NEW ZEALAND RESEARCH COMMERCIALISATION PRACTICE IN REAL LIFE

Lessons from Universities, CRIs and Research Organisations

BIO PACIFIC PARTNERS

KiwiNet
Kiwi Innovation Network

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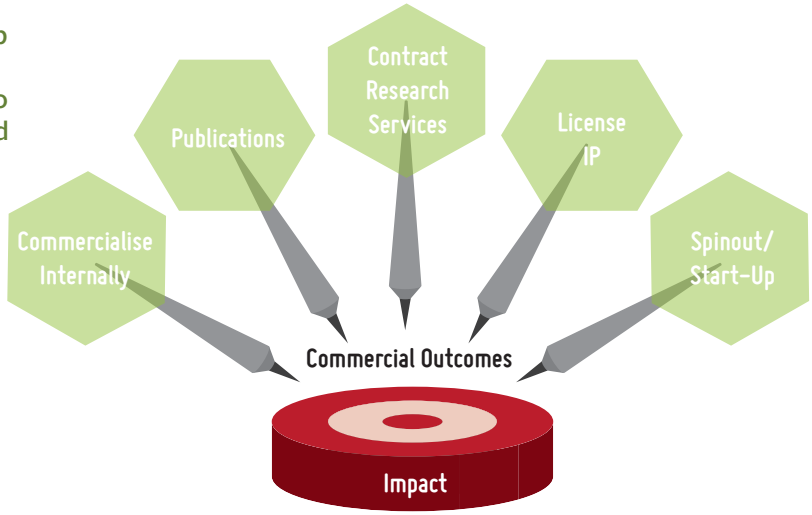
Introduction

Commercialisation of research is an intergral step in converting knowledge and skills into impact. Successful commercialisation has the potential to create products and services that solve real-world problems – issues that have a significant impact on the social, economic, and environmental wellbeing of the nation. This study surveyed the commercialisation practices used in New Zealand research and development (R&D) organisations, and highlights opportunities to develop untapped potential in this value-rich process.



This study was the first objective look at the commercialisation of research across all of New Zealand's R&D organisations. It explores this key national activity and describes the barriers and current practices used to overcome these in all 20 universities, Crown Research Institutes (CRIs) and research organisations.

This study was founded on the observation that there is a wide diversity of practices, approaches and outcomes in the commercialisation activities of universities, CRIs and research organisations in New Zealand.

This document is a summary of the full report. It provides an overview of the barriers and challenges faced by R&D organisations, the various approaches and practices taken to help overcome these, and their success in doing so. The methodology used in this study is outlined in the appendix.

By sharing these practices, we hope to help all New Zealand R&D organisations further enhance their commercialisation outcomes and improve their impact.

Creating impact

The main commercial outcomes used to create impact highlighted by organisations are summarised above.

In New Zealand, government funding for early-stage innovation has the long-term goal of ultimately creating impact.

Part of an innovation system that targets impact is the creation of outputs that are defined as the knowledge and skills developed by research activities (i.e. publications, products and IP that codify knowledge). This includes tacit knowledge that is exchanged between collaborators and peers and also the students and postgraduate researchers that are trained as part of the research process. The delivery of outputs is normally considered the responsibility of the researcher(s) or institution(s) performing the research.

Outputs are then used to deliver outcomes, which are the mechanisms that lead to impacts by the use or application of outputs. Outcomes are not usually under the full control of the researcher(s) or institution(s) that developed the outputs.

Measures of success in creating outcomes are hard to determine. This is because it can take many years for new knowledge to be widely used and applied in various settings, and these uses are often difficult to monitor and track.

Complementary inventions and technology are sometimes needed before the full benefits of particular knowledge can be used, creating lags in full impact generation. In other cases, the market may not be ready to adopt the technology – and financial, regulatory, social and other barriers may prevent uptake. Therefore, in this context, commercialisation can simply be looked at as one activity that occurs within an innovation pipeline by which outputs are turned into outcomes that lead to impact, where the impact is a new product, technology, or service introduced to the market.

Inputs

Resources that support research activities

Activities

Activities that, directly or indirectly, generate new knowledge or new applications of knowledge, including identifying research problems and opportunities

Outputs

The knowledge and skills that are developed by activities

Delivering outputs is normally considered the responsibility of the researcher(s) or institution(s) performing the activities

Commercialisation is responsible for pushing outputs through to outcomes

Outcomes

Mechanisms that lead to impacts by use or application of outputs

Commercialisation outcomes are new products or services introduced to the market

Usually not under full control of the researcher(s) or insitution(s) that developed the outputs

There may be several consecutive or parallel outcomes preceding imact

Specific funding may support some of these mechanisms (commercialisation funds, translation and extension funds, commercial co-funding)

Successful commercialisation addresses real social need, maximising impact

Impacts

A change to the economy, society, or environment, beyond contribution to knowledge and skills in research organisations

Over the past decade there has been an increasing focus on facilitating commercialisation activity with the introduction of the PreSeed Accelerator Fund (PSAF) managed through KiwiNet and Return on Science, the creation of Callaghan Innovation and its various innovation initiatives and more recently the advent of the Tech Incubator program.

Commercialisation is not the direct act of creating impact, but it has a critical role in facilitating the process of enabling outcomes to become reality. In its broadest sense, commercialisation is about using intellectual capital to solve intrinsic problems that impact on the social, environmental and financial health of the nation. Therefore, impact is only created when outcomes in whatever form are taken up by others.

The following metrics are considered by New Zealand research organisations as being indicators of success – generating impact or creating value from commercialisation activities:

- Financial revenues from fee-for-service contract research work
- Sales (research organisations with a product offering)
- Contracts awarded for fee-for-service work with industry
- Metrics dictated by MBIE grants for PSAF reporting: number of jobs created, revenue from external investment, number of spinouts
- Financial returns i.e. from licensing royalty payments or from spinout companies
- Repeat business from contract research and client retention
- Impact generation through industry-relevant publications
- Innovations that may not necessarily be attractive for licensing or acquisitions, but promotes the reputation of the organisation (e.g. deployed through the World Health Organisation)
- IP generation (patents)
- Successful contract completion with a client, enabling them to progress with a technology

All organisations in this study were aware of the opportunities available to them to generate impact, yet the drivers and ability to deliver on these were mixed and influenced by resources, capacity and institutional requirements.

Commercialisation directives

Research institutes and universities have fundamentally different mandates towards commercialisation.

Despite these differences, the challenges and barriers to commercialisation for research institutes and universities are generally similar across all organisations and fall into three main areas: **culture**, **team**, and **process**.

These three areas are outlined in the remainder of this summary report, along with the approaches and practices that are taken by organisations to overcome them.

Research Institutes (Including Crown Research Institutes)

CRIs were established to address New Zealand's issues and achieve economic growth for the country by improving sectors productivity and improving the sustainable use of natural resources.

In the early triaging process of research with commercialisation potential, CRIs are considered as having a greater focus and control on the technology than a university, and therefore more likely to follow a pathway towards commercialisation.

"We put discovery and translation on the same footing. It is also communicated internally that purely translational research is as important as publication."

CRI

As with CRIs, research organisations are also generally closely aligned with industry, having an applied focus through providing contract research services to industry. In these situations, the client owns any intellectual property (IP) that is created, but these activities still involve creating impact with industry.

Because of their alignment to industry, researchers at research institutes are considered to be closer to their stakeholder business groups than scientists in an academic setting.

There is a general expectation that researchers within a CRI or research organisation will have some level of understanding of the commercialisation process and that this will inevitably form a part of their role. Accordingly, they will often have lower publication rates than if they were a part of a university.

Universities

As tertiary education facilities, universities have a greater underlying focus on teaching, academic research and student support compared with research institutes. Many university representatives spoken to for this study say the key focus of the university is to teach, support student enterprise and culture, undertake research, obtain research funding and facilitate knowledge transfer.

One noted that while commercialisation is supported and welcomed when successful, **"it simply is not a high priority for university governance groups".**

The core directives for the commercialisation offices in universities are to support and drive commercial outcomes of research emanating from the university.

"The biggest challenge is to persuade the University that commercialisation of research, and all the parts that go alongside that, is a legitimate part of the research strategy. If you can do that, it is easier to be sustainable, because you get that cross-subsidisation across different activities."

University TTO

Barriers

Recommendations

Culture

Tension exists between patenting versus publishing for most organisations

Low awareness of IP and commercialisation, which risks prior disclosure

Disconnect between commercialisation staff and researchers

Provide training for researchers on IP and commercialisation

Communicate successes throughout the organisation

Foster a strong relationship with researchers and frame as a partnership

Provide incentives to researchers for motivation and engagement

Focus resources on working with researchers who are active and willing to engage in commercialisation

Raise awareness on the value of commercialisation through celebrating successes and hosting internal competitions

Drive cultural changes at the leadership level

Team

Challenge to find and recruit commercialisation specialists

Challenge to deploy team into commercial project or spinout

Lack of capacity in commercialisation team

Availability of researcher to work on commercial projects

Benchmark salaries with standard industry rates

Share benchmarking salary data across organisations

Use internships to bring in fresh thinking and develop commercialisation talent internally

Offer secondments to commercialisation staff across organisations to exchange ideas and best practice

Host an annual meeting for KiwiNet partners to share ideas

Outsource jobs or tasks where capacity is lacking

Deploy the best team – the inventor may not always be the right person

Co-locate the commercialisation and research office teams

Process

Lack of a specific, formalised process

Difficult to obtain high quality market insights

Lack of funding

Identifying innovative research before disclosure

Develop a formalised stage-gate process while remaining flexible and agile

Engage with researchers and the research office early to identify innovations and plan the commercial pathway upfront

Collaborate with researchers on grant applications

Sub-contract out elements of the process where capacity is limited

Conduct desk-based research using databases for initial market insights

Engage with industry early and use industry partners to validate the market need

Harness KiwiNet and Return on Science networks for links to industry partners, insights and/or customers

Adopt a global market perspective where relevant

Exploit co-funding opportunities from KiwiNet and/or industry partners

Culture

Raising awareness

Tensions between publishing and commercialisation exist in most organisations. The extent of this varies across organisations and appears to be influenced by their level of interaction with industry and depth of understanding of intellectual property.

This tension tends to be a more significant challenge in universities where publications are used by researchers to increase their scientific credibility. In research institutes, there is an expectation that researchers have an understanding that part of their role involves commercial activities with industry, and that they would not be able to generate the same level of scientific publications as what they would achieve in an academic setting.

However, it was stressed by all organisations that publishing and commercialisation do not need to be mutually exclusive. One CRI notes the tension between publishing and commercialisation is an entirely **"artificial construct...it's not a question of either/or".**

"It's not that you can't publish, but what you publish"

University TTO

Raising awareness of the value of commercialisation and requirement for IP protection is considered as an important initiative. Fundamentally, changes in the perspective towards innovation and commercialisation need to occur at the senior management or leadership level to influence organisational-wide cultural changes. Directives are set at this level then filter down throughout the organisation.

"It's removing that 'them and us', 'winner vs loser'. We are in it together; we're working towards the same outcome... it's a partnership."

Research Institute

- Provide training on commercialisation/IP for researchers.
- Run innovation competitions.
- Use internal communications to celebrate success.
- Involve commercialisation teams early on with potential research opportunities.
- Focus on working with researchers who are willing to be involved in commercial activities.
- Patent early.
- Change the internal dialogue on commercialisation.

Relationship management

For many organisations, it was noted that an 'us' versus 'them' culture still exists between researchers and commercialisation/corporate side of the business. In some organisations this goes so far as researchers seeing commercial teams as a drain on resources rather than adding value.

Building and maintaining a relationship with researchers is considered a fundamental element of research commercialisation.

"You've got to spend a lot of time walking the corridors. You really have to work that human relationship. Ultimately, this is a people business."

University TTO

Build and maintain relationships between the commercialisation office and researchers to frame it as a partnership that both parties can benefit from. This supports collaboration and communication between parties and creates an environment where researchers are more likely to come forward with innovations.

Where possible, ensure commercial commercialisation staff have a scientific and/or technical background to have credibility when liaising with researchers and scientists.

Provide constructive feedback to researchers when an innovation may not have commercial value. This avoids deterring them from coming forward in the future with other innovative ideas.

"Failure is good. Failing fast is even better."

CRI

Providing incentives for innovative research with commercial outputs is seen as a good way to motivate researchers to be more invested in commercialisation activities.

Some universities provide benefit schemes that provided financial or other incentives for researchers to be involved in commercialisation.

Incentives include the sharing of royalty payments or offering a stake in the company/ spinout.

Financial rewards are most often seen in universities, although some CRIs say they are currently looking into how they can introduce incentive schemes.

"80% of good commercial work comes from 20% of staff."

CRI

Work with the 'rainmakers' and champions of commercialisation

Most universities, CRIs and research organisations noted that there are a small group of serial innovators within their organisation that bring forward the majority of innovation disclosures.

These researchers – referred to by many as 'rainmakers' – are keen to be involved in commercialisation and are generally aware of the importance of timing between patenting and publication.

"We won't do anything the researcher isn't comfortable with. We will try to persuade them, but if you don't want to do it that way, then we won't waste our efforts."

University TTO

Focus time and resources into productive researchers who are engaged in innovation and keen to commercialise. This approach allows the commercialisation team to build credibility and demonstrate good service. While this is not necessarily scalable, it allows the commercialisation team to build credibility and demonstrate good service – a message that can reach a progressively larger number of researchers over time.

These 'rainmakers' often act as champions that raise awareness of the value of commercialisation across their department or faculty.

For some university commercialisation offices, IP may be signed over to researchers who are either not engaged or wish to take a different direction. Researchers are not forced into a decision and the team does not work with them further. This approach also facilitates relationship management in that researchers are aware that they will not be forced down a path they are not willing to pursue.

Approaches & Practices

Team

Team size

The size and ability of commercialisation teams vary considerably across New Zealand's universities and research institutes. As examples, at the time this study was conducted:

- One university technology transfer office employs seven senior commercialisation managers, two commercialisation managers, a full-time patent attorney, a contract and licensing professional, one intern, and several part-timers.
- One CRI would find it difficult to quantify an exact figure for those with a commercialisation focus. Of the 1,000 staff, 750 are considered scientists. The remaining staff are not necessarily totally focused on commercialisation, which makes it difficult to quantify numbers, but it was estimated at 17 full-time equivalents (FTEs) across the business.
- One research institute has no commercialisation office and no person solely dedicated to commercialisation. A restructure removed the commercialisation team and is now considered to be part of everyone's role - particularly as the institute is very commercially oriented.

Many organisations said that it is difficult to determine the exact size of the commercialisation team. **"Compartmentalising staff dedicated to commercialisation is an artificial construct,"** said one research institute, noting that all staff are involved – at least to some degree – in commercialisation.

Often employees are involved in cross-functional activities – which might include business development, bid-writing, research, other administrative duties – all of which can lead to commercial outcomes.

In general, those organisations that recognise that commercialisation is a distinct skill set and profession in its own right are the ones that are higher performing. These organisations say that while it is important that researchers and wider staff understand commercialisation, the actual execution requires well-honed professional skills and experience – **"commercialisation is an accredited profession."**

Have as many staff as possible upskilled in understanding commercial processes, regardless of their level of engagement in the process itself. A wider understanding of commercialisation ensures that good process is followed and respected, and ensures research with promising commercial potential reaches the relevant people and teams within an organisation.

It is noted that those researchers who have attended commercial events – such as the KiwiNet Commercialisation Awards – can become ambassadors for commercialisation.

Do not pursue projects if there is not sufficient capacity – being unresponsive to researchers can create a disconnect with the commercialisation team.

Put the appropriate team in place when spinning out a company. Some researchers have little interest in being involved in a commercial company. In other instances, researchers can have a false belief they are able to run a business and be a CEO – which can cut across the role of the business managers and commercialisation teams.

Provide support and backfill the existing workload of academics when they are required to work on a spinout or a commercial venture.

Regardless of team size, capacity and a lack of resources within the commercialisation team is considered a key challenge to the successful commercialisation of research. Many organisations say that being unresponsive to proactive approaches from researchers can create a disconnect between researchers and the commercialisation team.

Some relatively small commercialisation teams consider their size to be positive – noting that in large organisations there can be a temptation to spread resource too thin across multiple projects.

Recruitment & interns

In general, organisations that are located centrally within major cities tend to not experience too many challenges when recruiting commercialisation personnel.

"At one point we were hiring for two positions — but because we found three very eligible candidates, we hired all three!"

University TTO

Another university said they had 50 individuals apply recently for two analyst roles, and **"personnel recruitment does not pose a significant challenge as our organisation has approached a sufficient scale."**

Conversely, a research institute located in regional New Zealand said that the ability to hire good commercialisation personnel is a challenge when the location might not be as desirable to live in compared to a large city. However, another regionally-based research organisation countered this view, saying that its desirable location and variety of work on offer made recruitment easy.

Organisations located outside of major cities say that the low number of similar commercialisation roles available in their area means that they have a lower turnover than organisations in cities. This can prevent these organisations from bringing in new ideas and fresh thinking.

"We would interview people, and you may have some that apply that are really experienced business managers or business development managers in other industries, but they just don't understand science or IP, and were a total mismatch with what the organisation needs".

Research Institute

It was frequently noted that it can be difficult to find people with commercialisation backgrounds with the right technical skill level and experience.

It was also recognised that the limited pool of talent in research commercialisation in New Zealand means that often the same people will be recruited into roles within different universities and research institutes throughout their career. This is not always as seamless as it can appear – one research institute pointed out that **"people transitioning from a technology transfer office to a research institute are often not quite the right fit – their experience does not often align with the needs of the institute in terms of managing IP and licensing arrangements."**

Salary was also raised as a challenge for many organisations. This was due to several reasons, including:

- Tensions around salary discrepancies between the scientific and commercial teams, which can drive corporate salary levels down below a level that would make it desirable to join an organisation – particularly those located in the regions.
- Defined salary bands within some organisations mean that offers cannot be made that fall outside these brackets without significant justification. This is the case even when management within the organisation tries to push for competitive salaries to be offered.

Interns were identified by both research institutes and universities as being an effective way of identifying future staff and staff were often very impressed with their ability, qualities and enthusiasm. They are also seen as a way to bring in fresh ideas and perspectives to an organisation.

But it was considered essential that interns are not used solely as 'screening machines' by an organisation. Instead, it is suggested that interns experience a wide variety of commercialisation activity, including attending the Medical Research Commercialisation Fund (MRCF) and KiwiNet investment committee (IC) meetings.

"While New Zealand is awash with technical experts, not a lot of them have commercial nous."

University TTO

Secondments across organisations allow the commercialisation team to share practices and processes.

Recruit junior staff through relevant university programs and train them internally to create people with the right skill set for an organisation.

Ensure there is a career pathway for junior staff to progress professionally within the organisation.

Recruit commercialisation personnel with a good understanding of science – it is considered easier to train someone in commercialisation compared to science, and a technical understanding helps to build a strong, credible relationship with researchers.

Use benchmarking data on the size of jobs to adjust the expectations of HR and senior management within organisations.

Use interns to identify future staff and bring in fresh ideas and perspectives to an organisation at a relatively low cost. In many cases, short-term interns are brought into the organisation on a permanent basis following the internship. Interns receive a considerable amount of training, which ultimately makes them ideal candidates to transition into internal commercialisation roles.

Internship programs are easier to implement in larger research organisations. To overcome this, it may be useful to introduce an internship program where interns can gain experience in a number of different organisations.

Process

Identifying innovation

Identifying innovation and research with commercial potential is an integral part of the commercialisation process. However, most commercialisation teams say it is a challenge to have oversight of all innovation arising from research across the entire organisation.

Some organisations had specific strategies in place to capture innovative research, whereas others relied on a more rudimentary or ad hoc approach where the faculty and/or scientists were relied upon to come forward with invention disclosures.

Despite these differences, some of the approaches used were common across many organisations.

Foster a relationship with researchers and be in regular contact with them in order to become aware of relevant innovation.

Run internal innovation competitions to encourage researchers and other staff to come forward with new ideas.

By identifying innovations upfront or early in the process, the commercialisation teams have an opportunity to provide input into research grant proposals, capture IP early and/or prevent the disclosure of sensitive information.

Commercialisation process

The existence of a formal commercialisation process varied across organisations. The degree by which an organisation had a formalised process appeared to be influenced by the level of resource – both in terms of time, capacity and FTE staff dedicated to commercialisation.

Common challenges in the commercialisation process highlighted by organisations include:

- Late involvement of the commercialisation team in the project development or research grant proposal – this makes it challenging for teams to help to plan

In general, processes were more well-established at the beginning of the innovation pipeline and less so later on as the project grew in size and maturity across organisations.

Across organisations, the commercialisation process involved a linear model that started with screening opportunities from innovation discovery and disclosure, followed by opportunity assessment, developing a commercialisation plan/path to market plan, setting up a team around the project and identifying next steps required, market validation, additional investment and venture development/exit.

While having a formal process is important, organisations need to also be flexible and agile in their approach.

Desk-based research (through general searches of the internet, scientific literature, subscribing to commercial/IP databases and purchasing market reports) is a good first step to obtain initial market insights. However, engaging with industry is critical to gain real-world validation.

Where there are limited resources or the relevant technical expertise is not available internally, contract out parts of the process. This frees up staff to focus on other priorities – such as relationships with researchers and helps maintain commercialisation capabilities within the wider innovation ecosystem.

"Commercialisation activity is often deprioritised with the urgent displacing the important."

Research Institute

Approaches & Practices

the path to market, manage and/or capture IP and prevent prior disclosure through publication.

- Obtaining quality market insights to assess and screen opportunities including the freedom to operate (FTO), competition and the best path to market.
- Several organisations say they either do not have the capacity within the commercialisation team to conduct market research or found it challenging to obtain market insights for technologies or sectors outside of their area of technical expertise.
- Lack of resources and funding to be involved with additional rounds of investment.
- Lack of experience and expertise in selling companies and deal negotiation and execution with multinationals, which is a limiting factor for the New Zealand commercialisation ecosystem.
- The small appetite of the New Zealand investment community for funding high-risk projects.
- Lack of internal funds to invest in additional rounds of fund-raising into spinout companies.

Funding and value creation

Funding mechanisms vary significantly across different organisations, and while some organisations say they have sufficient funding for commercialisation activities, many identify funding as an issue.

The ability for follow-on investment varies between universities and research institutes.

Many organisations are highly risk-averse and are unwilling or unable to invest in expensive commercialisation projects. This results in a barrier to commercialisation, particularly in capital-intensive industries such as drug development.

Some organisations are averse to external investment, preferring full ownership of innovations, which can act as a barrier to developing the organisations' pipelines.

The lack of funding for commercialisation can mean that organisations are unable to pursue commercialisation projects, have limited patenting opportunities, or out-license technologies earlier than preferred.

New Zealand research organisations' funding sources include MBIE contestable funding, PSAF, external investment (including venture capital investment), Callaghan grants, incubator support, contract research revenue and other internal funds (i.e. contributed to by licensing and royalty payments).

All eligible organisations actively use PSAF funding to facilitate commercialisation, but some will only proceed to a Tier 2 PSAF project with an industry co-investor on board. In this respect, PSAF funding is used to leverage investment from industry partners, and PSAF funding is seen as highly attractive due to its non-dilutive nature.

Appendix: Project Methodology

BioPacific Partners gathered data and insights from each of the 18 member organisations of KiwiNet, as well as the University of Auckland (UniServices) and Lincoln Agritech – in total eight university commercialisation offices (TTOs) and 12 CRIs (and other research organisations). The approach to this study involved:

- Secondary desk-based research on global commercialisation activities
- Focus groups with universities and CRIs/other research organisations
- One-on-one interviews with representatives of each organisation

Desk-based research

Secondary desk-based research was conducted on the commercialisation activities conducted at global institutes to serve as an international benchmark and frame the New Zealand environment within the broader international context. This occurred concurrently with the primary research element of the study.

Focus groups

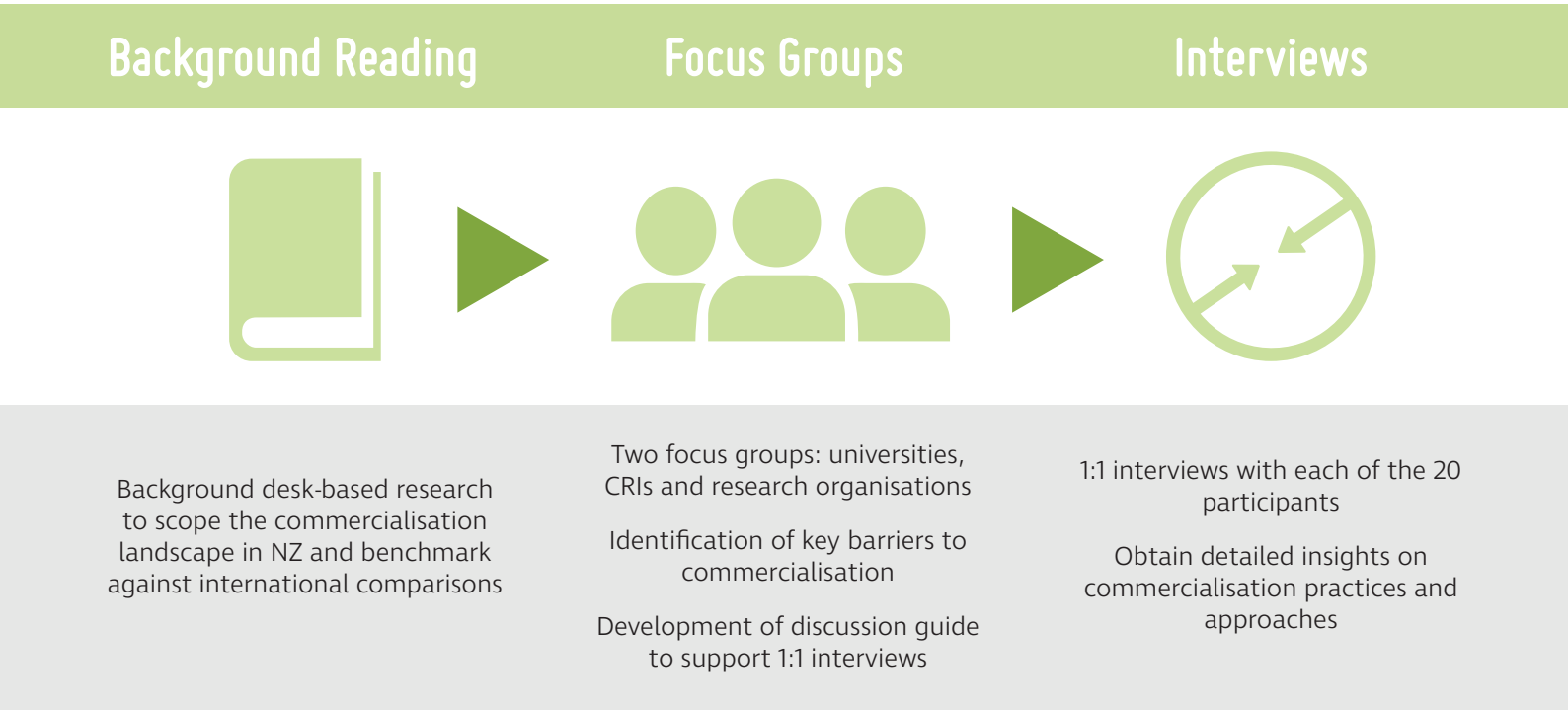
Two focus groups were held with representatives from each of the 20 organisations – one with participants from university commercialisation offices and the other with research institutes. Outputs from the focus groups identified the key issues and barriers to commercialisation for each type of organisation. These findings informed the development of a discussion guide, which served as a framework for discussions in the one-on-one interviews.

One-on-one interviews

Interviews were conducted with each of the 20 organisations to gain further insights on the issues raised during the focus groups, and the practices used to overcome these issues.

Stakeholders interviewed held various senior positions as managing directors, CEOs, Commercialisation Managers, Business Development Managers and Chief Scientific Officers.

Interviews were semi-structured and directed by a discussion guide incorporating the key themes of each focus group. Interviews incorporated a degree of flexibility to enable the interviewer to delve into other topics during the discussion to obtain additional relevant insights.



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