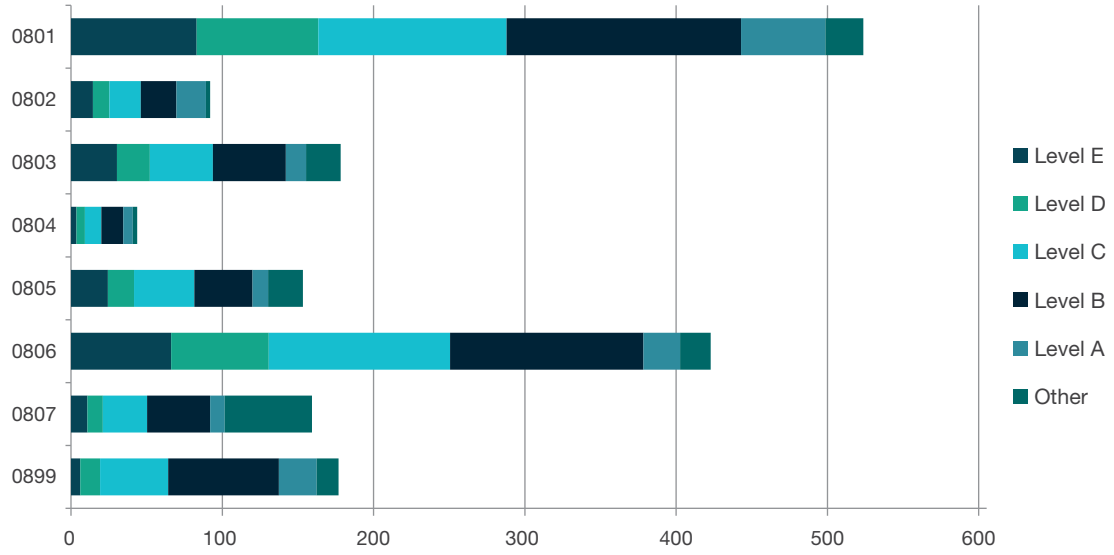
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
0801 Artificial Intelligence and Image Processing	30.0	516.2	2,688.7	5,960.0	1.0	9,196.0
0802 Computation Theory and Mathematics	4.5	76.1	719.9	659.8	0.0	1,460.2
0803 Computer Software	6.4	90.0	672.7	1,589.8	1.0	2,359.9
0804 Data Format	1.0	33.8	178.1	666.6	0.0	879.4
0805 Distributed Computing	10.6	198.8	812.8	1,556.2	0.0	2,578.3
0806 Information Systems	32.3	445.6	1,775.3	3,811.1	0.0	6,064.2
0807 Library and Information Studies	10.0	126.1	800.2	441.5	15.6	1,393.4
0899 Other Information and Computing Sciences	2.8	50.6	351.4	520.5	0.0	925.3
Total	**97.5**	**1,537.0**	**7,999.0**	**15,205.4**	**17.6**	**24,856.6**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0801 Artificial Intelligence and Image Processing	31,095,550	38,873,530	39,069,848	109,038,927
0802 Computation Theory and Mathematics	3,634,307	4,090,929	4,321,807	12,047,043
0803 Computer Software	9,868,429	9,973,277	11,221,611	31,063,317
0804 Data Format	1,346,233	1,156,121	1,056,168	3,558,521
0805 Distributed Computing	7,394,370	8,086,546	6,579,883	22,060,799
0806 Information Systems	19,009,474	21,533,362	20,225,102	60,767,939
0807 Library and Information Studies	2,276,724	2,031,957	3,661,454	7,970,135
0899 Other Information and Computing Sciences	222,322	204,277	1,416,841	1,843,439
Total	**74,847,407**	**85,950,000**	**87,552,713**	**248,350,121**

STAFFING PROFILE BY ACADEMIC LEVEL

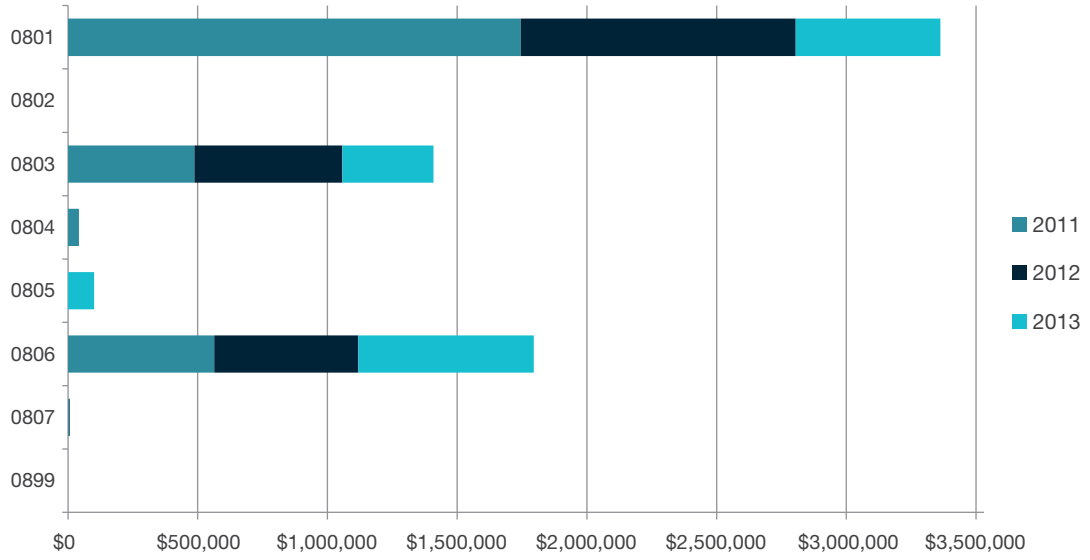


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
0801 Artificial Intelligence and Image Processing	83.0	80.5	124.4	155.1	55.7	25.1	523.7
0802 Computation Theory and Mathematics	14.4	10.9	20.8	23.6	19.4	2.9	92.0
0803 Computer Software	30.3	21.8	41.6	48.3	13.4	22.7	178.1
0804 Data Format	3.5	5.7	10.8	14.5	6.2	3.0	43.7
0805 Distributed Computing	24.3	17.3	39.8	38.5	10.4	23.0	153.3
0806 Information Systems	66.1	64.5	119.9	127.7	24.4	20.2	422.8
0807 Library and Information Studies	10.9	10.1	29.3	41.6	9.6	57.7	159.2
0899 Other Information and Computing Sciences	6.1	13.1	44.9	73.3	24.9	14.6	176.9
Total	**238.6**	**223.8**	**431.6**	**522.5**	**164.0**	**169.1**	**1,749.6**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total
0801 Artificial Intelligence and Image Processing	7.0	16.6	1.6	0.0	3.7	0.0	28.8
0802 Computation Theory and Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0803 Computer Software	0.0	0.0	0.0	0.0	0.5	0.0	0.5
0804 Data Format	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0805 Distributed Computing	3.0	2.1	0.0	0.0	1.0	0.0	6.1
0806 Information Systems	0.2	17.2	0.0	0.0	0.0	0.0	17.4
0807 Library and Information Studies	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0899 Other Information and Computing Sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**10.2**	**35.9**	**1.6**	**0.0**	**5.2**	**0.0**	**52.9**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



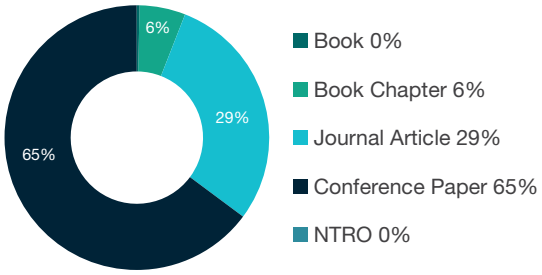
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0801 Artificial Intelligence and Image Processing	1,744,872	1,059,569	557,767	3,362,209
0802 Computation Theory and Mathematics	0	0	0	0
0803 Computer Software	487,428	570,339	350,963	1,408,730
0804 Data Format	42,493	0	0	42,493
0805 Distributed Computing	0	0	100,757	100,757
0806 Information Systems	563,548	555,500	676,389	1,795,437
0807 Library and Information Studies	3,974	2,514	0	6,488
0899 Other Information and Computing Sciences	0	0	0	0
Total	**2,842,314**	**2,187,922**	**1,685,877**	**6,716,113**

0801 Artificial Intelligence and Image Processing

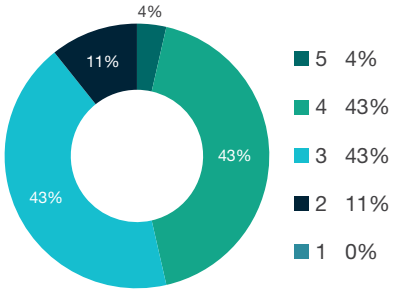
Indicator	No.
Research outputs	9,196.0
Research income	$109,038,927
FTEs	523.7
Esteem count	41.0
Patents	28.8
Research commercialisation income	$3,362,209

Rating	Distribution
5	1
4	12
3	12
2	3
1	0
Total	**28**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

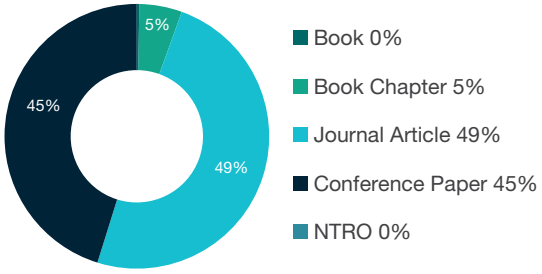


0802 Computation Theory and Mathematics

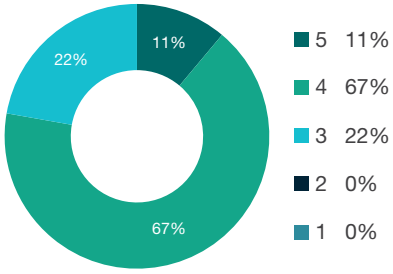
Indicator	No.
Research outputs	1,460.2
Research income	$12,047,043
FTEs	92.0
Esteem count	11.5
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	1
4	6
3	2
2	0
1	0
Total	**9**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

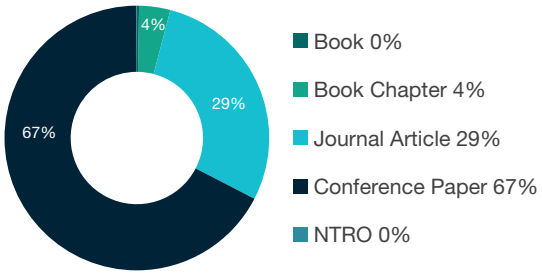


0803 Computer Software

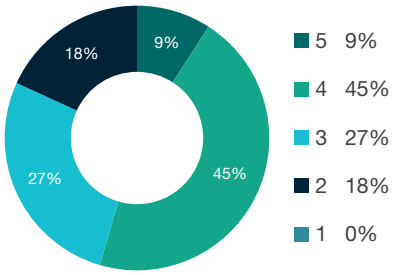
Indicator	No.
Research outputs	2,359.9
Research income	$31,063,317
FTEs	178.1
Esteem count	4.6
Patents	0.5
Research commercialisation income	$1,408,730

Rating	Distribution
5	1
4	5
3	3
2	2
1	0
Total	**11**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

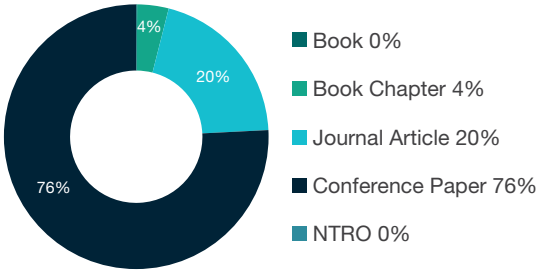


0804 Data Format

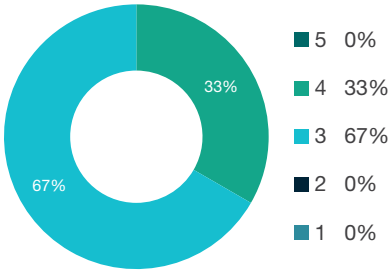
Indicator	No.
Research outputs	879.4
Research income	$3,558,521
FTEs	43.7
Esteem count	1.0
Patents	0.0
Research commercialisation income	$42,493

Rating	Distribution
5	0
4	1
3	2
2	0
1	0
Total	**3**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

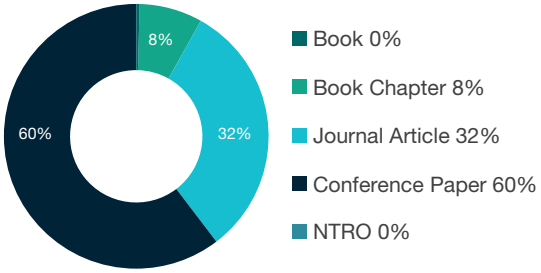


0805 Distributed Computing

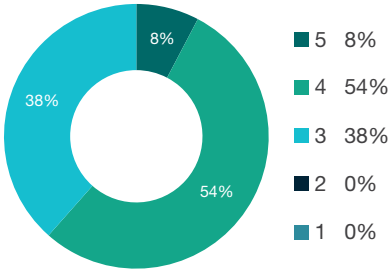
Indicator	No.
Research outputs	2,578.3
Research income	$22,060,799
FTEs	153.3
Esteem count	3.8
Patents	6.1
Research commercialisation income	$100,757

Rating	Distribution
5	1
4	7
3	5
2	0
1	0
Total	**13**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

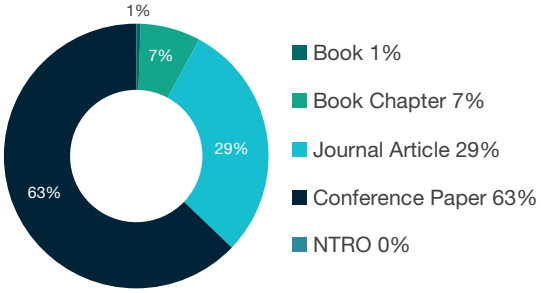


0806 Information Systems

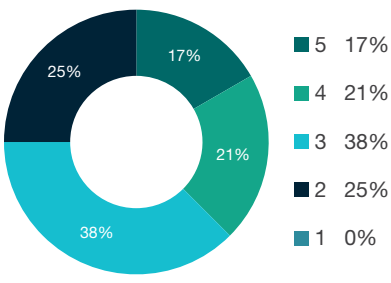
Indicator	No.
Research outputs	6,064.2
Research income	$60,767,939
FTEs	422.8
Esteem count	26.0
Patents	17.4
Research commercialisation income	$1,795,437

Rating	Distribution
5	4
4	5
3	9
2	6
1	0
Total	**24**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

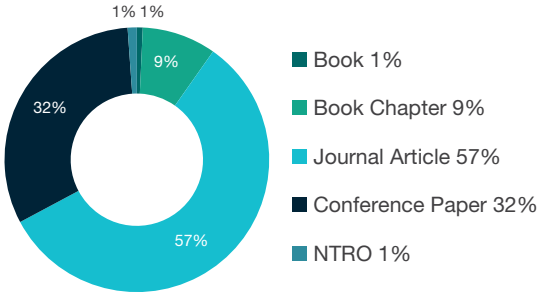


0807 Library and Information Studies

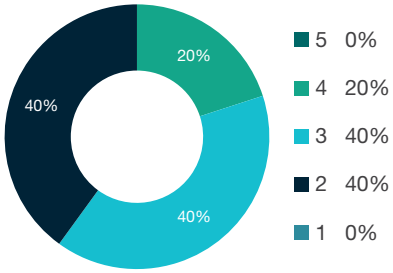
Indicator	No.
Research outputs	1,393.4
Research income	$7,970,135
FTEs	159.2
Esteem count	1.2
Patents	0.0
Research commercialisation income	$6,488

Rating	Distribution
5	0
4	1
3	2
2	2
1	0
Total	**5**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

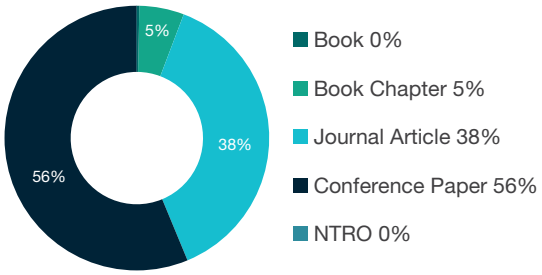


0899 Other Information and Computing Sciences

Indicator	No.
Research outputs	925.3
Research income	$1,843,439
FTEs	176.9
Esteem count	0.0
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 0899.

09 ENGINEERING

Engineering is comprised of the following four–digit codes:

0901 Aerospace Engineering

0902 Automotive Engineering

0903 Biomedical Engineering

0904 Chemical Engineering

0905 Civil Engineering

0906 Electrical and Electronic Engineering

0907 Environmental Engineering

0908 Food Sciences

0909 Geomatic Engineering

0910 Manufacturing Engineering

0911 Maritime Engineering

0912 Materials Engineering

0913 Mechanical Engineering

0914 Resources Engineering and Extractive Metallurgy

0915 Interdisciplinary Engineering

0999 Other Engineering

19 out of 34 two–digit UoEs and 110 out of 143 four–digit UoEs assessed were rated above world standard

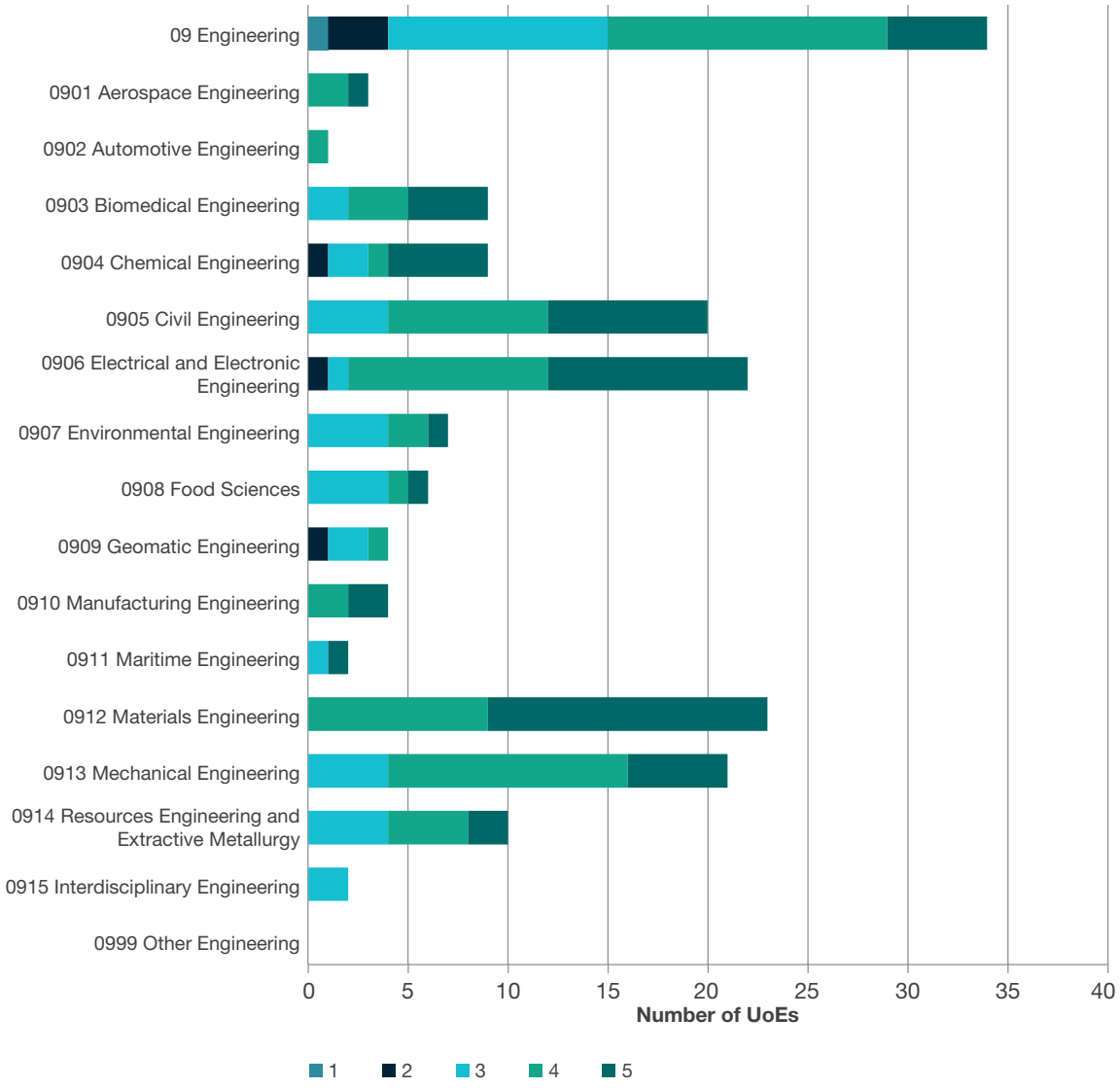
FoR Overview

Engineering (09) accounted for approximately 13 per cent of the research outputs submitted to ERA 2015. Approximately 31 per cent of the patents submitted to ERA 2015 were in Engineering. While journal articles were the predominant research output type (57 per cent), a large proportion of conference publications were also submitted to Engineering codes (39 per cent). Electrical and Electronic Engineering (0906) was the largest sub–discipline in terms of research outputs, staffing, research income, patents and research commercialisation income.

Indicator	No.
Research outputs	57,124.6
Research income	$1,085,215,725
FTEs	3,711.3
Esteem count	312.9
Patents	293.3
Research commercialisation income	$15,873,506

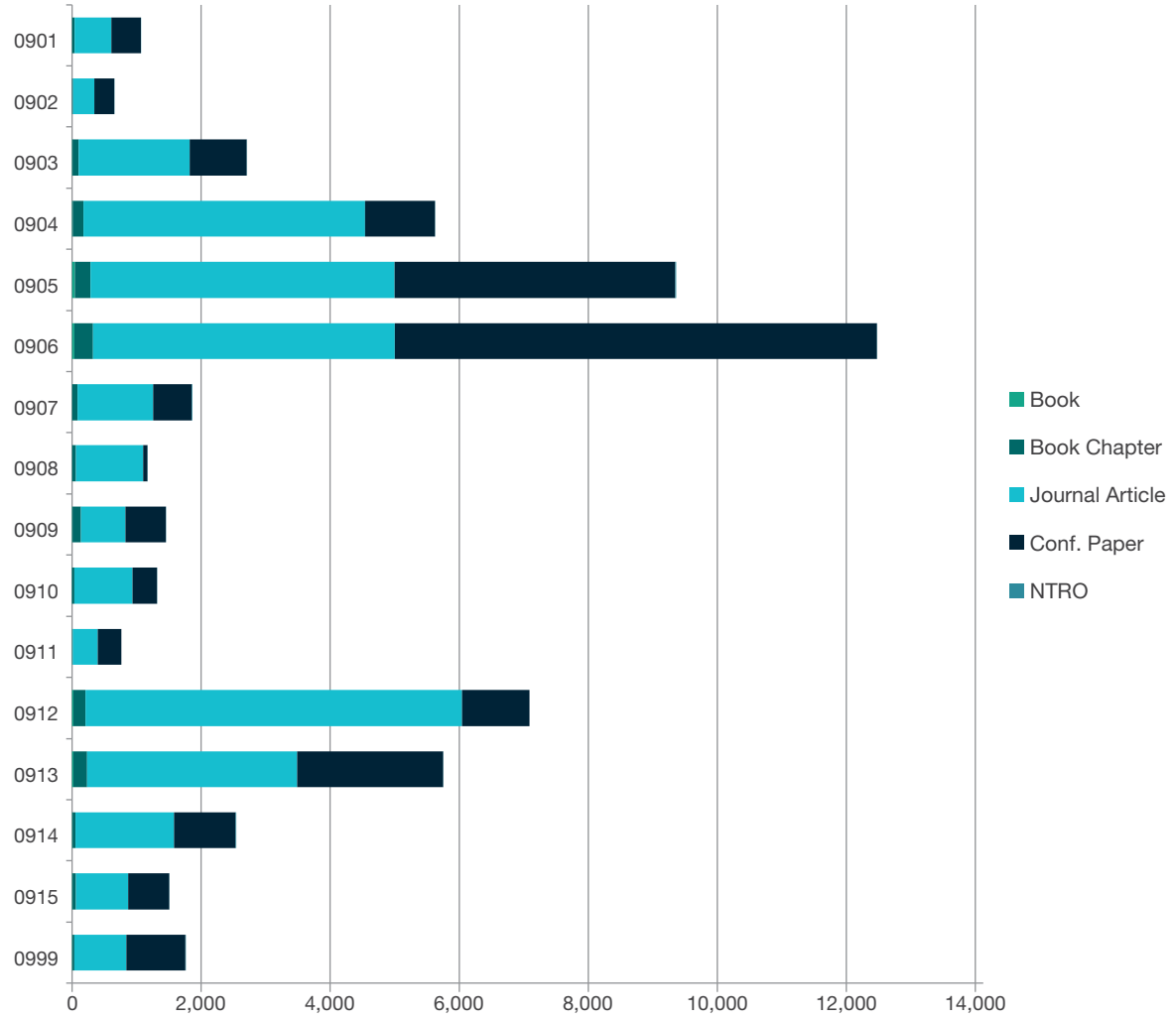
Rating	Distribution	
	Two–digit	Four–digit
5	5	54
4	14	56
3	11	30
2	3	3
1	1	0
Total	**34**	**143**

NUMBER OF UOES PER RATING SCALE SCORE



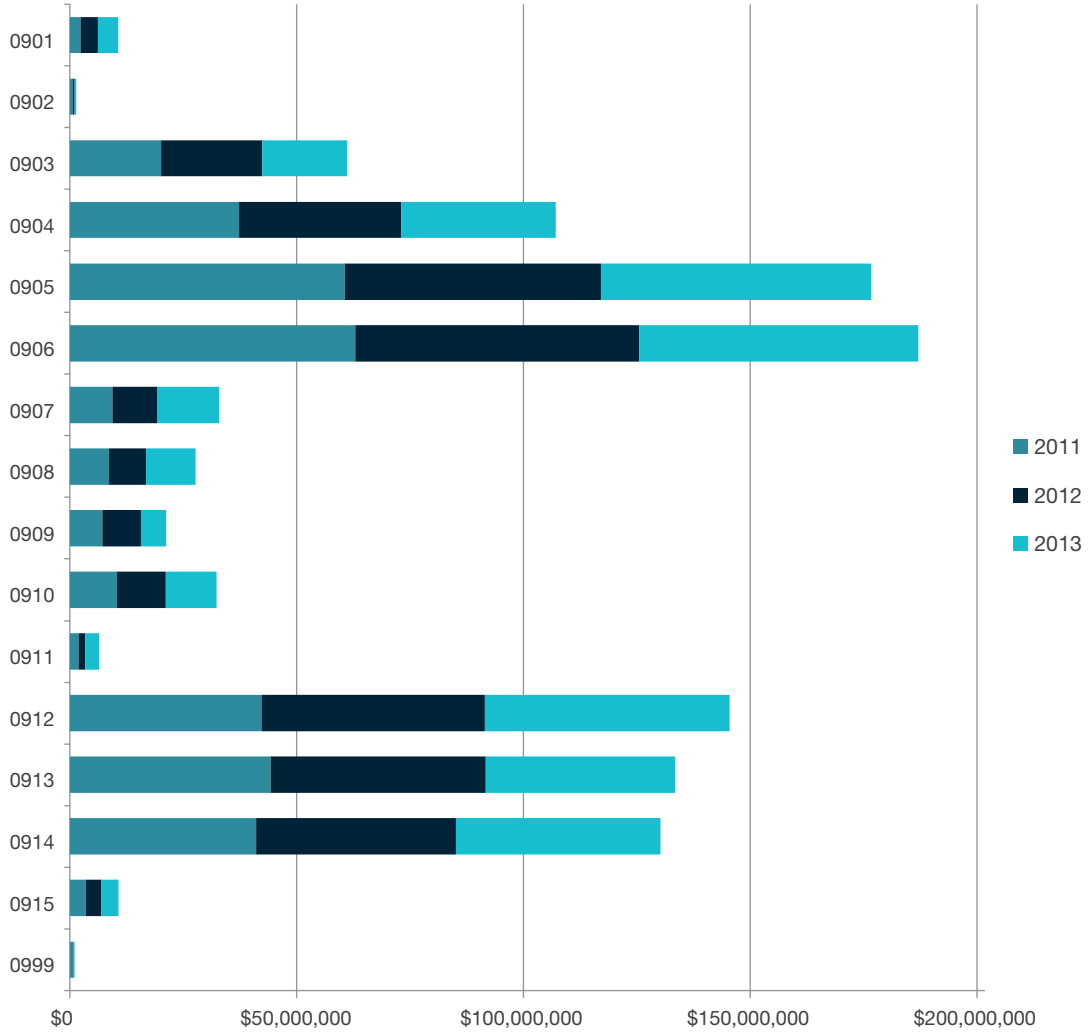
Note: 09 Engineering shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



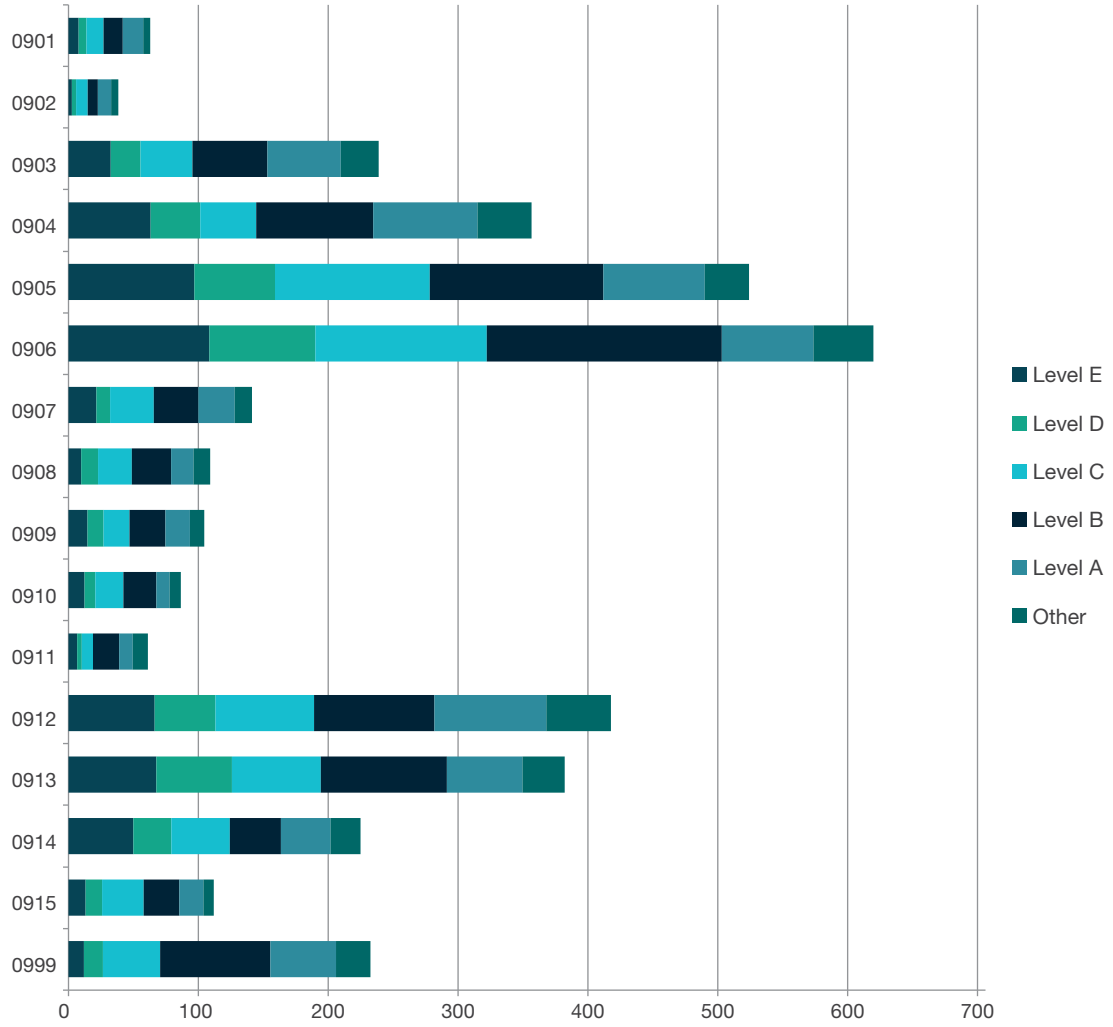
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
0901 Aerospace Engineering	2.7	34.0	572.3	456.3	1.0	1,066.1
0902 Automotive Engineering	0.0	12.4	329.9	310.4	2.4	655.1
0903 Biomedical Engineering	4.3	98.3	1,718.8	884.6	1.0	2,707.1
0904 Chemical Engineering	8.0	166.6	4,365.2	1,083.8	4.0	5,627.6
0905 Civil Engineering	42.6	242.5	4,711.5	4,353.2	14.1	9,363.9
0906 Electrical and Electronic Engineering	35.6	286.6	4,680.6	7,474.5	3.7	12,481.1
0907 Environmental Engineering	4.1	81.0	1,171.0	597.8	9.9	1,863.8
0908 Food Sciences	2.3	55.1	1,044.8	67.3	3.2	1,172.6
0909 Geomatic Engineering	5.0	132.7	687.5	627.0	2.0	1,454.2
0910 Manufacturing Engineering	0.2	33.8	900.2	380.5	1.0	1,315.8
0911 Maritime Engineering	2.3	7.8	385.7	366.5	0.0	762.3
0912 Materials Engineering	19.6	185.8	5,839.2	1,043.1	0.0	7,087.7
0913 Mechanical Engineering	20.4	209.8	3,258.9	2,262.9	0.9	5,752.9
0914 Resources Engineering and Extractive Metallurgy	6.6	44.4	1,528.3	953.0	12.1	2,544.4
0915 Interdisciplinary Engineering	4.3	56.0	807.6	637.3	1.0	1,506.3
0999 Other Engineering	5.3	29.5	804.4	917.7	6.8	1,763.8
Total	**163.3**	**1,676.3**	**32,805.8**	**22,416.1**	**63.1**	**57,124.6**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0901 Aerospace Engineering	2,328,930	3,821,844	4,513,345	10,664,120
0902 Automotive Engineering	568,523	431,492	374,871	1,374,886
0903 Biomedical Engineering	20,076,910	22,292,552	18,700,219	61,069,681
0904 Chemical Engineering	37,301,339	35,778,555	34,041,774	107,121,668
0905 Civil Engineering	60,630,245	56,432,844	59,621,407	176,684,496
0906 Electrical and Electronic Engineering	62,901,376	62,622,191	61,529,828	187,053,396
0907 Environmental Engineering	9,395,395	9,798,147	13,673,771	32,867,313
0908 Food Sciences	8,597,072	8,194,459	10,907,320	27,698,851
0909 Geomatic Engineering	7,161,295	8,502,892	5,549,118	21,213,305
0910 Manufacturing Engineering	10,369,106	10,744,396	11,210,556	32,324,058
0911 Maritime Engineering	1,934,589	1,434,795	3,013,620	6,383,005
0912 Materials Engineering	42,229,967	49,237,995	53,992,121	145,460,084
0913 Mechanical Engineering	44,290,556	47,411,916	41,704,440	133,406,912
0914 Resources Engineering and Extractive Metallurgy	41,042,708	44,063,125	45,103,929	130,209,762
0915 Interdisciplinary Engineering	3,473,593	3,427,627	3,779,701	10,680,921
0999 Other Engineering	585,661	198,608	218,999	1,003,268
Total	**352,887,265**	**364,393,440**	**367,935,020**	**1,085,215,725**

STAFFING PROFILE BY ACADEMIC LEVEL

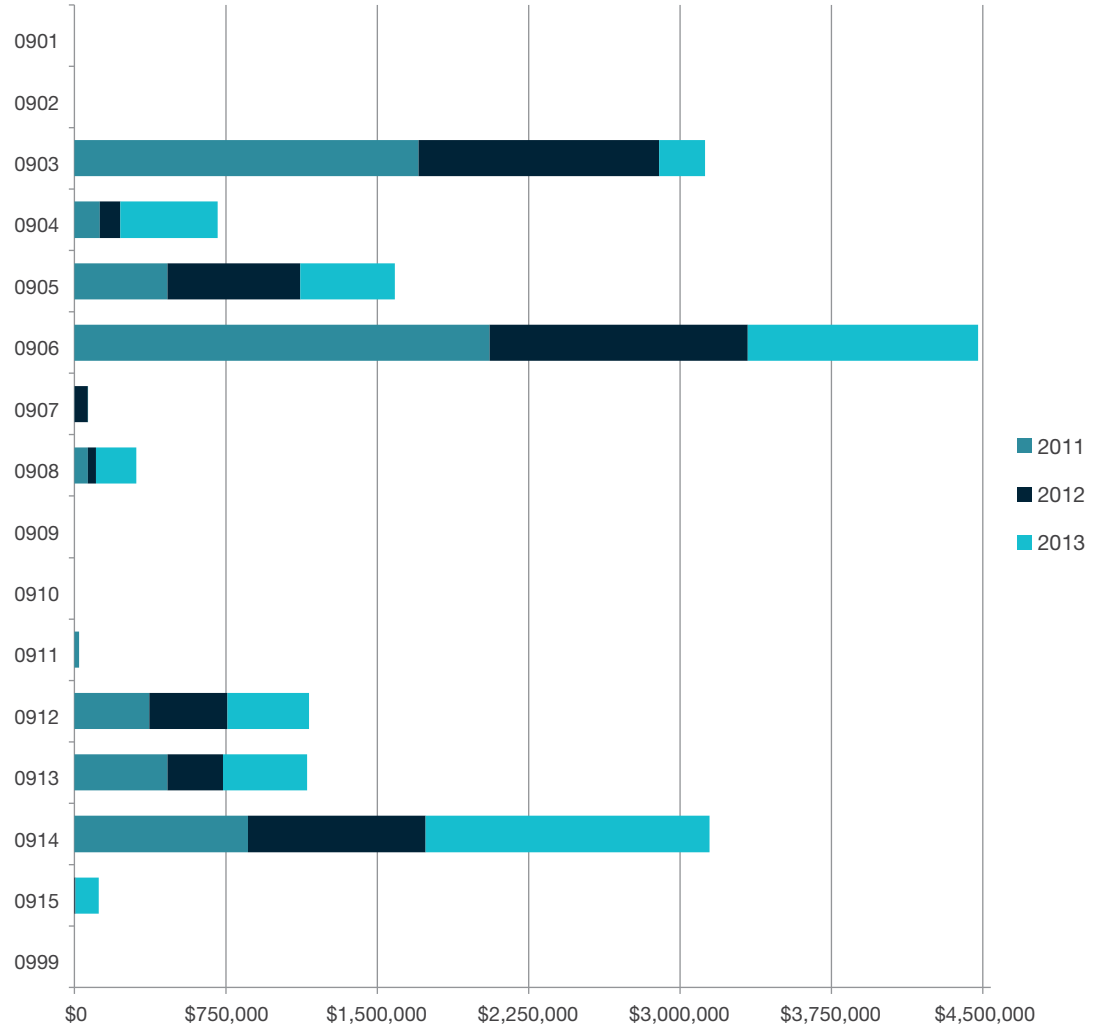


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
0901 Aerospace Engineering	7.7	6.1	13.1	14.8	15.8	5.3	62.9
0902 Automotive Engineering	2.6	3.3	9.0	7.8	10.2	5.6	38.3
0903 Biomedical Engineering	32.5	22.9	40.0	57.7	56.4	29.2	238.7
0904 Chemical Engineering	63.2	38.2	43.0	90.0	80.4	41.7	356.6
0905 Civil Engineering	96.9	62.0	119.3	133.5	78.1	34.1	523.9
0906 Electrical and Electronic Engineering	108.4	81.6	132.1	181.0	70.6	46.2	619.8
0907 Environmental Engineering	21.4	10.7	33.7	34.2	28.0	13.4	141.2
0908 Food Sciences	9.6	13.0	26.1	30.2	17.2	12.9	109.0
0909 Geomatic Engineering	14.6	12.4	20.0	27.6	18.9	11.1	104.6
0910 Manufacturing Engineering	12.2	8.3	21.6	25.4	10.3	8.7	86.5
0911 Maritime Engineering	6.5	3.6	8.7	20.1	10.4	11.8	61.1
0912 Materials Engineering	66.3	46.9	75.8	92.8	86.1	49.8	417.7
0913 Mechanical Engineering	67.5	58.2	68.5	97.2	58.2	32.4	382.0
0914 Resources Engineering and Extractive Metallurgy	49.9	29.3	45.0	39.3	38.2	23.1	224.8
0915 Interdisciplinary Engineering	13.2	12.6	32.1	27.4	18.5	8.0	111.8
0999 Other Engineering	11.8	14.6	44.1	84.9	50.5	26.5	232.4
Total	**584.2**	**423.6**	**732.1**	**963.8**	**647.7**	**359.9**	**3,711.3**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total
0901 Aerospace Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0902 Automotive Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0903 Biomedical Engineering	5.9	9.4	3.5	3.3	5.9	0.0	28.0
0904 Chemical Engineering	11.9	10.1	5.8	6.0	25.6	0.0	59.4
0905 Civil Engineering	2.2	2.2	0.2	1.0	6.0	0.0	11.6
0906 Electrical and Electronic Engineering	6.5	32.6	6.7	1.5	30.3	0.0	77.7
0907 Environmental Engineering	2.0	1.0	0.0	0.0	0.4	0.0	3.4
0908 Food Sciences	0.0	1.0	0.0	0.0	1.0	0.0	2.0
0909 Geomatic Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0910 Manufacturing Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0911 Maritime Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0912 Materials Engineering	4.8	10.2	7.8	6.5	18.9	0.0	48.3
0913 Mechanical Engineering	9.0	2.5	1.0	0.0	6.5	0.0	19.0
0914 Resources Engineering and Extractive Metallurgy	8.0	9.0	1.0	1.0	24.0	0.0	43.0
0915 Interdisciplinary Engineering	1.0	0.0	0.0	0.0	0.0	0.0	1.0
0999 Other Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**51.3**	**78.1**	**26.1**	**19.3**	**118.5**	**0**	**293.3**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



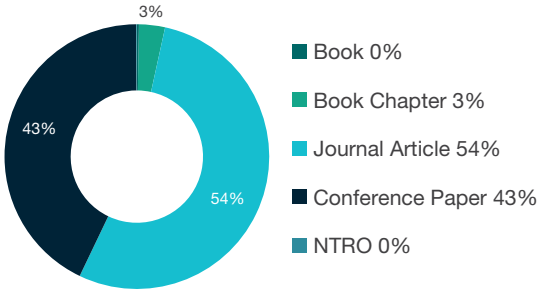
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
0901 Aerospace Engineering	0	0	0	0
0902 Automotive Engineering	0	0	0	0
0903 Biomedical Engineering	1,704,293	1,192,702	227,350	3,124,344
0904 Chemical Engineering	125,212	102,122	482,043	709,376
0905 Civil Engineering	460,714	657,506	468,661	1,586,881
0906 Electrical and Electronic Engineering	2,056,501	1,278,749	1,141,659	4,476,909
0907 Environmental Engineering	600	65,778	316	66,694
0908 Food Sciences	65,931	40,759	199,091	305,781
0909 Geomatic Engineering	0	0	0	0
0910 Manufacturing Engineering	0	0	0	0
0911 Maritime Engineering	22,730	0	0	22,730
0912 Materials Engineering	370,815	387,453	404,132	1,162,400
0913 Mechanical Engineering	461,024	274,311	416,880	1,152,215
0914 Resources Engineering and Extractive Metallurgy	859,002	880,657	1,406,542	3,146,202
0915 Interdisciplinary Engineering	0	4,994	114,980	119,974
0999 Other Engineering	0	0	0	0
Total	**6,126,822**	**4,885,031**	**4,861,653**	**15,873,506**

0901 Aerospace Engineering

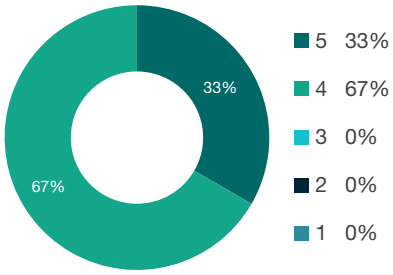
Indicator	No.
Research outputs	1,066.1
Research income	$10,664,120
FTEs	62.9
Esteem count	0.5
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	1
4	2
3	0
2	0
1	0
Total	**3**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

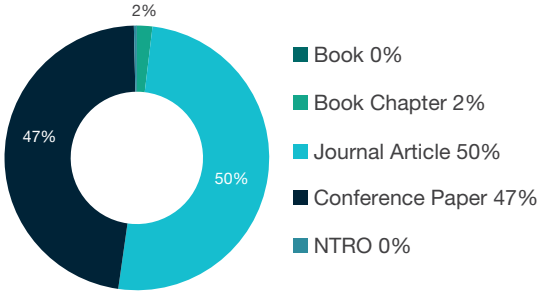


0902 Automotive Engineering

Indicator	No.
Research outputs	655.1
Research income	$1,374,886
FTEs	38.3
Esteem count	2.5
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	1
3	0
2	0
1	0
Total	**1**

RESEARCH OUTPUTS BY TYPE



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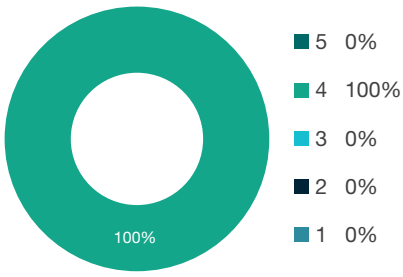
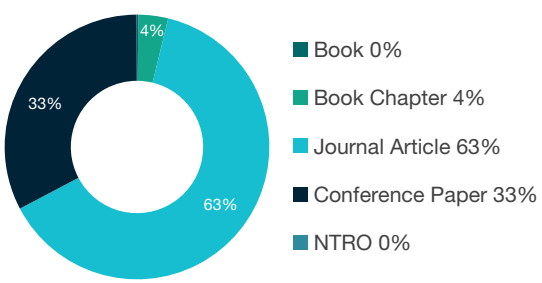


0903 Biomedical Engineering

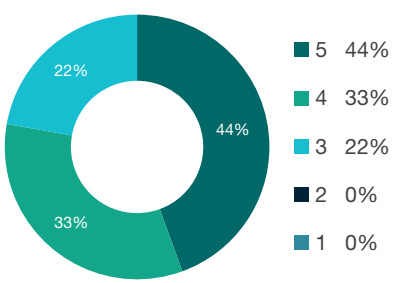
Indicator	No.
Research outputs	2,707.1
Research income	$61,069,681
FTEs	238.7
Esteem count	27.0
Patents	28.0
Research commercialisation income	$3,124,344

Rating	Distribution
5	4
4	3
3	2
2	0
1	0
Total	**9**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

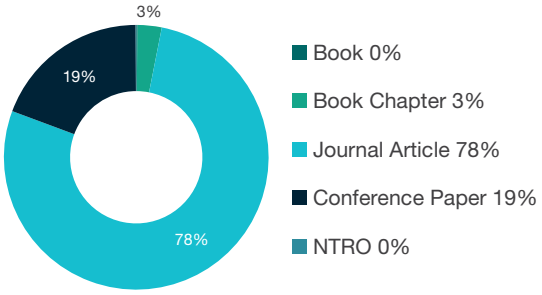


0904 Chemical Engineering

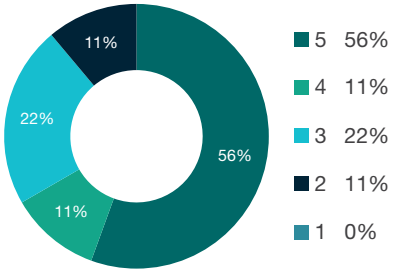
Indicator	No.
Research outputs	5,627.6
Research income	$107,121,668
FTEs	356.6
Esteem count	50.8
Patents	59.4
Research commercialisation income	$709,376

Rating	Distribution
5	5
4	1
3	2
2	1
1	0
Total	**9**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

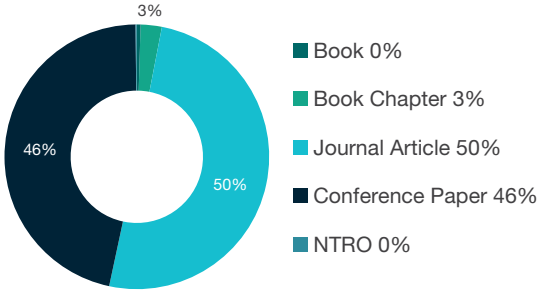


0905 Civil Engineering

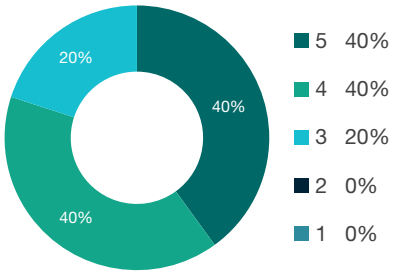
Indicator	No.
Research outputs	9,363.9
Research income	$176,684,496
FTEs	523.9
Esteem count	40.1
Patents	11.6
Research commercialisation income	$1,586,881

Rating	Distribution
5	8
4	8
3	4
2	0
1	0
Total	**20**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

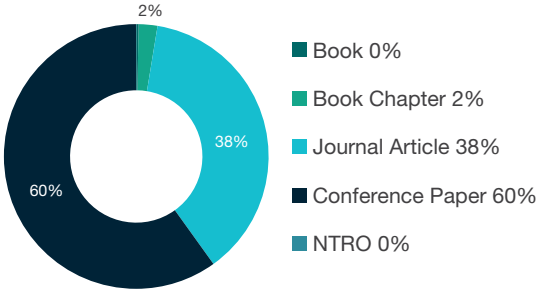


0906 Electrical and Electronic Engineering

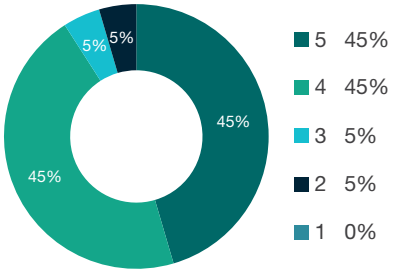
Indicator	No.
Research outputs	12,481.1
Research income	$187,053,396
FTEs	619.8
Esteem count	61.9
Patents	77.7
Research commercialisation income	$4,476,909

Rating	Distribution
5	10
4	10
3	1
2	1
1	0
Total	**22**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

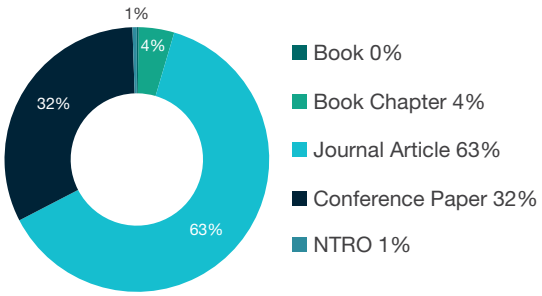


0907 Environmental Engineering

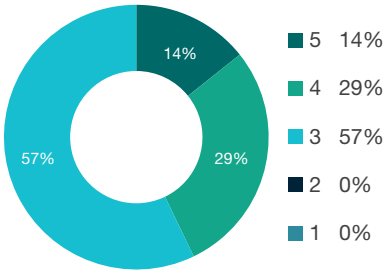
Indicator	No.
Research outputs	1,863.8
Research income	$32,867,313
FTEs	141.2
Esteem count	5.9
Patents	3.4
Research commercialisation income	$66,694

Rating	Distribution
5	1
4	2
3	4
2	0
1	0
Total	**7**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

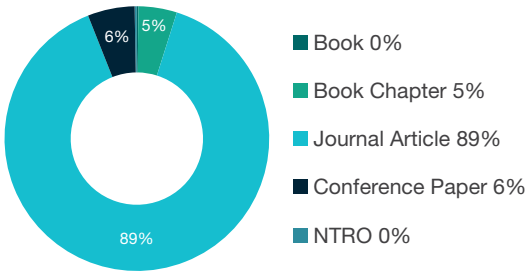


0908 Food Sciences

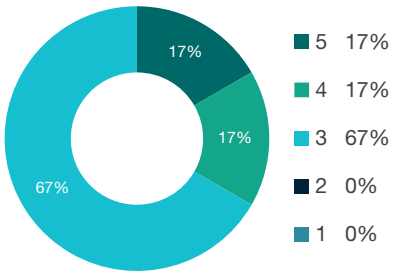
Indicator	No.
Research outputs	1,172.6
Research income	$27,698,851
FTEs	109.0
Esteem count	0.5
Patents	2.0
Research commercialisation income	$305,781

Rating	Distribution
5	1
4	1
3	4
2	0
1	0
Total	**6**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

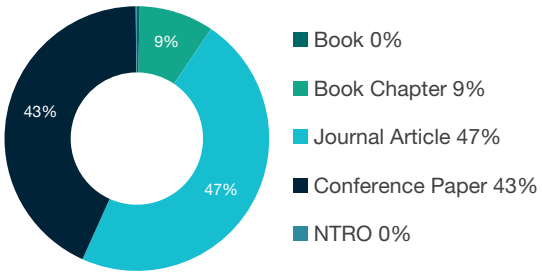


0909 Geomatic Engineering

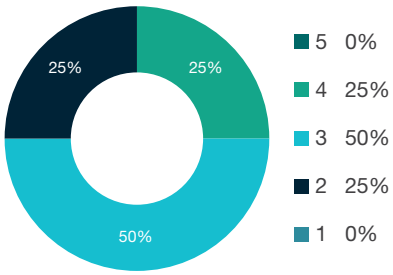
Indicator	No.
Research outputs	1,454.2
Research income	$21,213,305
FTEs	104.6
Esteem count	4.6
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	1
3	2
2	1
1	0
Total	**4**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

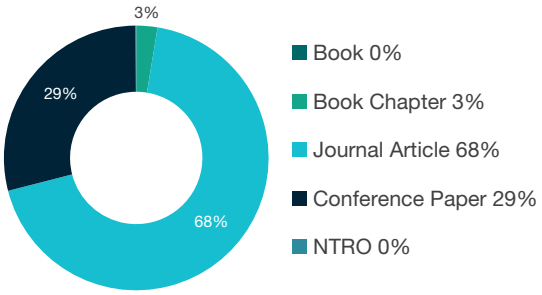


0910 Manufacturing Engineering

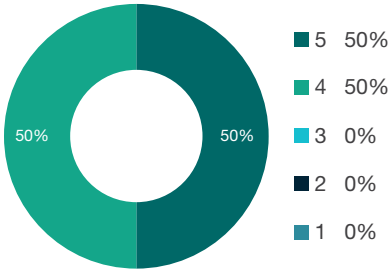
Indicator	No.
Research outputs	1,315.8
Research income	$32,324,058
FTEs	86.5
Esteem count	4.3
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	2
4	2
3	0
2	0
1	0
Total	**4**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

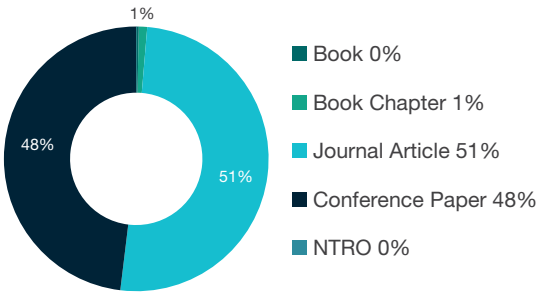


0911 Maritime Engineering

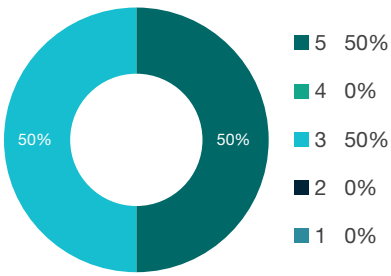
Indicator	No.
Research outputs	762.3
Research income	$6,383,005
FTEs	61.1
Esteem count	0.2
Patents	0.0
Research commercialisation income	$22,730

Rating	Distribution
5	1
4	0
3	1
2	0
1	0
Total	**2**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

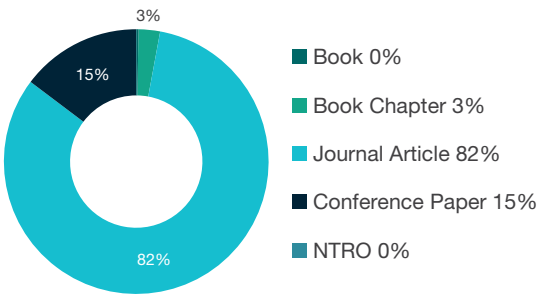


0912 Materials Engineering

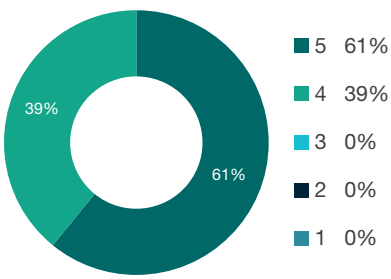
Indicator	No.
Research outputs	7,087.7
Research income	$145,460,084
FTEs	417.7
Esteem count	60.1
Patents	48.3
Research commercialisation income	$1,162,400

Rating	Distribution
5	14
4	9
3	0
2	0
1	0
Total	**23**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

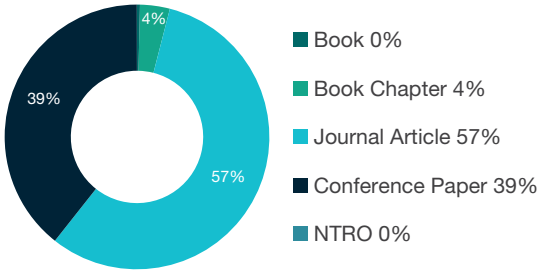


0913 Mechanical Engineering

Indicator	No.
Research outputs	5,752.9
Research income	$133,406,912
FTEs	382.0
Esteem count	30.4
Patents	19.0
Research commercialisation income	$1,152,215

Rating	Distribution
5	5
4	12
3	4
2	0
1	0
Total	**21**

RESEARCH OUTPUTS BY TYPE



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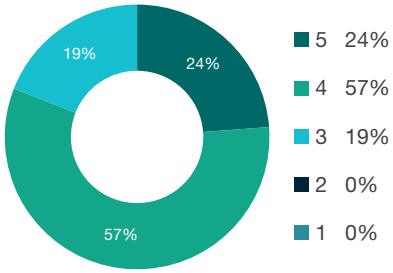
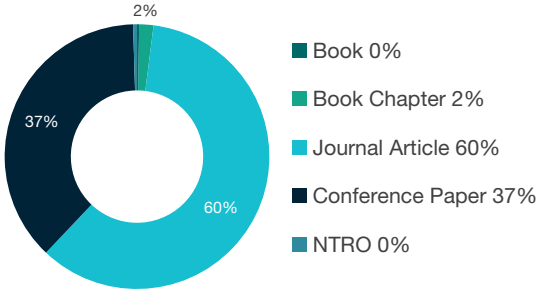


0914 Resources Engineering and Extractive Metallurgy

Indicator	No.
Research outputs	2,544.4
Research income	$130,209,762
FTEs	224.8
Esteem count	21.7
Patents	43.0
Research commercialisation income	$3,146,202

Rating	Distribution
5	2
4	4
3	4
2	0
1	0
Total	**10**

RESEARCH OUTPUTS BY TYPE



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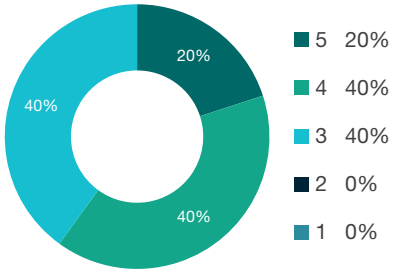
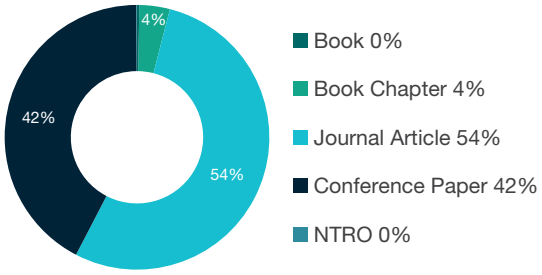


0915 Interdisciplinary Engineering

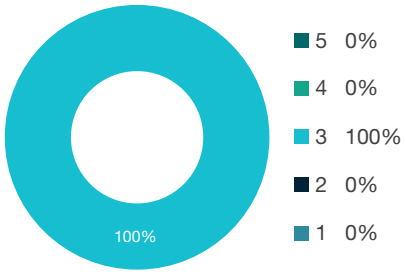
Indicator	No.
Research outputs	1,506.3
Research income	$10,680,921
FTEs	111.8
Esteem count	2.3
Patents	1.0
Research commercialisation income	$119,974

Rating	Distribution
5	0
4	0
3	2
2	0
1	0
Total	**2**

RESEARCH OUTPUTS BY TYPE



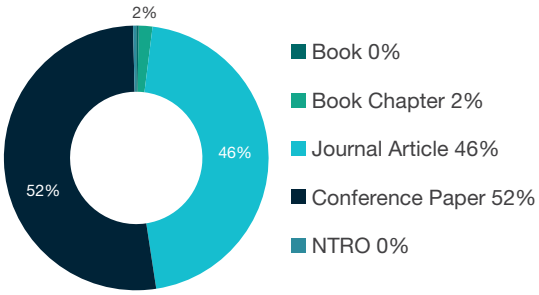
FOR RATING DISTRIBUTION



0999 Other Engineering

Indicator	No.
Research outputs	1,763.8
Research income	$1,003,268
FTEs	232.4
Esteem count	0.0
Patents	0.0
Research commercialisation income	$0

RESEARCH OUTPUTS BY TYPE



Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 0999.

10 TECHNOLOGY

Technology is comprised of the following four–digit codes:

1001 Agricultural Biotechnology

1002 Environmental Biotechnology

1003 Industrial Biotechnology

1004 Medical Biotechnology

1005 Communications Technologies

1006 Computer Hardware

1007 Nanotechnology

1099 Other Technology

9 out of 11 two–digit UoEs and 19 out of 19 four–digit UoEs assessed were rated above world standard

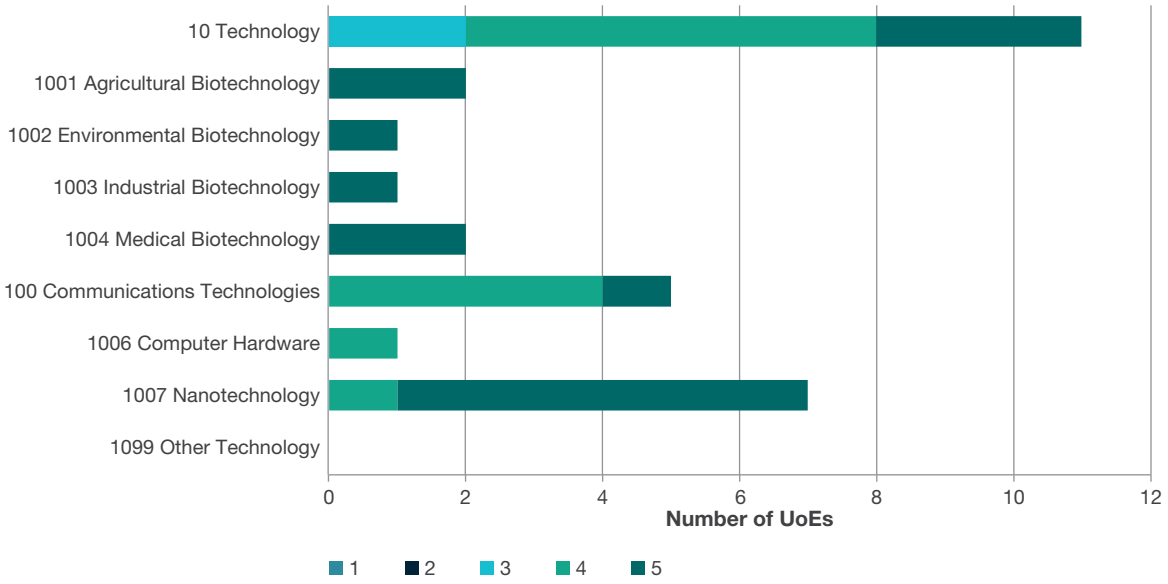
FoR Overview

Technology (10) accounted for approximately one per cent of the research outputs submitted to ERA 2015. Approximately five per cent of the patents submitted to ERA 2015 were from Technology. The most common research output types for Technology were journal articles (49 per cent), followed by conference papers (44 per cent). Communications Technologies (1005) and Other Technology (1099) were the two largest sub–disciplines in terms of research outputs, staff FTE and reseach income. Communications Technologies (1005) had the highest amount of research commercialisation income.

Indicator	No.
Research outputs	6,442.7
Research income	$114,779,676
FTEs	670.5
Esteem count	42.0
Patents	48.3
Research commercialisation income	$1,314,395

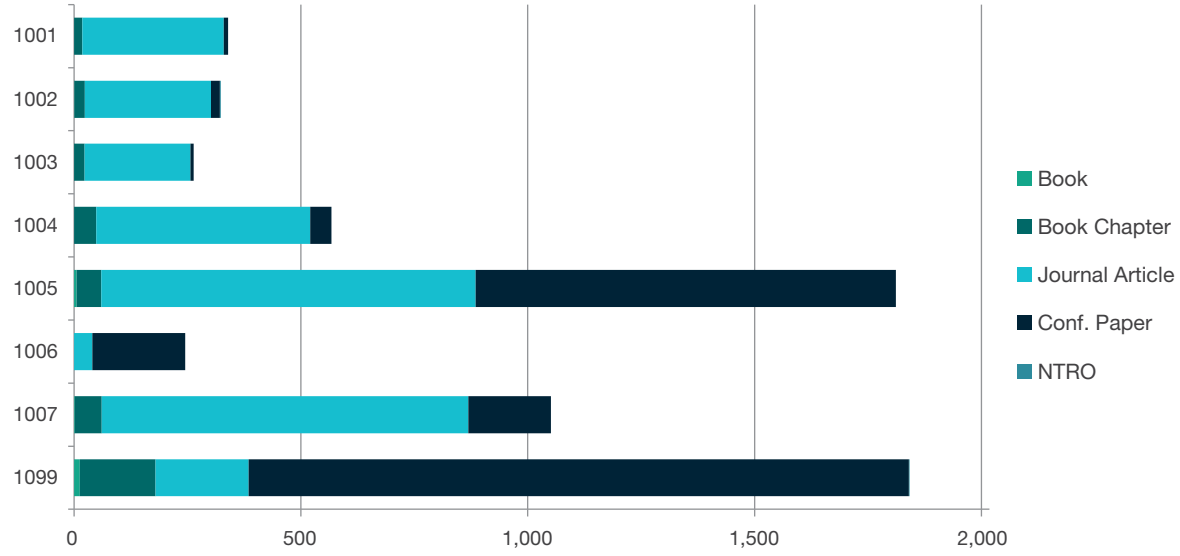
Rating	Distribution	
	Two–digit	Four–digit
5	3	13
4	6	6
3	2	0
2	0	0
1	0	0
Total	**11**	**19**

NUMBER OF UOES PER RATING SCALE SCORE



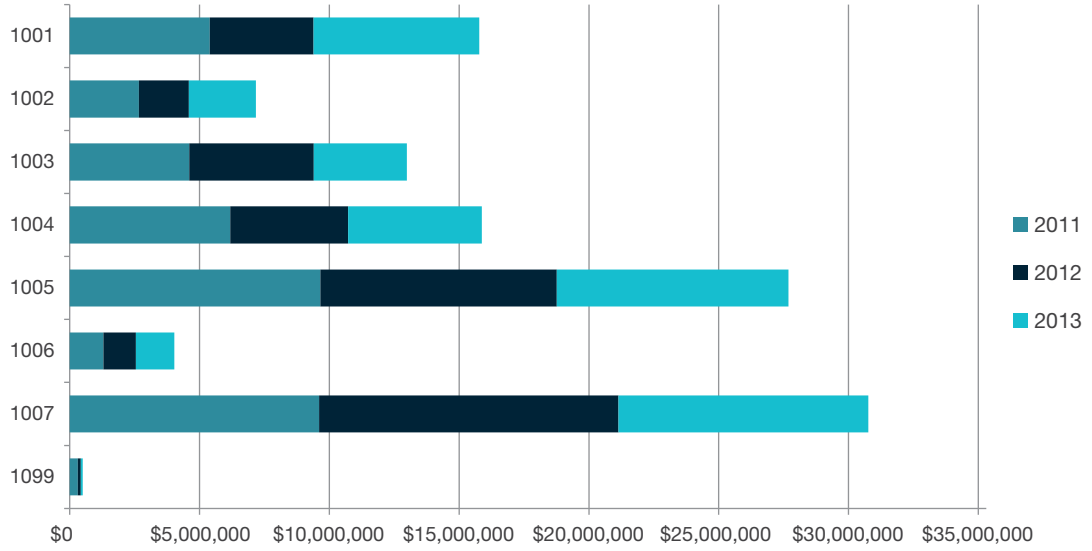
Note: 10 Technology shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



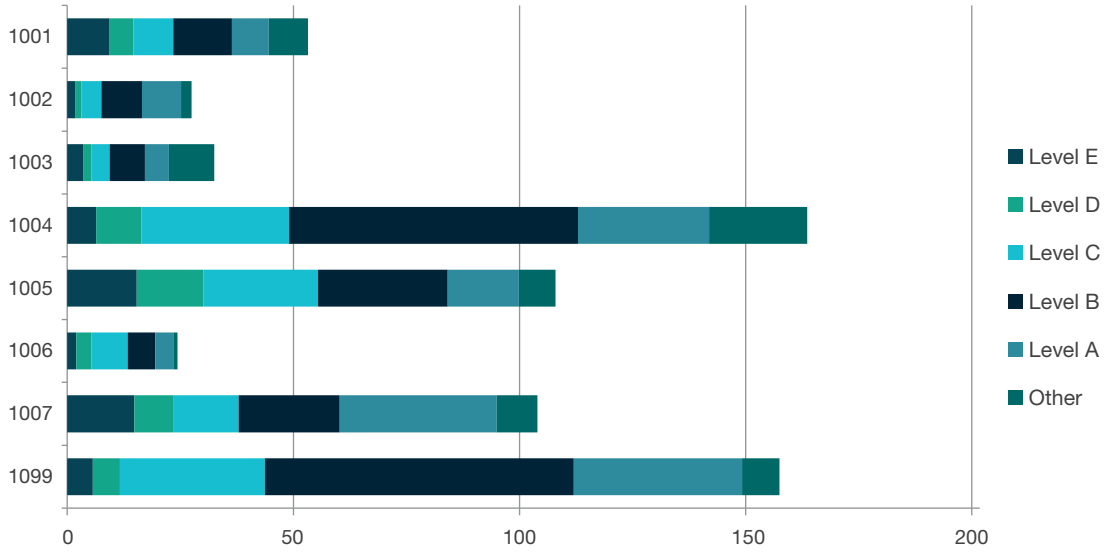
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
1001 Agricultural Biotechnology	0.0	18.2	311.7	9.6	0.0	339.5
1002 Environmental Biotechnology	0.4	23.4	277.8	19.9	1.8	323.3
1003 Industrial Biotechnology	0.2	22.8	233.3	7.0	0.0	263.3
1004 Medical Biotechnology	0.0	48.6	471.9	46.6	0.0	567.1
1005 Communications Technologies	5.5	54.4	825.1	926.4	0.0	1,811.4
1006 Computer Hardware	0.0	0.2	40.0	204.8	0.0	244.9
1007 Nanotechnology	1.5	59.2	808.2	182.4	0.0	1,051.3
1099 Other Technology	12.5	166.9	205.4	1,455.5	1.5	1,841.8
Total	**20.1**	**393.8**	**3,173.3**	**2,852.1**	**3.3**	**6,442.7**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1001 Agricultural Biotechnology	5,394,365	3,999,824	6,377,218	15,771,407
1002 Environmental Biotechnology	2,657,511	1,930,060	2,581,217	7,168,788
1003 Industrial Biotechnology	4,601,512	4,799,628	3,583,215	12,984,355
1004 Medical Biotechnology	6,186,484	4,537,207	5,148,593	15,872,284
1005 Communications Technologies	9,655,663	9,103,927	8,931,072	27,690,661
1006 Computer Hardware	1,292,834	1,252,608	1,482,084	4,027,525
1007 Nanotechnology	9,601,851	11,537,039	9,624,331	30,763,221
1099 Other Technology	312,078	107,864	81,493	501,435
Total	**39,702,298**	**37,268,157**	**37,809,221**	**114,779,676**

STAFFING PROFILE BY ACADEMIC LEVEL

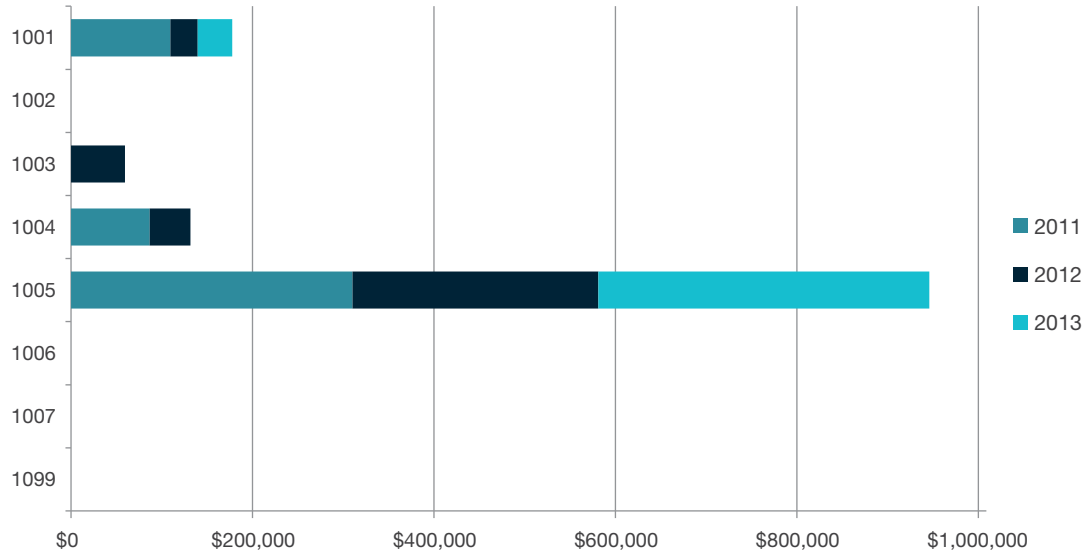


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
1001 Agricultural Biotechnology	9.4	5.3	8.8	12.9	8.2	8.7	53.2
1002 Environmental Biotechnology	1.9	1.3	4.5	8.9	8.7	2.3	27.5
1003 Industrial Biotechnology	3.6	1.8	4.0	7.8	5.3	10.0	32.5
1004 Medical Biotechnology	6.4	10.0	32.7	63.9	29.0	21.7	163.6
1005 Communications Technologies	15.4	14.7	25.3	28.7	15.7	8.1	107.9
1006 Computer Hardware	2.0	3.3	8.0	6.1	4.2	0.8	24.4
1007 Nanotechnology	14.8	8.6	14.5	22.4	34.7	9.0	104.0
1099 Other Technology	5.6	6.0	32.1	68.3	37.2	8.3	157.5
Total	**59.0**	**50.9**	**129.8**	**219.0**	**142.8**	**68.9**	**670.5**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total
1001 Agricultural Biotechnology	1.0	1.0	2.0	1.0	1.0	0.0	6.0
1002 Environmental Biotechnology	0.0	2.0	1.0	0.0	1.4	0.0	4.4
1003 Industrial Biotechnology	1.4	2.4	0.0	1.1	1.1	0.0	6.0
1004 Medical Biotechnology	3.0	1.0	3.0	3.0	14.0	0.0	24.0
1005 Communications Technologies	0.0	3.0	0.0	1.0	0.0	0.0	4.0
1006 Computer Hardware	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1007 Nanotechnology	0.0	3.5	0.0	0.3	0.2	0.0	4.0
1099 Other Technology	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**5.4**	**12.9**	**6.0**	**6.4**	**17.7**	**0.0**	**48.3**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



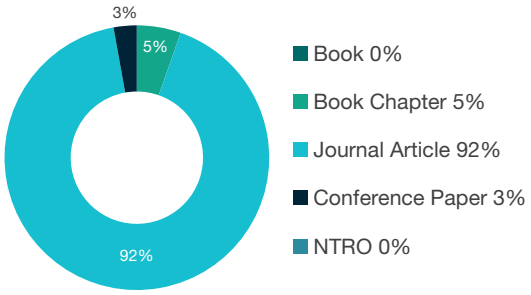
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1001 Agricultural Biotechnology	109,344	30,134	38,013	177,491
1002 Environmental Biotechnology	0	0	0	0
1003 Industrial Biotechnology	0	59,306	0	59,306
1004 Medical Biotechnology	86,537	45,061	0	131,598
1005 Communications Technologies	310,264	270,819	364,917	946,000
1006 Computer Hardware	0	0	0	0
1007 Nanotechnology	0	0	0	0
1099 Other Technology	0	0	0	0
Total	**506,145**	**405,320**	**402,930**	**1,314,395**

1001 Agricultural Biotechnology

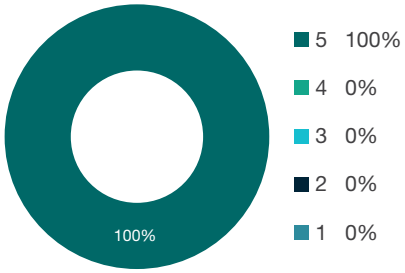
Indicator	No.
Research outputs	339.5
Research income	$15,771,407
FTEs	53.2
Esteem count	2.5
Patents	6.0
Research commercialisation income	$177,491

Rating	Distribution
5	2
4	0
3	0
2	0
1	0
Total	**2**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

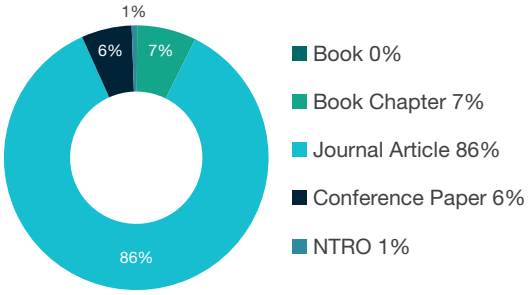


1002 Environmental Biotechnology

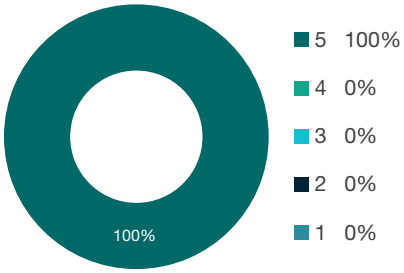
Indicator	No.
Research outputs	323.3
Research income	$7,168,788
FTEs	27.5
Esteem count	1.2
Patents	4.4
Research commercialisation income	$0

Rating	Distribution
5	1
4	0
3	0
2	0
1	0
Total	**1**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

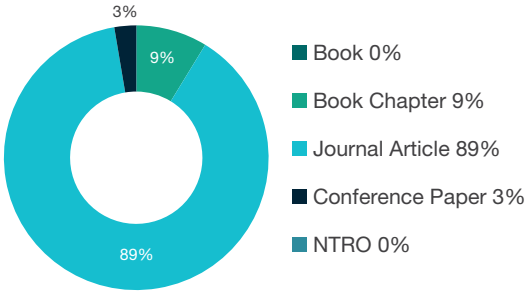


1003 Industrial Biotechnology

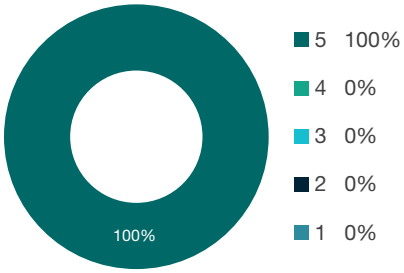
Indicator	No.
Research outputs	263.3
Research income	$12,984,355
FTEs	32.5
Esteem count	1.4
Patents	6.0
Research commercialisation income	$59,306

Rating	Distribution
5	1
4	0
3	0
2	0
1	0
Total	**1**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

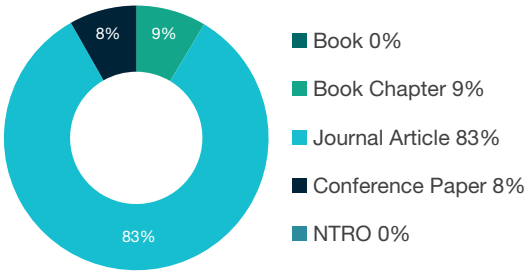


1004 Medical Biotechnology

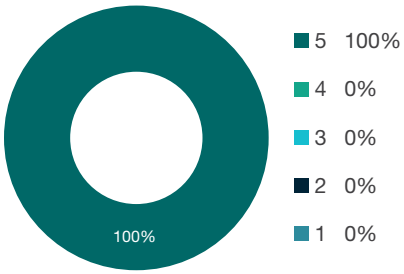
Indicator	No.
Research outputs	567.1
Research income	$15,872,284
FTEs	163.6
Esteem count	7.7
Patents	24.0
Research commercialisation income	$131,598

Rating	Distribution
5	2
4	0
3	0
2	0
1	0
Total	**2**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

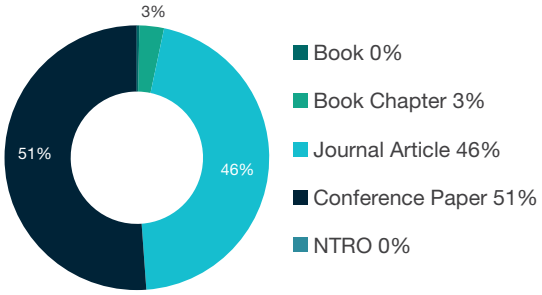


1005 Communications Technologies

Indicator	No.
Research outputs	1,811.4
Research income	$27,690,661
FTEs	107.9
Esteem count	9.9
Patents	4.0
Research commercialisation income	$946,000

Rating	Distribution
5	1
4	4
3	0
2	0
1	0
Total	**5**

RESEARCH OUTPUTS BY TYPE



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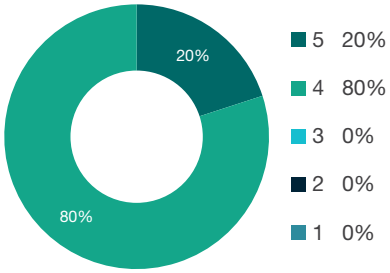
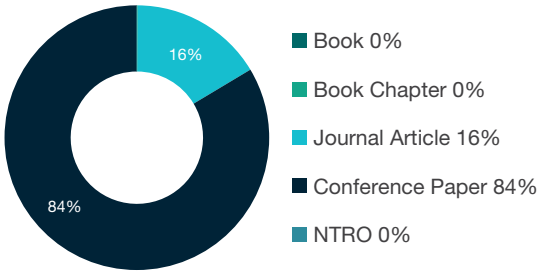


1006 Computer Hardware

Indicator	No.
Research outputs	244.9
Research income	$4,027,525
FTEs	24.4
Esteem count	0.0
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	1
3	0
2	0
1	0
Total	**1**

RESEARCH OUTPUTS BY TYPE



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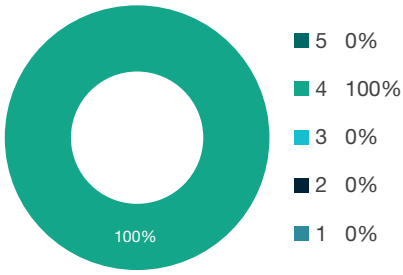
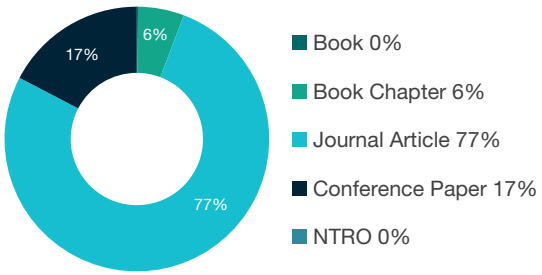


1007 Nanotechnology

Indicator	No.
Research outputs	1,051.3
Research income	$30,763,221
FTEs	104.0
Esteem count	19.3
Patents	4.0
Research commercialisation income	$0

Rating	Distribution
5	6
4	1
3	0
2	0
1	0
Total	**7**

RESEARCH OUTPUTS BY TYPE



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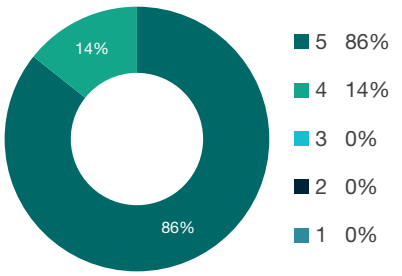
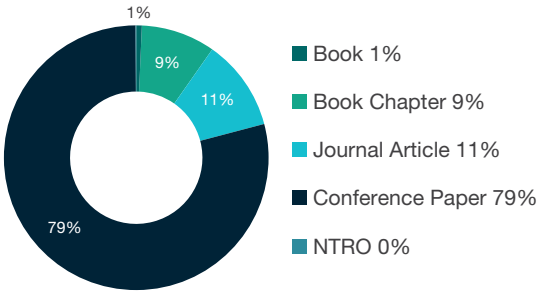


1099 Other Technology

Indicator	No.
Research outputs	1,841.8
Research income	$501,435
FTEs	157.5
Esteem count	0.0
Patents	0.0
Research commercialisation income	$0

RESEARCH OUTPUTS BY TYPE



Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 1099.

11 MEDICAL AND HEALTH SCIENCES

Medical and Health Sciences is comprised of the following four–digit codes:

1101 Medical Biochemistry and Metabolomics

1102 Cardiovascular Medicine and Haematology

1103 Clinical Sciences

1104 Complementary and Alternative Medicine

1105 Dentistry

1106 Human Movement and Sports Science

1107 Immunology

1108 Medical Microbiology

1109 Neurosciences

1110 Nursing

1111 Nutrition and Dietetics

1112 Oncology and Carcinogenesis

1113 Ophthalmology and Optometry

1114 Paediatrics and Reproductive Medicine

1115 Pharmacology and Pharmaceutical Sciences

1116 Medical Physiology

1117 Public Health and Health Services

1199 Other Medical and Health Sciences

26 out of 37 two–digit UoEs and 219 out of 274 four–digit UoEs assessed were rated above world standard

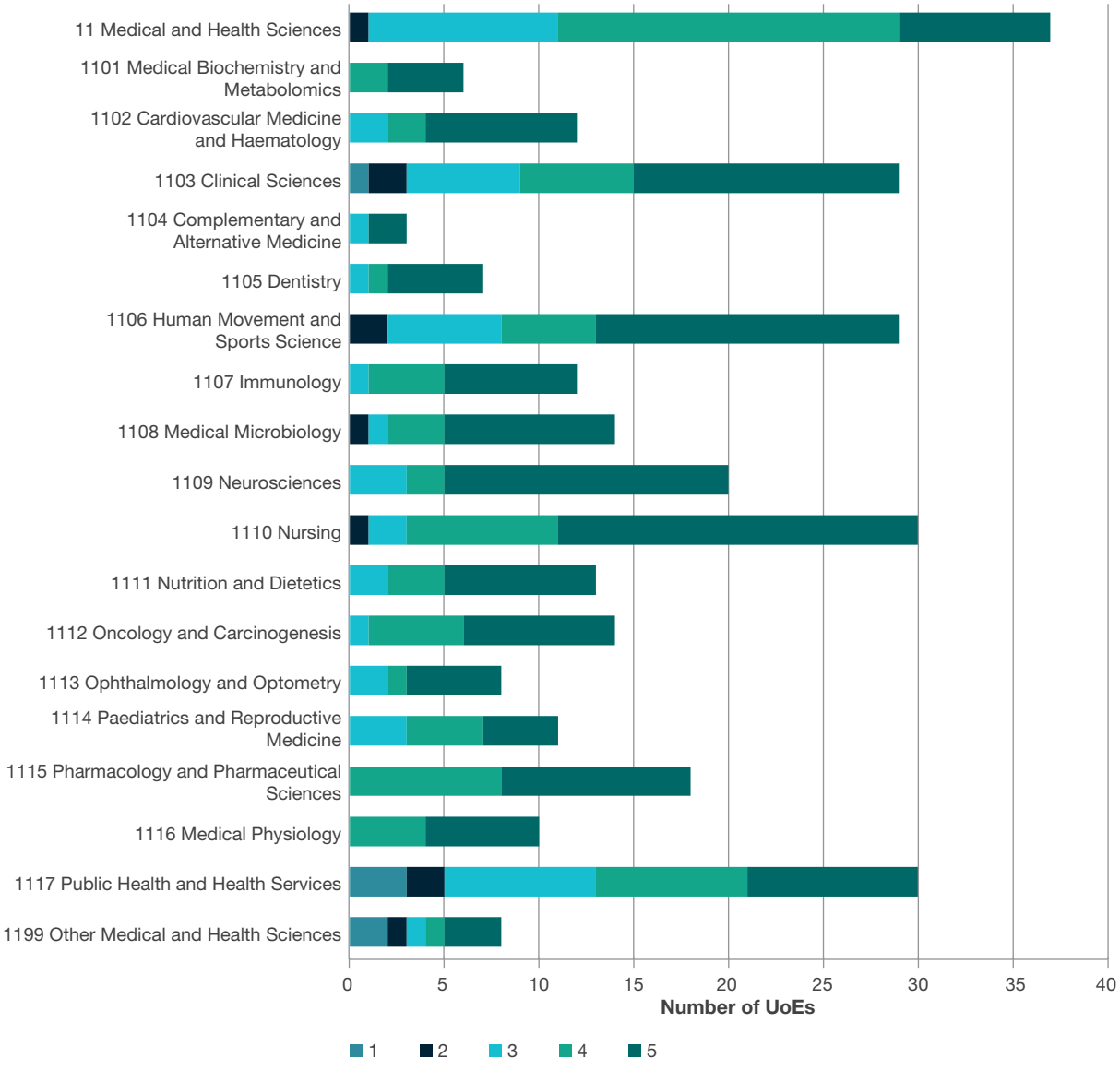
FoR Overview

Medical and Health Sciences (11) accounted for approximately 21 per cent of the research outputs submitted to ERA 2015. Journal articles were the most common research output type in the Medical and Health Sciences (93 per cent). The two largest Medical and Health Sciences Disciplines for research outputs, research income and staff FTE were Clinical Sciences (1103) and Public Health and Health Services (1117). Research commercialisation income was particularly strong in Immunology (1107).

Indicator	No.
Research outputs	90,650.5
Research income	$3,670,303,937
FTEs	9,788.8
Esteem count	1,537.6
Patents	236.5
Research commercialisation income	$75,292,607

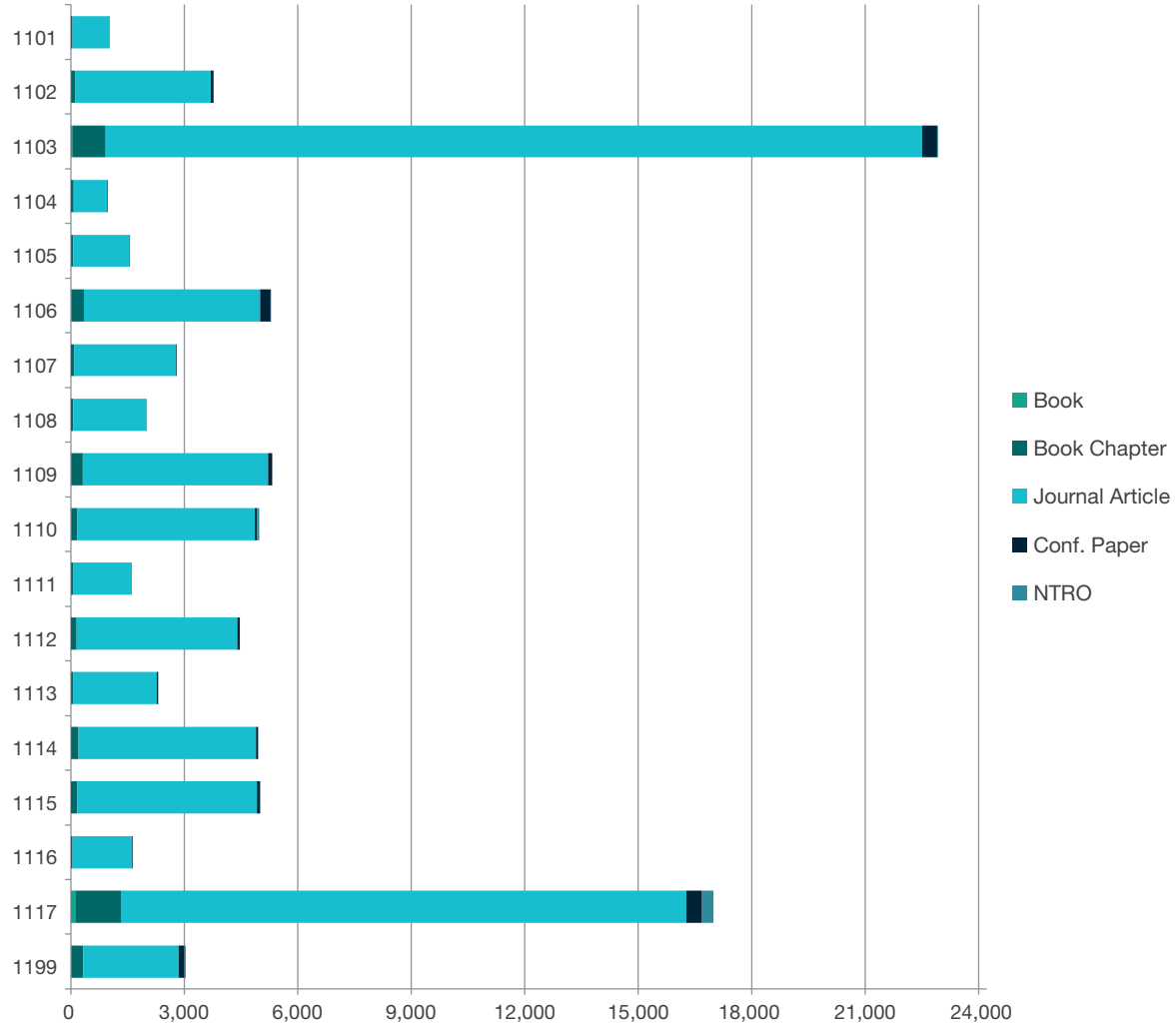
Rating	Distribution	
	Two–digit	Four–digit
5	8	152
4	18	67
3	10	40
2	1	9
1	0	6
Total	**37**	**274**

NUMBER OF UOES PER RATING SCALE SCORE



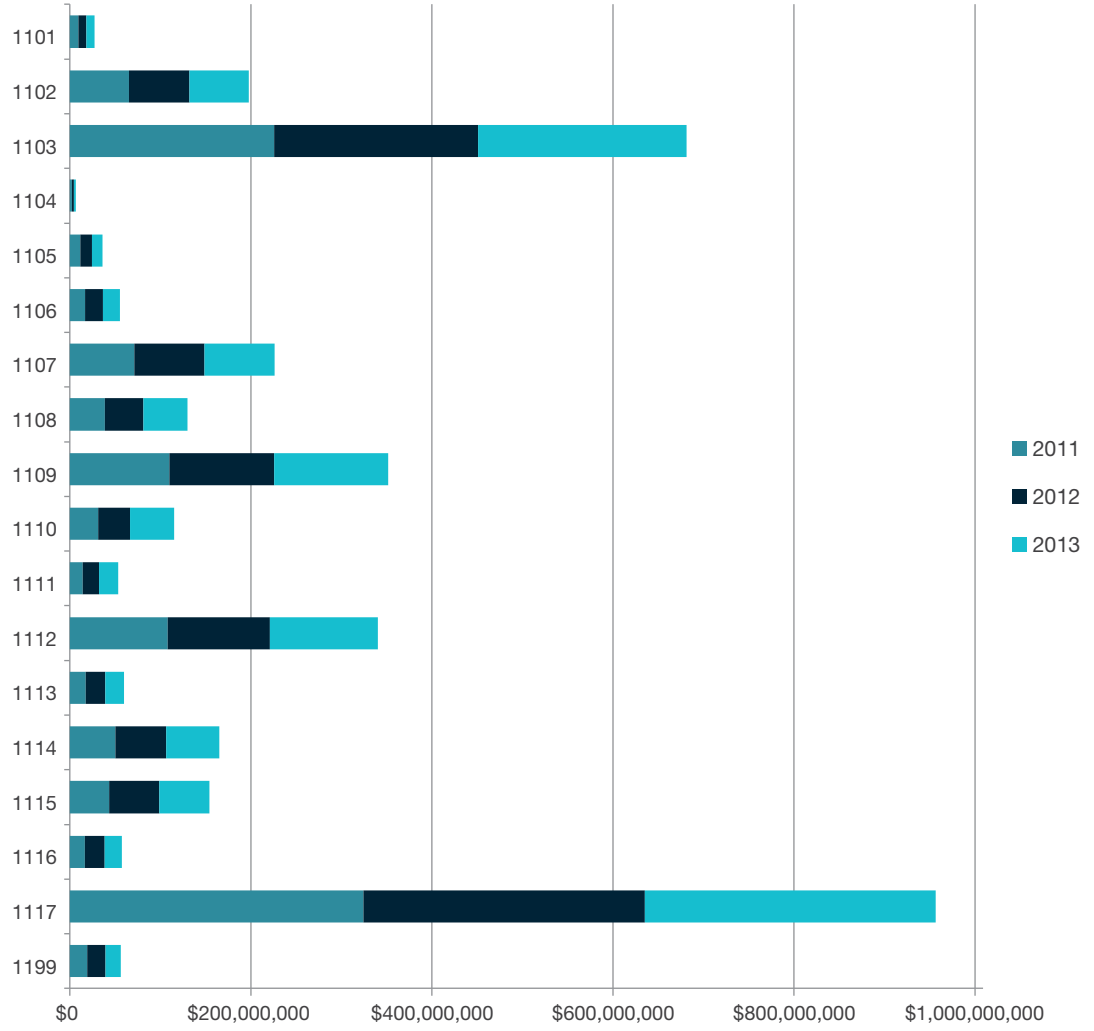
Note: 11 Medical and Health Sciences shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



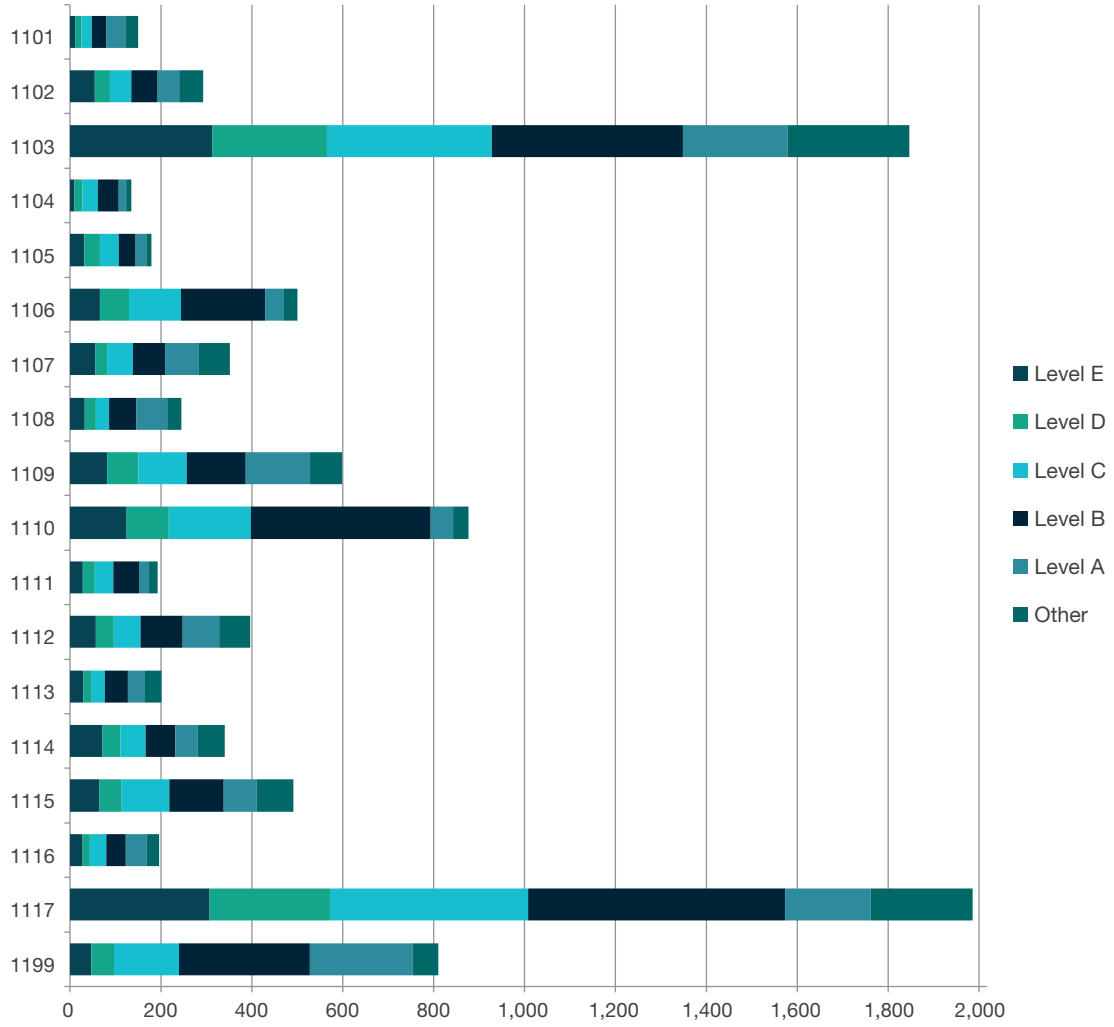
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
1101 Medical Biochemistry and Metabolomics	0.0	43.1	979.4	4.0	0.5	1,027.0
1102 Cardiovascular Medicine and Haematology	3.3	104.4	3,594.3	68.9	0.5	3,771.5
1103 Clinical Sciences	35.4	879.4	21,593.1	397.6	21.0	22,926.4
1104 Complementary and Alternative Medicine	2.5	72.2	877.1	20.2	1.6	973.7
1105 Dentistry	6.0	56.8	1,481.5	12.5	0.5	1,557.2
1106 Human Movement and Sports Science	17.3	326.9	4,659.7	277.4	11.2	5,292.5
1107 Immunology	0.3	84.0	2,696.9	20.5	0.0	2,801.7
1108 Medical Microbiology	0.0	60.4	1,938.1	6.5	0.0	2,004.9
1109 Neurosciences	12.2	298.5	4,902.6	108.4	0.0	5,321.6
1110 Nursing	13.7	153.9	4,695.0	61.5	52.6	4,976.8
1111 Nutrition and Dietetics	4.3	61.3	1,519.8	13.4	5.4	1,604.3
1112 Oncology and Carcinogenesis	1.0	151.3	4,248.9	65.7	0.0	4,466.8
1113 Ophthalmology and Optometry	3.0	60.8	2,202.7	38.1	9.0	2,313.6
1114 Paediatrics and Reproductive Medicine	7.7	193.5	4,691.4	58.0	3.5	4,954.1
1115 Pharmacology and Pharmaceutical Sciences	1.5	165.0	4,750.5	83.1	1.4	5,001.5
1116 Medical Physiology	0.0	39.0	1,577.5	19.7	0.0	1,636.2
1117 Public Health and Health Services	113.7	1,204.8	14,951.2	415.4	301.2	16,986.2
1199 Other Medical and Health Sciences	16.5	308.8	2,525.4	148.6	35.2	3,034.5
Total	**238.4**	**4,264.0**	**83,885.1**	**1,819.3**	**443.7**	**90,650.5**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1101 Medical Biochemistry and Metabolomics	9,364,438	8,849,924	9,036,076	27,250,438
1102 Cardiovascular Medicine and Haematology	65,176,520	66,839,558	65,679,230	197,695,308
1103 Clinical Sciences	225,722,511	225,406,203	230,285,333	681,414,047
1104 Complementary and Alternative Medicine	2,192,078	2,200,415	2,091,392	6,483,885
1105 Dentistry	11,618,479	12,746,276	11,753,260	36,118,015
1106 Human Movement and Sports Science	16,830,868	19,768,375	18,561,428	55,160,670
1107 Immunology	71,149,735	77,631,535	77,478,041	226,259,312
1108 Medical Microbiology	38,704,031	42,484,264	48,690,776	129,879,071
1109 Neurosciences	110,042,602	115,610,662	125,967,601	351,620,865
1110 Nursing	31,286,874	35,120,286	48,738,477	115,145,636
1111 Nutrition and Dietetics	14,244,371	18,073,186	21,160,384	53,477,941
1112 Oncology and Carcinogenesis	108,125,963	112,892,357	119,221,524	340,239,844
1113 Ophthalmology and Optometry	17,530,247	21,470,789	20,879,954	59,880,990
1114 Paediatrics and Reproductive Medicine	50,256,888	56,180,651	58,766,703	165,204,242
1115 Pharmacology and Pharmaceutical Sciences	43,356,050	55,352,649	55,471,145	154,179,844
1116 Medical Physiology	16,574,979	21,816,801	19,030,819	57,422,599
1117 Public Health and Health Services	324,236,468	311,017,060	321,420,337	956,673,866
1199 Other Medical and Health Sciences	19,036,940	20,269,203	16,891,220	56,197,363
Total	**1,175,450,041**	**1,223,730,195**	**1,271,123,701**	**3,670,303,937**

STAFFING PROFILE BY ACADEMIC LEVEL



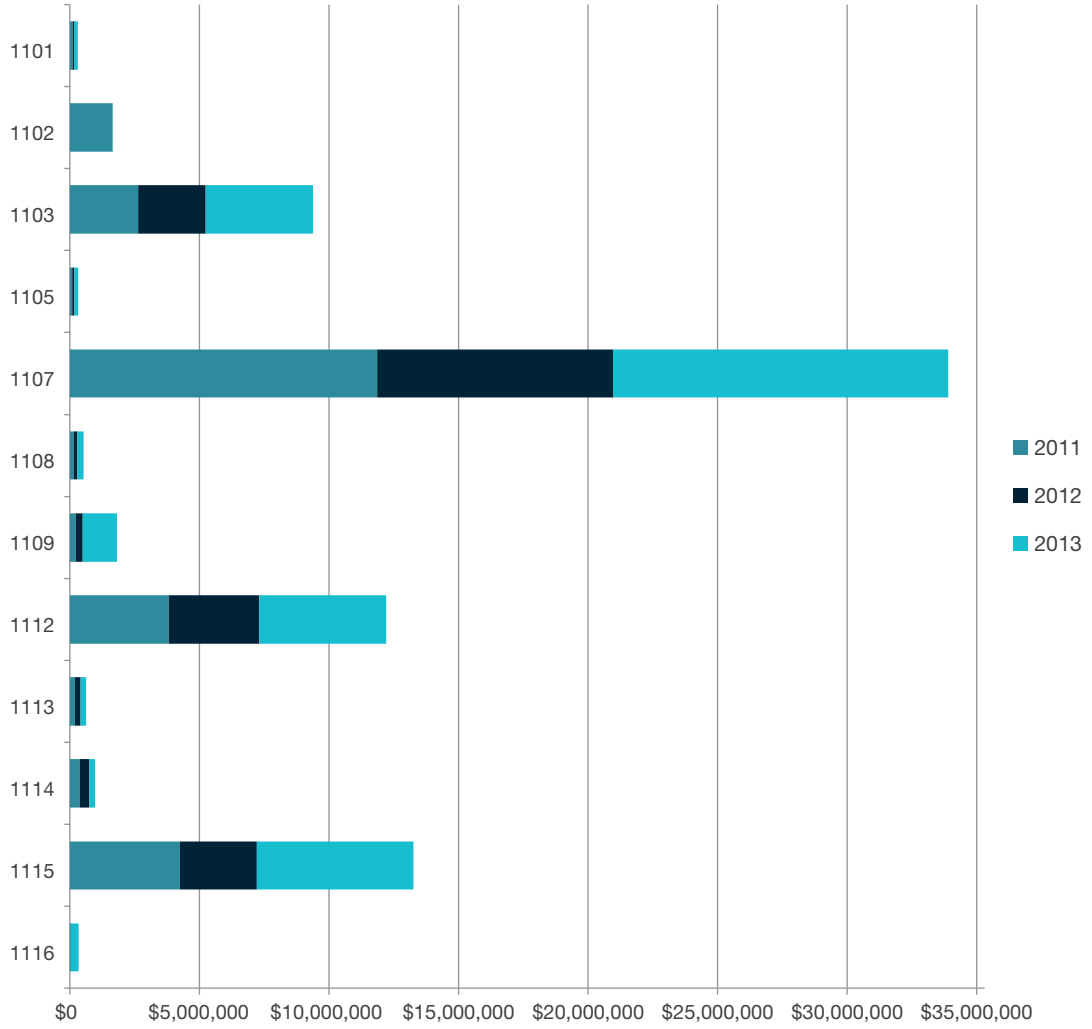
FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
1101 Medical Biochemistry and Metabolomics	11.1	14.3	22.4	31.4	42.7	27.9	149.8
1102 Cardiovascular Medicine and Haematology	54.3	33.7	46.9	57.6	47.8	52.7	292.9
1103 Clinical Sciences	312.6	252.7	362.6	420.3	230.4	267.7	1,846.4
1104 Complementary and Alternative Medicine	9.7	17.9	33.8	45.7	16.5	11.2	134.9
1105 Dentistry	31.2	34.4	41.5	37.1	23.6	11.3	179.1
1106 Human Movement and Sports Science	65.5	64.1	114.2	185.5	41.2	29.9	500.4
1107 Immunology	55.2	26.2	56.5	71.4	74.2	68.3	351.8
1108 Medical Microbiology	32.4	24.3	29.0	60.4	67.9	30.7	244.7
1109 Neurosciences	81.8	69.0	105.7	130.1	141.5	70.5	598.6
1110 Nursing	124.2	92.7	180.6	396.0	49.4	33.6	876.4
1111 Nutrition and Dietetics	27.8	26.7	41.0	56.3	22.2	18.8	192.7
1112 Oncology and Carcinogenesis	56.8	39.4	58.8	92.6	80.6	68.1	396.3
1113 Ophthalmology and Optometry	29.3	18.6	28.4	51.2	37.7	36.1	201.2
1114 Paediatrics and Reproductive Medicine	71.1	39.7	55.3	65.8	48.7	59.9	340.6
1115 Pharmacology and Pharmaceutical Sciences	64.8	48.9	104.9	119.4	72.8	80.4	491.2
1116 Medical Physiology	27.8	15.6	36.5	42.5	46.5	26.9	195.7
1117 Public Health and Health Services	307.0	264.6	436.2	565.7	187.9	224.6	1,986.1
1199 Other Medical and Health Sciences	47.0	49.8	142.6	288.1	225.8	56.6	810.1
Total	**1,409.6**	**1,132.7**	**1,896.9**	**2,716.9**	**1,457.3**	**1,175.4**	**9,788.8**

PATENT PROFILE

FoR code	Australia	USA	Europe	Japan	Other International	Triadic	Total*
1101 Medical Biochemistry and Metabolomics	1.5	2.7	1.5	1.0	2.5	0.0	9.1
1102 Cardiovascular Medicine and Haematology	3.0	2.0	3.0	0.0	3.0	0.0	11.0
1103 Clinical Sciences	6.5	9.2	3.1	2.3	8.8	0.3	31.0
1104 Complementary and Alternative Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1105 Dentistry	3.0	5.0	3.0	2.3	20.3	0.0	33.7
1106 Human Movement and Sports Science	1.0	0.0	1.0	0.0	3.3	0.0	5.3
1107 Immunology	2.5	8.1	2.6	1.1	5.3	0.0	19.7
1108 Medical Microbiology	3.3	2.8	1.1	0.3	5.0	0.0	12.5
1109 Neurosciences	1.0	15.0	5.0	4.5	7.3	0.0	32.8
1110 Nursing	0.4	0.4	0.0	0.0	0.0	0.0	0.8
1111 Nutrition and Dietetics	0.0	0.0	0.0	0.0	0.5	0.0	0.5
1112 Oncology and Carcinogenesis	2.8	3.8	3.6	1.9	7.1	0.0	19.2
1113 Ophthalmology and Optometry	2.0	3.0	1.0	2.5	10.0	0.7	20.5
1114 Paediatrics and Reproductive Medicine	1.5	1.5	0.5	0.5	1.5	0.0	5.5
1115 Pharmacology and Pharmaceutical Sciences	4.2	7.8	4.5	3.7	9.1	0.0	29.3
1116 Medical Physiology	0.0	0.0	2.0	0.0	0.0	0.0	2.0
1117 Public Health and Health Services	0.5	0.5	0.0	0.5	1.5	0.0	3.0
1199 Other Medical and Health Sciences	0.0	0.0	0.5	0.0	0.0	0.0	0.5
Total	**33.3**	**61.8**	**32.4**	**20.7**	**85.4**	**1.0**	**236.5**

**Note: triadic patents count as three patents in the total*

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



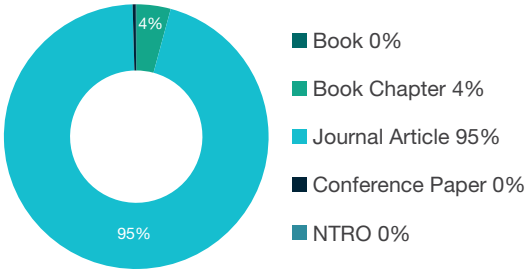
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1101 Medical Biochemistry and Metabolomics	101,951	64,908	135,778	302,637
1102 Cardiovascular Medicine and Haematology	1,635,098	4,914	14,124	1,654,137
1103 Clinical Sciences	2,636,932	2,600,682	4,142,729	9,380,344
1104 Complementary and Alternative Medicine	–	–	–	–
1105 Dentistry	87,077	80,684	148,145	315,906
1106 Human Movement and Sports Science	–	–	–	–
1107 Immunology	11,857,687	9,107,506	12,938,562	33,903,755
1108 Medical Microbiology	150,879	132,899	239,189	522,967
1109 Neurosciences	227,246	263,594	1,320,671	1,811,511
1110 Nursing	–	–	–	–
1111 Nutrition and Dietetics	–	–	–	–
1112 Oncology and Carcinogenesis	3,817,316	3,486,789	4,902,892	12,206,998
1113 Ophthalmology and Optometry	191,123	221,193	216,109	628,426
1114 Paediatrics and Reproductive Medicine	378,964	365,902	226,591	971,457
1115 Pharmacology and Pharmaceutical Sciences	4,247,759	2,966,588	6,044,017	13,258,364
1116 Medical Physiology	40,895	0	295,212	336,108
1117 Public Health and Health Services	–	–	–	–
1199 Other Medical and Health Sciences	–	–	–	–
Total	**25,372,929**	**19,295,660**	**30,624,018**	**75,292,607**

1101 Medical Biochemistry and Metabolomics

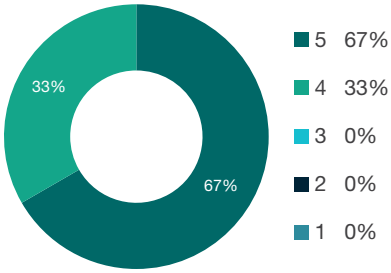
Indicator	No.
Research outputs	1,027.0
Research income	$27,250,438
FTEs	149.8
Esteem count	8.2
Patents	9.1
Research commercialisation income	$302,637

Rating	Distribution
5	4
4	2
3	0
2	0
1	0
Total	**6**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

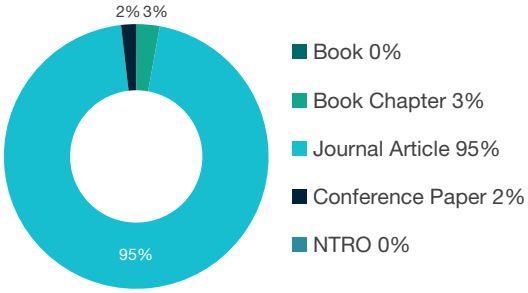


1102 Cardiovascular Medicine and Haematology

Indicator	No.
Research outputs	3,771.5
Research income	$197,695,308
FTEs	292.9
Esteem count	86.9
Patents	11.0
Research commercialisation income	$1,654,137

Rating	Distribution
5	8
4	2
3	2
2	0
1	0
Total	**12**

RESEARCH OUTPUTS BY TYPE



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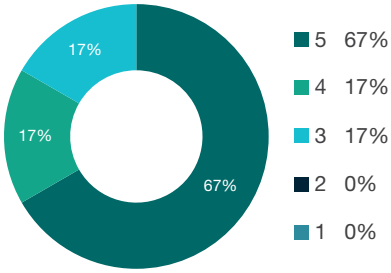


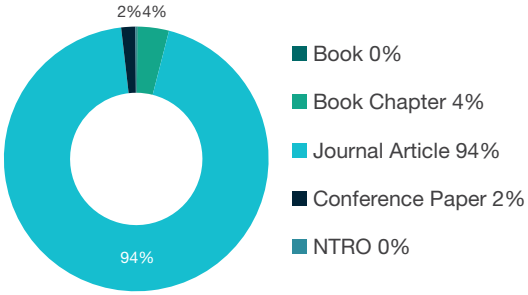
1103 Clinical Sciences

Indicator	No.
Research outputs	22,926.4
Research income	$681,414,047
FTEs	1,846.4
Esteem count	203.3
Patents*	31.0
Research commercialisation income	$9,380,344

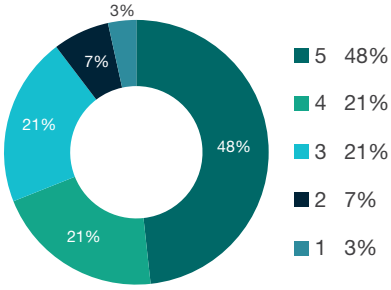
**Note: triadic patents count as three patents in the total*

Rating	Distribution
5	14
4	6
3	6
2	2
1	1
Total	**29**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

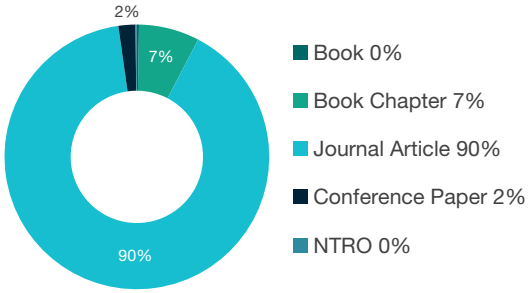


1104 Complementary and Alternative Medicine

Indicator	No.
Research outputs	973.7
Research income	$6,483,885
FTEs	134.9
Esteem count	8.5
Patents	0.0
Research commercialisation income	–

Rating	Distribution
5	2
4	0
3	1
2	0
1	0
Total	**3**

RESEARCH OUTPUTS BY TYPE



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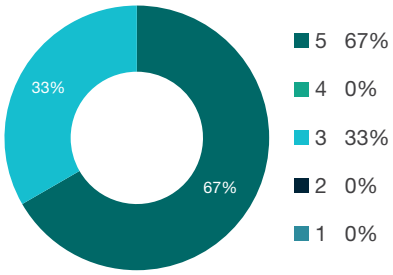
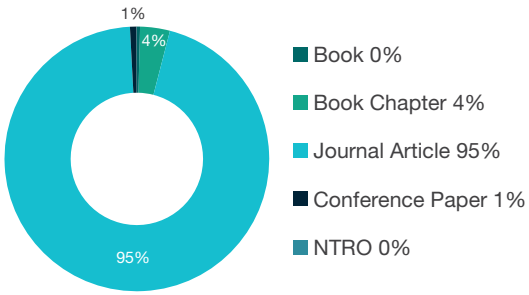


1105 Dentistry

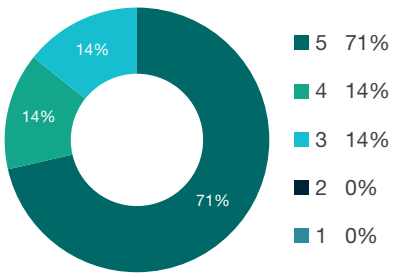
Indicator	No.
Research outputs	1,557.2
Research income	$36,118,015
FTEs	179.1
Esteem count	8.0
Patents	33.7
Research commercialisation income	$315,906

Rating	Distribution
5	5
4	1
3	1
2	0
1	0
Total	**7**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

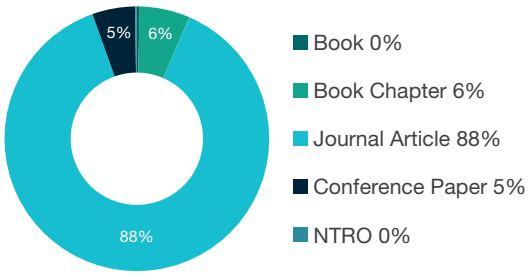


1106 Human Movement and Sports Science

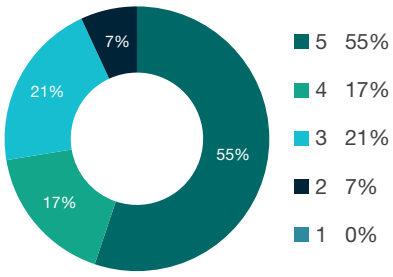
Indicator	No.
Research outputs	5,292.5
Research income	$55,160,670
FTEs	500.4
Esteem count	32.7
Patents	5.3
Research commercialisation income	–

Rating	Distribution
5	16
4	5
3	6
2	2
1	0
Total	**29**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

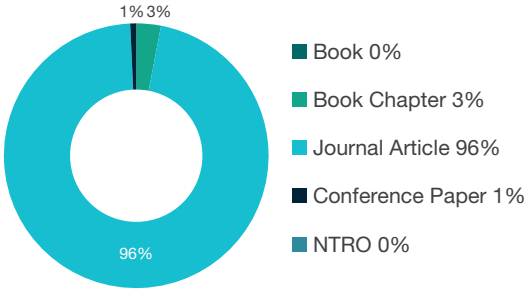


1107 Immunology

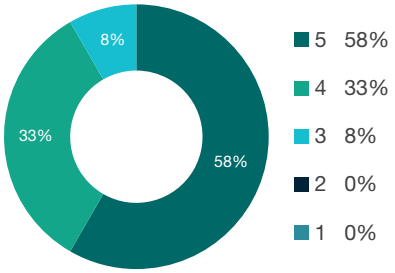
Indicator	No.
Research outputs	2,801.7
Research income	$226,259,312
FTEs	351.8
Esteem count	106.2
Patents	19.7
Research commercialisation income	$33,903,755

Rating	Distribution
5	7
4	4
3	1
2	0
1	0
Total	**12**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

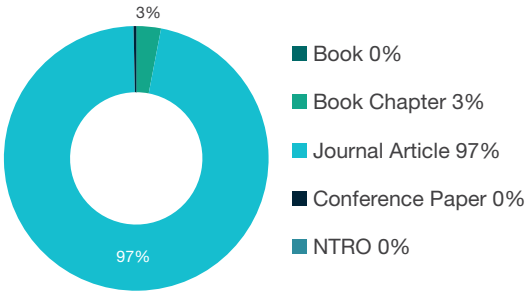


1108 Medical Microbiology

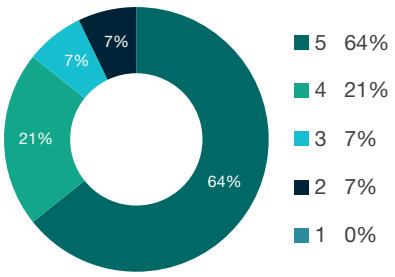
Indicator	No.
Research outputs	2,004.9
Research income	$129,879,071
FTEs	244.7
Esteem count	62.6
Patents	12.5
Research commercialisation income	$522,967

Rating	Distribution
5	9
4	3
3	1
2	1
1	0
Total	**14**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

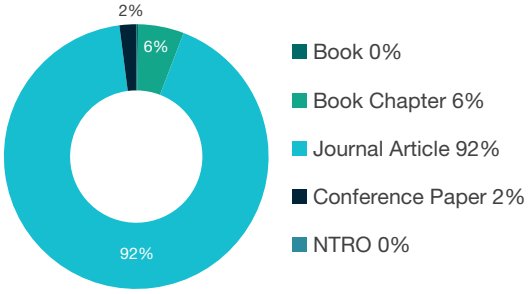


1109 Neurosciences

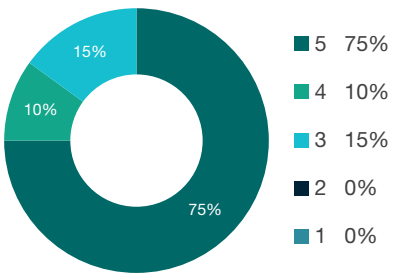
Indicator	No.
Research outputs	5,321.6
Research income	$351,620,865
FTEs	598.6
Esteem count	163.8
Patents	32.8
Research commercialisation income	$1,811,511

Rating	Distribution
5	15
4	2
3	3
2	0
1	0
Total	**20**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

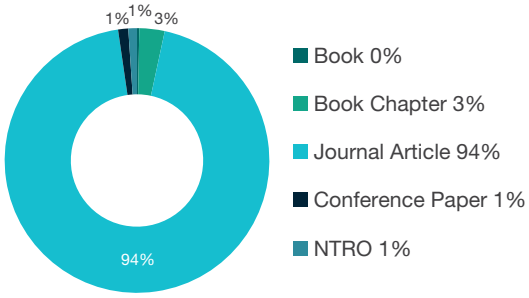


1110 Nursing

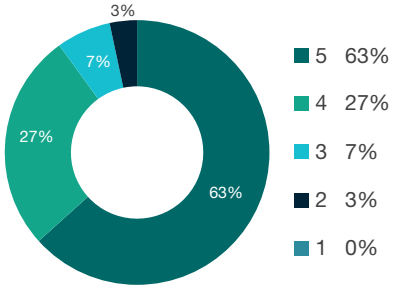
Indicator	No.
Research outputs	4,976.8
Research income	$115,145,636
FTEs	876.4
Esteem count	32.9
Patents	0.8
Research commercialisation income	–

Rating	Distribution
5	19
4	8
3	2
2	1
1	0
Total	**30**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

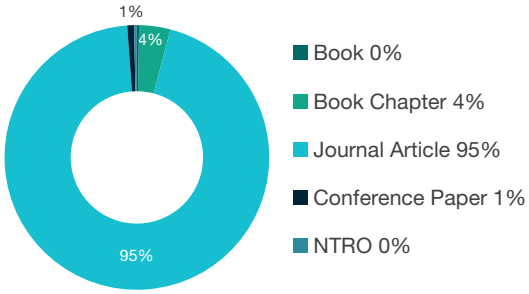


1111 Nutrition and Dietetics

Indicator	No.
Research outputs	1,604.3
Research income	$53,477,941
FTEs	192.7
Esteem count	30.4
Patents	0.5
Research commercialisation income	–

Rating	Distribution
5	8
4	3
3	2
2	0
1	0
Total	**13**

RESEARCH OUTPUTS BY TYPE



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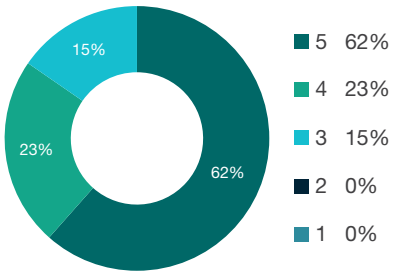
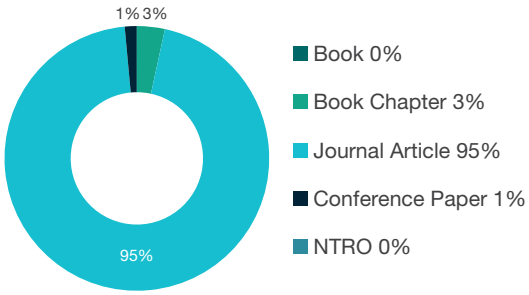


1112 Oncology and Carcinogenesis

Indicator	No.
Research outputs	4,466.8
Research income	$340,239,844
FTEs	396.3
Esteem count	73.5
Patents	19.2
Research commercialisation income	$12,206,998

Rating	Distribution
5	8
4	5
3	1
2	0
1	0
Total	**14**

RESEARCH OUTPUTS BY TYPE



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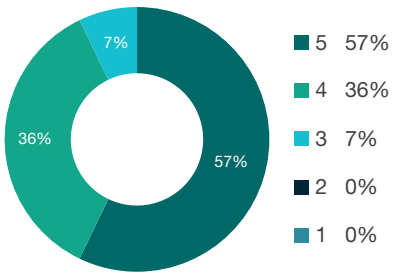


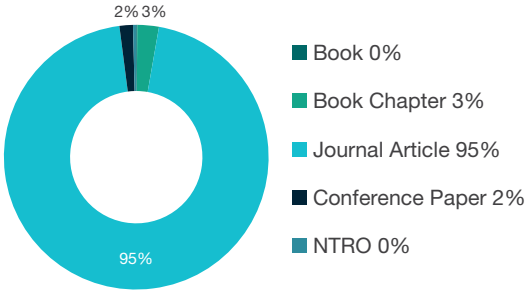
1113 Ophthalmology and Optometry

Indicator	No.
Research outputs	2,313.6
Research income	$59,880,990
FTEs	201.2
Esteem count	14.3
Patents*	20.5
Research commercialisation income	$628,426

Note: triadic patents count as three patents in the total

Rating	Distribution
5	5
4	1
3	2
2	0
1	0
Total	**8**

RESEARCH OUTPUTS BY TYPE



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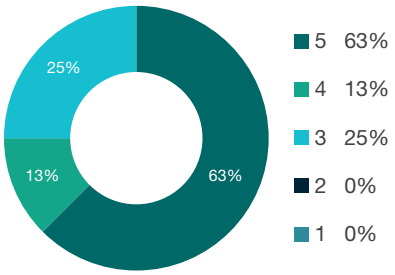
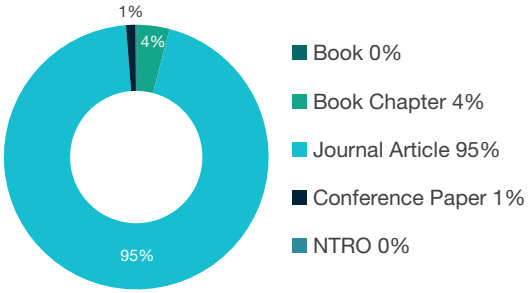


1114 Paediatrics and Reproductive Medicine

Indicator	No.
Research outputs	4,954.1
Research income	$165,204,242
FTEs	340.6
Esteem count	79.0
Patents	5.5
Research commercialisation income	$971,457

Rating	Distribution
5	4
4	4
3	3
2	0
1	0
Total	**11**

RESEARCH OUTPUTS BY TYPE



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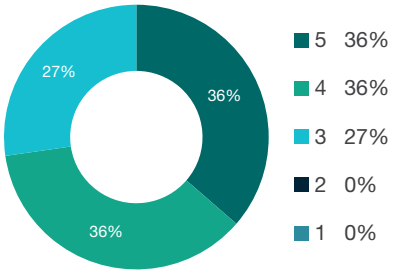
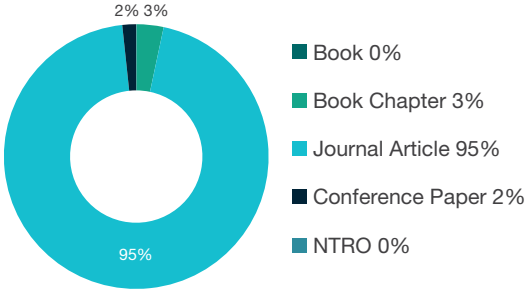


1115 Pharmacology and Pharmaceutical Sciences

Indicator	No.
Research outputs	5,001.5
Research income	$154,179,844
FTEs	491.2
Esteem count	62.0
Patents	29.3
Research commercialisation income	$13,258,364

Rating	Distribution
5	10
4	8
3	0
2	0
1	0
Total	**18**

RESEARCH OUTPUTS BY TYPE



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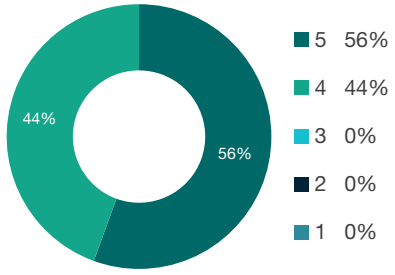
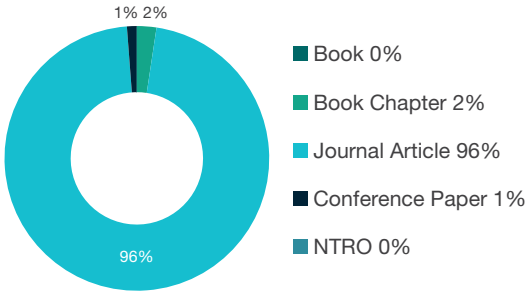


1116 Medical Physiology

Indicator	No.
Research outputs	1,636.2
Research income	$57,422,599
FTEs	195.7
Esteem count	40.7
Patents	2.0
Research commercialisation income	$336,108

Rating	Distribution
5	6
4	4
3	0
2	0
1	0
Total	**10**

RESEARCH OUTPUTS BY TYPE



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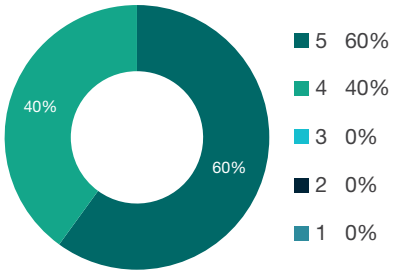
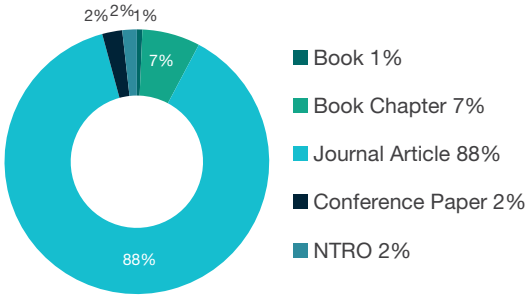


1117 Public Health and Health Services

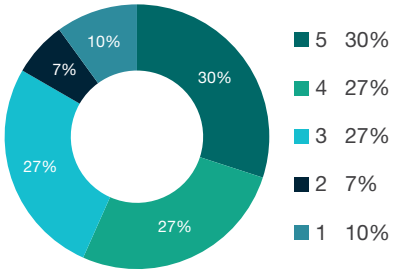
Indicator	No.
Research outputs	16,986.2
Research income	$956,673,866
FTEs	1,986.1
Esteem count	502.9
Patents	3.0
Research commercialisation income	–

Rating	Distribution
5	9
4	8
3	8
2	2
1	3
Total	**30**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

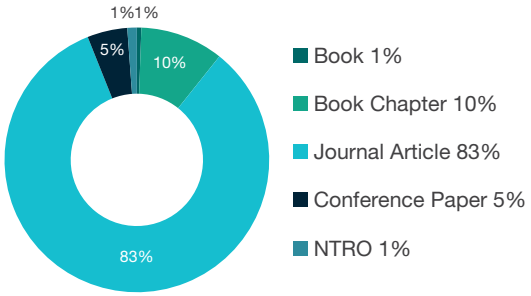


1199 Other Medical and Health Sciences

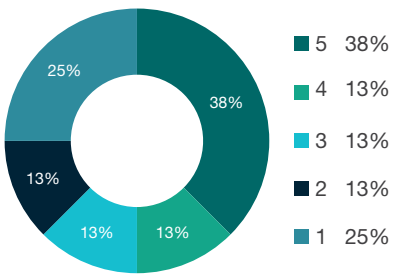
Indicator	No.
Research outputs	3,034.5
Research income	$56,197,363
FTEs	810.1
Esteem count	21.5
Patents	0.5
Research commercialisation income	–

Rating	Distribution
5	3
4	1
3	1
2	1
1	2
Total	**8**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION



12 BUILT ENVIRONMENT AND DESIGN

Built Environment and Design is comprised of the following four–digit codes:

1201 Architecture

1202 Building

1203 Design Practice and Management

1204 Engineering Design

1205 Urban and Regional Planning

1299 Other Built Environment and Design

3 out of 22 two–digit UoEs and 10 out of 44 four–digit UoEs assessed were rated above world standard

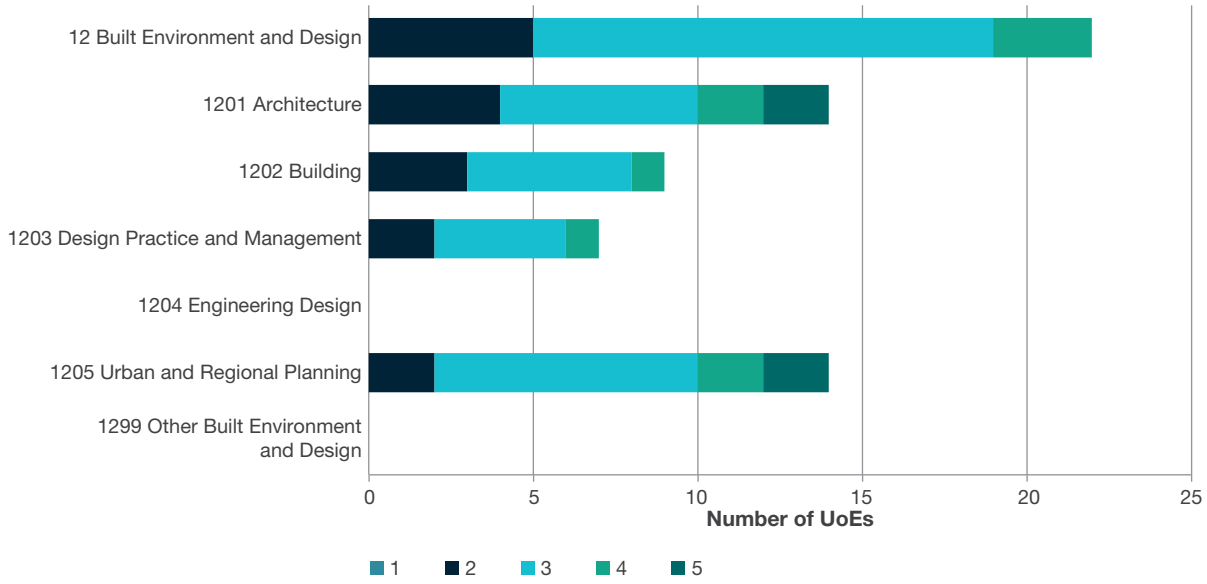
FoR Overview

Built Environment and Design (12) accounted for approximately two per cent of the research outputs submitted to ERA 2015. Overall, conference papers were the most common research output type (37 per cent), followed by journal articles (33 per cent). Non–traditional research outputs comprised a high proportion of outputs in Architecture (1201) and Design Practice and Management (1203). Urban and Regional Planning (1205) and Architecture (1201) were the largest sub–disciplines by research output volume and research income. Design Practice and Management (1203) was the only four–digit code that submitted research commercialisation income.

Indicator	No.
Research outputs	9,934.2
Research income	$89,679,775
FTEs	1,109.6
Esteem count	27.5
Patents	0
Research commercialisation income	$92,692

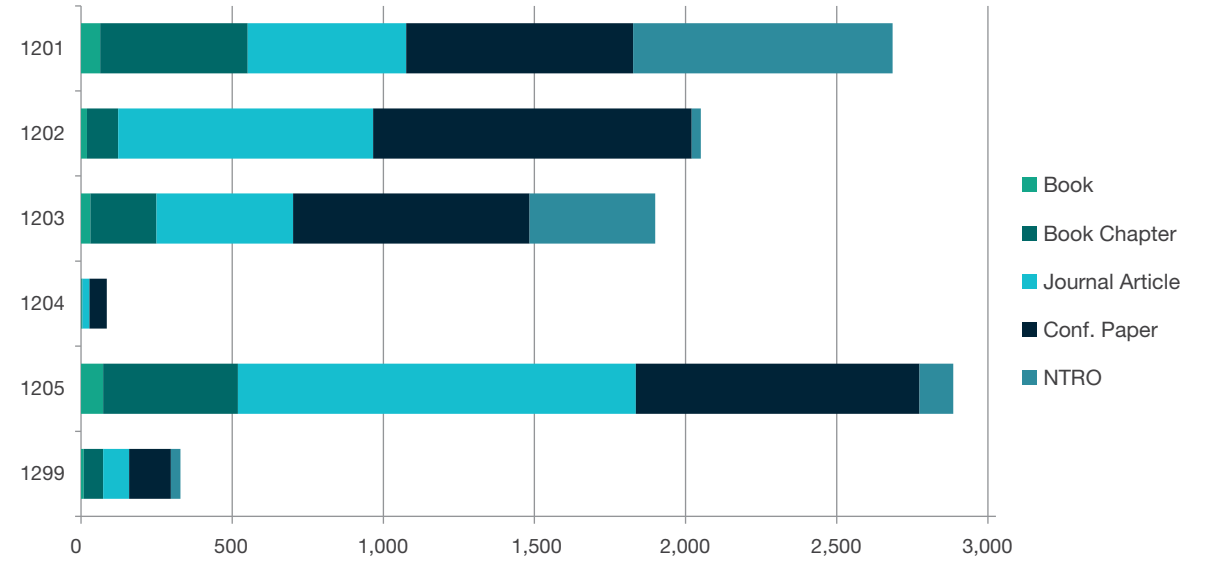
Rating	Distribution	
	Two–digit	Four–digit
5	0	4
4	3	6
3	14	23
2	5	11
1	0	0
Total	**22**	**44**

NUMBER OF UOES PER RATING SCALE SCORE



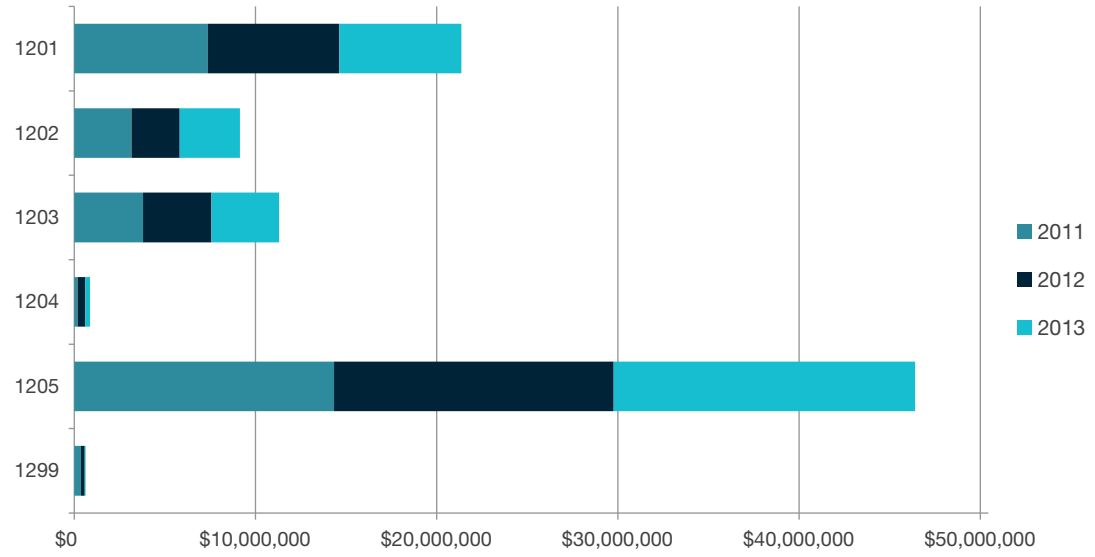
Note: 12 Built Environment and Design shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



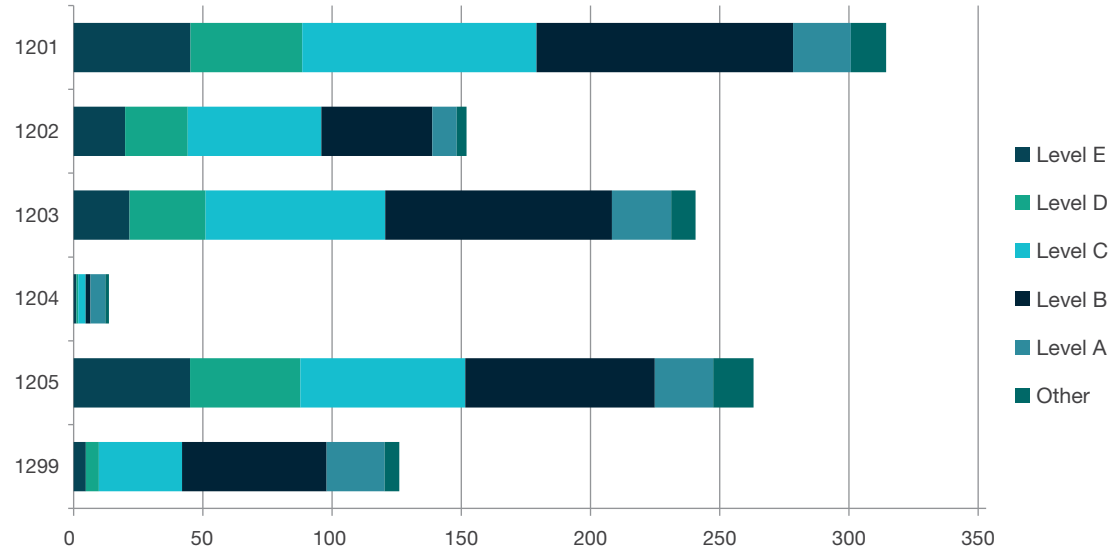
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
1201 Architecture	63.2	488.1	524.2	750.5	859.2	2,685.2
1202 Building	19.4	103.9	843.0	1,054.2	29.7	2,050.2
1203 Design Practice and Management	30.8	219.2	452.0	782.0	415.4	1,899.3
1204 Engineering Design	2.3	2.0	23.5	57.6	0.0	85.4
1205 Urban and Regional Planning	73.3	446.0	1,316.4	938.0	111.6	2,885.2
1299 Other Built Environment and Design	9.2	63.9	86.3	137.6	31.8	328.8
Total	**198.1**	**1,323.1**	**3,245.4**	**3,719.9**	**1,447.6**	**9,934.2**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1201 Architecture	7,357,570	7,254,285	6,744,326	21,356,181
1202 Building	3,157,075	2,657,104	3,319,684	9,133,862
1203 Design Practice and Management	3,792,233	3,770,372	3,735,723	11,298,329
1204 Engineering Design	184,353	405,088	280,346	869,787
1205 Urban and Regional Planning	14,337,399	15,431,129	16,641,372	46,409,900
1299 Other Built Environment and Design	364,126	201,157	46,432	611,716
Total	**29,192,757**	**29,719,135**	**30,767,883**	**89,679,775**

STAFFING PROFILE BY ACADEMIC LEVEL



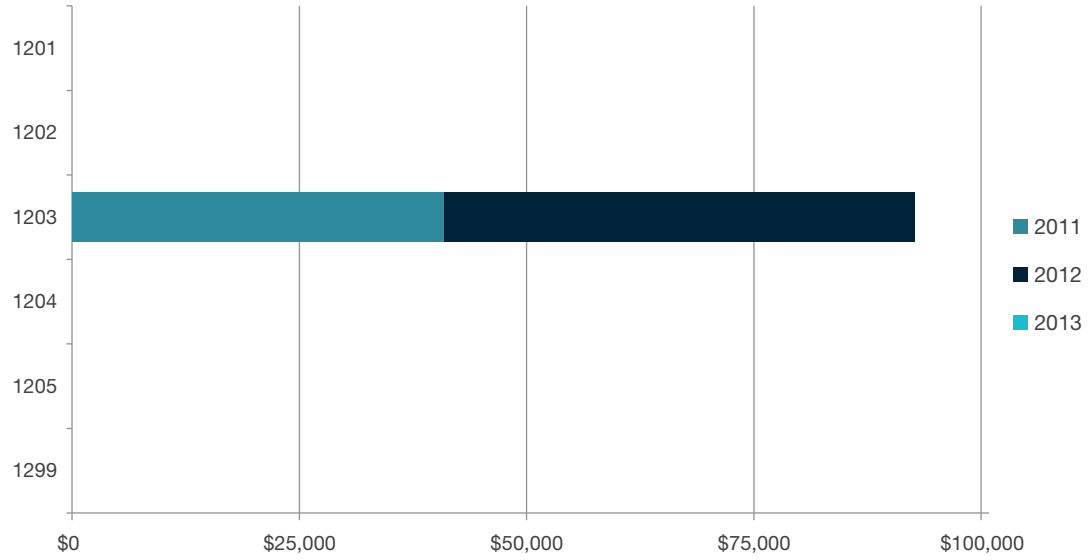
Continued

FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
1201 Architecture	45.2	43.2	90.6	99.3	22.3	13.7	314.3
1202 Building	19.9	24.2	51.7	43.0	9.4	3.8	152.0
1203 Design Practice and Management	21.5	29.5	69.5	87.7	22.9	9.5	240.6
1204 Engineering Design	1.0	0.7	2.8	1.9	5.8	1.4	13.6
1205 Urban and Regional Planning	45.0	42.7	63.8	73.3	22.6	15.6	263.1
1299 Other Built Environment and Design	4.6	5.1	32.2	55.9	22.5	5.7	125.9
Total	**137.3**	**145.4**	**310.7**	**361.1**	**105.5**	**49.6**	**1,109.6**

PATENT PROFILE

Note: There were no patents submitted by UoEs in this FoR.

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



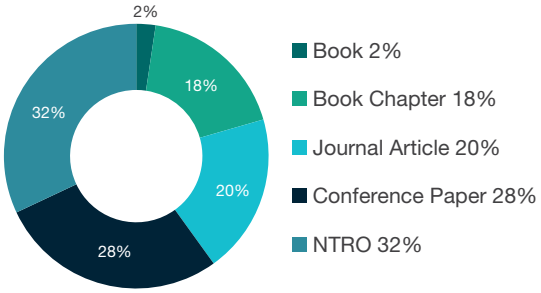
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1201 Architecture	0	0	0	0
1202 Building	0	0	0	0
1203 Design Practice and Management	40,895	51,797	0	92,692
1204 Engineering Design	0	0	0	0
1205 Urban and Regional Planning	0	0	0	0
1299 Other Built Environment and Design	0	0	0	0
Total	**40,895**	**51,797**	**0**	**92,692**

1201 Architecture

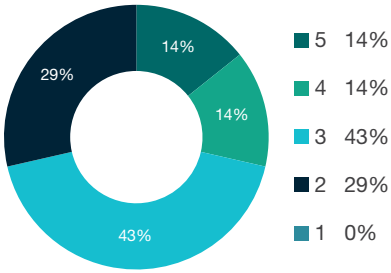
Indicator	No.
Research outputs	2,685.2
Research income	$21,356,181
FTEs	314.3
Esteem count	11.9
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	2
4	2
3	6
2	4
1	0
Total	**14**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

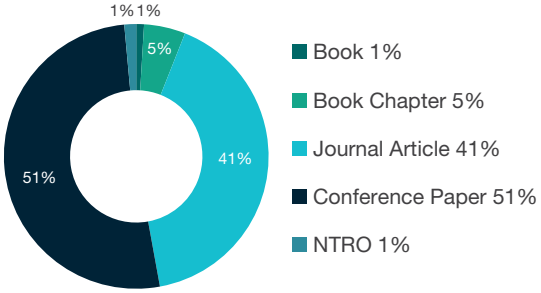


1202 Building

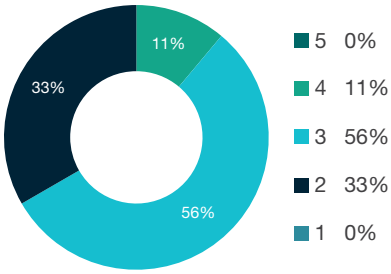
Indicator	No.
Research outputs	2,050.2
Research income	$9,133,862
FTEs	152.0
Esteem count	1.1
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	1
3	5
2	3
1	0
Total	**9**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

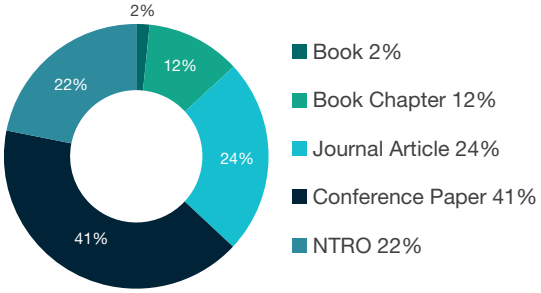


1203 Design Practice and Management

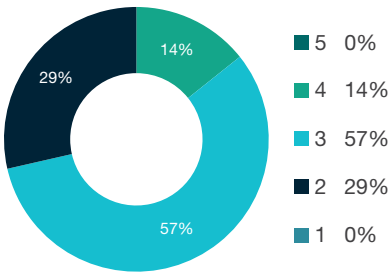
Indicator	No.
Research outputs	1,899.3
Research income	$11,298,329
FTEs	240.6
Esteem count	3.5
Patents	0.0
Research commercialisation income	$92,692

Rating	Distribution
5	0
4	1
3	4
2	2
1	0
Total	**7**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

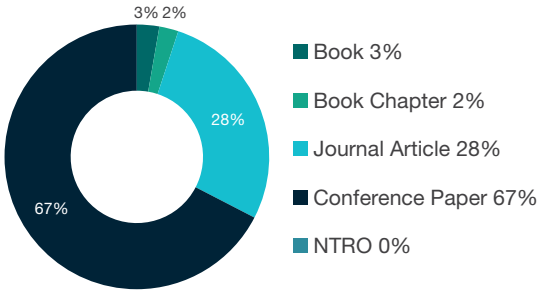


1204 Engineering Design

Indicator	No.
Research outputs	85.4
Research income	$869,787
FTEs	13.6
Esteem count	0.0
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

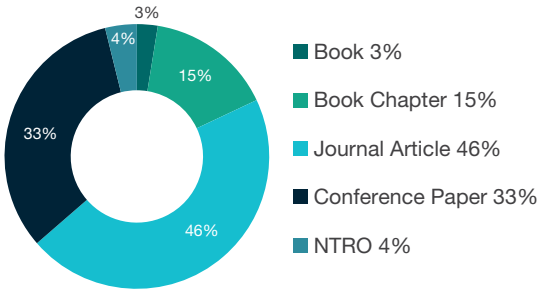
Note: There is no FoR rating distribution for 1204.

1205 Urban and Regional Planning

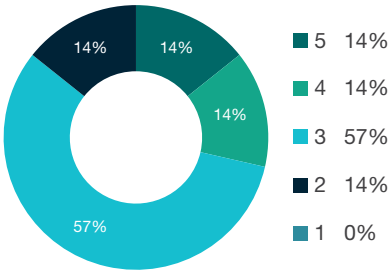
Indicator	No.
Research outputs	2,885.2
Research income	$46,409,900
FTEs	263.1
Esteem count	11.0
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	2
4	2
3	8
2	2
1	0
Total	**14**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

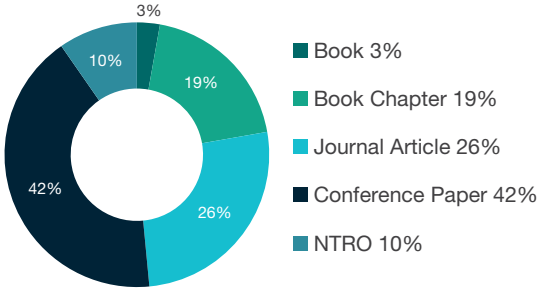


1299 Other Built Environment and Design

Indicator	No.
Research outputs	328.8
Research income	$611,716
FTEs	125.9
Esteem count	0.0
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 1299.

13 EDUCATION

Education is comprised of the following four–digit codes:

1301 Education Systems

1302 Curriculum and Pedagogy

1303 Specialist Studies in Education

1399 Other Education

8 out of 38 two–digit UoEs and 20 out of 93 four–digit UoEs assessed were rated above world standard

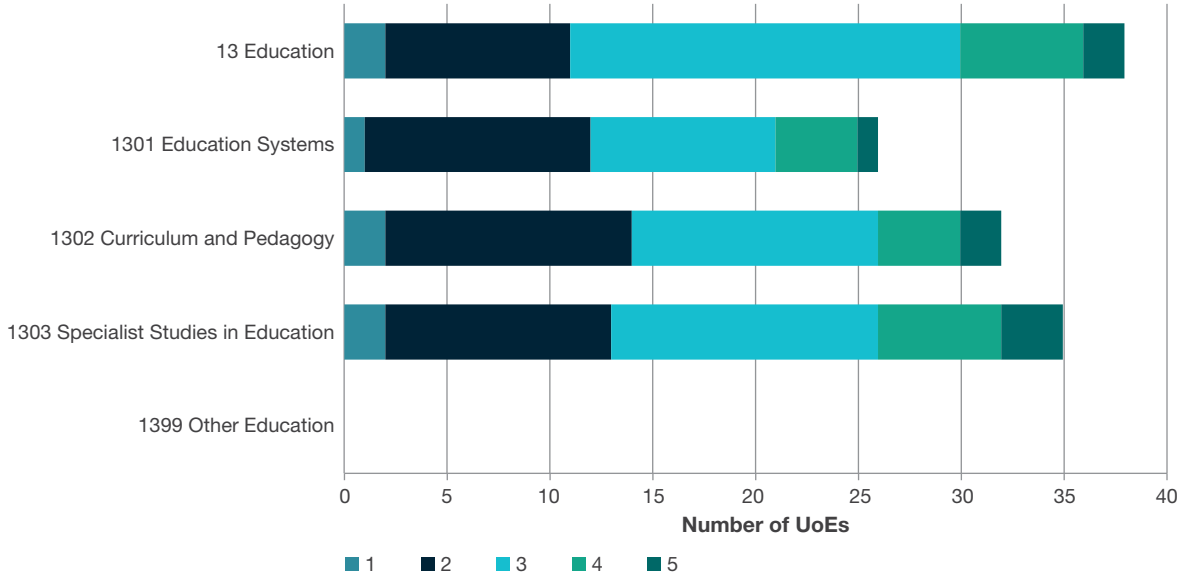
FoR Overview

Education (13) accounted for approximately five per cent of the research outputs submitted to ERA 2015. The most common research output type was journal articles (54 per cent), though the proportions of book chapters and conference paper were also high (22 per cent and 20 per cent respectively). Specialist Studies in Education (1303) was the largest Education sub–discipline in terms of volume of outputs, research income and staff FTE. Education Systems (1301) had the highest amount of research commercialisation income.

Indicator	No.
Research outputs	20,286.9
Research income	$215,728,415
FTEs	2,938.7
Esteem count	63.7
Patents	–
Research commercialisation income	$1,362,916

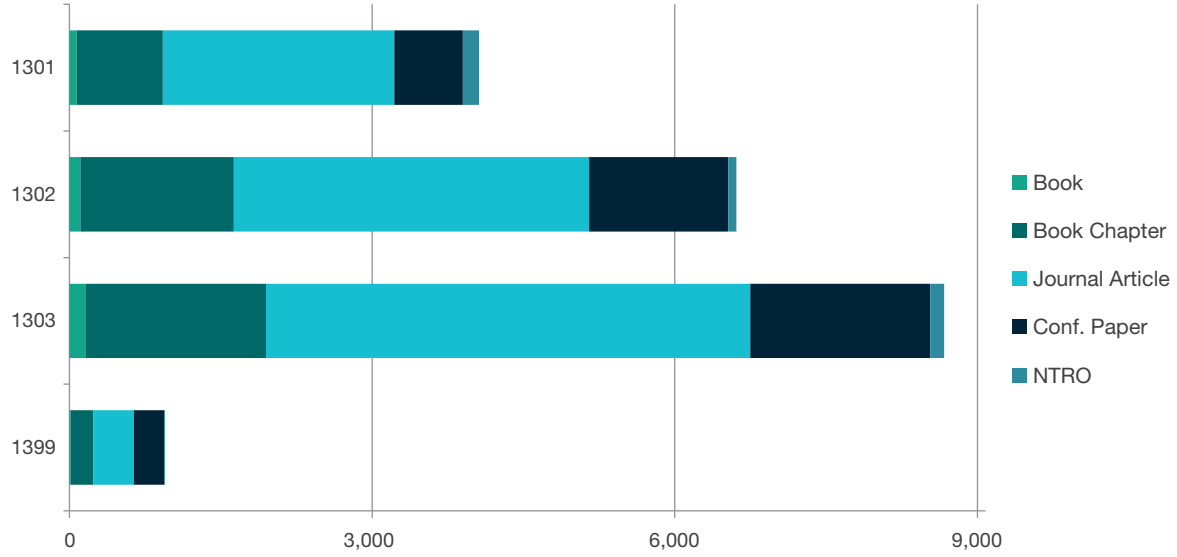
Rating	Distribution	
	Two–digit	Four–digit
5	2	6
4	6	14
3	19	34
2	9	34
1	2	5
Total	**38**	**93**

NUMBER OF UOES PER RATING SCALE SCORE



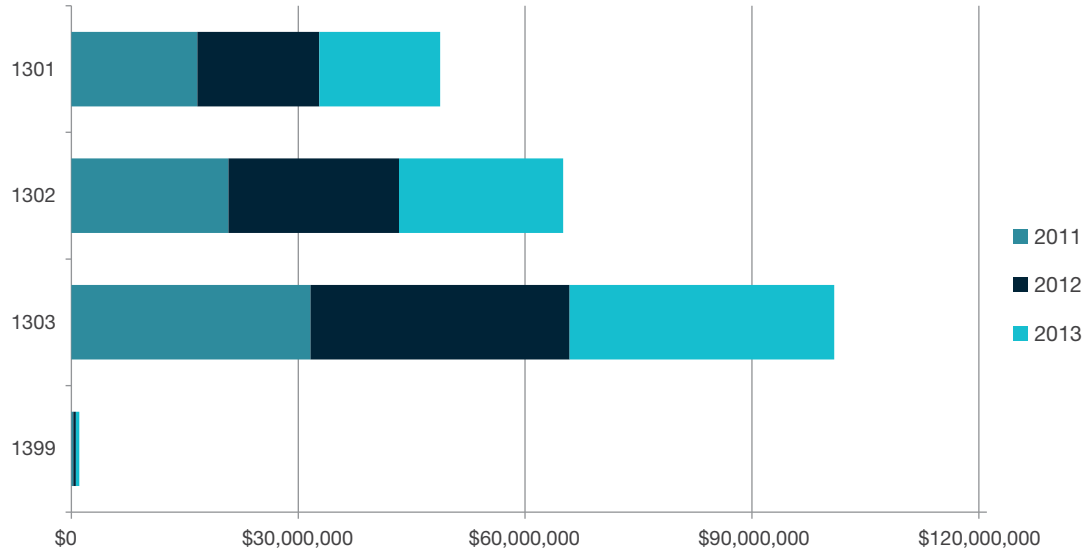
Note: 13 Education shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



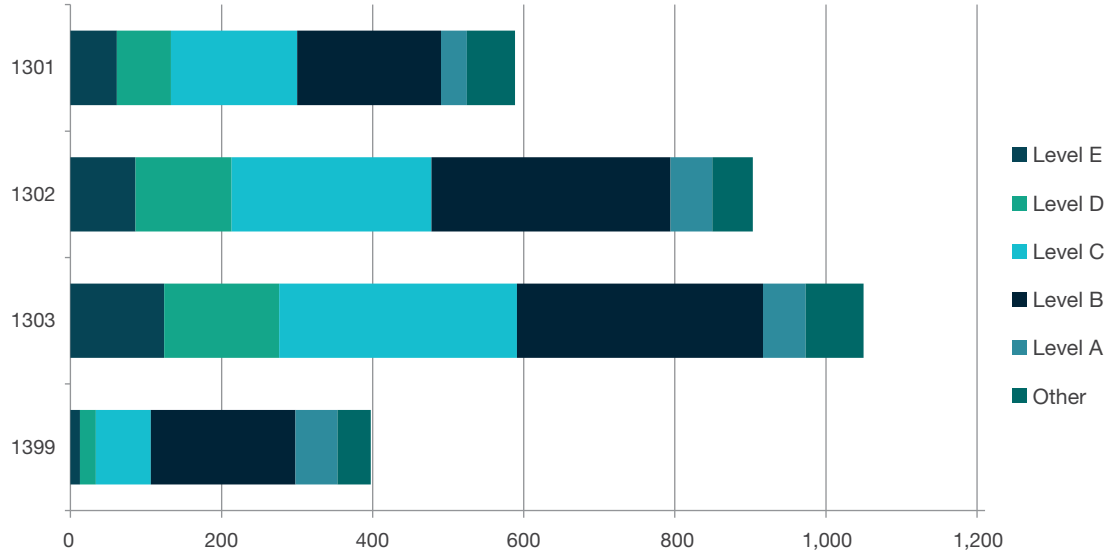
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
1301 Education Systems	72.2	851.9	2,296.3	678.8	160.7	4,060.0
1302 Curriculum and Pedagogy	107.1	1,522.7	3,520.2	1,381.3	80.0	6,611.2
1303 Specialist Studies in Education	158.2	1,789.8	4,800.3	1,782.9	137.8	8,669.1
1399 Other Education	11.9	221.7	404.8	302.7	5.4	946.5
Total	**349.4**	**4,386.2**	**11,021.6**	**4,145.7**	**384.0**	**20,286.9**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



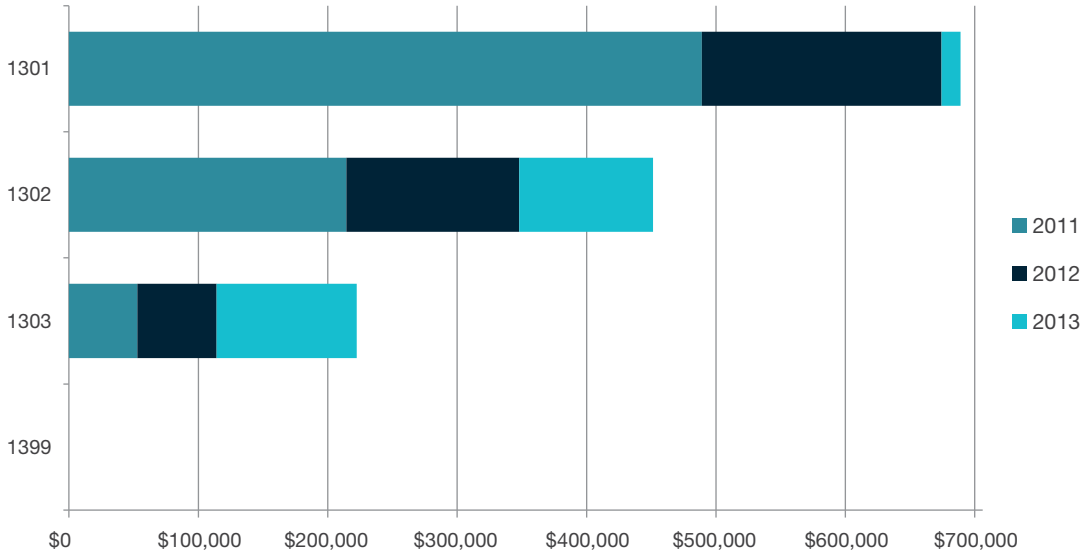
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1301 Education Systems	16,673,945	16,116,103	15,978,542	48,768,590
1302 Curriculum and Pedagogy	20,765,372	22,555,641	21,720,565	65,041,577
1303 Specialist Studies in Education	31,620,174	34,249,332	34,987,713	100,857,219
1399 Other Education	255,393	347,793	457,842	1,061,028
Total	**69,314,884**	**73,268,868**	**73,144,662**	**215,728,415**

STAFFING PROFILE BY ACADEMIC LEVEL



FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
1301 Education Systems	61.4	71.5	167.1	190.5	34.3	63.6	588.3
1302 Curriculum and Pedagogy	86.1	127.2	264.6	316.4	55.3	53.7	903.3
1303 Specialist Studies in Education	124.1	151.9	314.9	325.6	56.6	76.5	1,049.7
1399 Other Education	12.5	21.1	72.6	191.7	55.6	43.9	397.4
Total	**284.1**	**371.7**	**819.2**	**1,024.3**	**201.8**	**237.6**	**2,938.7**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



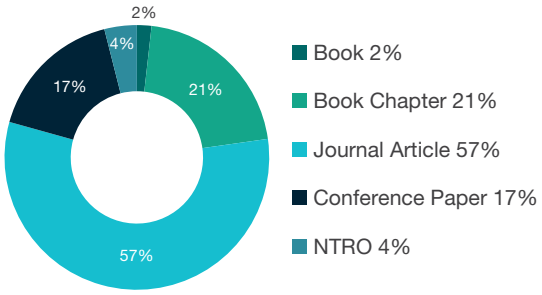
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1301 Education Systems	489,116	185,132	14,804	689,052
1302 Curriculum and Pedagogy	214,389	133,630	103,398	451,416
1303 Specialist Studies in Education	52,868	61,245	108,335	222,448
1399 Other Education	0	0	0	0
Total	**756,373**	**380,007**	**226,536**	**1,362,916**

1301 Education Systems

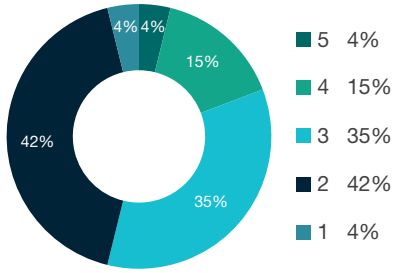
Indicator	No.
Research outputs	4,060.0
Research income	$48,768,590
FTEs	588.3
Esteem count	17.9
Patents	–
Research commercialisation income	$689,052

Rating	Distribution
5	1
4	4
3	9
2	11
1	1
Total	**26**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

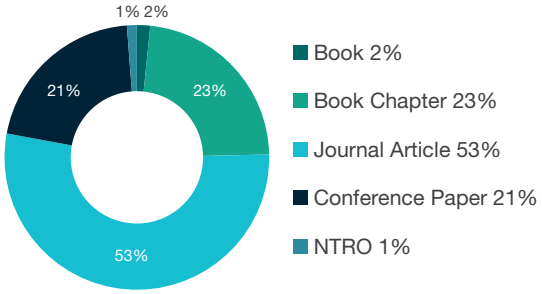


1302 Curriculum and Pedagogy

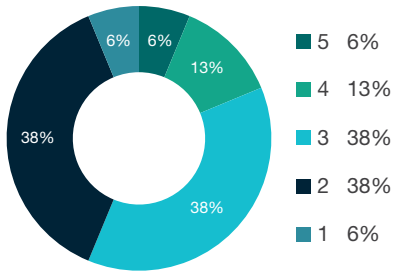
Indicator	No.
Research outputs	6,611.2
Research income	$65,041,577
FTEs	903.3
Esteem count	16.5
Patents	–
Research commercialisation income	$451,416

Rating	Distribution
5	2
4	4
3	12
2	12
1	2
Total	**32**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

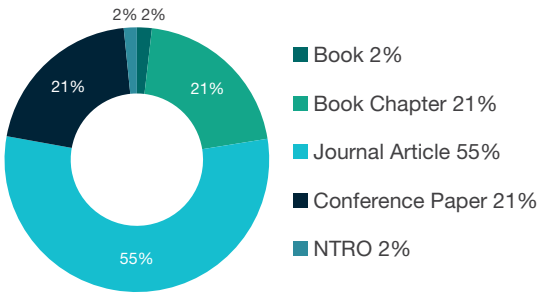


1303 Specialist Studies in Education

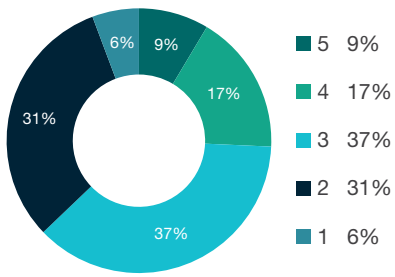
Indicator	No.
Research outputs	8,669.1
Research income	$100,857,219
FTEs	1,049.7
Esteem count	29.3
Patents	–
Research commercialisation income	$222,448

Rating	Distribution
5	3
4	6
3	13
2	11
1	2
Total	**35**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

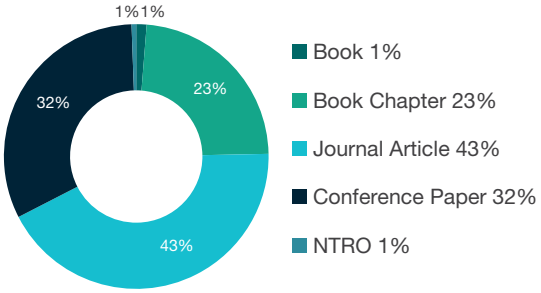


1399 Other Education

Indicator	No.
Research outputs	946.5
Research income	$1,061,028
FTEs	397.4
Esteem count	0.0
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 1399.

14 ECONOMICS

Economics is comprised of the following four–digit codes:

1401 Economic Theory

1402 Applied Economics

1403 Econometrics

1499 Other Economics

7 out of 34 two–digit UoEs and 18 out of 46 four–digit UoEs assessed were rated above world standard

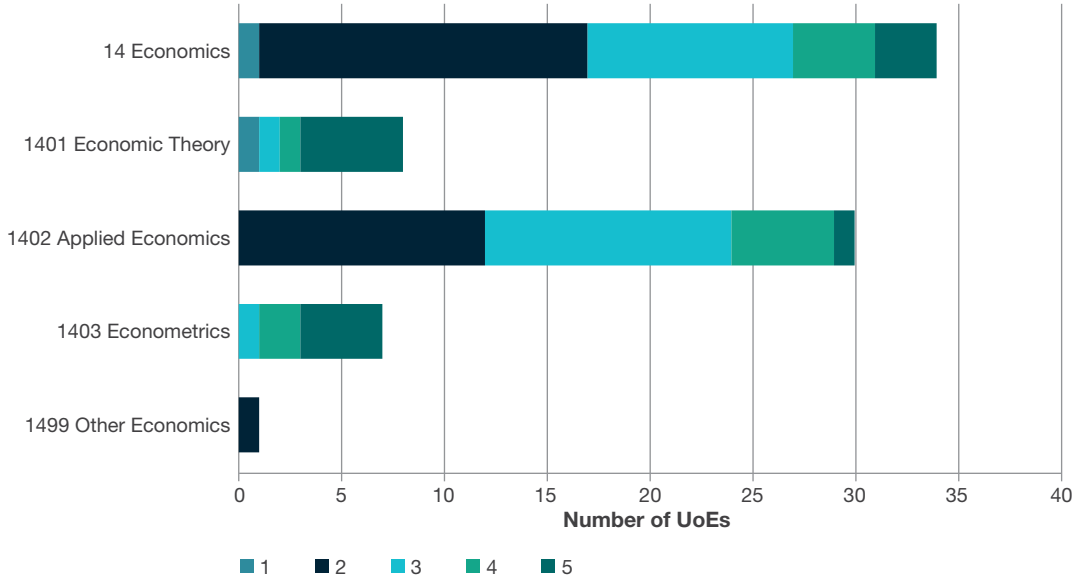
FoR Overview

Economics (14) accounted for approximately two per cent of the research outputs submitted to ERA 2015. Journal articles were the primary research output type (76 per cent). Applied Economics (1402) was the largest Economics sub–discipline, in terms of research outputs, research income, staffing levels and research commercialisation income.

Indicator	No.
Research outputs	7,386.5
Research income	$151,172,292
FTEs	947.3
Esteem count	91.9
Patents	–
Research commercialisation income	$12,843

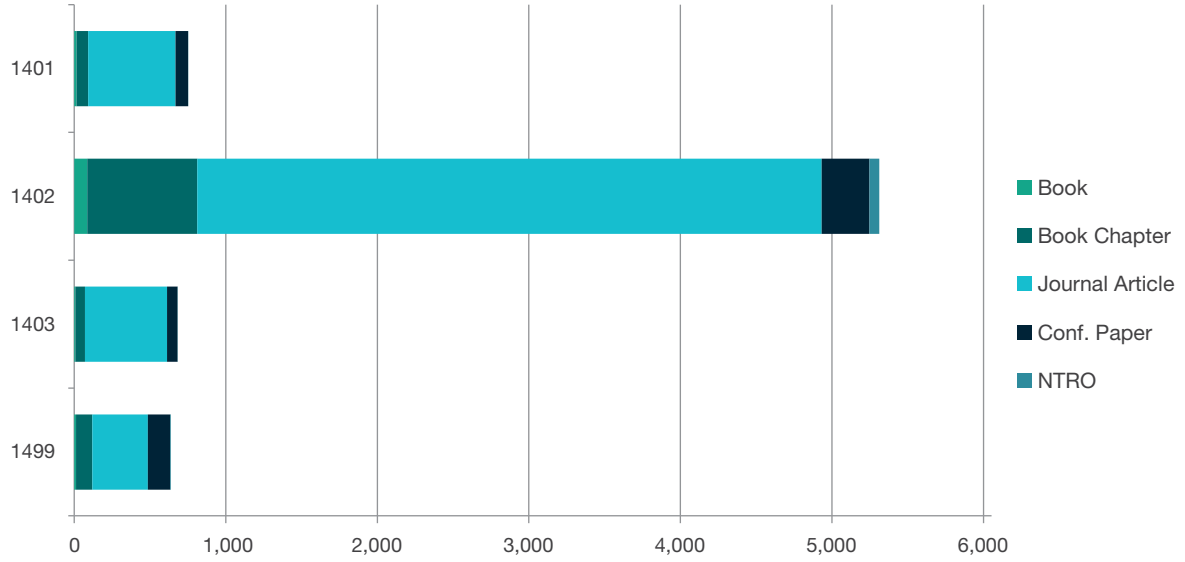
Rating	Distribution	
	Two–digit	Four–digit
5	3	10
4	4	8
3	10	14
2	16	13
1	1	1
Total	**34**	**46**

NUMBER OF UOES PER RATING SCALE SCORE



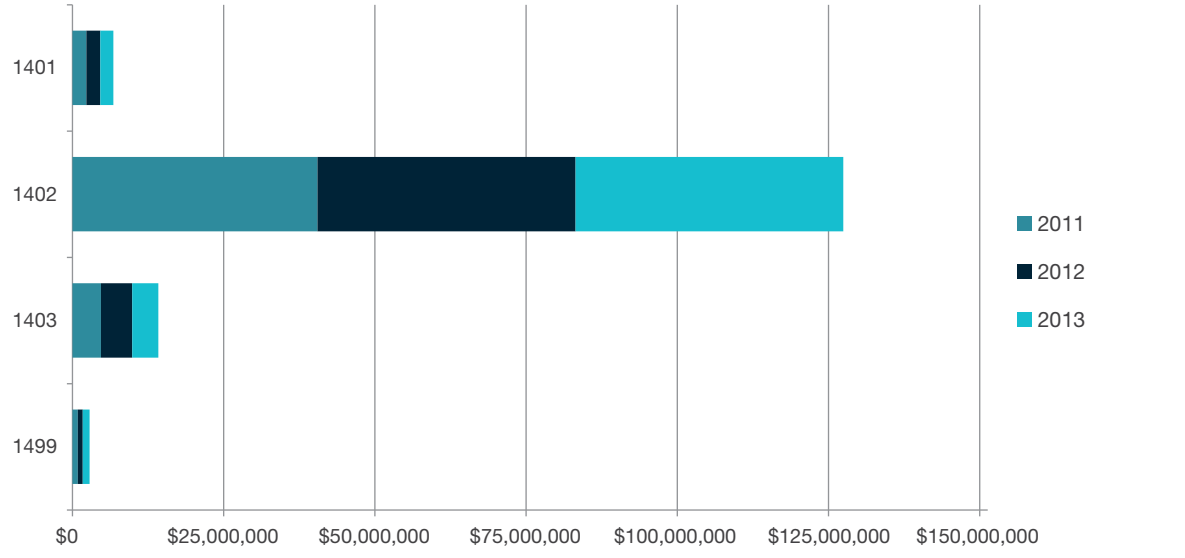
Note: 14 Economics shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



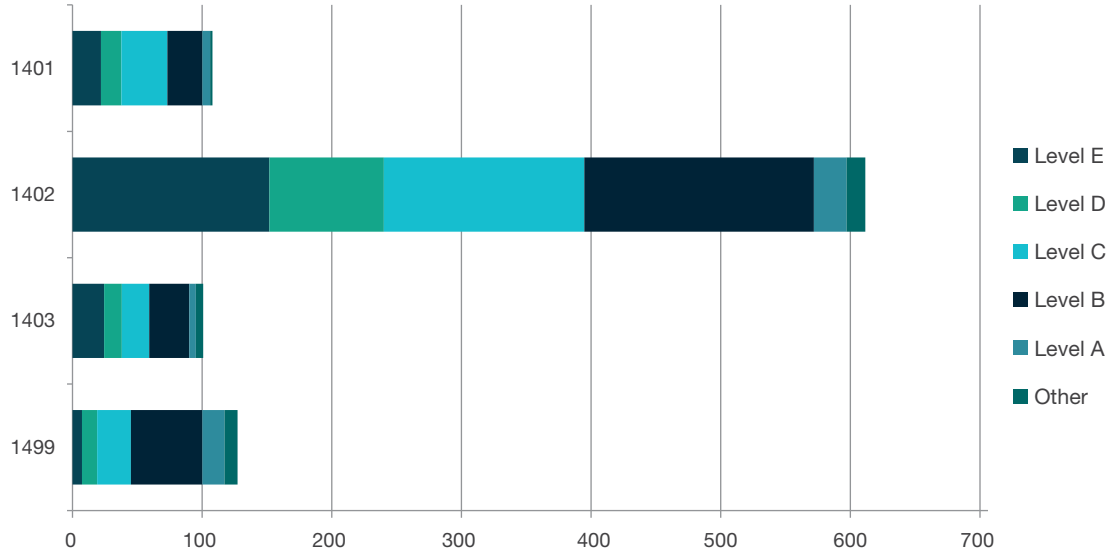
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
1401 Economic Theory	15.0	77.3	576.7	82.6	1.0	752.5
1402 Applied Economics	85.6	726.0	4,120.9	315.8	64.5	5,312.8
1403 Econometrics	7.9	62.2	542.7	69.2	1.0	683.0
1499 Other Economics	12.4	106.7	365.9	148.2	4.9	638.2
Total	**120.9**	**972.2**	**5,606.2**	**615.8**	**71.4**	**7,386.5**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



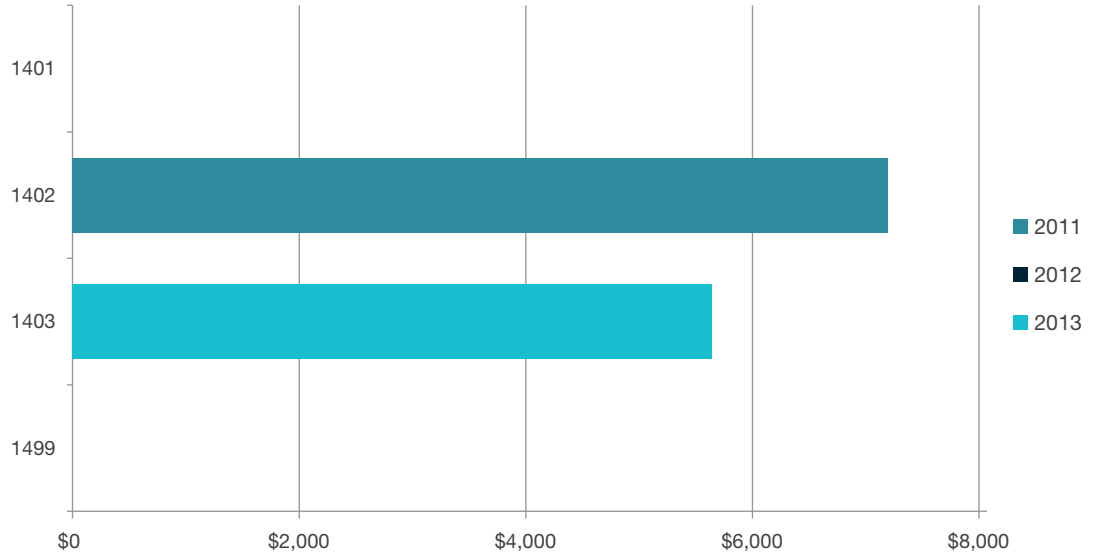
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1401 Economic Theory	2,283,601	2,293,477	2,161,014	6,738,091
1402 Applied Economics	40,502,304	42,664,126	44,260,373	127,426,803
1403 Econometrics	4,700,113	5,175,075	4,323,065	14,198,254
1499 Other Economics	859,913	830,124	1,119,107	2,809,144
Total	**48,345,931**	**50,962,802**	**51,863,559**	**151,172,292**

STAFFING PROFILE BY ACADEMIC LEVEL



FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
1401 Economic Theory	21.9	15.7	35.5	26.9	6.0	1.8	107.8
1402 Applied Economics	151.8	88.3	154.6	177.2	25.1	14.5	611.5
1403 Econometrics	24.3	13.8	21.1	30.9	5.0	5.6	100.7
1499 Other Economics	7.3	11.6	26.1	55.1	17.0	10.2	127.3
Total	**205.2**	**129.4**	**237.3**	**290.1**	**53.1**	**32.1**	**947.3**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



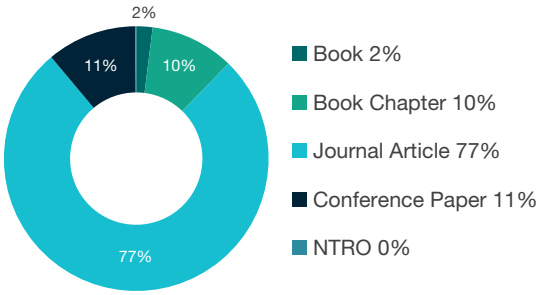
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1401 Economic Theory	0	0	0	0
1402 Applied Economics	7,201	0	0	7,201
1403 Econometrics	0	0	5,642	5,642
1499 Other Economics	0	0	0	0
Total	**7,201**	**0**	**5,642**	**12,843**

1401 Economic Theory

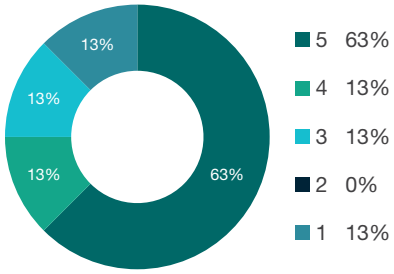
Indicator	No.
Research outputs	752.5
Research income	$6,738,091
FTEs	107.8
Esteem count	9.3
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	5
4	1
3	1
2	0
1	1
Total	**8**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

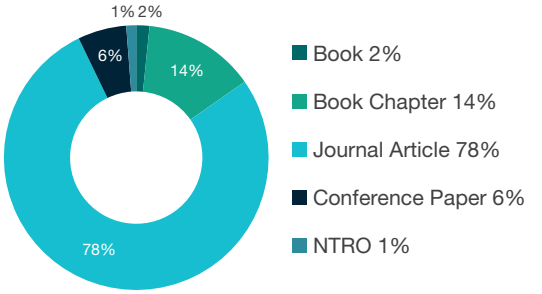


1402 Applied Economics

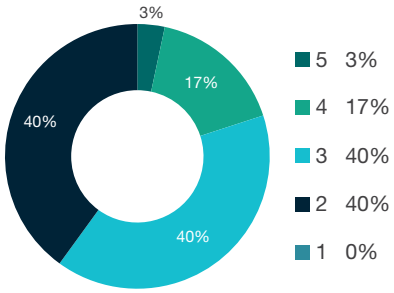
Indicator	No.
Research outputs	5,312.8
Research income	$127,426,803
FTEs	611.5
Esteem count	70.3
Patents	–
Research commercialisation income	$7,201

Rating	Distribution
5	1
4	5
3	12
2	12
1	0
Total	**30**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

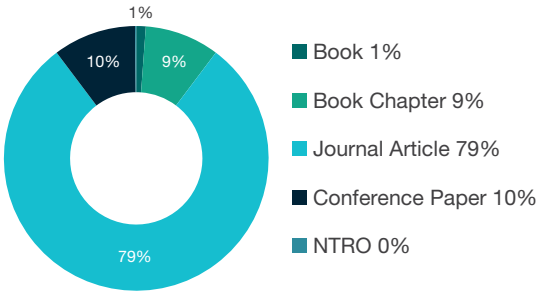


1403 Econometrics

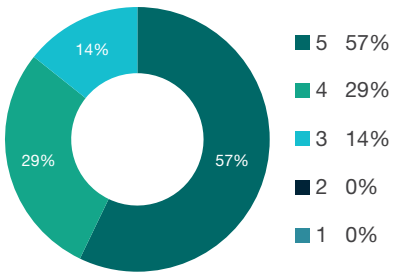
Indicator	No.
Research outputs	683.0
Research income	$14,198,254
FTEs	100.7
Esteem count	12.0
Patents	–
Research commercialisation income	$5,642

Rating	Distribution
5	4
4	2
3	1
2	0
1	0
Total	**7**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

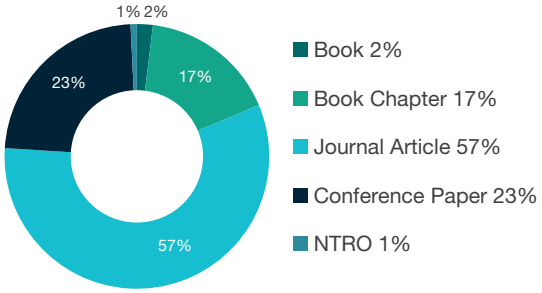


1499 Other Economics

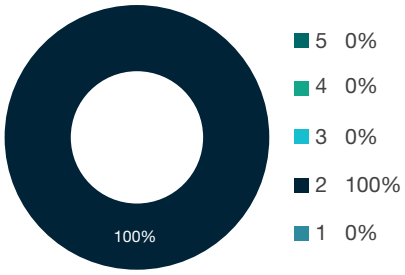
Indicator	No.
Research outputs	638.2
Research income	$2,809,144
FTEs	127.3
Esteem count	0.4
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	1
1	0
Total	**1**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION



15 COMMERCE, MANAGEMENT, TOURISM AND SERVICES

Commerce, Management, Tourism and Services is comprised of the following four–digit codes:

1501 Accounting, Auditing and Accountability

1502 Banking, Finance and Investment

1503 Business and Management

1504 Commercial Services

1505 Marketing

1506 Tourism

1507 Transportation and Freight Services

1599 Other Commerce, Management, Tourism and Services

8 out of 37 two–digit UoEs and 40 out of 120 four–digit UoEs assessed were rated above world standard

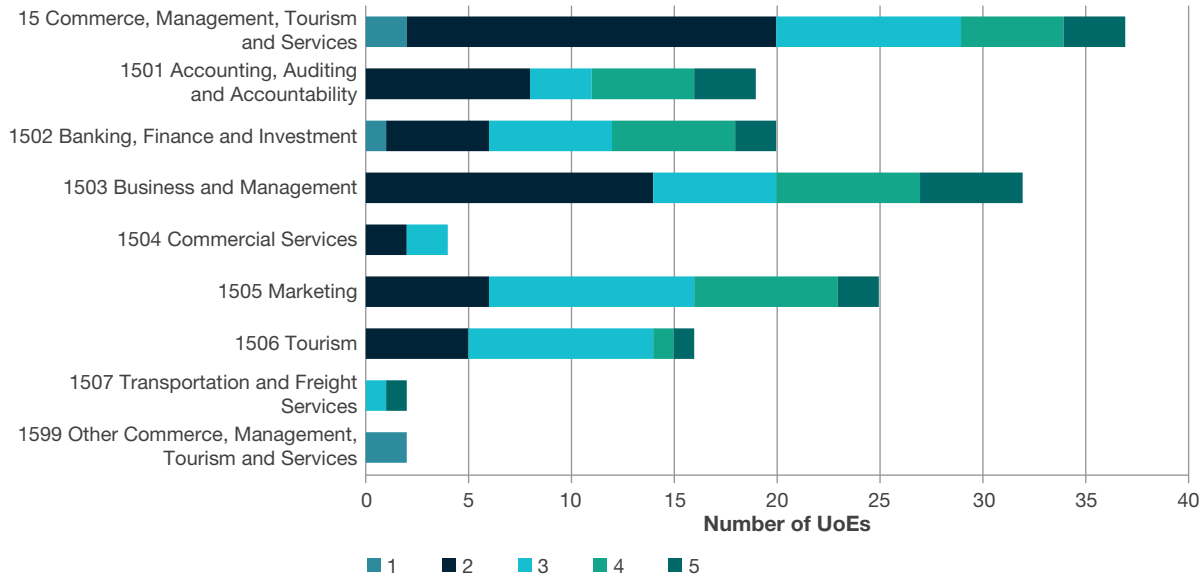
FoR Overview

Commerce, Management, Tourism and Services (15) contributed approximately five per cent of the research outputs to ERA 2015. Journal articles were the most common research output type (62 per cent), though a moderately high proportion of conference papers were submitted (24 per cent). Business and Management (1503) was the largest discipline sub–grouping in terms of research outputs, research income and staffing profile. Commercial Services (1504) had the highest research commercialisation income.

Indicator	No.
Research outputs	23,384.0
Research income	$153,344,580
FTEs	3,175.4
Esteem count	46.9
Patents	–
Research commercialisation income	$148,065

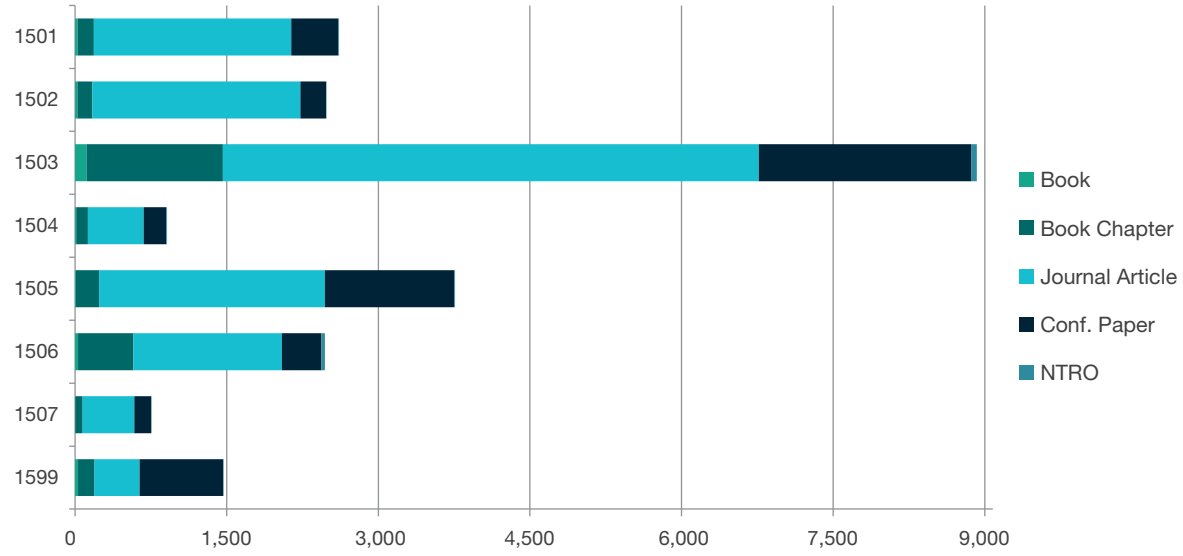
Rating	Distribution	
	Two–digit	Four–digit
5	3	14
4	5	26
3	9	37
2	18	40
1	2	3
Total	**37**	**120**

NUMBER OF UOES PER RATING SCALE SCORE



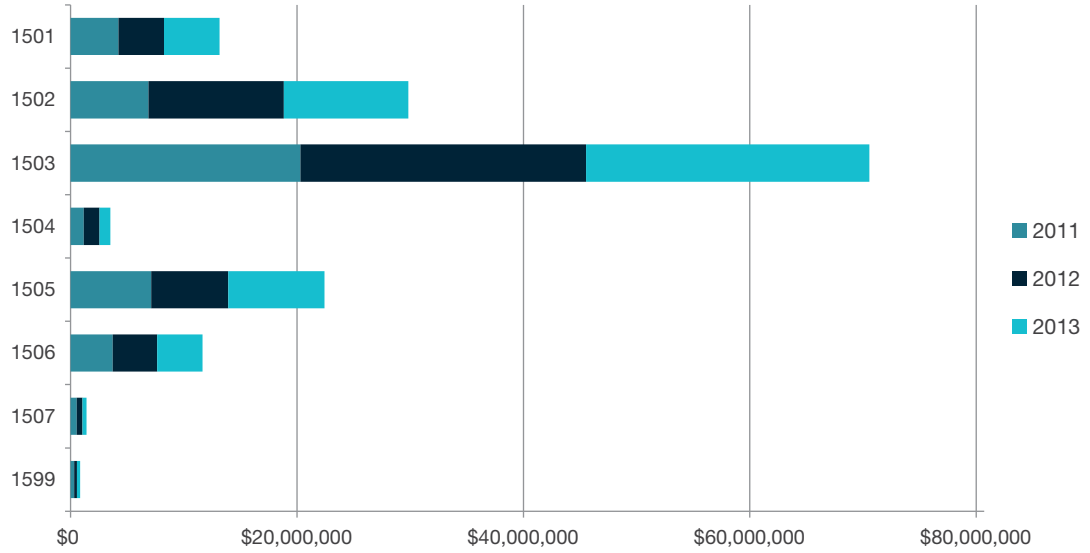
Note: 15 Commerce, Management, Tourism and Services shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



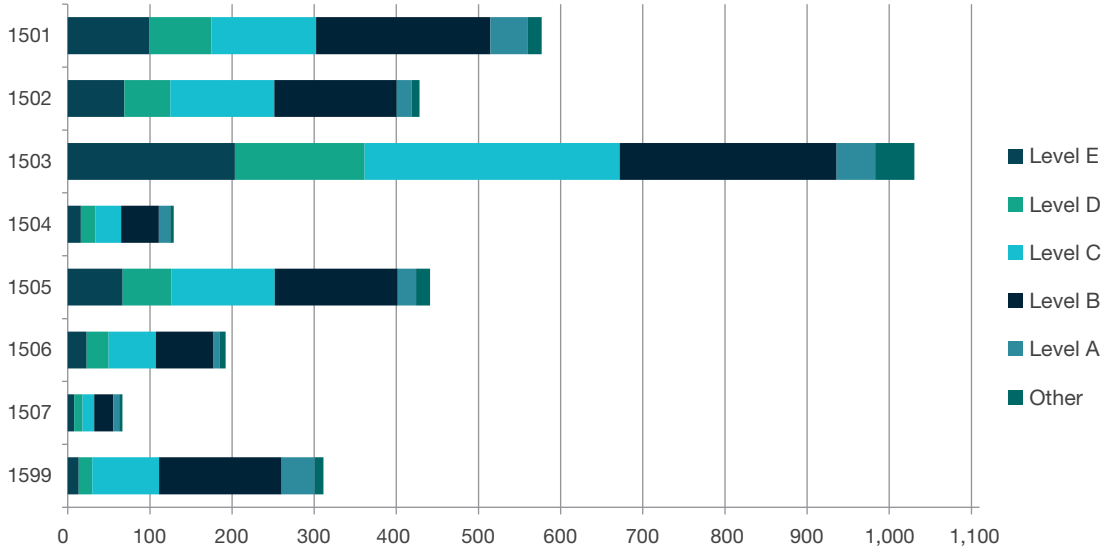
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
1501 Accounting, Auditing and Accountability	24.6	160.6	1,953.1	466.5	8.0	2,612.7
1502 Banking, Finance and Investment	22.0	147.0	2,060.1	252.6	4.9	2,486.6
1503 Business and Management	112.4	1,350.2	5,302.1	2,100.8	55.3	8,920.8
1504 Commercial Services	11.0	115.4	551.4	224.6	6.5	908.9
1505 Marketing	8.4	228.4	2,235.2	1,279.4	7.8	3,759.2
1506 Tourism	28.7	548.8	1,468.8	392.0	33.3	2,471.6
1507 Transportation and Freight Services	2.0	73.0	512.0	166.5	3.0	756.6
1599 Other Commerce, Management, Tourism and Services	28.4	164.3	445.1	828.7	1.0	1,467.5
Total	**237.5**	**2,787.7**	**14,527.8**	**5,711.2**	**119.8**	**23,384.0**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



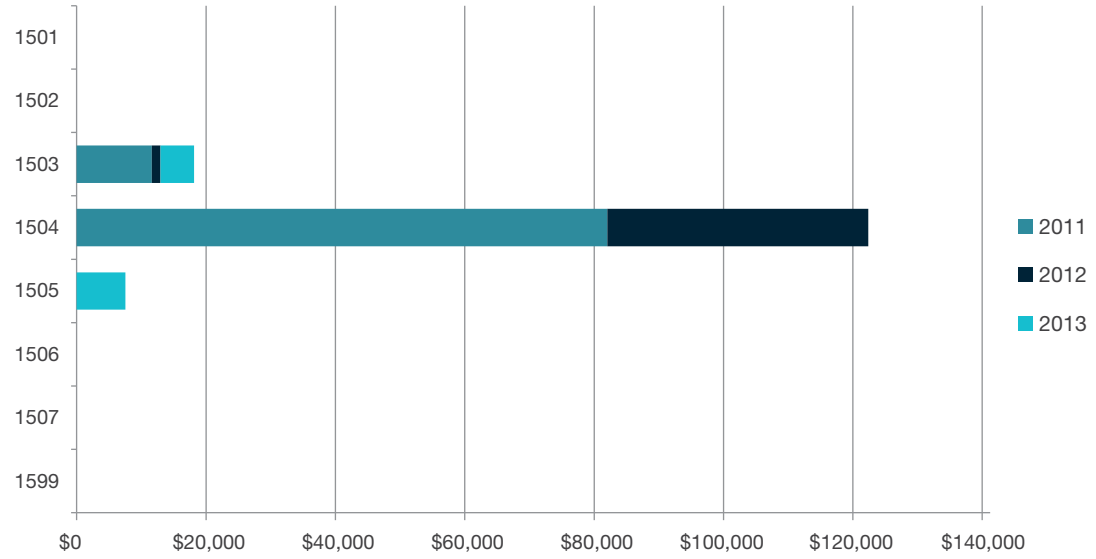
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1501 Accounting, Auditing and Accountability	4,222,976	4,025,253	4,903,593	13,151,821
1502 Banking, Finance and Investment	6,869,136	11,961,364	10,993,627	29,824,126
1503 Business and Management	20,300,218	25,241,759	25,018,735	70,560,712
1504 Commercial Services	1,157,818	1,394,349	955,817	3,507,985
1505 Marketing	7,115,266	6,803,645	8,498,254	22,417,165
1506 Tourism	3,719,891	3,929,805	3,994,752	11,644,448
1507 Transportation and Freight Services	534,454	512,752	351,528	1,398,734
1599 Other Commerce, Management, Tourism and Services	305,893	249,144	284,552	839,589
Total	**44,225,651**	**54,118,071**	**55,000,858**	**153,344,580**

STAFFING PROFILE BY ACADEMIC LEVEL



FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
1501 Accounting, Auditing and Accountability	99.3	75.6	127.4	212.2	45.6	16.8	576.9
1502 Banking, Finance and Investment	68.8	56.1	126.5	149.1	18.3	9.3	428.1
1503 Business and Management	203.4	158.0	310.3	264.2	46.8	47.8	1,030.6
1504 Commercial Services	16.0	17.5	31.3	46.1	13.9	4.1	129.0
1505 Marketing	66.8	59.5	125.7	149.7	22.3	16.9	441.0
1506 Tourism	22.9	26.9	57.4	70.2	7.2	7.6	192.2
1507 Transportation and Freight Services	7.8	10.4	14.2	23.3	6.9	4.1	66.6
1599 Other Commerce, Management, Tourism and Services	13.2	16.5	81.4	149.1	40.1	10.8	311.2
Total	**498.3**	**420.6**	**874.2**	**1,063.8**	**201.1**	**117.4**	**3,175.4**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



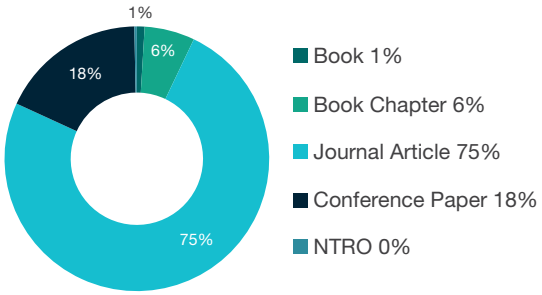
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1501 Accounting, Auditing and Accountability	0	0	0	0
1502 Banking, Finance and Investment	0	0	0	0
1503 Business and Management	11,606	1,350	5,184	18,139
1504 Commercial Services	82,045	40,342	0	122,387
1505 Marketing	0	0	7,539	7,539
1506 Tourism	0	0	0	0
1507 Transportation and Freight Services	0	0	0	0
1599 Other Commerce, Management, Tourism and Services	0	0	0	0
Total	**93,650**	**41,692**	**12,723**	**148,065**

1501 Accounting, Auditing and Accountability

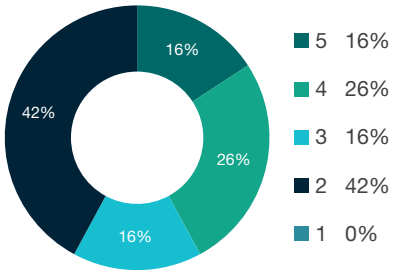
Indicator	No.
Research outputs	2,612.7
Research income	$13,151,821
FTEs	576.9
Esteem count	7.2
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	3
4	5
3	3
2	8
1	0
Total	**19**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

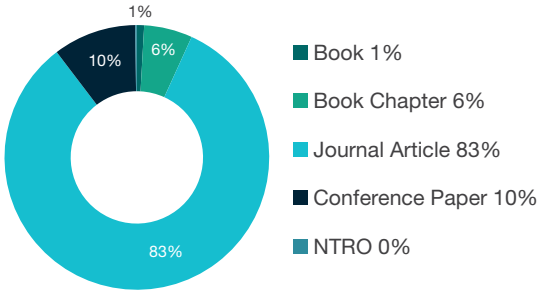


1502 Banking, Finance and Investment

Indicator	No.
Research outputs	2,486.6
Research income	$29,824,126
FTEs	428.1
Esteem count	4.2
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	2
4	6
3	6
2	5
1	1
Total	**20**

RESEARCH OUTPUTS BY TYPE



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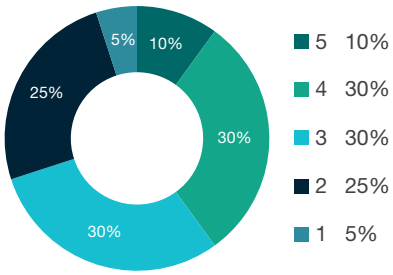
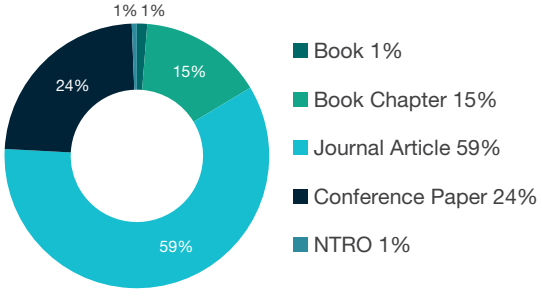


1503 Business and Management

Indicator	No.
Research outputs	8,920.8
Research income	$70,560,712
FTEs	1,030.6
Esteem count	29.6
Patents	–
Research commercialisation income	$18,139

Rating	Distribution
5	5
4	7
3	6
2	14
1	0
Total	**32**

RESEARCH OUTPUTS BY TYPE



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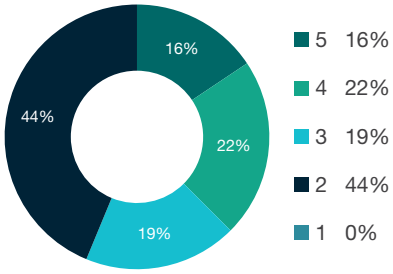
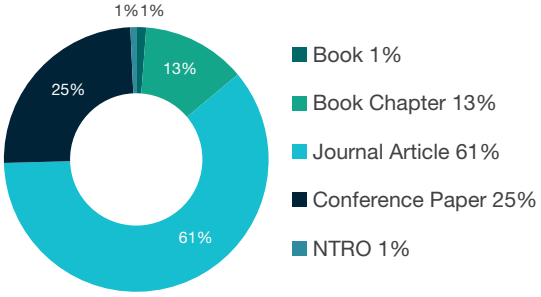


1504 Commercial Services

Indicator	No.
Research outputs	908.9
Research income	$3,507,985
FTEs	129.0
Esteem count	0.0
Patents	–
Research commercialisation income	$122,387

Rating	Distribution
5	0
4	0
3	2
2	2
1	0
Total	**4**

RESEARCH OUTPUTS BY TYPE



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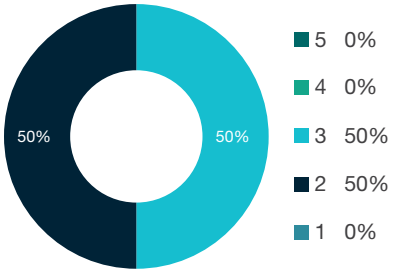
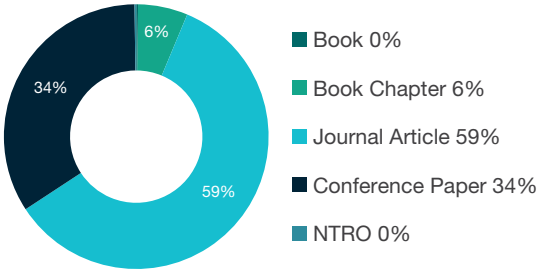


1505 Marketing

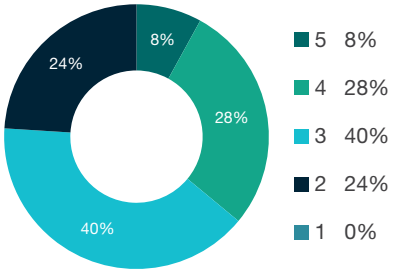
Indicator	No.
Research outputs	3,759.2
Research income	$22,417,165
FTEs	441.0
Esteem count	2.1
Patents	–
Research commercialisation income	$7,539

Rating	Distribution
5	2
4	7
3	10
2	6
1	0
Total	**25**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

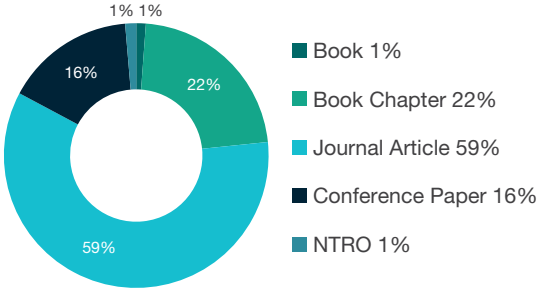


1506 Tourism

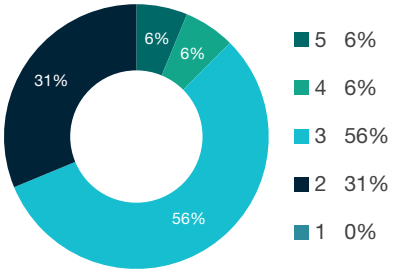
Indicator	No.
Research outputs	2,471.6
Research income	$11,644,448
FTEs	192.2
Esteem count	2.7
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	1
4	1
3	9
2	5
1	0
Total	**16**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

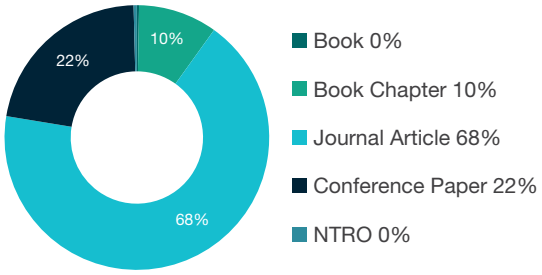


1507 Transportation and Freight Services

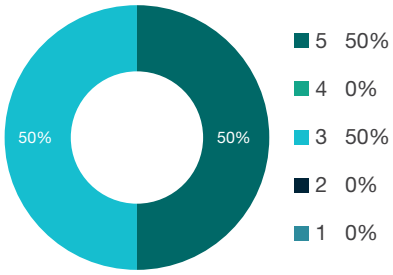
Indicator	No.
Research outputs	756.6
Research income	$1,398,734
FTEs	66.6
Esteem count	1.1
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	1
4	0
3	1
2	0
1	0
Total	**2**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

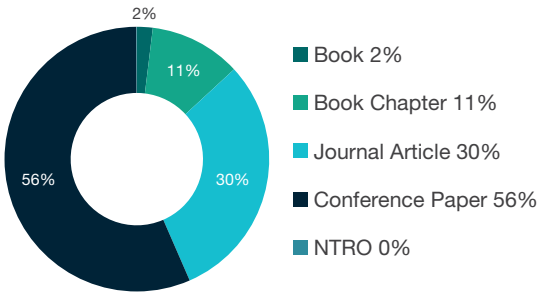


1599 Other Commerce, Management, Tourism and Services

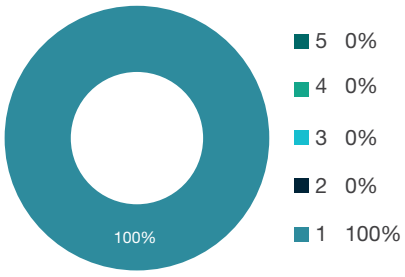
Indicator	No.
Research outputs	1,467.5
Research income	$839,589
FTEs	311.2
Esteem count	0.0
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	2
Total	**2**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION



16 STUDIES IN HUMAN SOCIETY

Studies in Human Society is comprised of the following four–digit codes:

1601 Anthropology

1602 Criminology

1603 Demography

1604 Human Geography

1605 Policy and Administration

1606 Political Science

1607 Social Work

1608 Sociology

1699 Other Studies in Human Society

10 out of 39 two–digit UoEs and 43 out of 121 four–digit UoEs assessed were rated above world standard

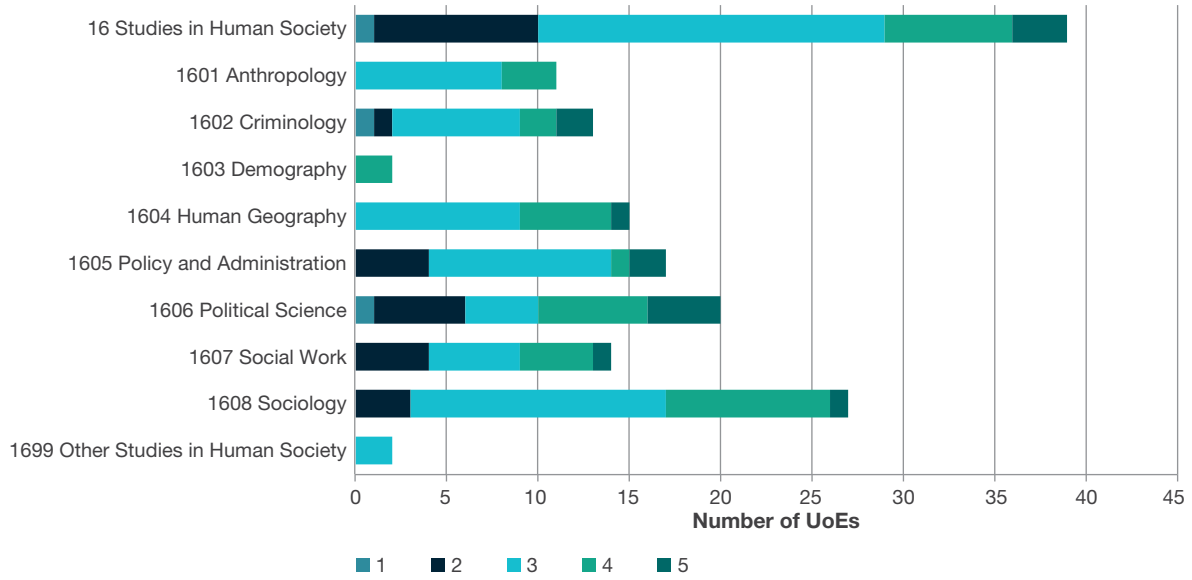
FoR Overview

Studies in Human Society (16) contributed approximately five per cent of the research outputs to ERA 2015. Journal articles were the most common research output type (58 per cent), followed by book chapters (29 per cent). The three largest sub–disciplines in terms of research outputs, research income and staff FTE were Policy and Adminstration (1605), Political Science (1606) and Sociology (1608). No research commercialisation income was submitted to ERA 2015 for Studies in Human Society (16).

Indicator	No.
Research outputs	22,976.7
Research income	$392,138,498
FTEs	2,411.9
Esteem count	294.2
Patents	–
Research commercialisation income	$0

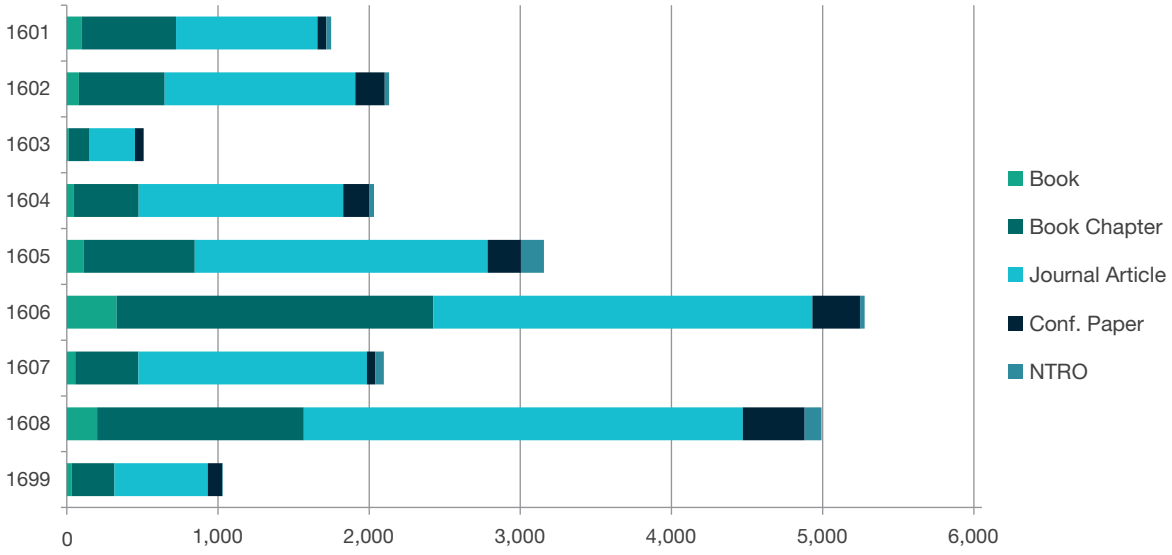
Rating	Distribution	
	Two–digit	Four–digit
5	3	11
4	7	32
3	19	59
2	9	17
1	1	2
Total	**39**	**121**

NUMBER OF UOES PER RATING SCALE SCORE



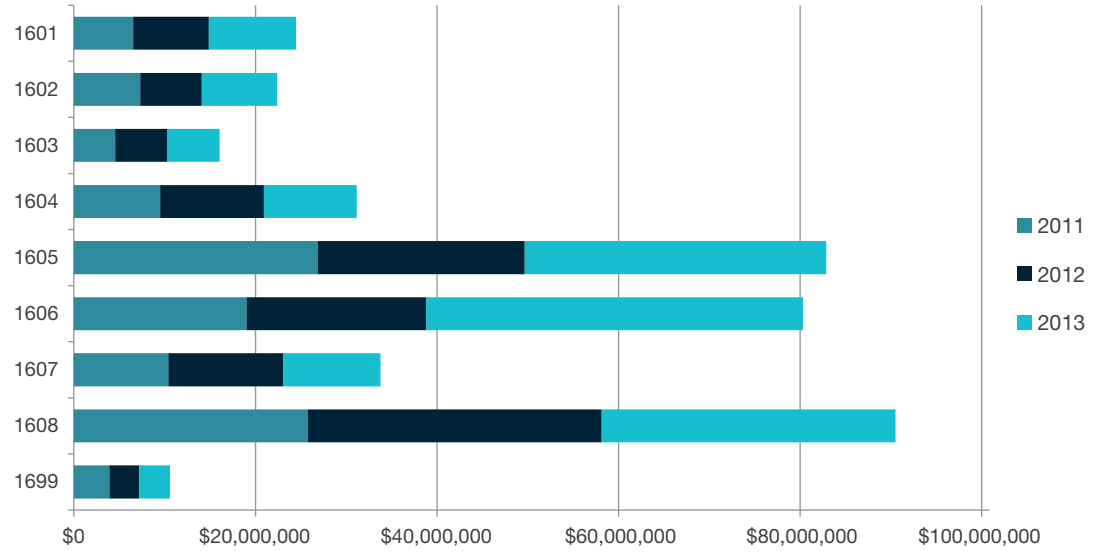
Note: 16 Studies in Human Society shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



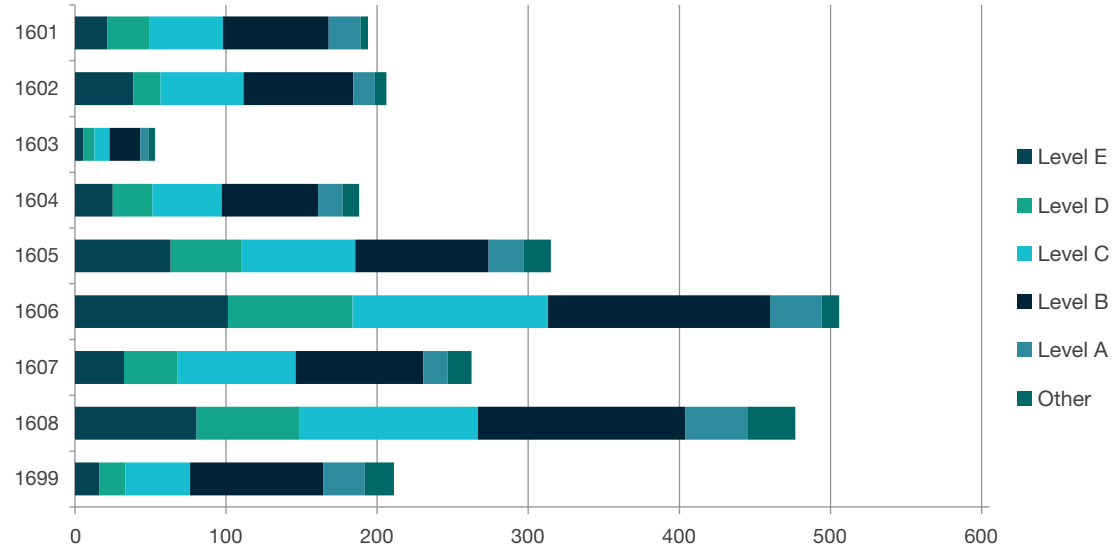
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
1601 Anthropology	99.2	623.8	934.5	60.1	30.5	1,748.2
1602 Criminology	79.8	567.7	1,260.8	195.1	28.3	2,131.6
1603 Demography	13.4	136.8	300.8	57.0	0.7	508.6
1604 Human Geography	47.2	427.5	1,354.4	171.3	32.0	2,032.3
1605 Policy and Administration	110.1	736.7	1,937.4	219.6	152.8	3,156.5
1606 Political Science	330.9	2,094.1	2,507.4	315.3	29.6	5,277.3
1607 Social Work	56.0	417.2	1,512.8	53.2	58.1	2,097.4
1608 Sociology	200.3	1,367.8	2,904.4	408.8	111.3	4,992.6
1699 Other Studies in Human Society	31.4	283.9	617.5	95.2	4.3	1,032.3
Total	**968.1**	**6,655.5**	**13,329.9**	**1,575.6**	**447.6**	**22,976.7**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1601 Anthropology	6,523,781	8,343,077	9,594,166	24,461,024
1602 Criminology	7,308,613	6,777,671	8,313,583	22,399,866
1603 Demography	4,554,351	5,760,699	5,739,380	16,054,430
1604 Human Geography	9,492,754	11,431,980	10,236,972	31,161,707
1605 Policy and Administration	26,881,926	22,789,748	33,207,261	82,878,935
1606 Political Science	19,030,160	19,776,275	41,505,782	80,312,217
1607 Social Work	10,408,564	12,631,136	10,737,202	33,776,902
1608 Sociology	25,777,621	32,354,734	32,370,445	90,502,800
1699 Other Studies in Human Society	3,915,607	3,277,767	3,397,242	10,590,617
Total	**113,893,377**	**123,143,087**	**155,102,033**	**392,138,498**

STAFFING PROFILE BY ACADEMIC LEVEL



Continued

FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
1601 Anthropology	21.6	27.8	48.6	69.9	21.3	4.8	193.9
1602 Criminology	38.5	18.0	54.9	72.7	14.3	7.6	206.1
1603 Demography	5.3	7.5	10.1	20.3	5.7	4.1	53.0
1604 Human Geography	25.1	26.2	45.8	63.9	16.2	10.9	188.1
1605 Policy and Administration	63.4	47.0	75.1	88.3	23.0	18.2	314.9
1606 Political Science	101.2	82.4	129.5	146.8	34.3	11.5	505.7
1607 Social Work	32.4	35.2	78.4	84.5	16.2	15.8	262.5
1608 Sociology	80.5	67.7	118.5	137.4	41.3	31.3	476.7
1699 Other Studies in Human Society	16.3	17.0	42.9	88.3	27.3	19.2	211.1
Total	**384.5**	**328.7**	**603.9**	**772.0**	**199.4**	**123.4**	**2,411.9**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)

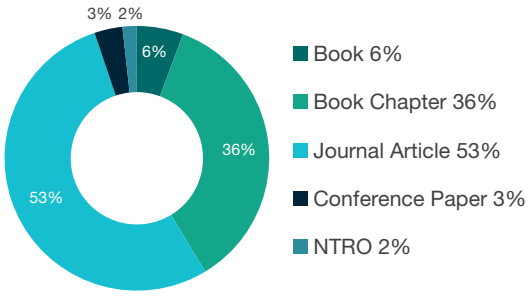
Note: There was no research commercialisation income reported by UoEs in this FoR.

1601 Anthropology

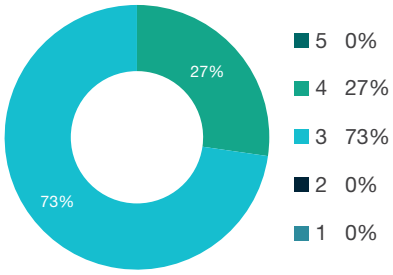
Indicator	No.
Research outputs	1,748.2
Research income	$24,461,024
FTEs	193.9
Esteem count	66.7
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	3
3	8
2	0
1	0
Total	**11**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

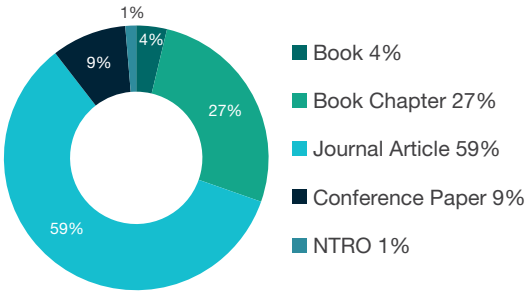


1602 Criminology

Indicator	No.
Research outputs	2,131.6
Research income	$22,399,866
FTEs	206.1
Esteem count	11.6
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	2
4	2
3	7
2	1
1	1
Total	**13**

RESEARCH OUTPUTS BY TYPE



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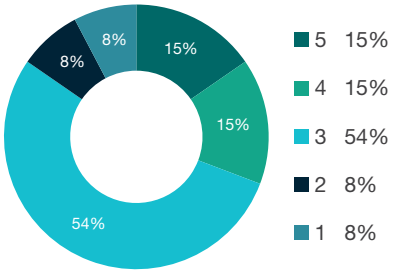
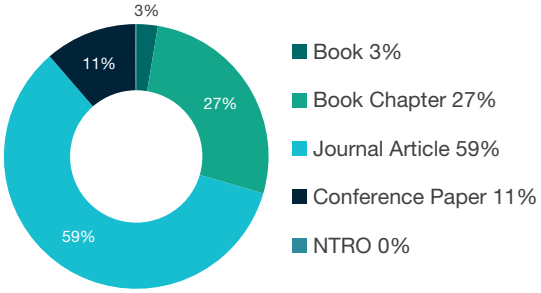


1603 Demography

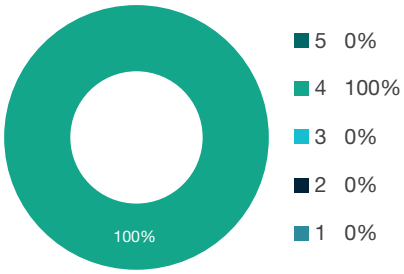
Indicator	No.
Research outputs	508.6
Research income	$16,054,430
FTEs	53.0
Esteem count	8.3
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	2
3	0
2	0
1	0
Total	**2**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

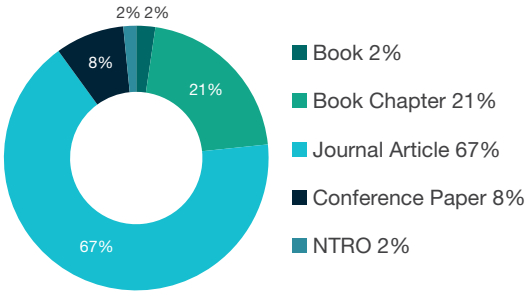


1604 Human Geography

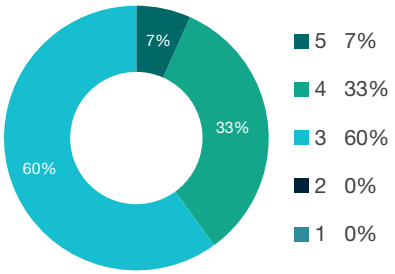
Indicator	No.
Research outputs	2,032.3
Research income	$31,161,707
FTEs	188.1
Esteem count	29.4
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	1
4	5
3	9
2	0
1	0
Total	**15**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

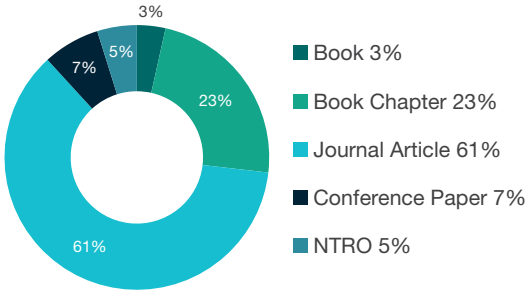


1605 Policy and Administration

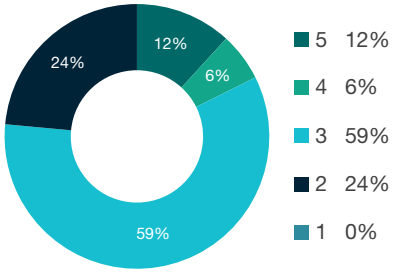
Indicator	No.
Research outputs	3,156.5
Research income	$82,878,935
FTEs	314.9
Esteem count	30.1
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	2
4	1
3	10
2	4
1	0
Total	**17**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

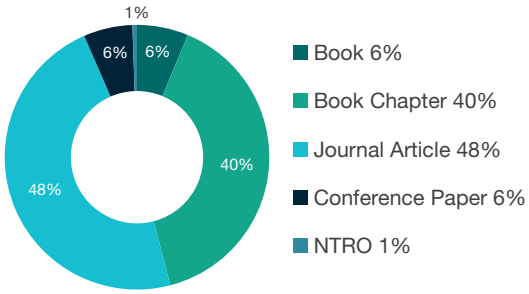


1606 Political Science

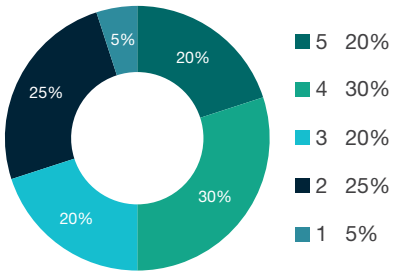
Indicator	No.
Research outputs	5,277.3
Research income	$80,312,217
FTEs	505.7
Esteem count	82.3
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	4
4	6
3	4
2	5
1	1
Total	**20**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

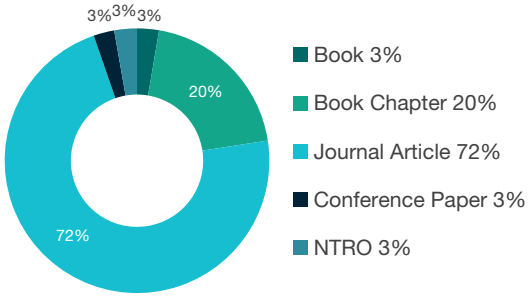


1607 Social Work

Indicator	No.
Research outputs	2,097.4
Research income	$33,776,902
FTEs	262.5
Esteem count	1.7
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	1
4	4
3	5
2	4
1	0
Total	**14**

RESEARCH OUTPUTS BY TYPE



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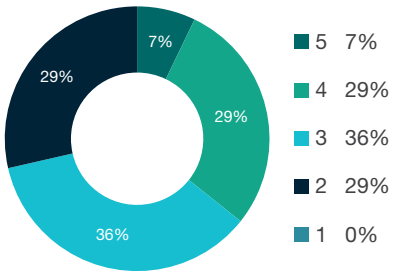
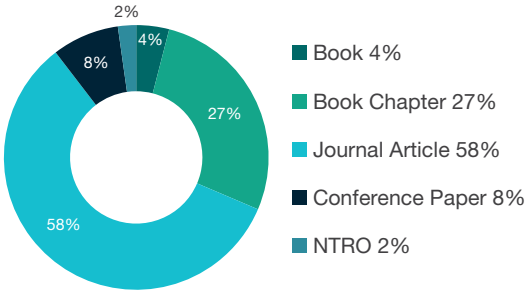


1608 Sociology

Indicator	No.
Research outputs	4,992.6
Research income	$90,502,800
FTEs	476.7
Esteem count	54.6
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	1
4	9
3	14
2	3
1	0
Total	**27**

RESEARCH OUTPUTS BY TYPE



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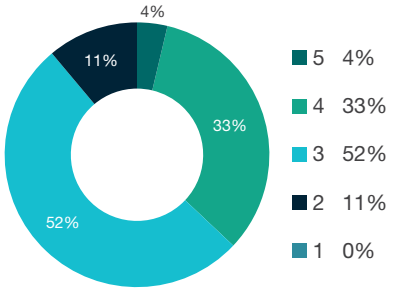
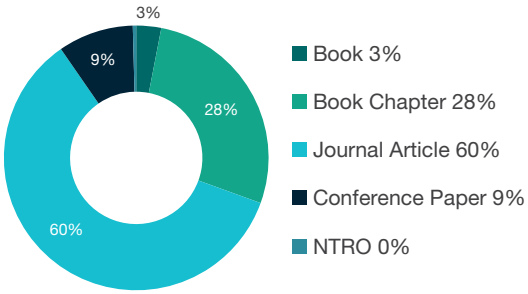


1699 Other Studies in Human Society

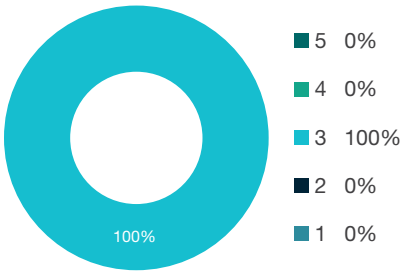
Indicator	No.
Research outputs	1,032.3
Research income	$10,590,617
FTEs	211.1
Esteem count	9.4
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	2
2	0
1	0
Total	**2**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION



17 PSYCHOLOGY AND COGNITIVE SCIENCES

Psychology and Cognitive Sciences is comprised of the following four–digit codes:

1701 Psychology

1702 Cognitive Sciences

1799 Other Psychology and Cognitive Sciences

13 out of 33 two–digit UoEs and 22 out of 33 four–digit UoEs assessed were rated above world standard

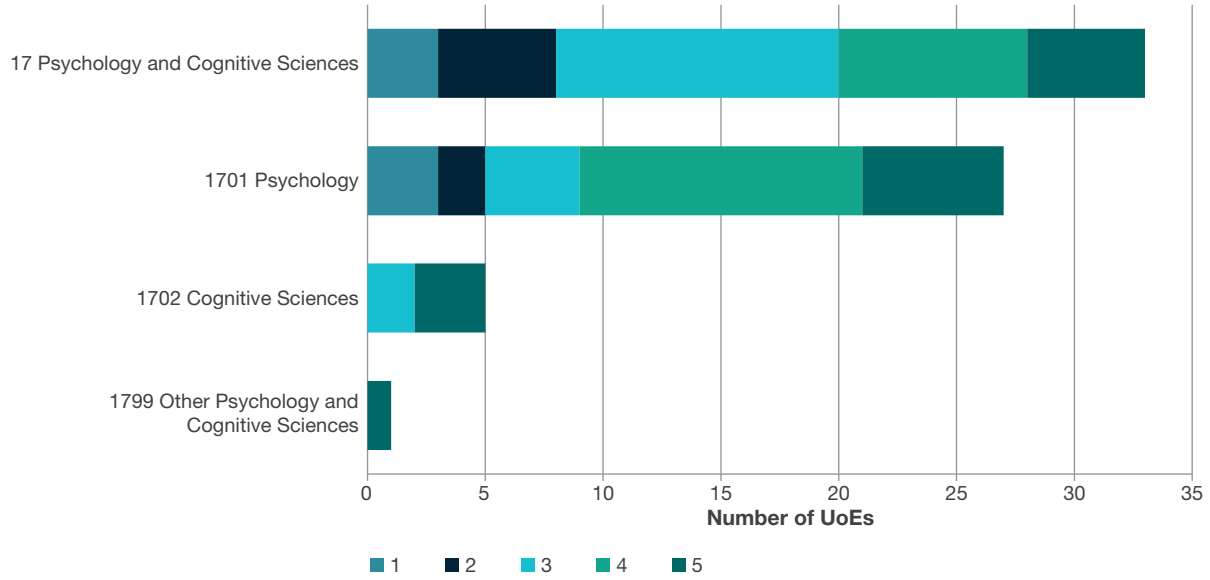
FoR Overview

Psychology and Cognitive Sciences (17) contributed approximately three per cent of the research outputs to ERA 2015. Journal articles were the main research output (83 per cent). Psychology (1701) was the largest sub–discipline in terms of research outputs, research income, staffing profile and research commercialisation income.

Indicator	No.
Research outputs	14,377.1
Research income	$265,456,454
FTEs	1,421.5
Esteem count	203.7
Patents	–
Research commercialisation income	$3,236,394

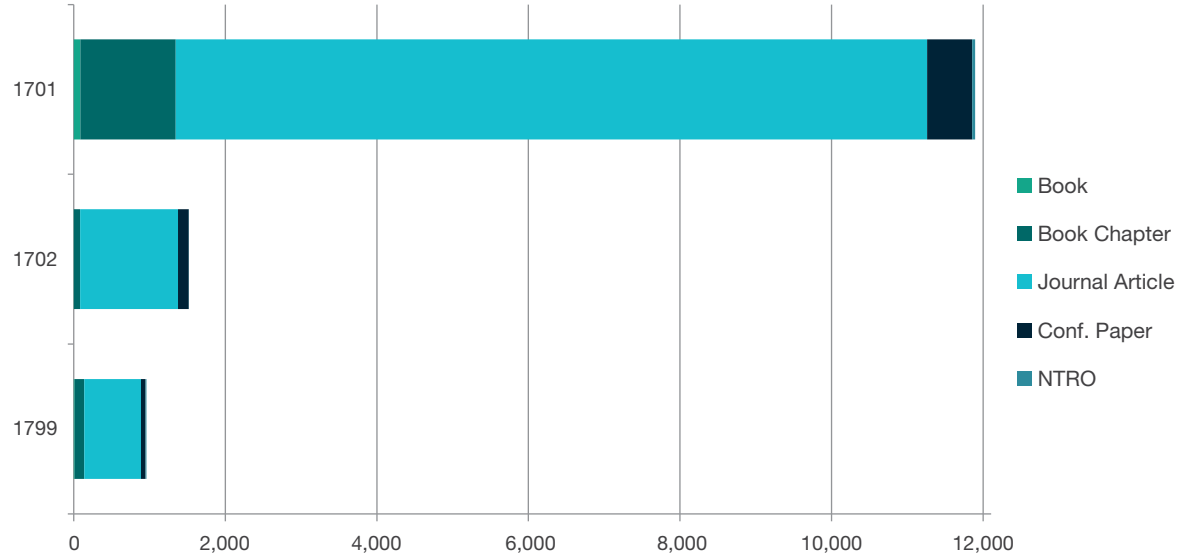
Rating	Distribution	
	Two–digit	Four–digit
5	5	10
4	8	12
3	12	6
2	5	2
1	3	3
Total	**33**	**33**

NUMBER OF UOES PER RATING SCALE SCORE



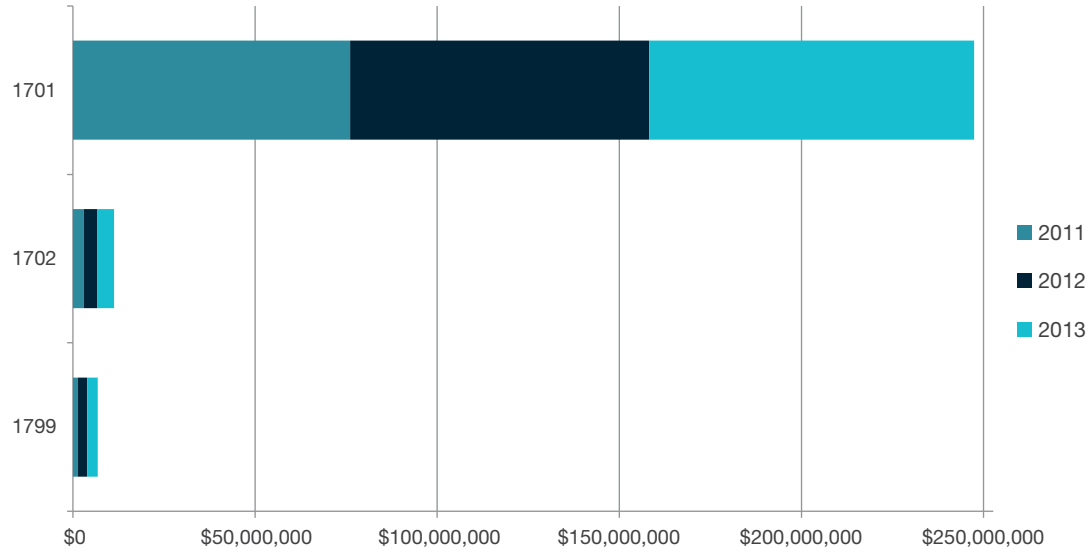
Note: 17 Psychology and Cognitive Sciences shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



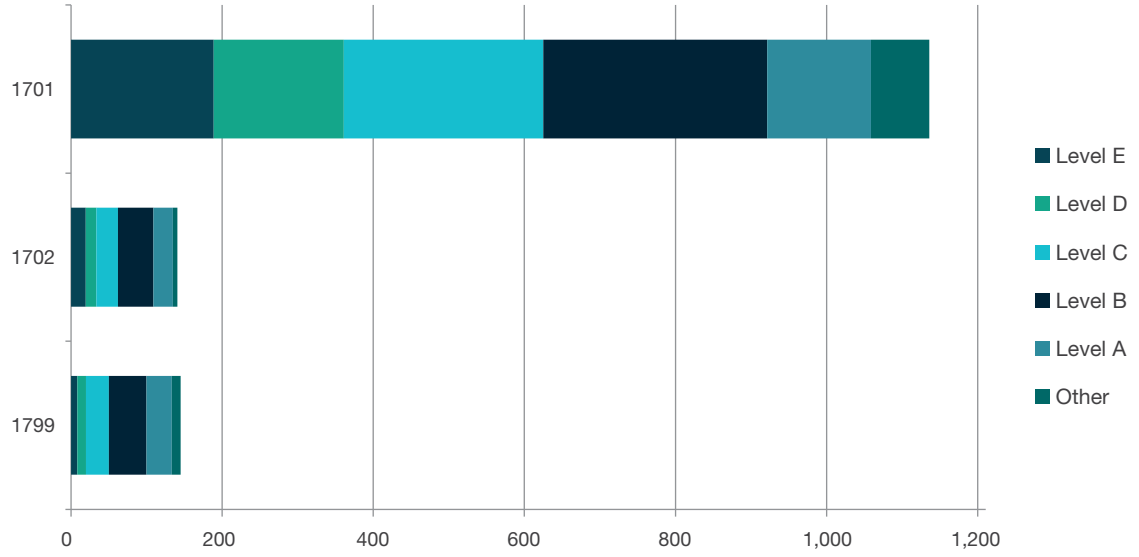
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
1701 Psychology	87.7	1,258.4	9,917.1	594.0	39.6	11,896.6
1702 Cognitive Sciences	4.0	79.3	1,292.5	142.3	2.0	1,520.0
1799 Other Psychology and Cognitive Sciences	12.6	126.8	747.6	60.2	13.3	960.5
Total	**104.3**	**1,464.5**	**11,957.1**	**796.4**	**54.9**	**14,377.1**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



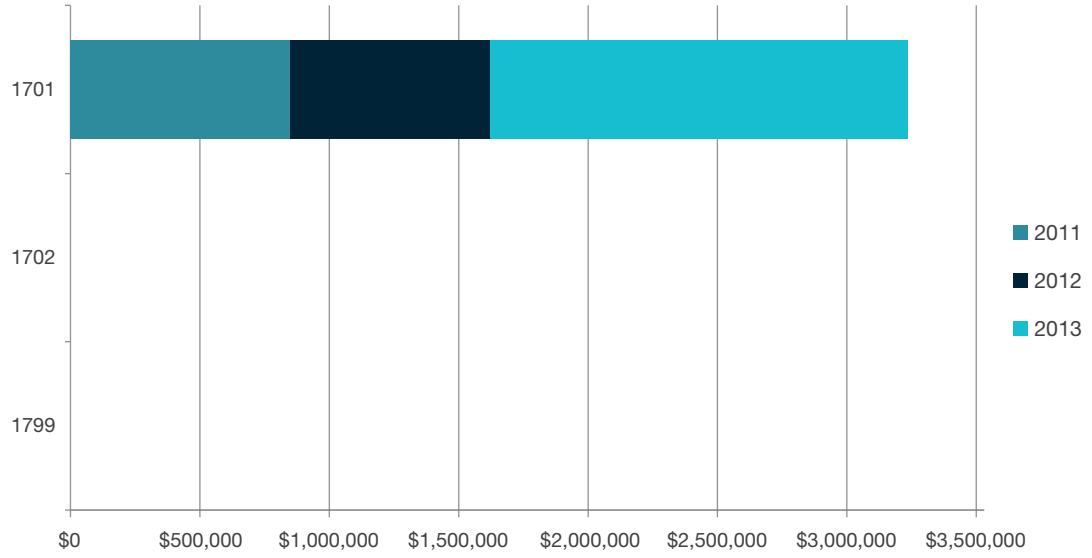
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1701 Psychology	76,072,059	82,141,854	89,178,787	247,392,700
1702 Cognitive Sciences	3,003,073	3,593,827	4,674,320	11,271,220
1799 Other Psychology and Cognitive Sciences	1,326,717	2,586,516	2,879,300	6,792,533
Total	**80,401,849**	**88,322,198**	**96,732,407**	**265,456,454**

STAFFING PROFILE BY ACADEMIC LEVEL



FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
1701 Psychology	188.7	172.2	264.1	296.5	137.2	77.2	1,135.9
1702 Cognitive Sciences	19.5	13.9	28.8	46.7	25.9	5.9	140.6
1799 Other Psychology and Cognitive Sciences	8.1	11.5	30.2	50.0	33.3	11.8	145.0
Total	**216.3**	**197.6**	**323.1**	**393.2**	**196.4**	**94.9**	**1,421.5**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



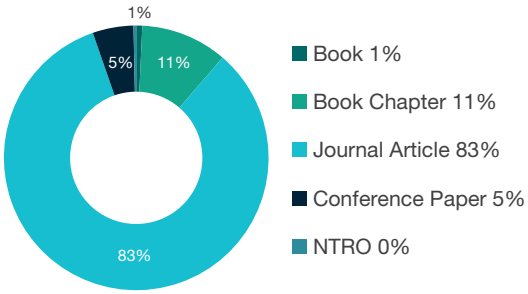
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1701 Psychology	849,757	772,511	1,614,125	3,236,394
1702 Cognitive Sciences	0	0	0	0
1799 Other Psychology and Cognitive Sciences	0	0	0	0
Total	**849,757**	**772,511**	**1,614,125**	**3,236,394**

1701 Psychology

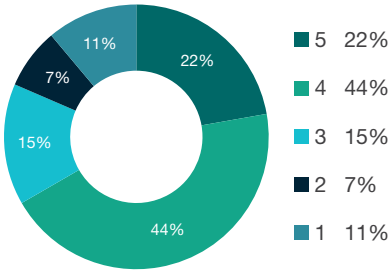
Indicator	No.
Research outputs	11,896.6
Research income	$247,392,700
FTEs	1,135.9
Esteem count	195.5
Patents	–
Research commercialisation income	$3,236,394

Rating	Distribution
5	6
4	12
3	4
2	2
1	3
Total	**27**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

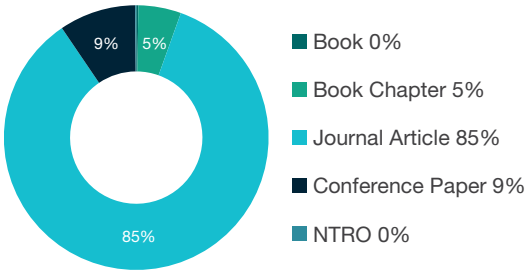


1702 Cognitive Sciences

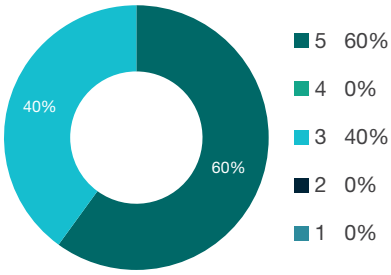
Indicator	No.
Research outputs	1,520.0
Research income	$11,271,220
FTEs	140.6
Esteem count	7.9
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	3
4	0
3	2
2	0
1	0
Total	**5**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

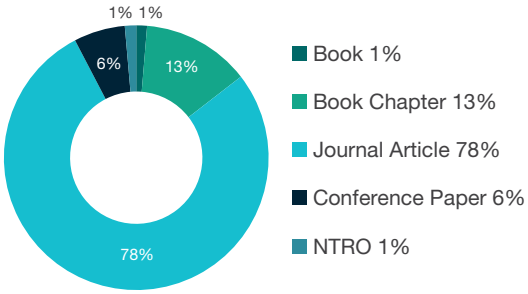


1799 Other Psychology and Cognitive Sciences

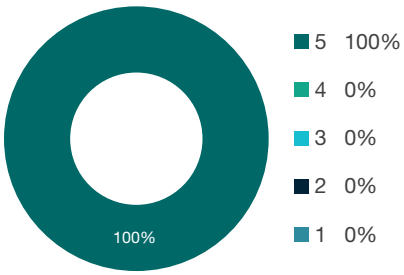
Indicator	No.
Research outputs	960.5
Research income	$6,792,533
FTEs	145.0
Esteem count	0.3
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	1
4	0
3	0
2	0
1	0
Total	**1**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION



18 LAW AND LEGAL STUDIES

Law and Legal Studies is comprised of the following four–digit codes:

1801 Law

1802 Maori Law

1899 Other Law and Legal Studies

13 out of 30 two–digit UoEs and 14 out of 30 four–digit UoEs assessed were rated above world standard

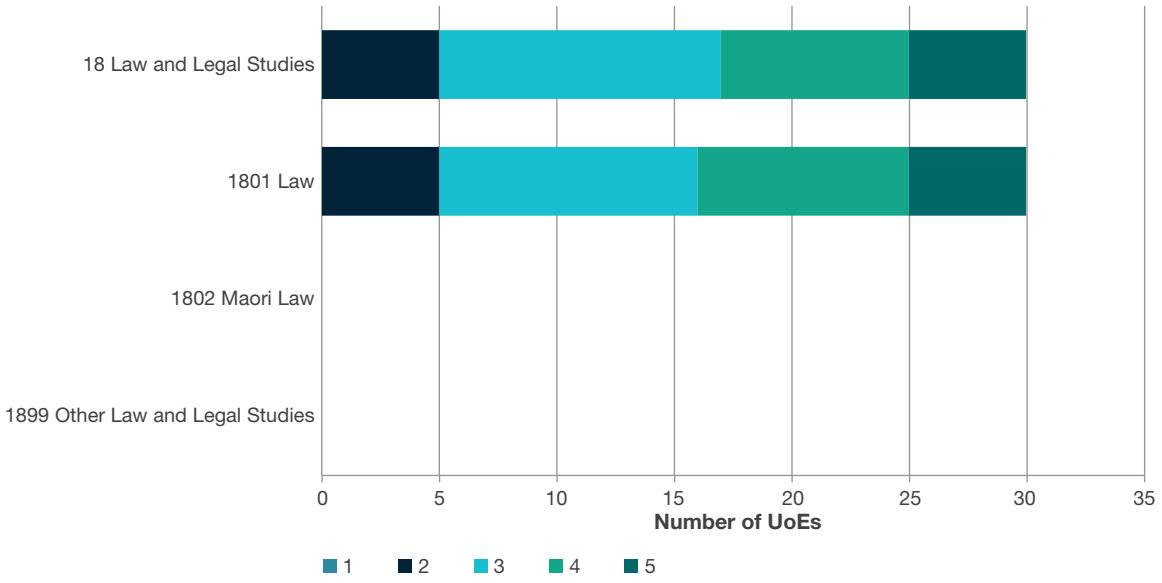
FoR Overview

Law and Legal Studies (18) contributed approximately two per cent of the research outputs to ERA 2015. Journal articles were the main research output type (64 per cent) followed by book chapters (29 per cent). Law (1801) accounted for the majority of all research outputs, research income and staff FTE in the discipline.

Indicator	No.
Research outputs	10,252.5
Research income	$75,699,347
FTEs	1,339.2
Esteem count	65.4
Patents	–
Research commercialisation income	–

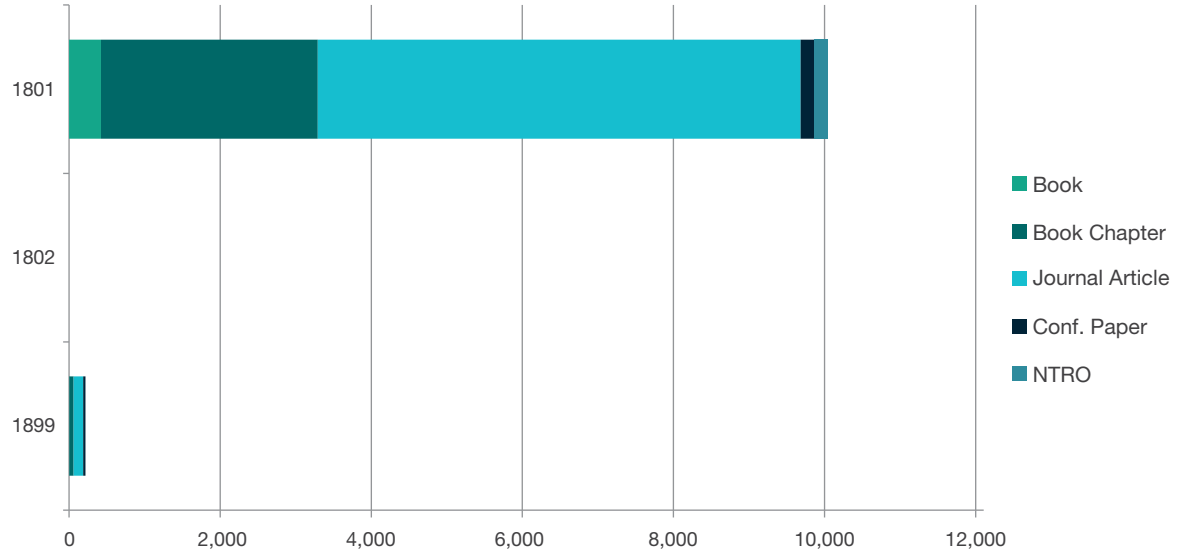
Rating	Distribution	
	Two–digit	Four–digit
5	5	5
4	8	9
3	12	11
2	5	5
1	0	0
Total	**30**	**30**

NUMBER OF UOES PER RATING SCALE SCORE



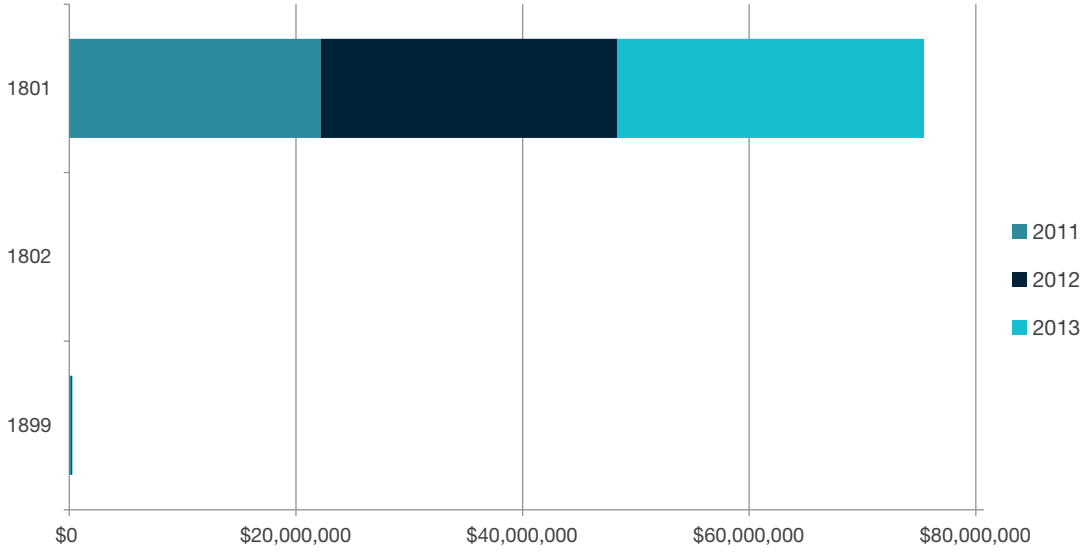
Note: 18 Law and Legal Studies shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



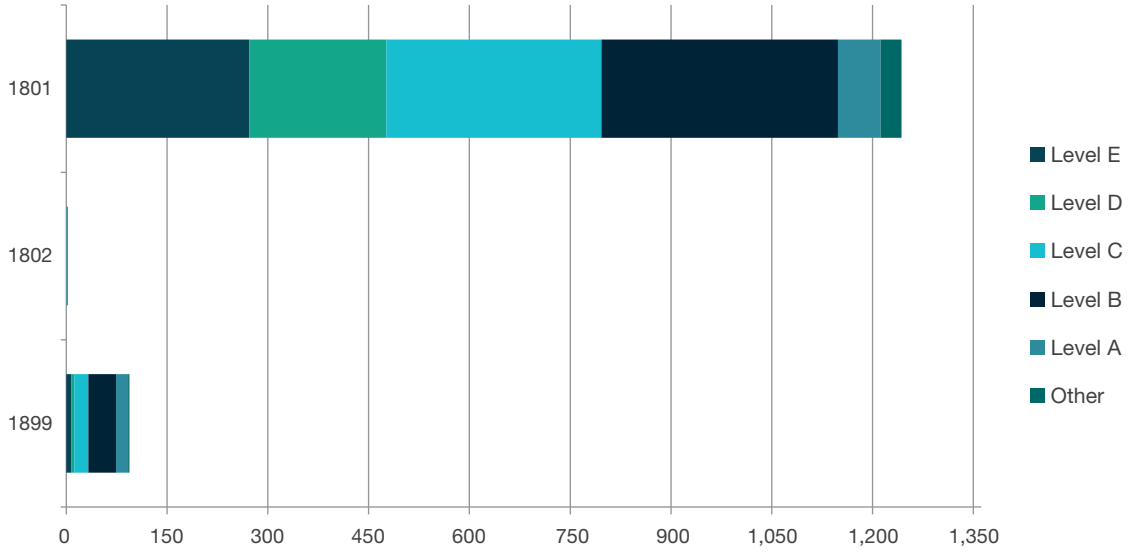
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
1801 Law	423.6	2,867.0	6,393.4	176.0	175.0	10,035.1
1802 Maori Law	0.0	0.0	0.0	0.0	0.0	0.0
1899 Other Law and Legal Studies	2.0	58.7	126.2	30.5	0.0	217.4
Total	**425.6**	**2,925.7**	**6,519.7**	**206.5**	**175.0**	**10,252.5**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1801 Law	22,176,731	26,202,097	27,054,020	75,432,849
1802 Maori Law	0	0	0	0
1899 Other Law and Legal Studies	161,549	74,141	30,808	266,498
Total	**22,338,280**	**26,276,239**	**27,084,829**	**75,699,347**

STAFFING PROFILE BY ACADEMIC LEVEL



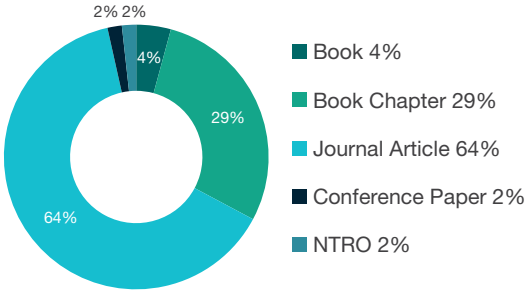
FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
1801 Law	272.1	204.1	320.5	352.1	63.4	31.1	1,243.2
1802 Maori Law	0.0	0.0	0.2	0.0	1.0	1.0	2.2
1899 Other Law and Legal Studies	7.7	4.0	21.0	41.1	18.3	1.7	93.8
Total	**279.8**	**208.1**	**341.6**	**393.2**	**82.6**	**33.8**	**1,339.2**

1801 Law

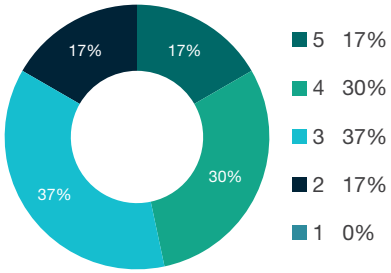
Indicator	No.
Research outputs	10,035.1
Research income	$75,432,849
FTEs	1,243.2
Esteem count	65.4
Patents	–
Research commercialisation income	–

Rating	Distribution
5	5
4	9
3	11
2	5
1	0
Total	**30**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION



1802 Maori Law

Indicator	No.
Research outputs	0.0
Research income	$0
FTEs	2.2
Esteem count	0.0
Patents	–
Research commercialisation income	–

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE

There are no research outputs coded to 1802.

FOR RATING DISTRIBUTION

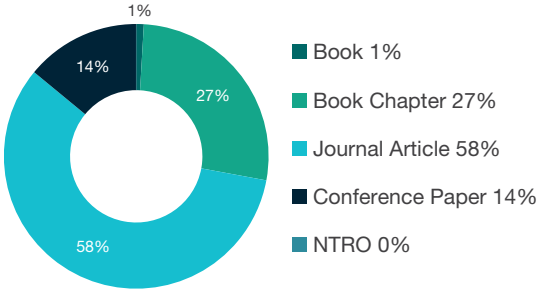
Note: There is no FoR rating distribution for 1802.

1899 Other Law and Legal Studies

Indicator	No.
Research outputs	217.4
Research income	$266,498
FTEs	93.8
Esteem count	0.0
Patents	–
Research commercialisation income	–

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 1899.

19 STUDIES IN CREATIVE ARTS AND WRITING

Studies in Creative Arts and Writing is comprised of the following four–digit codes:

1901 Art Theory and Criticism

1902 Film, Television and Digital Media

1903 Journalism and Professional Writing

1904 Performing Arts and Creative Writing

1905 Visual Arts and Crafts

1999 Other Studies in Creative Arts and Writing

7 out of 36 two–digit UoEs and 20 out of 70 four–digit UoEs assessed were rated above world standard

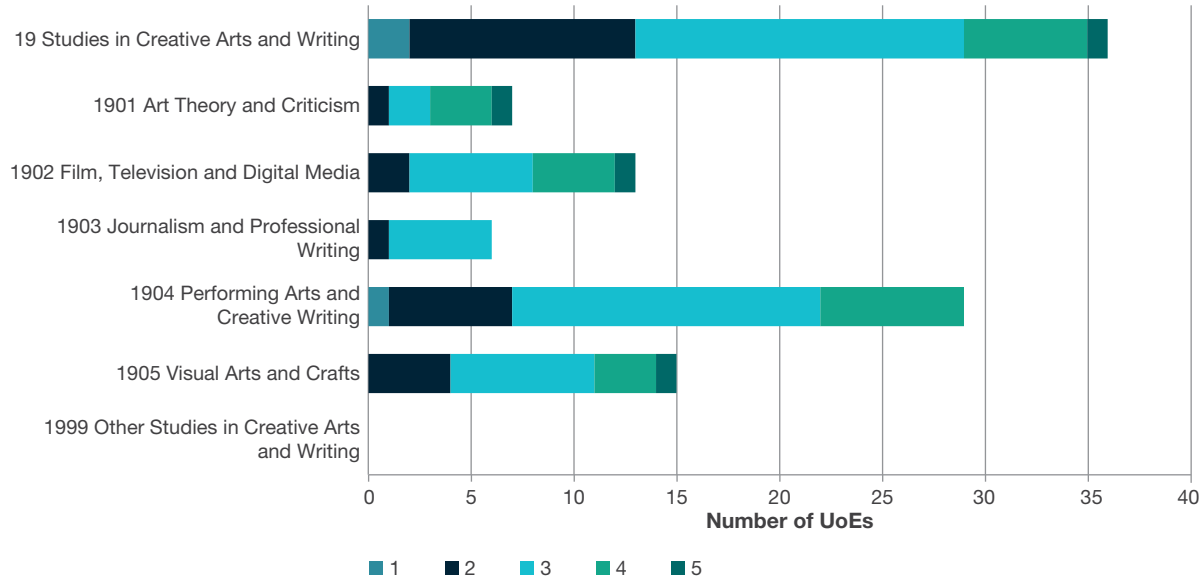
FoR Overview

Studies in Creative Arts and Writing (19) contributed approximately three per cent of the research outputs to ERA 2015. Non–traditional research outputs were the main research output type (52 per cent), followed by journal articles (23 per cent). Performing Arts and Creative Writing (1904) was the largest sub–discipline in terms of research outputs, research income and staff FTE. Film, Television and Digital Media (1902) had the largest amount of research commercialisation income.

Indicator	No.
Research outputs	12,939.7
Research income	$38,443,728
FTEs	1,557.1
Esteem count	162.7
Patents	0
Research commercialisation income	$255,837

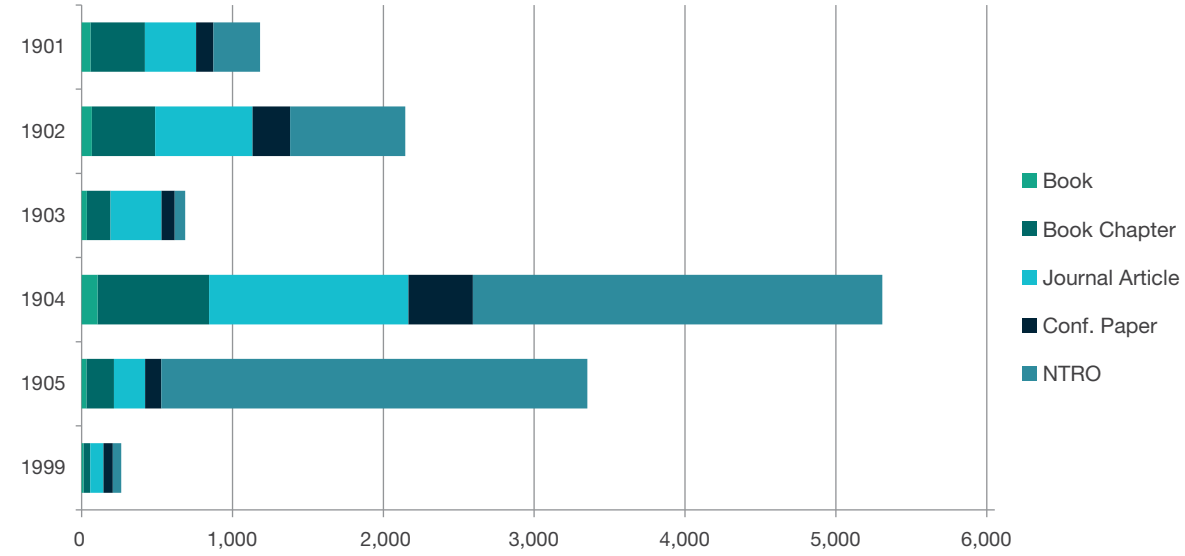
Rating	Distribution	
	Two–digit	Four–digit
5	1	3
4	6	17
3	16	35
2	11	14
1	2	1
Total	**36**	**70**

NUMBER OF UOES PER RATING SCALE SCORE



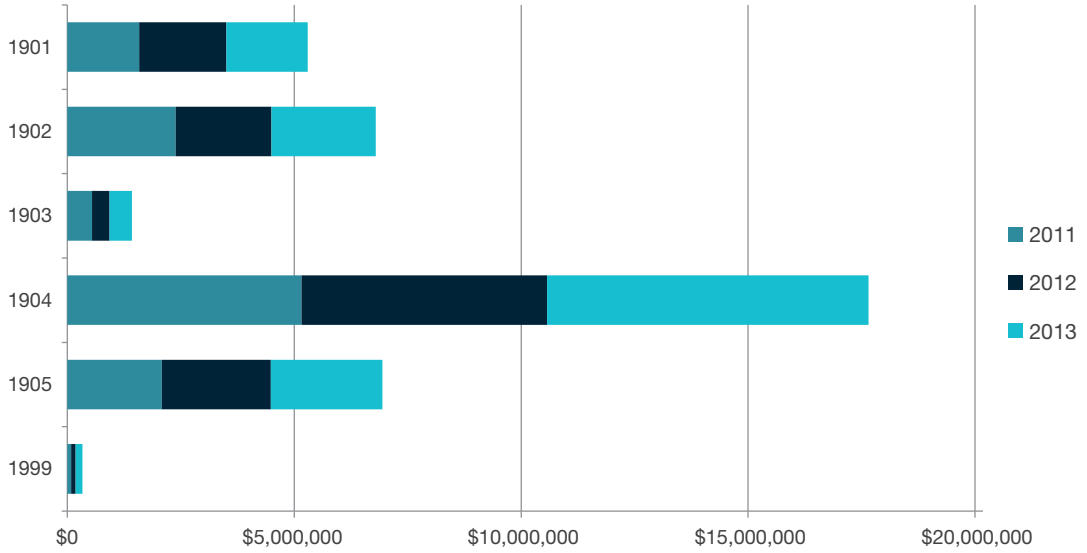
Note: 19 Studies in Creative Arts and Writing shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



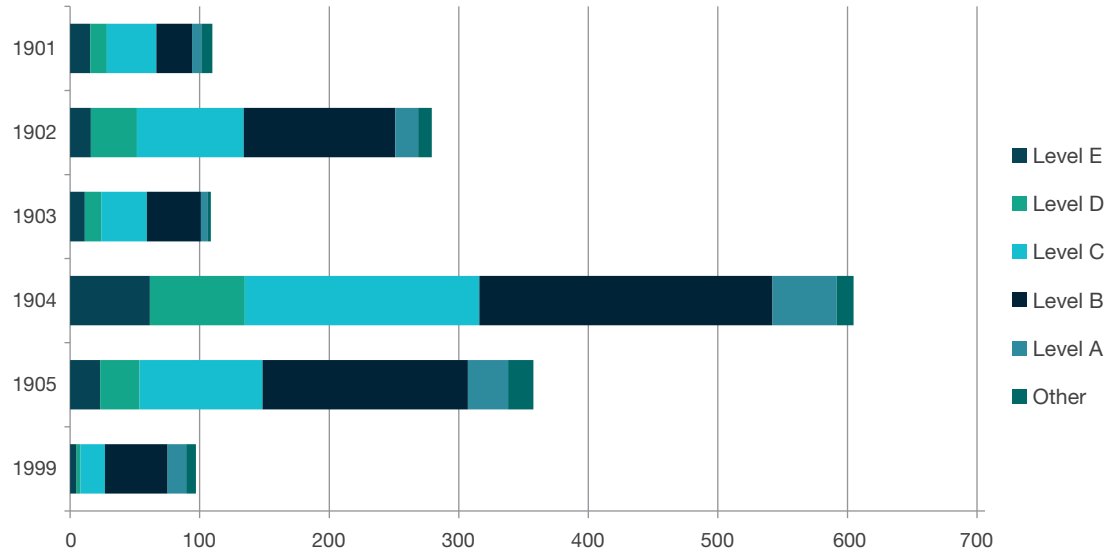
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
1901 Art Theory and Criticism	58.7	361.0	339.7	114.6	309.4	1,183.5
1902 Film, Television and Digital Media	68.1	418.7	646.7	248.2	764.1	2,145.7
1903 Journalism and Professional Writing	34.4	156.6	338.2	87.6	70.0	686.8
1904 Performing Arts and Creative Writing	105.1	739.7	1,321.8	427.7	2,714.4	5,308.6
1905 Visual Arts and Crafts	31.6	182.8	206.6	106.9	2,824.8	3,352.7
1999 Other Studies in Creative Arts and Writing	11.5	45.5	87.3	63.0	55.2	262.5
Total	**309.4**	**1,904.3**	**2,940.2**	**1,048.0**	**6,737.8**	**12,939.7**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1901 Art Theory and Criticism	1,580,781	1,923,358	1,791,377	5,295,516
1902 Film, Television and Digital Media	2,384,489	2,113,564	2,296,919	6,794,972
1903 Journalism and Professional Writing	544,928	384,007	492,179	1,421,114
1904 Performing Arts and Creative Writing	5,158,776	5,412,394	7,084,733	17,655,903
1905 Visual Arts and Crafts	2,081,786	2,400,022	2,461,266	6,943,075
1999 Other Studies in Creative Arts and Writing	81,135	101,782	150,231	333,149
Total	**11,831,895**	**12,335,127**	**14,276,706**	**38,443,728**

STAFFING PROFILE BY ACADEMIC LEVEL

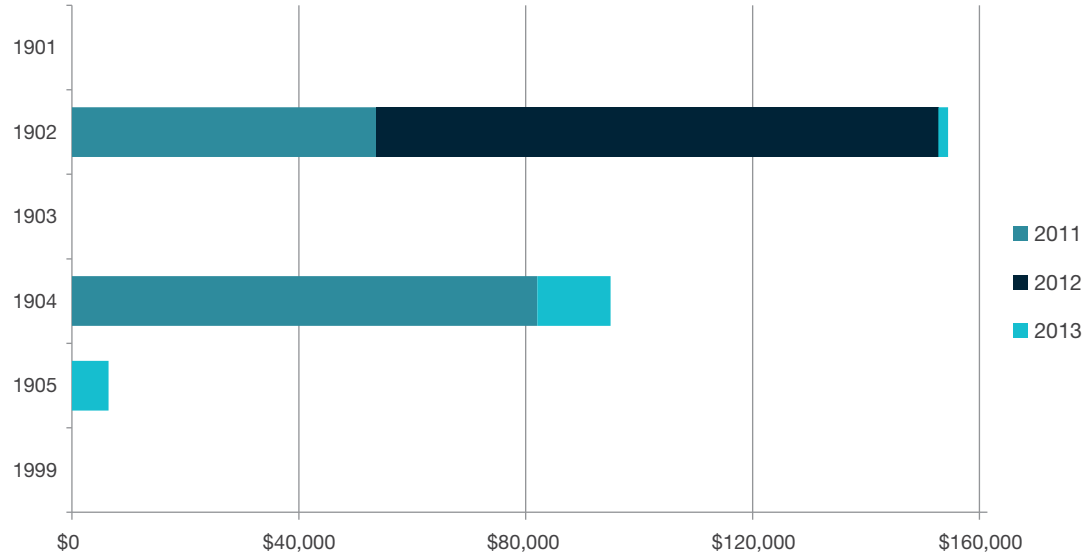


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
1901 Art Theory and Criticism	15.5	12.9	38.1	27.6	7.1	8.6	109.9
1902 Film, Television and Digital Media	16.0	35.4	82.5	116.9	17.7	10.5	279.2
1903 Journalism and Professional Writing	11.2	12.8	35.2	41.6	5.1	2.7	108.6
1904 Performing Arts and Creative Writing	61.6	73.3	181.0	226.3	49.7	13.0	604.8
1905 Visual Arts and Crafts	23.2	30.4	94.9	158.5	31.1	19.4	357.5
1999 Other Studies in Creative Arts and Writing	5.0	2.9	18.9	48.4	14.4	7.5	97.1
Total	**132.6**	**167.6**	**450.7**	**619.3**	**125.1**	**61.8**	**1,557.1**

PATENT PROFILE

Note: There were no patents submitted by UoEs in this FoR.

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



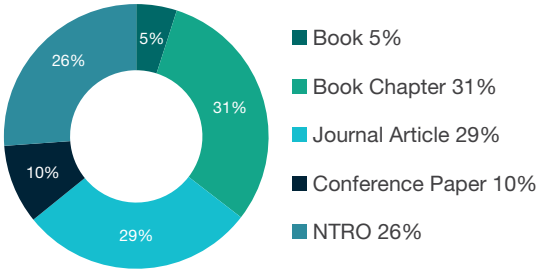
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
1901 Art Theory and Criticism	0	0	0	0
1902 Film, Television and Digital Media	53,628	99,117	1,713	154,457
1903 Journalism and Professional Writing	0	0	0	0
1904 Performing Arts and Creative Writing	82,045	0	12,908	94,953
1905 Visual Arts and Crafts	0	0	6,427	6,427
1999 Other Studies in Creative Arts and Writing	0	0	0	0
Total	**135,672**	**99,117**	**21,048**	**255,837**

1901 Art Theory and Criticism

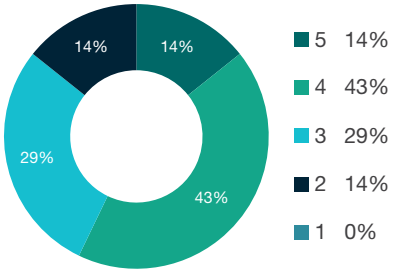
Indicator	No.
Research outputs	1,183.5
Research income	$5,295,516
FTEs	109.9
Esteem count	16.2
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	1
4	3
3	2
2	1
1	0
Total	**7**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

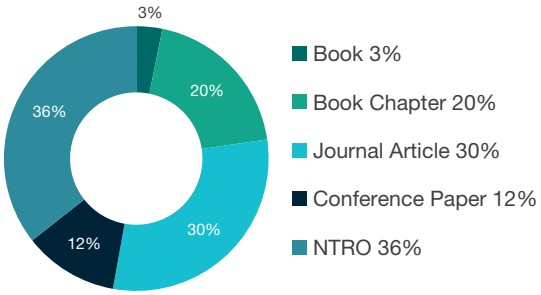


1902 Film, Television and Digital Media

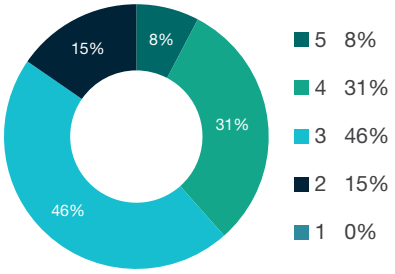
Indicator	No.
Research outputs	2,145.7
Research income	$6,794,972
FTEs	279.2
Esteem count	25.8
Patents	0.0
Research commercialisation income	$154,457

Rating	Distribution
5	1
4	4
3	6
2	2
1	0
Total	**13**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

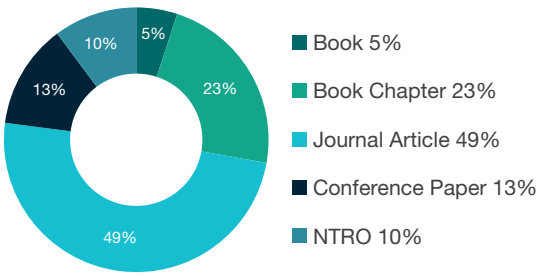


1903 Journalism and Professional Writing

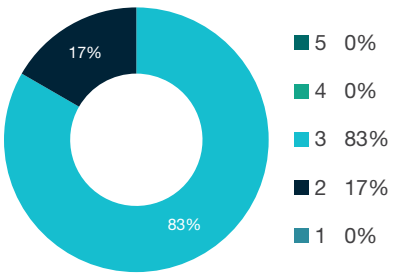
Indicator	No.
Research outputs	686.8
Research income	$1,421,114
FTEs	108.6
Esteem count	2.0
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	5
2	1
1	0
Total	**6**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

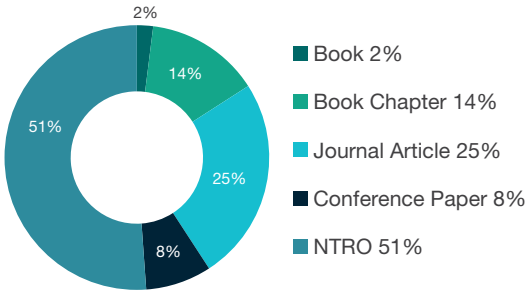


1904 Performing Arts and Creative Writing

Indicator	No.
Research outputs	5,308.6
Research income	$17,655,903
FTEs	604.8
Esteem count	65.7
Patents	0.0
Research commercialisation income	$94,953

Rating	Distribution
5	0
4	7
3	15
2	6
1	1
Total	**29**

RESEARCH OUTPUTS BY TYPE



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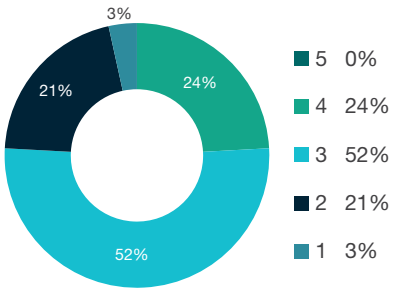
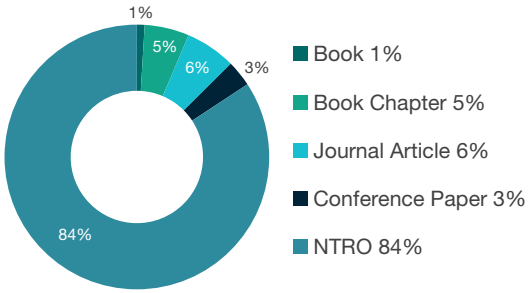


1905 Visual Arts and Crafts

Indicator	No.
Research outputs	3,352.7
Research income	$6,943,075
FTEs	357.5
Esteem count	52.0
Patents	0.0
Research commercialisation income	$6,427

Rating	Distribution
5	1
4	3
3	7
2	4
1	0
Total	**15**

RESEARCH OUTPUTS BY TYPE



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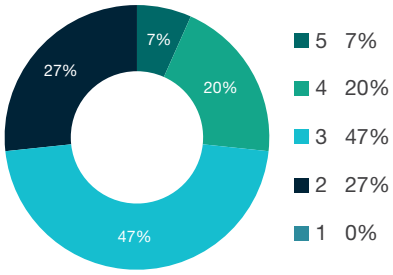
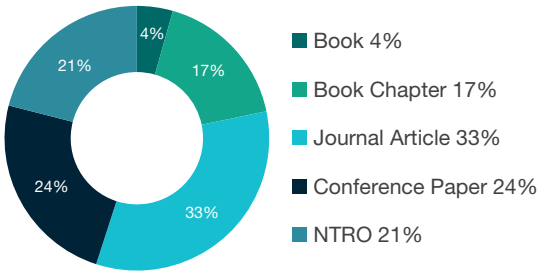


1999 Other Studies in Creative Arts and Writing

Indicator	No.
Research outputs	262.5
Research income	$333,149
FTEs	97.1
Esteem count	1.0
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 1999.

20 LANGUAGE, COMMUNICATION AND CULTURE

Language, Communication and Culture is comprised of the following four–digit codes:

2001 Communication and Media Studies

2002 Cultural Studies

2003 Language Studies

2004 Linguistics

2005 Literary Studies

2099 Other Language, Communication and Culture

15 out of 33 two–digit UoEs and 43 out of 77 four–digit UoEs assessed were rated above world standard

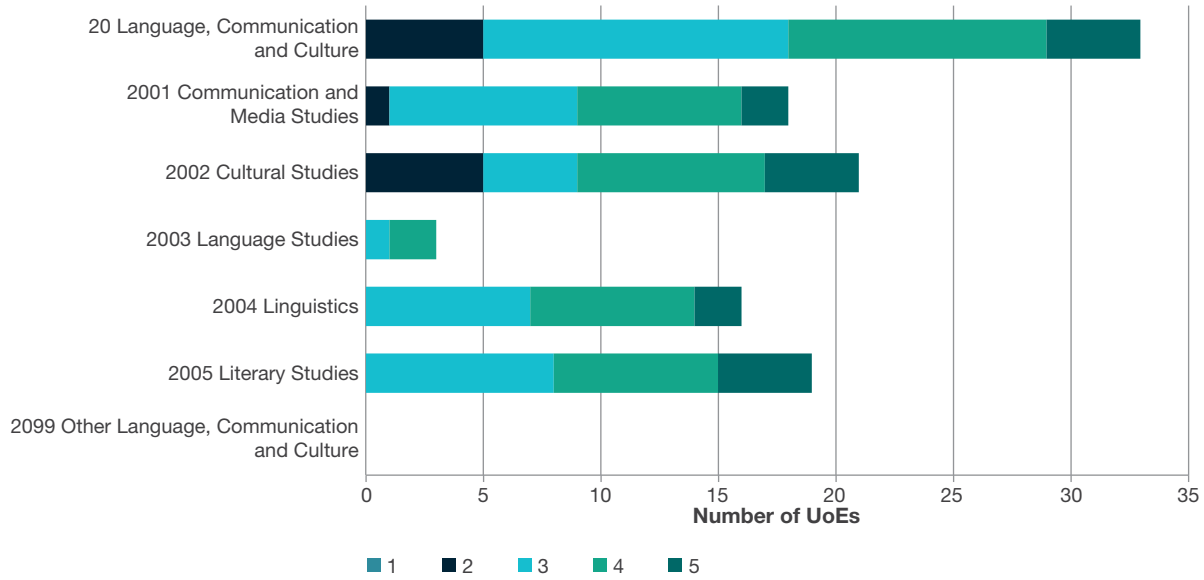
FoR Overview

Language, Communication and Culture (20) contributed approximately three per cent of the research outputs to ERA 2015. While journal articles were the most common research output type (48 per cent), a significant proportion were book chapters (36 per cent). Cultural Studies (2002) and Literary Studies (2005) were the two largest disciplines in terms of research outputs and staff FTE. Linguistics (2004) had the largest amount of research income, whereas Communication and Media Studies (2001) had the largest amount of research commercialisation income.

Indicator	No.
Research outputs	13,409.7
Research income	$96,737,219
FTEs	1,574.9
Esteem count	224.0
Patents	–
Research commercialisation income	$12,963

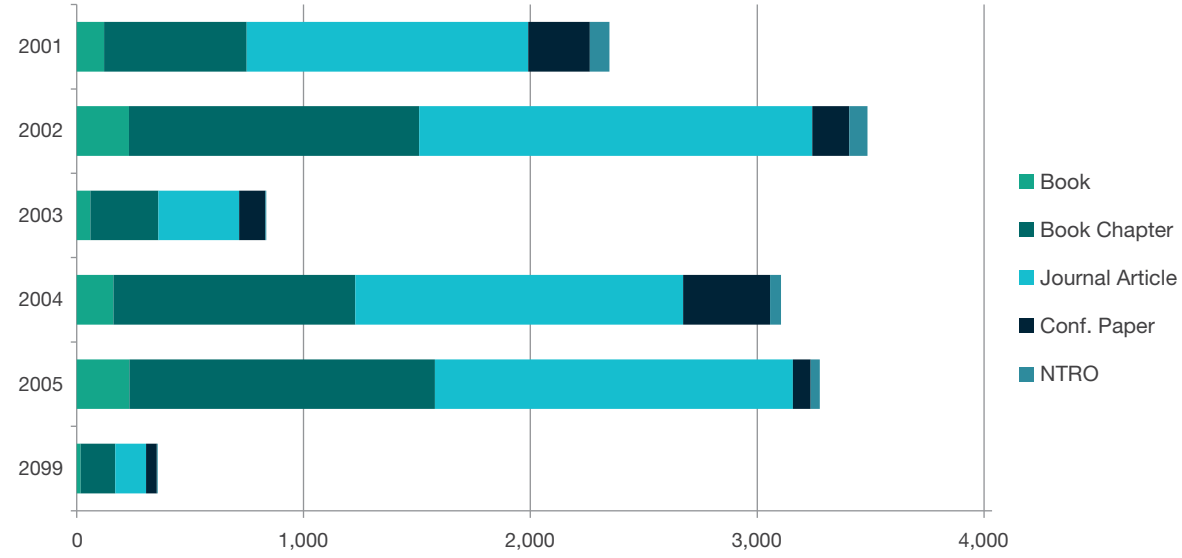
Rating	Distribution	
	Two–digit	Four–digit
5	4	12
4	11	31
3	13	28
2	5	6
1	0	0
Total	**33**	**77**

NUMBER OF UOES PER RATING SCALE SCORE



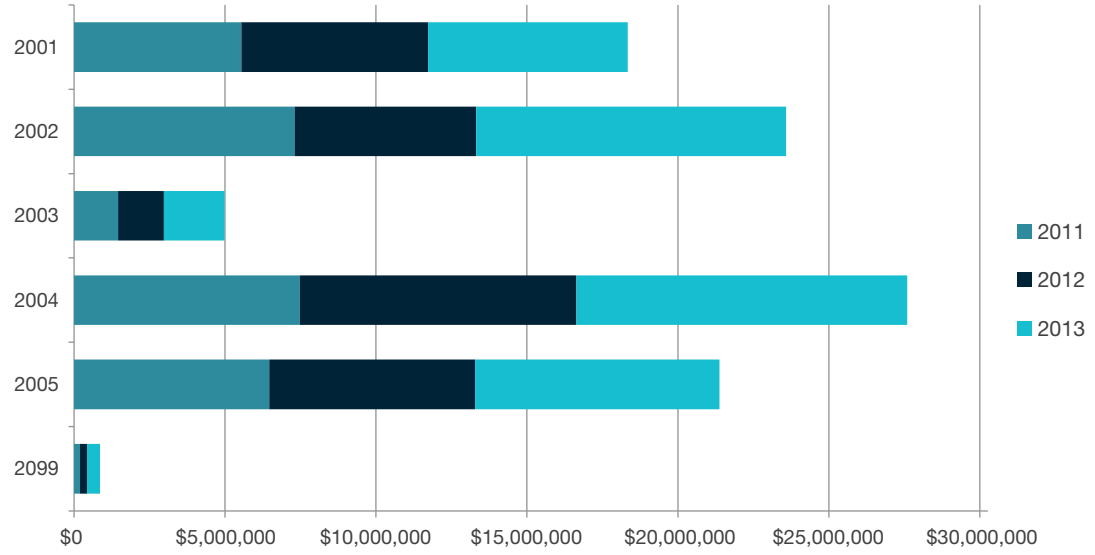
Note: 20 Language, Communication and Culture shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



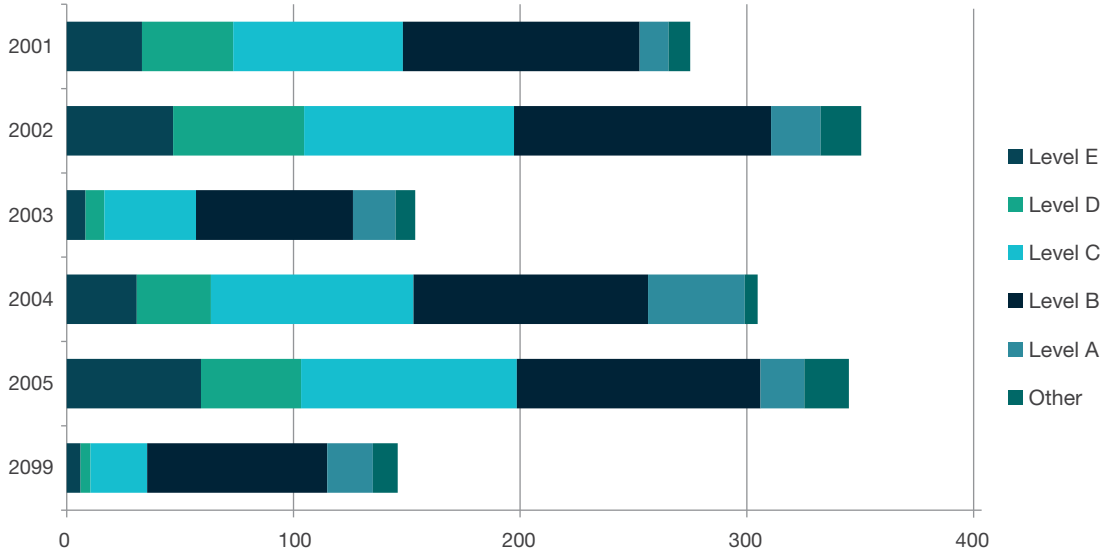
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
2001 Communication and Media Studies	120.3	629.5	1,240.5	271.9	87.0	2,349.1
2002 Cultural Studies	230.5	1,279.1	1,733.5	162.7	80.8	3,486.7
2003 Language Studies	60.8	299.4	355.7	114.9	5.5	836.2
2004 Linguistics	162.3	1,065.9	1,445.2	383.5	47.8	3,104.7
2005 Literary Studies	232.3	1,347.3	1,578.3	77.8	40.3	3,275.9
2099 Other Language, Communication and Culture	16.8	153.6	135.9	47.0	3.8	357.0
Total	**822.9**	**4,774.8**	**6,489.1**	**1,057.7**	**265.2**	**13,409.7**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



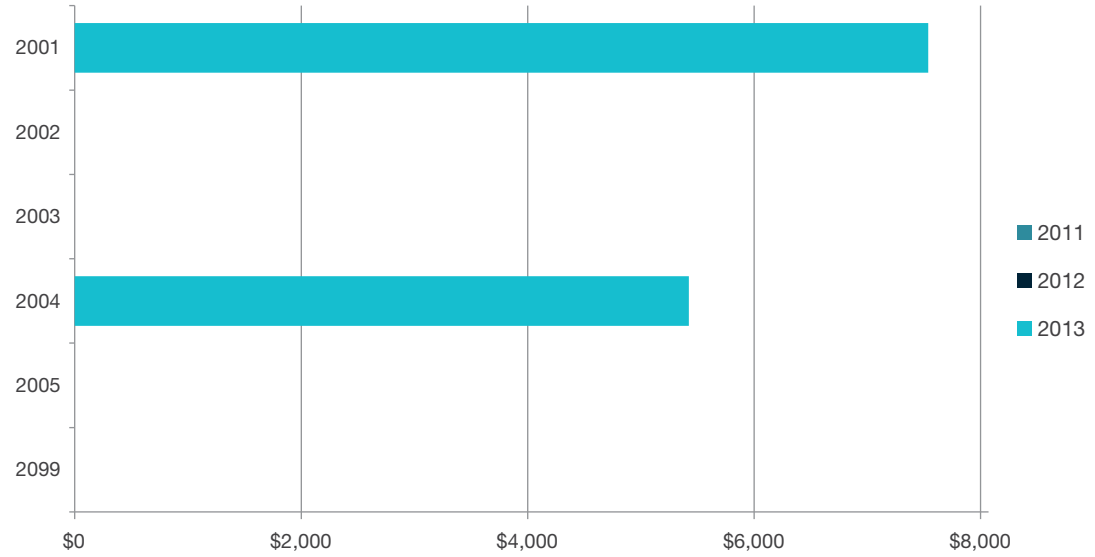
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
2001 Communication and Media Studies	5,539,117	6,184,345	6,613,315	18,336,776
2002 Cultural Studies	7,305,859	6,012,426	10,268,798	23,587,083
2003 Language Studies	1,457,381	1,519,725	2,003,742	4,980,847
2004 Linguistics	7,481,569	9,157,277	10,958,845	27,597,691
2005 Literary Studies	6,461,314	6,819,737	8,096,725	21,377,776
2099 Other Language, Communication and Culture	193,308	231,886	431,853	857,046
Total	**28,438,547**	**29,925,395**	**38,373,277**	**96,737,219**

STAFFING PROFILE BY ACADEMIC LEVEL



FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
2001 Communication and Media Studies	33.2	40.3	74.8	104.4	12.7	9.6	275.0
2002 Cultural Studies	46.9	57.7	92.7	113.4	21.8	17.9	350.4
2003 Language Studies	8.2	8.4	40.4	69.2	18.8	8.7	153.7
2004 Linguistics	30.9	32.7	89.4	103.5	42.6	5.7	304.8
2005 Literary Studies	59.2	44.1	95.2	107.5	19.3	19.6	345.0
2099 Other Language, Communication and Culture	6.1	4.4	25.0	79.4	20.1	11.0	146.0
Total	**184.5**	**187.5**	**417.5**	**577.4**	**135.5**	**72.5**	**1,574.9**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



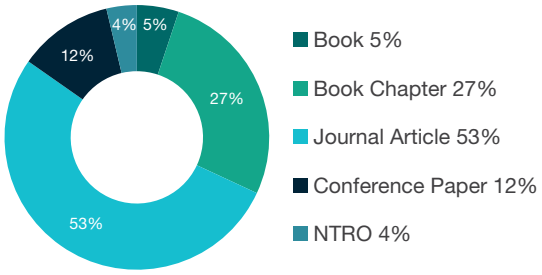
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
2001 Communication and Media Studies	0	0	7,539	7,539
2002 Cultural Studies	0	0	0	0
2003 Language Studies	0	0	0	0
2004 Linguistics	0	0	5,424	5,424
2005 Literary Studies	0	0	0	0
2099 Other Language, Communication and Culture	0	0	0	0
Total	**0**	**0**	**12,963**	**12,963**

2001 Communication and Media Studies

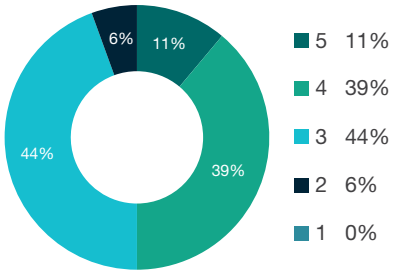
Indicator	No.
Research outputs	2,349.1
Research income	$18,336,776
FTEs	275.0
Esteem count	17.8
Patents	–
Research commercialisation income	$7,539

Rating	Distribution
5	2
4	7
3	8
2	1
1	0
Total	**18**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

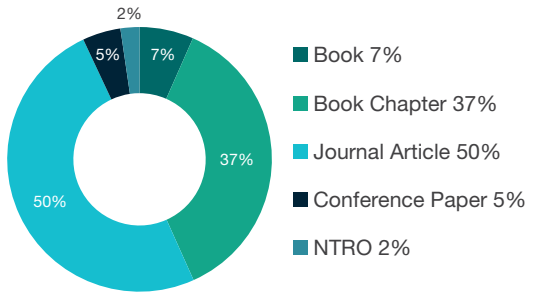


2002 Cultural Studies

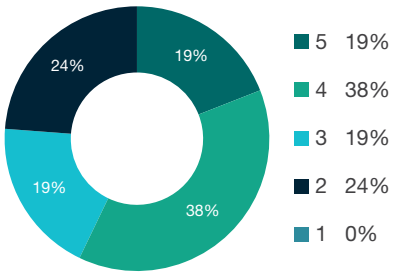
Indicator	No.
Research outputs	3,486.7
Research income	$23,587,083
FTEs	350.4
Esteem count	48.1
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	4
4	8
3	4
2	5
1	0
Total	**21**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

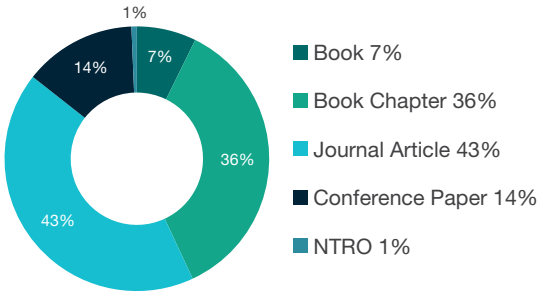


2003 Language Studies

Indicator	No.
Research outputs	836.2
Research income	$4,980,847
FTEs	153.7
Esteem count	15.6
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	2
3	1
2	0
1	0
Total	**3**

RESEARCH OUTPUTS BY TYPE



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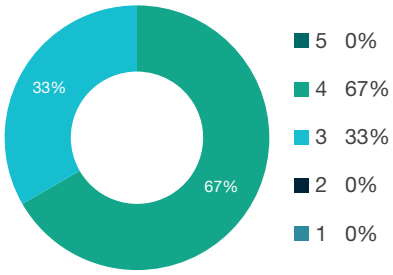
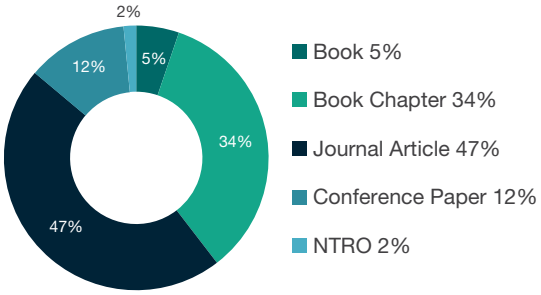


2004 Linguistics

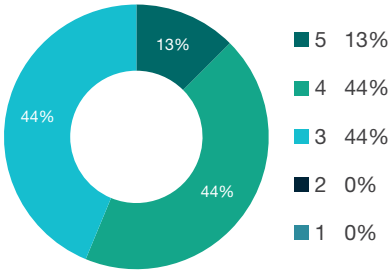
Indicator	No.
Research outputs	3,104.7
Research income	$27,597,691
FTEs	304.8
Esteem count	60.2
Patents	–
Research commercialisation income	$5,424

Rating	Distribution
5	2
4	7
3	7
2	0
1	0
Total	**16**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

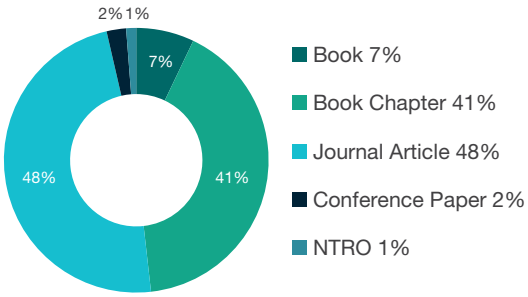


2005 Literary Studies

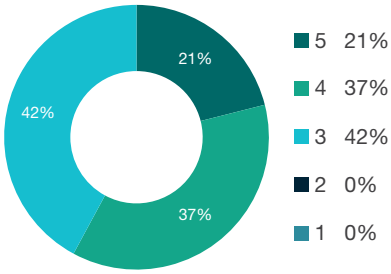
Indicator	No.
Research outputs	3,275.9
Research income	$21,377,776
FTEs	345.0
Esteem count	81.9
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	4
4	7
3	8
2	0
1	0
Total	**19**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

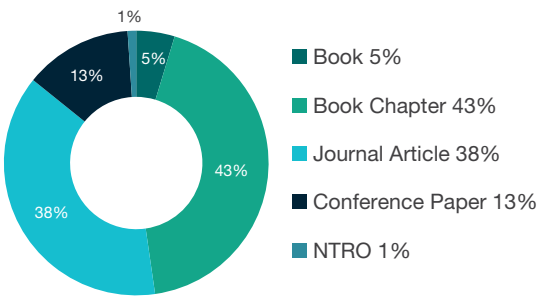


2099 Other Language, Communication and Culture

Indicator	No.
Research outputs	357.0
Research income	$857,046
FTEs	146.0
Esteem count	0.3
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 2099.

21 HISTORY AND ARCHAEOLOGY

History and Archaeology is comprised of the following four–digit codes:

2101 Archaeology

2102 Curatorial and Related Studies

2103 Historical Studies

2199 Other History and Archaeology

17 out of 28 two–digit UoEs and 26 out of 44 four–digit UoEs assessed were rated above world standard

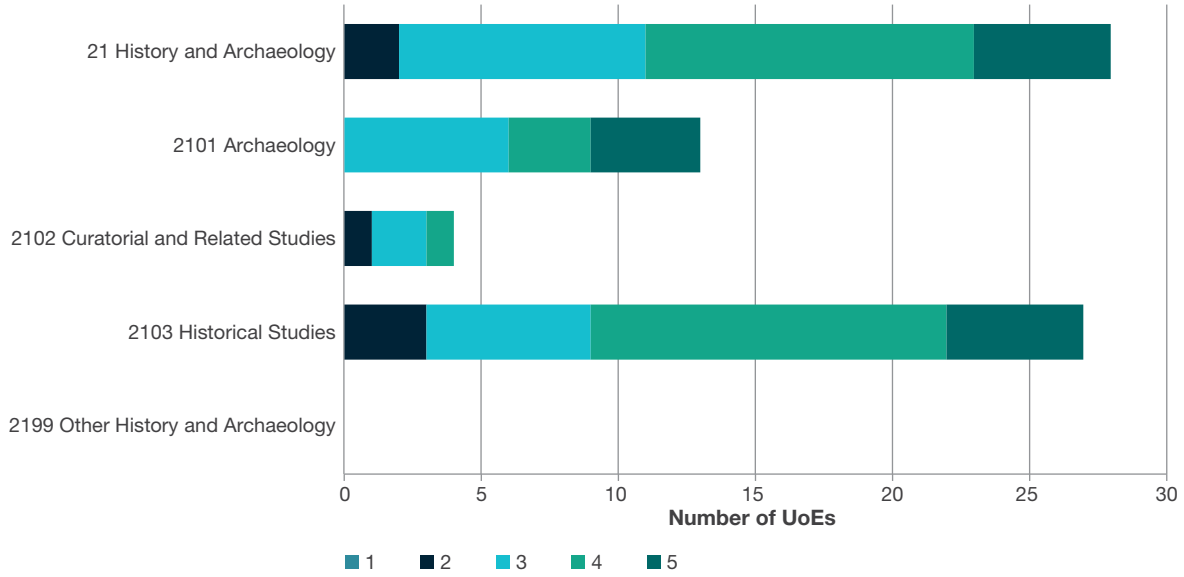
FoR Overview

History and Archaeology (21) contributed approximately two per cent of the research outputs to ERA 2015. It also contributed approximately six per cent of the esteem measures submitted to ERA 2015. While journal articles were the most common research output type (49 per cent), book chapters also comprised a significant proportion (38 per cent). Historical Studies (2103) was the largest sub–discipline in terms of research outputs, research income and staffing. Archaeology (2101) had the largest amount of research commercialisation income.

Indicator	No.
Research outputs	7,934.1
Research income	$116,037,147
FTEs	773.6
Esteem count	303.6
Patents	0
Research commercialisation income	$24,871

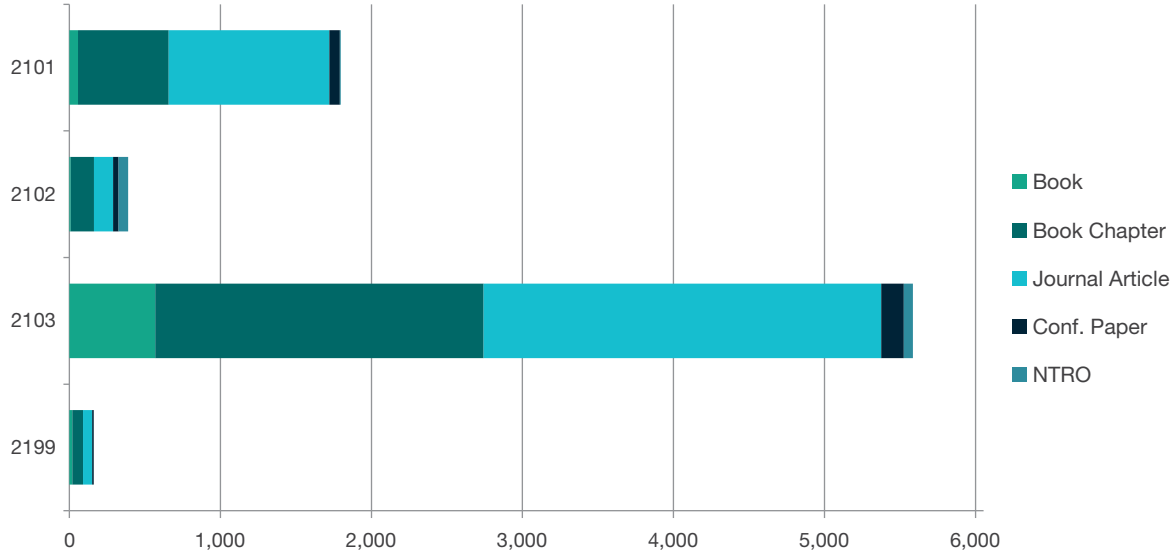
Rating	Distribution	
	Two–digit	Four–digit
5	5	9
4	12	17
3	9	14
2	2	4
1	0	0
Total	**28**	**44**

NUMBER OF UOES PER RATING SCALE SCORE



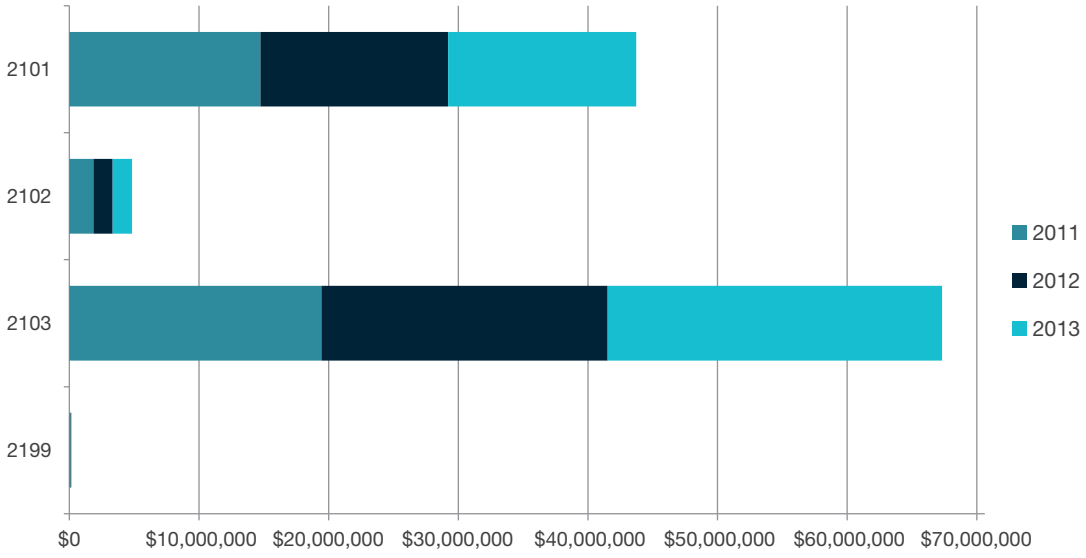
Note: 21 History and Archaeology shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



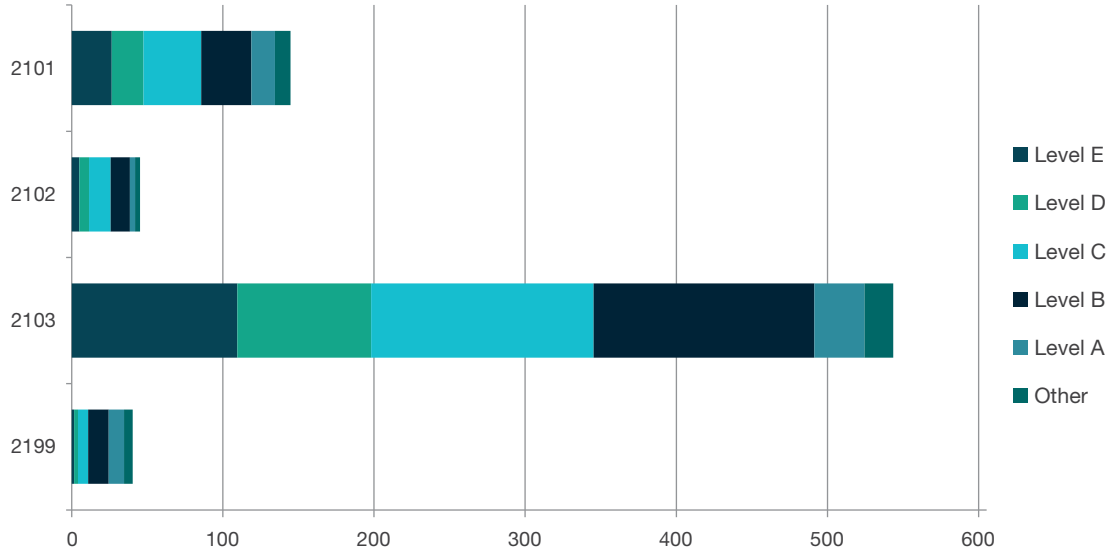
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
2101 Archaeology	57.6	600.3	1,063.4	70.1	6.1	1,797.4
2102 Curatorial and Related Studies	9.2	153.2	126.5	36.5	63.8	389.2
2103 Historical Studies	568.5	2,174.8	2,632.9	148.8	61.4	5,586.3
2199 Other History and Archaeology	19.5	71.3	59.3	11.0	0.0	161.2
Total	**654.8**	**2,999.7**	**3,882.1**	**266.3**	**131.2**	**7,934.1**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
2101 Archaeology	14,733,432	14,478,161	14,519,462	43,731,055
2102 Curatorial and Related Studies	1,847,741	1,480,971	1,498,464	4,827,176
2103 Historical Studies	19,441,896	22,078,296	25,806,802	67,326,993
2199 Other History and Archaeology	98,229	28,683	25,011	151,923
Total	**36,121,298**	**38,066,111**	**41,849,739**	**116,037,147**

STAFFING PROFILE BY ACADEMIC LEVEL

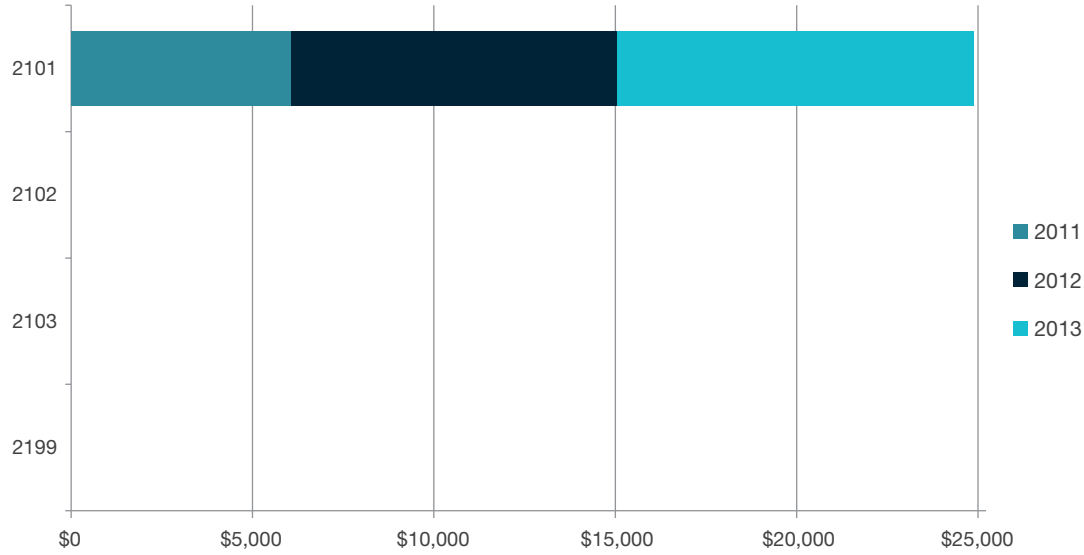


FoR code	Level E	Level D	Level C	Level B	Level A	Other FTE	Total
2101 Archaeology	26.5	21.0	38.2	33.2	15.6	10.3	144.7
2102 Curatorial and Related Studies	5.0	6.3	14.3	12.8	3.4	3.3	45.2
2103 Historical Studies	109.5	88.5	147.2	146.1	33.1	19.1	543.5
2199 Other History and Archaeology	1.5	2.5	6.7	13.6	10.2	5.7	40.3
Total	**142.5**	**118.4**	**206.4**	**205.7**	**62.3**	**38.4**	**773.6**

PATENT PROFILE

Note: There were no patents submitted by UoEs in this FoR.

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



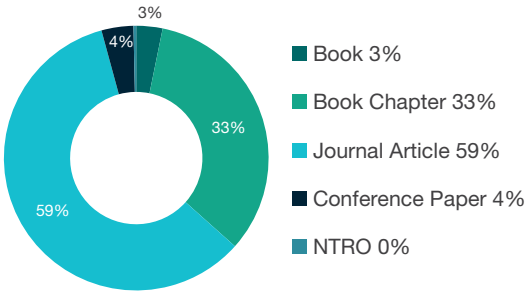
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
2101 Archaeology	6,065	8,989	9,818	24,871
2102 Curatorial and Related Studies	0	0	0	0
2103 Historical Studies	0	0	0	0
2199 Other History and Archaeology	0	0	0	0
Total	**6,065**	**8,989**	**9,818**	**24,871**

2101 Archaeology

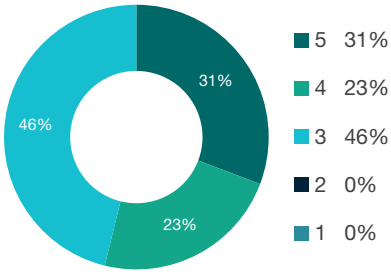
Indicator	No.
Research outputs	1,797.4
Research income	$43,731,055
FTEs	144.7
Esteem count	71.7
Patents	–
Research commercialisation income	$24,871

Rating	Distribution
5	4
4	3
3	6
2	0
1	0
Total	**13**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

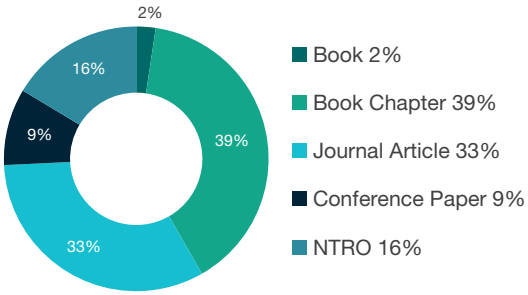


2102 Curatorial and Related Studies

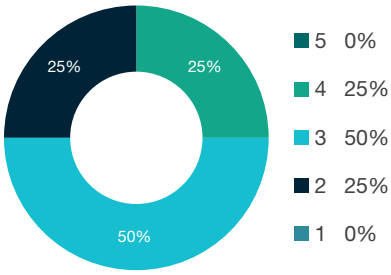
Indicator	No.
Research outputs	389.2
Research income	$4,827,176
FTEs	45.2
Esteem count	6.6
Patents	0.0
Research commercialisation income	$0

Rating	Distribution
5	0
4	1
3	2
2	1
1	0
Total	**4**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

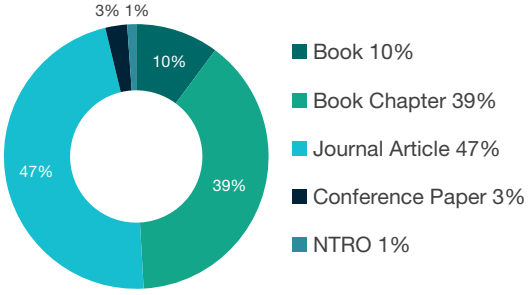


2103 Historical Studies

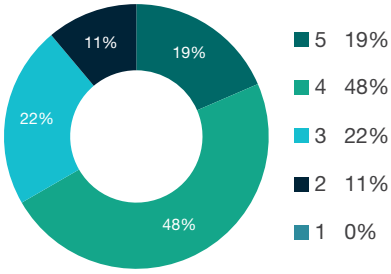
Indicator	No.
Research outputs	5,586.3
Research income	$67,326,993
FTEs	543.5
Esteem count	225.4
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	5
4	13
3	6
2	3
1	0
Total	**27**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

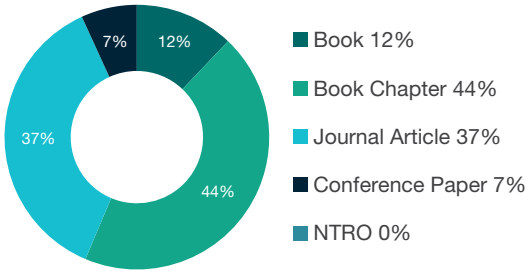


2199 Other History and Archaeology

Indicator	No.
Research outputs	161.2
Research income	$151,923
FTEs	40.3
Esteem count	0.0
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 2199.

22 PHILOSOPHY AND RELIGIOUS STUDIES

Philosophy and Religious Studies is comprised of the following four–digit codes:

2201 Applied Ethics

2202 History and Philosophy of Specific Fields

2203 Philosophy

2204 Religion and Religious Studies

2299 Other Philosophy and Religious Studies

9 out of 24 two–digit UoEs and 27 out of 43 four–digit UoEs assessed were rated above world standard

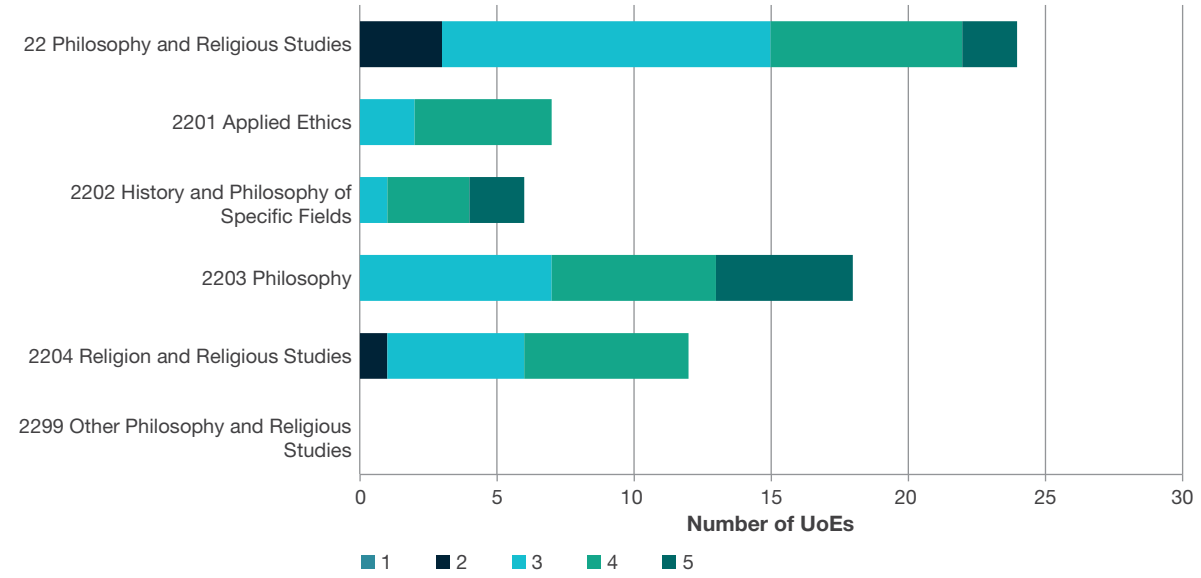
FoR Overview

Philosophy and Religious Studies (22) contributed approximately two per cent of the research outputs to ERA 2015. Journal articles were the most common research output type (53 per cent) followed by book chapters (38 per cent). Philosophy (2203) and Religion and Religious Studies (2204) were the two largest sub–disciplines in terms of research outputs, research income and staffing levels. Applied Ethics (2201) was the only code that reported research commercialisation income.

Indicator	No.
Research outputs	6,619.1
Research income	$47,552,105
FTEs	616.8
Esteem count	118.1
Patents	–
Research commercialisation income	$40,895

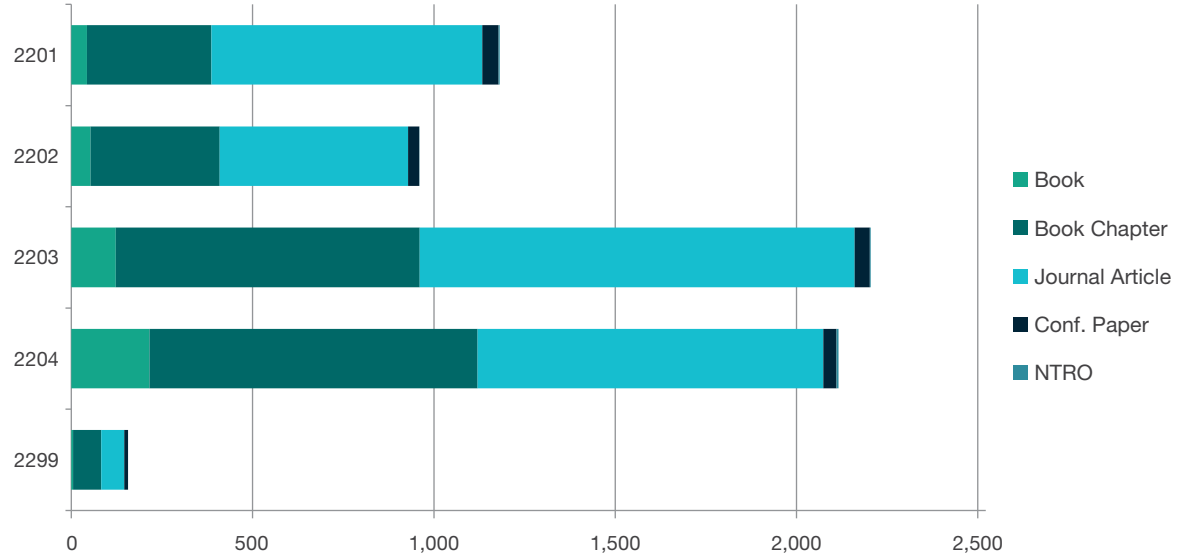
Rating	Distribution	
	Two–digit	Four–digit
5	2	7
4	7	20
3	12	15
2	3	1
1	0	0
Total	**24**	**43**

NUMBER OF UOES PER RATING SCALE SCORE



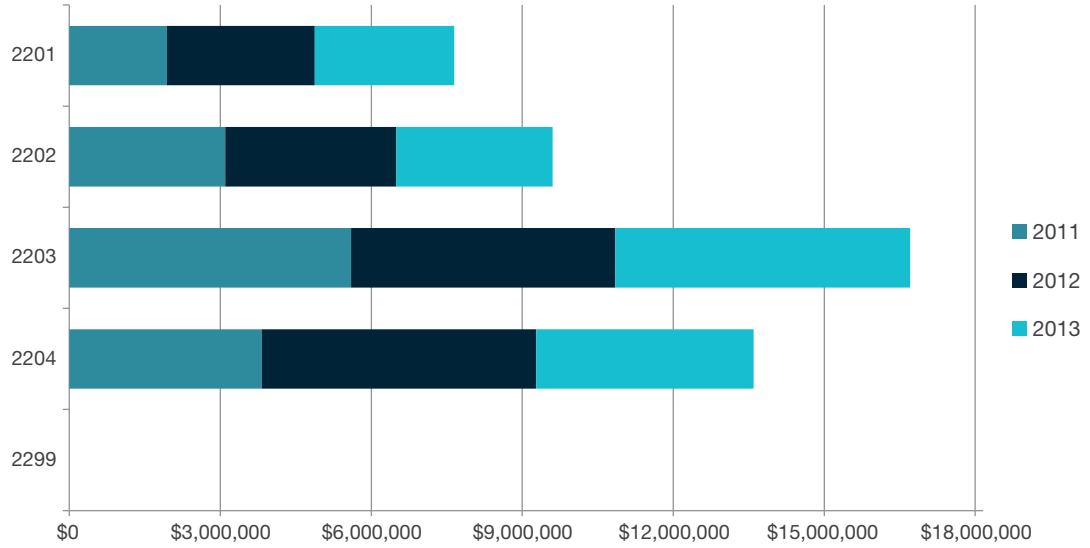
Note: 22 Philosophy and Religious Studies shows assessed two–digit UoEs only.

RESEARCH OUTPUTS SUBMITTED BY TYPE



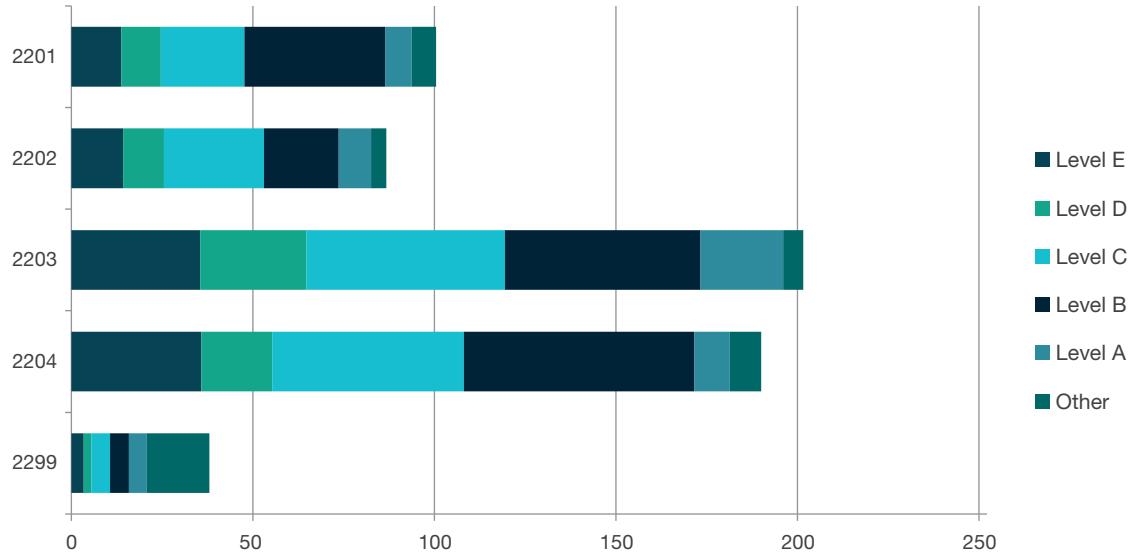
FoR code	Book	Book Chapter	Journal Article	Conference Paper	NTRO	Total
2201 Applied Ethics	42.9	343.7	746.6	45.3	3.3	1,181.8
2202 History and Philosophy of Specific Fields	53.0	356.2	519.7	30.5	1.0	960.5
2203 Philosophy	122.7	837.9	1,199.8	41.9	2.5	2,204.8
2204 Religion and Religious Studies	215.6	904.7	953.7	36.8	5.0	2,115.8
2299 Other Philosophy and Religious Studies	5.0	77.6	63.1	10.5	0.0	156.2
Total	**439.2**	**2,520.1**	**3,483.0**	**164.9**	**11.8**	**6,619.1**

RESEARCH INCOME BY YEAR–ALL CATEGORIES ($)



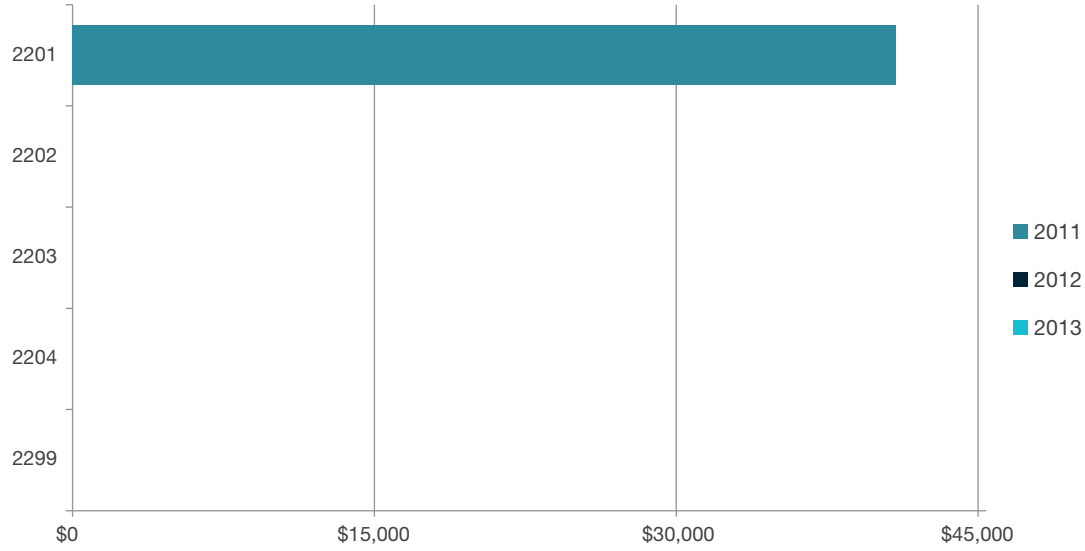
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
2201 Applied Ethics	1,937,079	2,940,949	2,770,546	7,648,574
2202 History and Philosophy of Specific Fields	3,099,607	3,398,581	3,102,999	9,601,187
2203 Philosophy	5,597,902	5,245,259	5,861,916	16,705,077
2204 Religion and Religious Studies	3,822,490	5,456,622	4,318,154	13,597,267
2299 Other Philosophy and Religious Studies	0	0	0	0
Total	**14,457,078**	**17,041,411**	**16,053,615**	**47,552,105**

STAFFING PROFILE BY ACADEMIC LEVEL



FoR code	Level E	Level D	Level C	Level B	Level A	Other	Total
2201 Applied Ethics	13.8	10.9	23.0	38.8	7.4	6.7	100.5
2202 History and Philosophy of Specific Fields	14.2	11.2	27.6	20.6	8.9	4.3	86.8
2203 Philosophy	35.5	29.2	54.8	53.9	22.8	5.5	201.6
2204 Religion and Religious Studies	35.8	19.5	52.7	63.6	9.7	8.6	190.0
2299 Other Philosophy and Religious Studies	3.4	2.1	5.1	5.2	4.9	17.2	38.0
Total	**102.7**	**73.0**	**163.2**	**182.0**	**53.6**	**42.3**	**616.8**

RESEARCH COMMERCIALISATION INCOME BY YEAR ($)



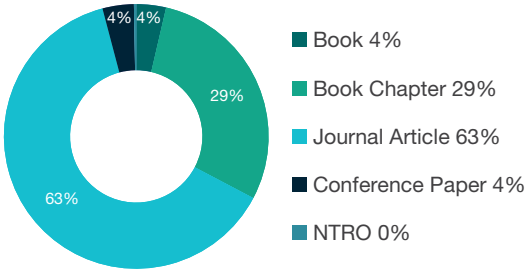
FoR code	2011 ($)	2012 ($)	2013 ($)	Total ($)
2201 Applied Ethics	40,895	0	0	40,895
2202 History and Philosophy of Specific Fields	0	0	0	0
2203 Philosophy	0	0	0	0
2204 Religion and Religious Studies	0	0	0	0
2299 Other Philosophy and Religious Studies	0	0	0	0
Total	**40,895**	**0**	**0**	**40,895**

2201 Applied Ethics

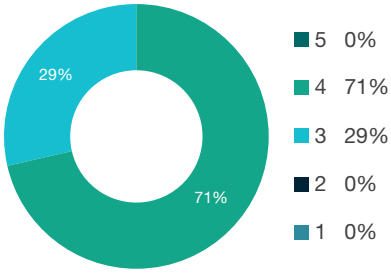
Indicator	No.
Research outputs	1,181.8
Research income	$7,648,574
FTEs	100.5
Esteem count	12.1
Patents	–
Research commercialisation income	$40,895

Rating	Distribution
5	0
4	5
3	2
2	0
1	0
Total	**7**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

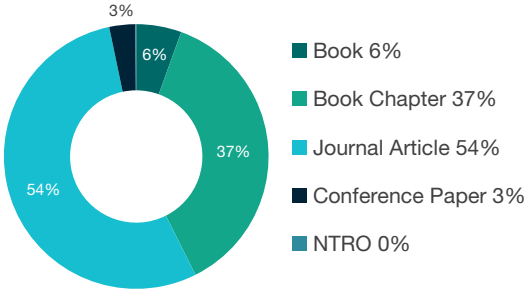


2202 History and Philosophy of Specific Fields

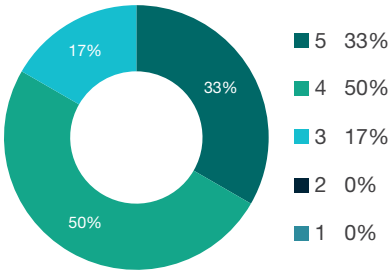
Indicator	No.
Research outputs	960.5
Research income	$9,601,187
FTEs	86.8
Esteem count	24.1
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	2
4	3
3	1
2	0
1	0
Total	**6**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

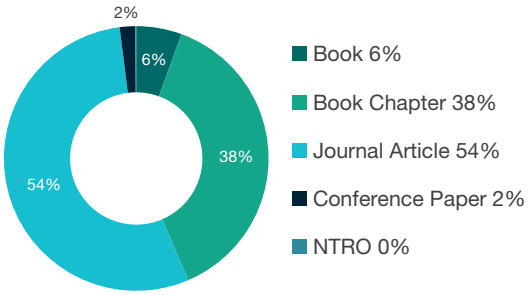


2203 Philosophy

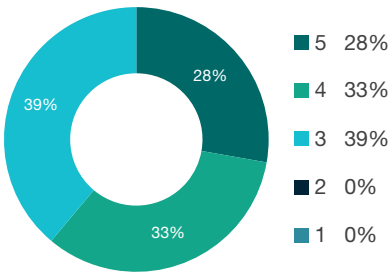
Indicator	No.
Research outputs	2,204.8
Research income	$16,705,077
FTEs	201.6
Esteem count	64.3
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	5
4	6
3	7
2	0
1	0
Total	**18**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

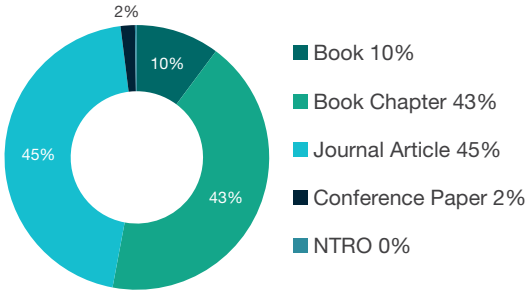


2204 Religion and Religious Studies

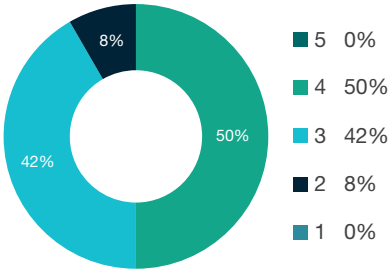
Indicator	No.
Research outputs	2,115.8
Research income	$13,597,267
FTEs	190.0
Esteem count	17.2
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	6
3	5
2	1
1	0
Total	**12**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

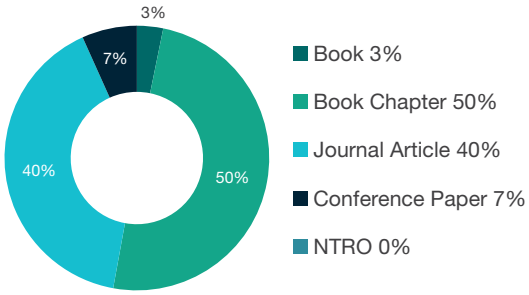


2299 Other Philosophy and Religious Studies

Indicator	No.
Research outputs	156.2
Research income	$0
FTEs	38.0
Esteem count	0.3
Patents	–
Research commercialisation income	$0

Rating	Distribution
5	0
4	0
3	0
2	0
1	0
Total	**0**

RESEARCH OUTPUTS BY TYPE



FOR RATING DISTRIBUTION

Note: There is no FoR rating distribution for 2299.