

Callaghan Innovation Business Case

2013/14 – 2015/16

As submitted to the Minister of Science and Innovation and
the Minister of Finance November 2013

Contents

I.	Vision for the Future	1
II.	Introduction	3
III.	Motivating an Innovation Culture	4
IV.	Connecting Firms to Resources and Support	6
V.	Delivering Research and Technical Services	10
VI.	Customer Segments and Marketing for our Services	16
VII.	National Technology Networks	17
VIII.	Domestic and International Partnerships	20
IX.	Equity Ownership in Firms	21
X.	Intellectual Property	22
XI.	Strategy for the Māori Economy	22
XII.	Collaborative Innovation Projects	23
XIII.	Organisation Structure	23
XIV.	Geographic Locations and Real Estate Rationalisation	25
XV.	Roadmap for the Top Ten Outcomes 2013/2016	25
XVI.	Key Performance Metrics	28
XVII.	Financials	30
XVIII.	Key Risks and Mitigation Strategies	33
XIX.	Conclusion	34

Callaghan Innovation Business Case

2013/14 – 2015/16

I. Vision for the Future

Callaghan Innovation will have a wide-reaching impact on New Zealand's ability to convert innovation into high-value products and services. By the end of 2016, the programmes and actions outlined in this three-year Business Case will be transforming the speed with which New Zealand firms commercialise their ideas and inventions. Our vision encompasses the following top ten outcomes over the next three years:

- 1. Firms Using R&D:** New Zealand firms are engaging more intensively and productively with research and technical service providers. The innovation system's science, engineering and technology capability – spanning basic and applied research, and development – is better connected and aligned with commercial needs and is more accessible to firms. Callaghan Innovation is a trusted broker to assist firms with scoping their technical needs and priorities, and connecting firms with prospective service providers and other solutions. There is a demonstrable increase in the speed and frequency with which ideas are being commercialised, and this translates into a significant increase in the economic contribution of high-value manufacturing and service (HVMS) companies.
- 2. Accelerator Services:** Callaghan Innovation is delivering a portfolio of Accelerator Services to firms throughout New Zealand. These services assist firms with identifying the issues constraining their growth, developing their growth strategies, linking them to the resources and talent they need, evaluating their eligibility for R&D grants and administering grants provided. New services continue to be developed, with those that are effective being expanded and those that are ineffective being quickly identified and modified, or discontinued.
- 3. Client Solutions Managers:** The foundation for delivery of these services is a highly skilled team of Client Solutions Managers (CSMs) who work directly with firms to help them identify and access the Research and Technical Services and Accelerator Services they need to deliver winning products and services into global markets. CSMs are knowledgeable about the capabilities of partner organisations, such as New Zealand Trade and Enterprise (NZTE) and New Zealand Venture Investment Fund (NZVIF), and the full range of technical services and research available across New Zealand. They link firms to whichever institutions and resources are most appropriate, inside or outside Callaghan Innovation. An advanced website, which utilises state-of-the-art social media and database tools to link firms to the resources, tools and talent they need, is a key asset to support these activities.
- 4. National Technology Networks:** A number of National Technology Networks (NTNs) have been established, with each network comprising a collaborative mix of institutions, teams or individual researchers who together provide key capacity for fundamental and applied research in an important field of technology. Callaghan Innovation has in place a group of experienced Network Managers who provide coordinating and facilitating roles to National Technology Networks, but network members have full autonomy over their individual programmes. The NTNs provide a mechanism for engagement between the National Science Challenges and relevant research and business communities. NTNs are providing the environment for the creation of new collaborative innovation projects and funding models – drawing on relevant overseas experience – and involving research institutions and firms, to generate and commercialise innovations. Numerous firms in multiple industry sectors rely on these National Technology Networks for the fundamental and applied research essential to remaining globally competitive in the medium to long term.

5. **Near-market Research and Technical Services:** Callaghan Innovation has transformed its internal R&D capabilities to focus on applied research and technical services that directly help firms to complete their product development or manufacturing processes, for faster launch into global markets. Examples of research and technical services include facilities for manufacturing prototype products, advice and training on product and process development methods, access to pilot plants to scale up production volumes (e.g. The FoodBowl), access to specialised equipment, and testing and failure analysis. Callaghan Innovation's facilities and experts are part of a well-defined nationwide set of product and process development facilities owned by CRIs, private industry, Institutes of Technology and Polytechnics (ITPs) and universities, which are available on a fee-for-service basis for use by firms.
6. **Transfer of Basic Research:** New Zealand's research capabilities have been strengthened by the transfer to appropriate universities or Crown Research Institutes (CRIs) of some Callaghan Innovation research personnel and programmes that are primarily focused on more early stage, fundamental research, rather than near-market research and product development. Most of these basic research programmes are co-located with Callaghan Innovation Research and Technical Services and firms at the Gracefield innovation precinct, or at other university or precinct sites. These stronger and better financed research teams are continuing to build New Zealand's global scientific reputation and provide the knowledge advances that are fundamental to innovation and commercialisation in the long term. They also strengthen the learning experience for university students. Callaghan Innovation continues to have access and some influence over this research through the teams' participation in the National Technology Networks, the National Science Challenges, and collaborative innovation projects involving the receiving university or CRI.
7. **Gracefield Innovation Precinct:** The Gracefield site of the former IRL has been revitalised as an innovation precinct for the high-value manufacturing sector. With Callaghan Innovation as the on-site manager, the current campus is home to a vibrant mix of firms, university research teams, CRIs and Callaghan Innovation's Research and Technical Services staff. A longer term plan for private and public development of this innovation precinct has been completed and endorsed by stakeholders. This plan is aligned with the needs of HVMS firms, the development goals of the Wellington region, and the intentions of other innovation precincts around the country. Callaghan Innovation has staff and facilities co-located within several innovation precincts around New Zealand, in addition to Gracefield, including Wynyard Quarter, University of Canterbury, Downtown Christchurch and the Lincoln AgTech precincts. These sites provide fertile ground for interaction between firms, providers of science, engineering, technology and design (SETD) services, and universities.
8. **Māori HVMS Economy:** Māori-owned businesses are well-represented among the firms with whom CSMs are working. All Callaghan Innovation services – research and technical, and accelerator – have taken into account the needs of the Māori economy. Māori innovations and ideas are directly influencing and expanding the country's total innovation environment. HVMS companies are becoming part of the mix of Māori-owned companies.
9. **A Model for Other Countries:** Other countries are starting to notice the New Zealand model of accelerating commercialisation and are sending business and government delegations to learn from our success. Callaghan Innovation is well-connected with the Europe Enterprise Network and has affiliations with innovation initiatives in Australia, Asia and the United States.
10. **All New Zealanders Involved:** These results have been achieved not through the actions of Callaghan Innovation alone, but through partnerships across all New Zealand's stakeholder organisations. In particular, Callaghan Innovation has partnered closely with NZTE, the Ministry of Business, Innovation and Employment (MBIE), the Ministry of Foreign Affairs and Trade (MFAT), universities, ITPs, CRIs, the venture capital community,

including NZVIF, Economic Development Agencies (EDAs), industry associations and many hundreds of businesses to achieve a shared vision of national commercialisation and economic success.

The achievement of these top ten outcomes will signal a new era of innovation and economic growth for New Zealand and confirm that Callaghan Innovation is accomplishing its mission through the strategies and programmes described in this Business Case.

II. Introduction

Callaghan Innovation's mission is to accelerate the commercialisation of innovation by firms in New Zealand. We are therefore focused on the needs of businesses, and on delivering services and resources that help them to be more competitive and/or launch their own new products and services faster, and thereby grow more quickly than they would otherwise.

We measure our effectiveness and success by the profitable growth of HVMS firms in New Zealand and the subsequent impact on GDP per capita for the country.

Three important characteristics of the New Zealand business environment, compared with other OECD countries, are that:

- The country's economy continues to be dominated by primary industries in agriculture, food production, timber and fisheries, which make up 58% of national annual exports
- Most New Zealand HVMS companies are very small by international standards (less than \$5m in revenues) and we have very few large global HVMS companies (above \$500m in revenues)
- New Zealand firms' investment in R&D is well below the OECD average, with our medium and large firms investing less by proportion than their OECD counterparts, while SMEs (fewer than 50 employees) invest more by proportion. This is partly a consequence of the dominance of primary industries, such as agriculture, fisheries and forestry, in New Zealand's economy. These industries are less R&D intensive than the automotive, pharmaceutical, semiconductor, defence and computer hardware industries, which are more prevalent in other OECD nations and increasingly underpin their higher productivity and incomes per capita.

Relative to other OECD countries, these characteristics are holding back New Zealand's economic growth rate in the high-value, highly productive industry sectors that are critical for long-term prosperity and quality of life. Therefore Callaghan Innovation's primary roles are to:

- **Motivate** more people to innovate and commercialise their ideas by creating new HVMS companies and inspiring existing business owners and leaders to build bigger companies
- **Connect** those businesses with the resources and skills they need to accelerate their growth, including access to capital, markets, talent and technology
- **Deliver** research, technical and accelerator services that directly assist companies with the speed and success rate of innovation, supporting the design, production and launch of their new HVMS products and services into global markets and/or innovating their production processes to increase competitiveness.

What we do

Our primary role in the New Zealand innovation system is to:

- Provide research and technical services to support near-market innovation by firms
- Support and coordinate national technology networks including partnering, collaborating and investing
- Assist firms to develop skills and expertise to successfully take ideas to market
- Award and administer R&D grants to firms
- Foster a culture of innovation and build excitement about business growth potential among current and future business leaders

Callaghan Innovation has developed initial strategies to perform each of these three roles and will continue to add to and improve these strategies over time. To be successful, Callaghan Innovation will need to establish itself as a well-informed honest broker in the eyes of both firms and SETD providers nationwide.

Our guiding principles are:

- Be firm-focused and firm-driven
- Prioritise firms that demonstrate commitment to, and potential for, growth
- Invest in services that meet business needs, as shown by firms' willingness to co-invest or pay for them
- Support and expand programmes that other organisations have developed, rather than duplicate existing solutions
- Try out new ideas quickly
- Do more of what works and 'call failure fast' on what doesn't work
- Take a national perspective
- Engage fully with the Māori economy and aspirations
- Collaborate with and support partner organisations
- Provide new services, while minimising competition with existing service providers
- Be transparent and responsive to all stakeholders.

III. Motivating an Innovation Culture

The role of motivating the commercialisation of innovation is possibly the most intractable, as it implies potentially changing human behaviour and deeply held cultural values. However, Callaghan Innovation believes it can effectively motivate more interest in commercialising ideas by targeting two population segments with specific initiatives:

- **Today's innovators:** Entrepreneurs, business owners and leaders who are receptive to creating or growing big HVMS businesses. The message to this segment is "Better by Big – business growth is good and personally rewarding for you and your employees, and it is well within your grasp". New entrepreneurs will be encouraged to 'go for growth' from the earliest days of launching their businesses.
- **Tomorrow's innovators:** Young people at primary, secondary or tertiary education levels who are still developing their interests, discovering their talents, and making life and career choices. The message to this segment is that many exciting and interesting career choices – doing cool things – are in store for kids who study science, engineering, design, and business.

Callaghan Innovation will seek to cultivate engagement with, and enthusiasm for, innovation; challenge people to take risks; and grow ambition. The following table lists the initial programmes that are being introduced to inspire an innovation and commercialisation mindset in these two segments of New Zealand's population.

Segment	'Motivate an Innovation Culture' Programmes
Today's innovators – entrepreneurs, business owners and leaders	<p>Innovation events and forums – thought-provoking information about innovation</p> <p>Innovation information – access to stories, tips, trends and tools from New Zealand and offshore to motivate and inspire</p> <p>Trade missions, tours and site visits – opportunities to see new technologies and best practice in action in New Zealand and offshore</p> <p>Academic Interface Programme – organise a pool of volunteer academics and researchers to meet one-on-one with entrepreneurs for informal discussions and brainstorming. The programme addresses the fact that many firms have limited knowledge of what R&D is all about and how R&D professionals can add innovation value</p> <p>Collaboration with NZTE, NZVIF and NZX – a joint effort to motivate growth aspirations and capabilities among willing entrepreneurs</p> <p>Engagement with the media to promote stories on successful entrepreneurs and create the HVMS equivalent of 'Country Calendar'.</p>
Segment	'Motivate an Innovation Culture' Programmes
Tomorrow's innovators	<p>Futureintech – tools, insights and advice about the exciting career opportunities in technology, engineering and science</p> <p>Internship marketplace – opportunities to work with firms, apply existing training and learn new skills</p> <p>Sponsorship – sponsoring existing and new programmes to inspire innovation, such as the Young Enterprise Trust or an annual 'Take Your Child to Work Day'.</p>

We will also work closely with the education sector at the primary through tertiary levels to explore how a passion for SETD and entrepreneurship can be intensified among young New Zealanders who are still in the education system and represent the entrepreneurs of tomorrow. Where effective programmes already exist, we will support and invest in expanding those programmes, rather than duplicating them with new initiatives.

Callaghan Innovation has had preliminary discussions with three partner organisations about how to raise the aspirations of current business owners and leaders. The CEOs of NZTE, NZVIF and NZX have all expressed willingness to collaborate on unified messages and strategies to motivate growth. Our shared effort will focus on that subset of business owners and leaders who are willing to pursue growth, but may not have the necessary capabilities or aspirations in place yet.

The media can also be a valuable partner in promoting an innovation culture. Callaghan Innovation will encourage the media to highlight successful entrepreneurs and the rewards of business growth in magazines, radio and television.

Another approach for building an innovation culture is to attract to New Zealand multinational firms that establish an R&D presence here. This introduces companies of greater size into the New Zealand economy and helps transfer commercialisation skills into New Zealand as these companies hire and train local employees. Some of these employees will likely later move to other firms, cross-pollinating local firms with the innovative culture of the multinational. This approach will very likely be pursued in future but is not explicitly included in the Business Case due to limits on time and resources. We will keep the multinationals objective in mind and collaborate on any opportunities to attract multinationals to New Zealand that may be identified by the Chief Science Advisor or others, working with NZTE's Capital team, which has responsibility for attracting foreign direct investment.

IV. Connecting Firms to Resources and Support

For a relatively compact country with a small population, New Zealand's innovation system is surprisingly fragmented. It has diverse and often excellent skills and expertise spread across multiple organisations and locations, making it difficult for businesses to identify sources of help for their commercialisation problems. Callaghan Innovation is designing tools and programmes that will more efficiently help firms to identify weaknesses or gaps in their business skills and tap into the resources available, domestically or internationally, to strengthen those weak areas. We refer to this portfolio as Accelerator Services.

Accelerator Services

The driving force in delivering our Accelerator Services will be our newly created Client Solutions Manager (CSM) positions. Over three years we will build a team of 30 CSMs, in partnership with the Customer Managers at NZTE. Each of them will work with multiple individual firms to assess their commercialisation capability and help them to access the help they need to accelerate innovations being brought to market. The CSMs will be supported by expert teams specialising in the services described below. Over time, it is expected that NZTE, Callaghan Innovation, and possibly other government agencies, will move towards a single customer-facing workforce that uses the same training, databases and tools to help firms access the full range of resources available to them.

- **Access to Technology** – Accelerator Services will build a team of technical experts: experienced technically trained professionals who can understand and assess a firm's underlying technology. Their role is to identify the SETD expertise a firm may need, and connect the firm to the appropriate resource. A number of firms have expressed the difficulty they face in finding someone within the New Zealand system, or overseas, with the right knowledge and the time to help them. Most of these technical experts will not be permanent Callaghan Innovation employees. They will be associates, tapped as needed and available, to help firms on specific problems and projects. **Global Expert** is a programme that connects firms to technical experts nationally and internationally. Over time, this technology team will extend Global Expert to a comprehensive, readily accessed database of experts, many of whom will be part of the National Technology Networks described in a later section. In some cases, the required expertise will be sourced from Callaghan Innovation's own Research and Technical Services teams. Another approach, which has been successful in Europe, is the establishment of Business Panels that identify the shared problems of an industry or group of firms and foster collaborative projects to solve those problems.
- **Access to Training** – 'Better By' training courses are developed and offered in conjunction with New Zealand Trade and Enterprise. NZTE's Better by Design and Better by Lean programmes are already available, with NZTE currently rolling out Better by Capital. Subject to market testing, we are looking to introduce Better by IP in 2014 and Better by Market Creation in 2015. The Training team in Accelerator Services also provides access to information about a range of skill development programmes available nationally and internationally. Self-assessment tools will be made available online to allow

Finding the right experts



Tauranga company Prolan gained a competitive advantage in Scandinavia, thanks to being connected with the right experts.

Prolan produces lubricants and corrosion inhibitors made from lanolin, a wax from sheep wool. But Prolan's original product had limited use in cold climates, as it became impossible to use at temperatures below 10 degrees Celsius.

The company was put in touch with AgResearch and Locus Research, who collaborated to enhance Prolan's formulation. As a direct result of the project, Prolan developed a soft grease usable to zero degrees.

The result: Prolan has increased its orders to Scandinavia, and the market is steadily growing.

firms to evaluate their innovation readiness and identify the training available to take their internal capabilities to the next level.

- **Access to Talent** – Many firms mention a lack of skilled employees in New Zealand as their single biggest growth constraint. The team of experts focused on talent will provide links to recruiting capabilities throughout New Zealand and work with the education sector to help translate firms' requirements into curricula design choices made by schools, ITPs and universities, linking closely with the work on driving innovation culture. Through this team, Callaghan Innovation will also provide services that link interns to HVMS firms, or facilitate joint appointments between firms and providers of science, engineering, technology and design (SETD) services. The Talent team will build a network of experienced entrepreneurs and investors who may be willing to mentor a business owner or act as an interim executive or director, where there is no conflict of interest, to complement the Academic Interface Programme. This 'Freelance Army' will tap the wealth of expertise among successful returned expatriates and foreigners who spend time in New Zealand and wish to stay active in the business world on a part-time basis.
- **Access to Capital** – This team will have a sound understanding of the various sources of capital available to businesses and will be able to link an entrepreneur to those sources. They will also help firms polish their skills in making pitches to investors, working with NZTE and its Better by Capital initiative. This team will coordinate its programmes with the initiatives of NZVIF and other providers of capital, including banks, venture capital firms, private equity firms, and angel investor groups.
- **Access to Markets** – Accelerator Services will include a small team that is closely aligned with NZTE, to ensure HVMS firms can access the knowledge they need of potential markets and competition for their products and services. As one example, Callaghan Innovation will source help from NZTE's market research function to serve the needs of the companies engaging with our CSMs. As we work with more firms and different industries, we will identify the types of marketing assistance that firms need and locate resources that can help them. Access to this information will eventually be through online channels, such as the online services described above.

Capital-raising challenges

"Raising capital in New Zealand is very difficult. Our sales this year will be \$35m with EBITDA of \$3m and the company is on target for sales and 40% ahead on profit for the first four months. Our projected growth target to \$50m revenue in 24 months is conservative as it is easy to continue to scale this company into a very large market.

Based on our positive track record, both with this business and our past businesses, we went to the market late last year to raise NZ\$4m.

To cut a long story short, we have received no offers in New Zealand to date, despite presenting our proposal to venture capitalists, angels and banks. We opened up the opportunity to offshore investors and, as expected, we have several interested parties but they all want to BUY the company."

- Source: A top New Zealand entrepreneur

NZTE as Key Partner: New Zealand Trade and Enterprise and Callaghan Innovation have complementary roles, each making a distinctive contribution to supporting firms to innovate, grow and succeed internationally. The combined offerings of NZTE and Callaghan Innovation work together to support firms' R&D activities, improve operations and productivity, develop talent, access capital, develop effective growth strategies, create and access markets, and connect with global opportunities.

Callaghan Innovation and NZTE are working together to align our product and service offerings across the key areas of access to technology, training talent, capital and markets. Callaghan Innovation will frequently refer firms to NZTE services and training programmes. The transfer of the government-funded Incubator Support Programme from NZTE to Callaghan Innovation began in November 2013. Callaghan Innovation will also administer the Repayable Grants Programme for technology-focused incubators. These incubator grants are discussed further under Grants Services below.

The two agencies will share client segmentation and engagement processes and systems as much as possible, in order to provide clients with a consistent experience and to support the 'No Wrong Door' principle. Both organisations will co-invest in shared infrastructure, such as a combined customer relationship management system. In addition, Callaghan Innovation and NZTE will share staff training programmes so that staff understand the role of each organisation, the service offerings, and how to leverage their respective capabilities.

Online Services: An especially important and fundamental new initiative for Callaghan Innovation is a project code named Avatar, in which state-of-the-art social media and cloud-based search techniques will be used to build an online site for access to many of the accelerator services listed above, and the research and technical services and technology networks described in a later section. Avatar will enable a dynamic, cloud-based community of firms and service providers to connect with each other and share experiences, leads and information. Individuals can post résumés and seek jobs or internships, while firms can identify the expertise they need. Avatar will require a high level of IT innovation and expertise within Callaghan Innovation to develop and maintain this vibrant source of information, dialogue and contacts.

When scoping the potential product and service offering of Callaghan Innovation, it became apparent that Callaghan Innovation needed to support firms and other communities of interest by providing:

- Intermediary services and improved connectivity and expertise in the innovation system
- Facilitation for industry-led research and innovation consortia
- Support for the formation of innovation clusters
- Access to business R&D grants
- Access to relevant technical and commercialisation expertise, information, equipment and facilities
- Mechanisms to foster the mobility of staff and students between universities, CRIs and businesses.

Callaghan Innovation's ability to make a significant impact by using traditional delivery channels for products and services based on these requirements is limited by the level of resources available to us. However, provision of services via an online channel will not only serve the firms that Callaghan Innovation's CSMs engage with, but will also enable Callaghan Innovation to reach a much larger audience.

Callaghan Innovation's ability to provide improved connectivity and collaboration, and to enable firms to participate more fully in the innovation ecosystem, requires more than a traditional website to enable the access of static content. Improved connectivity and collaboration can be achieved via the facilitation of a dynamic cloud-based community.

Our initial assessment is that this does not require new IT platforms or expert systems, but does require leveraging existing technologies and enabling easier access and management of these for users. This assessment also indicates that this approach is likely to be self-sustaining and more efficient than the traditional methods.

We recognise that the Avatar project is technically quite complex and, therefore, potentially risky to accomplish. To minimise the risk, and also make some initial capabilities available to firms

R&D Grants



Government grants were critical to fruit and vegetable-handling machinery maker Compac Sorting Equipment's expansion into a new market.

A \$3.3m R&D project grant helped Compac develop imaging software and specialised sorting equipment to grade smaller fruit.

Compac's general R&D programme also received a \$1.6m technology development grant.

These grants allowed the company to: make a big investment in R&D by taking out some of the financial risk; grow faster and take on more staff; and speed up R&D by working with research organisations.

The result: Three cherry sorters worth millions sold in the US and Chile, with Compac expecting sales to grow significantly.

quickly, the Avatar project will be developed in modules. The project will be managed in line with best practice guidelines set out in the Governance and Oversight of Large Information Technology Projects by the Office of the Auditor-General in 2000.

Grants Services: Another important set of services which Callaghan Innovation already provides is the issuing and administration of several types of government-funded grants. These grants support firms to undertake additional R&D over and above the investment they would make without grant funding. Callaghan Innovation already has in place a team (transferred from MBIE) with extensive expertise in assessing a firm's readiness to take advantage of various government-funded grants. This team will continue to administer the Government's Business R&D Grants funding, through the new investment categories announced in Budget 2013:

- **Growth grants:** significant grants of up to \$5m per year to support a programme of R&D activity for three years (alongside 80% investment from the business)
- **Project grants:** project-focused grants, aimed at businesses early in their R&D investment activity, or to support collaborative projects (alongside 50-70% investment from the business)
- **Student grants:** to support undergraduate and graduate students to work in a commercial R&D environment
- **Incubator Support Programme:** provides operational funding to founder-focused incubators. These grants increase the probability that entrepreneur-initiated companies receiving services from the incubator will grow into successful companies. Currently seven incubators receive total annual funding of \$4.6m through this programme.
- **Repayable Grants Programme:** provides grants to technology-focused incubators in order to create and nurture new businesses based on promising areas of technology. This new programme will ramp up to providing 24 grants annually of \$450,000. These grants must be repaid once the new businesses begin generating revenues.

The awarding of grants for firms and incubators provides a clear indication of the types of businesses and industries in New Zealand that are investing in R&D and developing technology-intensive new products. The specific work undertaken using grant funds is strictly confidential to the receiving organisation, however, Callaghan Innovation will encourage all New Zealand's R&D providers to use publicly available data on grants utilisation to better align their capabilities and services with the help that businesses need.

Section V below discusses the research services Callaghan Innovation will offer as part of New Zealand's total R&D capability.

Service Mix: The portfolio of services described above was chosen from the recommendations of reports on business needs and barriers to commercialisation (including *Powering Innovation* in 2011 and an MBIE-commissioned survey of business demand for innovation services in 2012). The services also reflect the experience of internal experts from both the grants administration and R&D sides of the business; evidence of the effectiveness of New Zealand and overseas policy initiatives and levers; and input from extensive discussions with firms held by Board members and senior management of Callaghan Innovation..

Different options for the service mix were assessed, given the financial constraints. The final portfolio represents, in the view of Callaghan Innovation's Board and management, the best balance of short and long-term impact activities possible within the budget available. It is a starting point that will be continually refined and adapted in the market, within a 'call failure fast' framework, so the portfolio as a whole is continually adjusted to improve performance and results.

Wherever we identify an existing service or programme established by a third party in the private or public sector, our approach will be to assess whether that programme already serves the needs of New Zealand's innovators and how we can help to support and expand it, rather than creating a new programme at Callaghan Innovation. In some cases we may help to consolidate multiple existing programmes to achieve greater impact and productivity than each is achieving on its own. With this approach, we will help to connect nationwide capabilities, reduce fragmentation, and leverage investments already made. This philosophy applies to the accelerator services described above and the research and technical services discussed in the next section.

V. Delivering Research and Technical Services

The third role of Callaghan Innovation has been the most challenging to define as it requires a sound understanding of the needs of firms, both revealed and emerging; research and development capabilities inherited from the former IRL; an appreciation of the SETD expertise in other organisations such as universities, ITPs, CRIs, industry and other research organisations; and insight into the intricacies and history of different forms of funding that have sustained the country's R&D capabilities to date.

A. Research and Technical Services

In keeping with its principles of collaboration and national perspective, Callaghan Innovation will focus its internal research and SETD activities on where they will directly impact the ability of a firm to bring a product from idea to launch in the fastest possible time, and/or improve its manufacturing processes to ensure its products are priced competitively and performing optimally. This means Callaghan Innovation will develop world-class research and technical expertise to support near-market innovation in fields such as:

1. **Research and expertise in product development processes and procedures.** Callaghan Innovation will build, over time, a team of experts who can assist firms with planning and executing the series of steps required for successful product development. Project management expertise is part of this capability.
2. **Customised research and product development assistance** to solve specific process or product-related problems for firms. Callaghan Innovation's SETD experts will directly help firms to solve their toughest problems.
3. **A 'one-stop shop' source of expertise about the regulations and compliance** issues required for various types of products in foreign markets. This service means companies will not have to figure this out for themselves or, through ignorance, make costly mistakes in product design, documentation or packaging. Because of the wide range of regulations and regulatory environments, it is likely that Callaghan Innovation will initially specialise in certain product categories and identify third parties with expertise in others.
4. **Machine shop and workshop facilities** that firms need to create prototype products or evaluate manufacturing equipment. This capability will include additive manufacturing equipment and expertise, sometimes linked with other providers.
5. **Testing and failure analysis services**, through which

Pilot plants



The FoodBowl, a joint venture between Callaghan Innovation and ATEED, has helped premium chilli maker Culley's grow from a hobby to a commercial company about to start exporting.

The FoodBowl's high-tech equipment and specialist staff helped Culley's to produce more chilli more quickly, improve productivity and efficiency, and maintain consistency.

Production time was cut by about three-quarters and potential output lifted from about 1,500 bottles a day to over 6,000.

The FoodBowl's service also included help with business development, such as diversifying production channels, and advice and training on technical issues, such as testing and bottle filling.

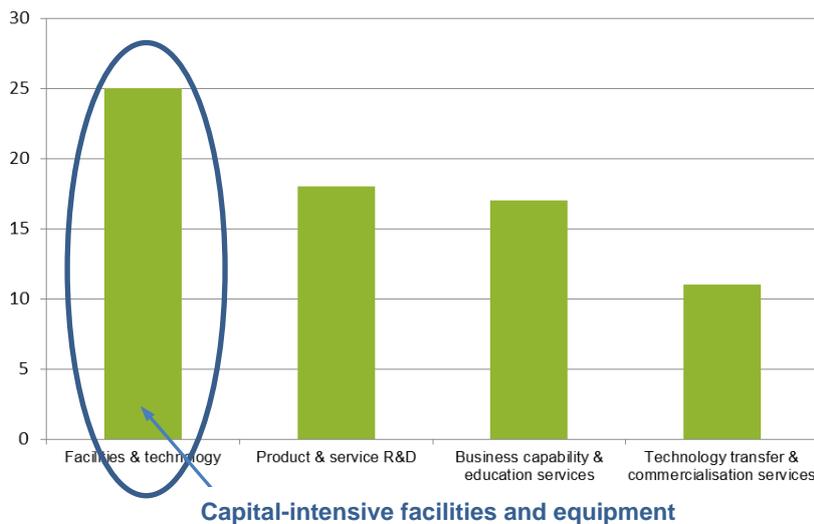
The result: Culley's recently signed a large Australian distribution deal.

firms can quickly understand the cause of product or component performance problems. Callaghan Innovation will make available testing equipment and expertise that individual firms could not afford and would only occasionally use.

6. **Pilot plant research capability and facilities** to assist a firm in scaling up its manufacturing from prototype to production quantities. The GlycoSyn, SuperEx and FoodBowl facilities are the three existing examples of this service but more pilot capability may be added, driven by the needs of firms in various industries. Note that, unlike the original FoodBowl assumptions, there is no expectation that these pilot plant facilities will generate a profit, or break even, in their own right. Their success will be measured by the successful commercialisation ramp-up of the firms that use the pilot plants.
7. **Open lab services and research expertise** that offer shared use of physical locations, providing fit-for-purpose short-term accommodation for businesses wanting direct access to technical specialists, equipment, advice and services that are world-class, professional and business-friendly. In addition to offering our own open lab facilities, Callaghan Innovation, through its accelerator services, will link firms to the facilities available at other institutions.

These services have been identified based on the research commissioned by MBIE in 2012, which surveyed firms on their existing approaches to innovation and their views on how an Advanced Technology Institute could be helpful to them. One finding from that research is shown below.

Possible roles Callaghan Innovation could play



In recent months more discussions have taken place with dozens of individual firms that confirm needs for these services. However, more work remains to be done to validate these services and establish priorities. As the costs of developing these research and technical services are better understood, it is likely that current funding will not be sufficient to fully develop all seven service categories. Instead, there will be a focus on doing well in a shorter list of the services firms most need and are willing to purchase. An important criterion for Callaghan Innovation when offering any technical service is that multiple firms are creating a demand for that service and are 'putting their money where their mouth is' by paying, at least in part, for the cost of the service.

Currently Callaghan Innovation has a mix of product development and more fundamental science and research programmes. It is anticipated that the majority of the new Research and Technical Services (RTS) teams will be drawn from within our current R&D staff. Teams whose research is primarily fundamental and early stage are a better fit with research-focused universities or CRIs and a transfer process is already underway.

While these research teams are better located in universities or CRIs – so that they can continue to participate in contestable funding rounds and be a part of wider research programmes and cultures – their underlying capability and pipeline of new discoveries remains important to Callaghan Innovation. Research is critical to a sustainable innovation system and Callaghan Innovation requires access to the research capabilities across all research organisations.

Callaghan Innovation will continue to have access to the capability and discoveries of relocated research teams in a number of ways:

- These teams will be members of the National Technology Networks, which Callaghan Innovation will establish and lead. The opportunities for coordination and alignment between Callaghan Innovation – with our focus on providing more applied research and technical services – and these research teams could potentially be further strengthened through the design of, and involvement in, the National Science Challenges
- By helping firms to access the most appropriate SETD services across the innovation system, our Client Solutions Managers (CSMs) will identify opportunities for these research teams to contribute to solutions for firms
- Appropriate partnership and governance arrangements around these teams, including possible joint venture arrangements, will be agreed with the receiving university or CRI to ensure continuing access and alignment.

In addition, Callaghan Innovation will retain teams where research directly supports our more technical services – for example, glycotherapeutics research, which will support the GlycoSyn pilot plant services.

Callaghan Innovation will establish the performance expectations for all RTS initiatives to ensure the expected benefits are being delivered. Explicit criteria will be developed for the success of a programme, against which objective decisions can be made in the future on cancelling or continuing such R&D programmes.

It is anticipated that, in that open dialogue process, additional research functions may also be identified as a good fit with universities or CRIs. In general, the approach would be to move these functions to where their value could be maximised. Any contestable funding allocated to such research would also be transferred.

The restructuring of RTS in Callaghan Innovation also represents an opportunity to reduce the overhead cost structure of the organisation. Some of the non-R&D roles are likely to transition to roles in the Accelerator Services Group. Any change process will be appropriately managed. It is likely that the overhead costs of the new Research and Technical Services function in Callaghan Innovation will have at least a 10% reduction in overhead costs, compared with the former IRL structure.

Contestable Funding

This business model also addresses the long-standing concern about competition between Callaghan Innovation and universities or CRIs for contestable science funding administered by MBIE. Callaghan Innovation has made a strategic decision to not pursue contestable funding as a lead researcher in the future, so that it can engage in a fully collaborative relationship with all New Zealand's SETD providers. There will likely be situations where a third-party lead researcher submitting a contestable funding proposal requires skills and/or equipment from Callaghan Innovation as a sub-contractor, which Callaghan Innovation will, of course, provide. Our role will be to support the proposals of the broader R&D system, rather than compete with them. Without contestable funding income, Callaghan Innovation's services will be sustained by funding from the Government for strategic investment in capability, and by commercial revenues. If firms do not value a particular technical service provided by Callaghan Innovation enough to pay for it, at least partially, then that service is unlikely to continue.

The outcome of the contestable funding round for 2013 was that Callaghan Innovation was awarded only one of 14 submitted proposals. The one award was for superconductivity, whose activities are likely to transfer to Victoria University of Wellington. This outcome represents a shortfall to budgeted revenues of about \$4.3m. Callaghan Innovation will sustain the RTS organisation by moving \$4.3m in operating funds from Output Classes One and Two to Output Class Three to ensure R&D capability is sustained in the organisation, though not necessarily for the same projects that applied for, but did not receive, contestable funding. Some new accelerator services will be introduced more slowly as a result.

MBIE officials indicated a willingness to consider re-allocation of Callaghan Innovation's existing multi-year contestable funds, if the original proposal was for work that is no longer well-aligned with the new Callaghan Innovation direction, as set out in this Business Case.

Gracefield Innovation Precinct

Our proposed scenario is that the Gracefield site will become an innovation precinct including Callaghan Innovation's Research and Technical Services specialists, HVMS firms (13 of which already have tenancies on the campus), and the research teams transferred to universities and/or Crown Research Institutes. Some transferred staff might hold joint appointments between Callaghan Innovation and their new employer. The precinct organisations will share facilities, such as the cafeteria, machine shops and meeting rooms, creating 'water cooler' exchanges of ideas between the different entities on the campus.

The innovation precinct will enable firms to collaborate and build scale with each other and SETD providers, both nationally and internationally, to improve knowledge and skills, deploy technology and develop a cohort of growth-oriented firms. It will build a critical mass of HVMS businesses and science, engineering, technology and design providers focused on taking full advantage of domestic and international opportunities, including integration into global supply chains and opportunities arising out of Asia.

It is expected that Callaghan Innovation will run the innovation precinct, engage a property developer in its long-term design, and access capital from tenant organisations for building improvements. In addition to the firms currently located at Gracefield, Callaghan Innovation will seek out 1-3 well-regarded, successful high-value firms willing to relocate parts of their business to Gracefield as anchor tenants for the site. Such firms can also act as valuable motivators to the earlier stage companies in the precinct, providing a daily reminder of what is possible.

This innovation precinct concept allows for co-location and collaboration between Callaghan Innovation's retained and expanded firm-focused product development teams and the more science and research-focused efforts of the participating universities and CRIs. It lets Callaghan Innovation focus on its firm-driven research and technical services; preserve the teams and the value of the research capabilities that were in CIRL; and avoid extensive relocation or redundancies for employees.

The concept of an innovation precinct at Gracefield will require substantial investment in the buildings and facilities on the campus, and a dedicated business case for the site will need to be developed. However, the precinct proposal fits well with the economic development plans for the Hutt Valley via Hutt City's Vision Seaview Gracefield 2030¹;

Product development



Long-term collaboration with New Zealand Pharmaceuticals (NZP) led to the development of a product worth millions of dollars.

In 2003, scientists in Callaghan Innovation's Carbohydrate Chemistry group developed a process that the company licensed and scaled up to produce a carbohydrate known as ManNAc, used to manufacture various drugs and medications.

The result: NZP sells ManNAc to biotechnology companies around the world, a business that has made the company millions and led to the construction of a new manufacturing facility.

¹ <http://www.huttcity.govt.nz/en/Your-Council/Projects/Vision-Seaview-Gracefield-2030/>

the Technology Valley® Development Group projects²; and the community-led initiative Technology Valley³. These three projects recognise the potential of the Seaview Gracefield area to significantly increase its role as a major industrial, commercial and advanced manufacturing hub for the Wellington region and for New Zealand.

In early 2011, the former IRL prepared site development plans for the Gracefield campus. These plans were focused on enabling the site to deliver on the Government's National Science priorities, to provide specialised working areas and facilities to meet the operational requirements of IRL and its tenants, and to become a technology hub for the region. The Gracefield campus plans were developed within an investment cap of \$20m, appropriate to that more limited brief. These plans need to be reviewed in light of the more ambitious aspiration for the Gracefield site as an innovation precinct.

The investment required to deliver the innovation precinct vision will be significantly greater than the cap set for the Gracefield campus development. Recent examples of proposed developments include Auckland University's development of the former Lion Breweries site in Newmarket, Auckland and the Lincoln Hub. Auckland University's Newmarket development work in the next five years is estimated to cost \$86m (excludes \$67m purchase of site). Similarly the Lincoln Hub (agricultural research and education facility to be sited at Lincoln, near Christchurch), which has been developed by a partnership of Lincoln University, DairyNZ and Crown Research Institutes AgResearch, Plant & Food Research, and Landcare Research, sees AgResearch investing \$100m over four years.

Callaghan Innovation will work with local government, developers, businesses, iwi and the community to develop the detailed business case for the innovation precinct.

Incubators and 'Open Labs'

Currently NZTE manages the MBIE-funded Incubator Support Programme, which is now transferring to Callaghan Innovation. The purpose of the Incubator Support Programme is to enable the survival and development of early-stage, high-growth businesses through the provision of partial funding for high-quality business incubators. The incubator services are targeted at entrepreneurs, and start-up ventures with high-growth, export potential. The Incubator Support Programme provides funding assistance to qualifying incubators; promotes best practice among incubators; and helps facilitate connections between incubators and other organisations with an interest in incubation locally and internationally.

Callaghan Innovation's focus on providing world-class capability in product development, and in particular, its Open Labs initiative, has synergies with the Incubator Support Programme. Strong linkages between the Open Labs and incubators will accelerate the creation of new HVMS firms by ensuring entrepreneurs are able to easily access technical specialists, equipment and services within a disciplined new product development process. This customised product development assistance will help entrepreneurs with prototyping of products, testing and failure analysis, and ensure products are manufacture-ready.

The table overleaf summarises the implementation plan for establishing Callaghan Innovation's research and technical services and transforming Gracefield into an innovation precinct.

Once the Gracefield innovation precinct is established, it will represent just one of a national chain of innovation precincts located throughout the country and specialising to some extent in different industries. The list of current and anticipated innovation precincts is shown in the second table below.

Current Science and Innovation Hub Activity

² <http://www.huttcity.govt.nz/en/Our-City/Science-and-Technology-in-Hutt-City/Technology-Valley-Development-Group/>

³ www.technologyvalley.co.nz

Hub	Detail	Establishment date
Wynyard Quarter (Auckland)	This is a local council initiative for an innovation precinct (still in the development stage). ICT focus.	Ongoing. Some tenants in (e.g. ASB), but proponents still considering operator and governance issues.
Waikato Innovation Park (Ruakura)	Waikato Innovation Park was established to be the focus for agri-technology innovation and an AgBio cluster in the Waikato region. It is home to FoodWaikato, the regional pilot-scale spray drier that is part of the NZ Food Innovation Network. Located next to AgResearch at Ruakura, and close to the University of Waikato and the Waikato Institute of Technology.	Established.
Food Centre (Palmerston North)	In 2009, research providers in Palmerston North (Massey University, BioCommerce Centre, Riddet Institute, AgResearch, Plant & Food and Fonterra) launched a centre for food research and innovation through establishing a website under the 'Food Innovation NZ' label. Spurred on by the development of the Lincoln Innovation Precinct, this concept has now been reinvigorated (supported by Palmerston North City and Manawatu District Councils) and is being re-launched as the Food Centre.	Website established 2009. Concept to be re-launched July 2013.
Gracefield Science Park (Hutt Valley)	Early 2011, the Hutt City Council proposed a science and technology park in Gracefield, alongside Industrial Research Limited's (IRL) Gracefield campus.	On hold, pending decisions on Gracefield campus by Callaghan Innovation.
Lincoln Hub (Canterbury)	In April 2013, Ministers Joyce and Guy unveiled concept plans for a world-class agricultural research and education facility to be located at Lincoln, just outside Christchurch.	Business case may be submitted by the end of the year. Operational changes likely to begin sooner than physical changes.
ChIP (Chch)	Early 2014? ICT and knowledge-based innovation precinct in Christchurch.	Potentially a temporary hub established in early 2014 for start-ups. Anchor tenants in potentially from late 2014/early 2015.
Current Science and Innovation Hub Activity (continued)		
Hub	Detail	Establishment date
Health precinct (Chch)	2014? The master plan for the health precinct in Christchurch shows areas for research and innovation. The innovation section will largely be health-related companies, including health ICT. The research section planned to include the University of Otago and the University of Canterbury (UC).	Master plan delivered in June. Establishment likely in 2014 (tbc).
UC's Regional Science and Innovation Centre (Chch)	UC's business case includes a proposal for a centre for learning, teaching, research and innovation in science and science education.	Medium to longer-term.
Tait Campus (Chch)	Tait Communications has intentions for a campus development at the Wairakei Road site for technology-based firms.	Unknown.

The transition of our SET capabilities and associated alignment with partner organisations is the most demanding challenge facing Callaghan Innovation in the next 12 months, as it requires cooperation between multiple organisations, and respect and consideration for the employees whose roles or employment status are affected. However, Callaghan Innovation believes the transition provides the clarity and focus that is critical to achieving our mission in the long term.

This re-shaping of the SETD role of Callaghan Innovation represents an exceptional window of opportunity to create a very different innovation entity than has ever existed in New Zealand. The Board of Callaghan Innovation and the Chief Science Advisor to the Prime Minister are supportive of the new direction. The decision to radically restructure the former IRL site at Gracefield will be as courageous and important as the decision to launch Callaghan Innovation itself. It is an approach that fits the widely expressed needs of firms and addresses the concerns

of universities and CRIs. In addition, it creates a compelling rebirth of the Gracefield site as a hub for innovation in New Zealand.

VI. Customer Segments and Marketing for our Services

Even with the best possible accelerator services and research and technical services in place, Callaghan Innovation will need to get the word out to its target market to generate demand for its services. There has been significant discussion on whether Callaghan Innovation should give priority to certain kinds of firms and, if so, which ones. Firms in need of commercialisation help can be categorised by size, industry and innovation maturity. The opportunity for Callaghan Innovation to have an impact is quite different for a large well-established firm already operating in global markets, compared with a start-up company operating within an incubator. A food and beverages firm has very different needs from a software company.

NZTE has already done substantial work on segmenting firms in New Zealand and has identified 500 firms that have potential for international growth. NZVIF also has expertise in, and knowledge of, the venture capital and angel investment communities. There are sets of firms working within incubators or at the commercialisation units of universities, all of which can benefit from using Callaghan Innovation's services. The set of firms that have already received grants from Callaghan Innovation represent another target group.

In the first 2-3 months of implementing this Business Case, Callaghan Innovation will partner with NZTE, and be informed by NZVIF's knowledge of the venture investment communities, to identify those firms that are demonstrating strong aspirations for growth. Our focus will be on the firms most willing to take advantage of Callaghan Innovation's services and where success stories can validate our services and inspire other firms to engage with us. The 'sweet spot' will be firms that are already seeking market access help from NZTE and help in raising capital. Where these firms also need access to technology and more applied research and technical services, there is a powerful opportunity to bring together the capabilities of several government entities in supporting a firm's growth.

Once the priority firms are identified, Callaghan Innovation will connect them to the full range of available resources, expertise and grants, through the new CSMs. Other marketing approaches will be used to reach a broader cross-section of firms, including web-based approaches and publicity at events etc. Callaghan Innovation will work with firms of all sizes. However, large firms are more likely to have internal capability, which makes them less dependent on our services. SMEs are recognised worldwide as being the dominant drivers of job creation, breakthrough product ideas, and therefore economic impact. For this reason, Callaghan Innovation will focus particularly on reaching out to SMEs.

Whenever a marketing initiative fails to gain much response, it will be quickly discontinued, consistent with our 'call failure fast' principle. It will be important to analyse why a particular approach did not work so that the knowledge can be applied to alternative strategies. Failures are only helpful when something useful is learned from them and successful alternatives are produced, otherwise they are just failures.

Networking for success



A partnership between the sheep meat industry, research organisations and Callaghan Innovation is producing world-leading meat processing robots.

The Ovine Automation Consortium aims to lift industry productivity and address labour shortages.

Along with food processing company Milmeq and the Meat Industry Association (MIA), Callaghan Innovation helped facilitate the consortium's creation and developed some research ideas.

Funding comes from both government and industry – nine businesses plus MIRINZ (jointly owned by MIA and Beef + Lamb NZ).

The result: The robots operate at several plants and promise to contribute to higher returns, longer shelf life and a more internationally competitive industry.

VII. National Technology Networks

Another major Callaghan Innovation initiative is the formation and development of proposed National Technology Networks. During an in-depth review of Callaghan Innovation's internal R&D capabilities, it emerged that there were several areas of SETD expertise that provided the scientific and engineering knowledge essential to support firms in one or multiple high priority industries. The table below shows a preliminary list of industries (columns) and possible technology networks (rows).

It was clear during the SETD Alignment project that New Zealand has significant or excellent capability in each of these technologies, although that capability is spread across teams or individual experts in multiple organisations and locations. The intent of the National Technology Networks is that these networks of scientists, engineers, technologists and their related equipment could be managed, coordinated and funded in a more strategic way to ensure current and emerging New Zealand firms have depth and breadth of innovation to draw upon and access easily. Callaghan Innovation's Research and Technical Services and the research teams transferred to universities and CRIs will form part of these networks.

	INDUSTRY OR SERVICE SECTORS (example products and services)	FOOD & BEVERAGE Processed foods, nutraceuticals, innovative foods & beverages, packaging	HEALTH Medical devices, pharmaceuticals, diagnostic testing, animal health, genetics & breeding	SPECIALISED MANUFACTURING Automation, controls, sorting and processing equipment for multiple industries	INFORMATION AND COMMUNICATIONS Audio, wireless & navigation, digital entertainment, telecommunications, education tools	CONSTRUCTION Wood products, construction services and methods, speciality materials e.g laminates	OTHER*	Indicative partners involved (see key)
National Technology Networks	Applied chemistry & biotechnology	✓	✓					AUT, CI, LU, Malaghan, MU, NZFIN/FoodBowl, PFR, Riddet, Scion, UA, UC, UO, VUW
	Advanced materials		✓	✓		✓		AUT, BRANZ, CI, MacDiarmid, TIDA, UA, UC, UW, VUW
	Robotics & automation	✓	✓	✓				AgR, AUT, CI, LA, MU, UA, UC
	Imaging & sensing	✓	✓	✓		✓		CI, GNS, LA, DTA, PFR, UA, VUW
	Food Technology	✓						AUT, CI, MU, PFR, Riddet, UO
	Digital technologies & software		✓		✓		✓	AUT, CI, DTA, LU, LA, MU, UA, UC, UO, UW, VUW
	Data processing & modelling			✓	✓			AUT, GNS, MU, UA, UC, UW, VUW
	Other *							
	* Other sectors and technology networks refer both to those existing but not yet identified, and to those newly emerging and future sectors and networks. Both of these will become clearer and be incorporated over time; equally, some existing networks and sectors may be of lower priority in the future.							
	KEY: AgR-AgResearch, AUT-Auckland University of Technology, BRANZ-Building Research Association of New Zealand, CI-Callaghan Innovation, DTA-Defence Technology Agency, HERA-Heavy Engineering Research Association, LA-Lincoln Agritech, UO-University of Otago, LR-Landcare Research, LU-Lincoln University, MU-Massey University, NZFIN-New Zealand Food Innovation Network, PFR-Plant and Food Research, TIDA-Titanium Industry Development Association, UA-University of Auckland, UC-University of Canterbury, UW-University of Waikato, VUW-Victoria University							

The table shows a preliminary identification of organisations that are undertaking research or development, related to each network. The first networks will focus on food technology, information and communications technologies, sensing technologies and advanced materials. Callaghan Innovation is appointing research and technically-literate network managers tasked with identifying the nationwide components of the selected networks, identifying any gaps, linking to any offshore institutions related to a network, and generally promoting and supporting the teams that make up a network. These networks could become a framework for a national science and innovation strategy that can help to define a more strategic approach to funding, rather than making one-off decisions on individual proposals.

The network managers will initially focus on attaining a sound understanding of the science and research skills and projects underway in each area across New Zealand, and will build relationships with the relevant research institutions to ensure this information remains current. We will use this information and work closely with research organisations, such as Science New Zealand, universities, ITPs and CRIs, to define and select future NTN that will meet New Zealand businesses' innovation priorities. The information will also be used in online services to educate Accelerator Services staff and to assist firms with connecting to the relevant research and technical services.

The next step will be to build greater connection and community amongst those research institutions that are members of each NTN, and the industry organisations and firms for whom the network is relevant. We anticipate the NTNs will provide an efficient mechanism for engagement with the National Science Challenges. Ultimately, the NTNs provide the environment for the member research institutions and client firms to explore new organisational structures and co-funding models that provide improved alignment and stronger pipelines of commercially relevant discoveries spanning both research and technical solutions.

We will look to overseas experience with network-like structures, such as those operated by Germany's Fraunhofer Institutes and the Danish Innovation Networks, to inform the development of NTNs in New Zealand. Like New Zealand, these countries have also seen the opportunity to better connect the research and technology skills distributed across their regions, in order to help firms to access the expertise needed for innovation. However, we need to be mindful of the particular structure of our HVMS sector – notably the absence of a large number of firms of global scale that can act as foundation and funding partners – and how this might impact the design, funding and evolution of 'fit for purpose' NTNs in New Zealand.

The structure of R&D funding and mix of R&D providers in New Zealand also differs from structures in other countries. These differences are important to consider when introducing commercialisation concepts that have been successful overseas.

Networks will, of course, evolve constantly over time – some networks will become obsolete and new networks will emerge as science breakthroughs generate new technologies and new industries. Sustainability of any given network will ultimately rely on measurable firm involvement. Membership in networks will also evolve, as member organisations or individuals move into new areas of research, leaving or joining a network as a result. The Board will carry out a formal review process for all networks to ensure they continue to add value.

To be effective, the network managers need to be highly regarded in a science or engineering field in their own right, to have a well-developed network and reputation in the R&D community, and have the interpersonal skills to forge collaboration across networks. They also need to have a good understanding of business needs so that the networks remain well-aligned with commercialisation priorities. These roles, along with the CSMs, will be among the most important and high impact operations positions in Callaghan Innovation.

Note that the research and technical services offered by Callaghan Innovation will be just one part of broader national capabilities. Many of New Zealand's CRIs and corporations have internal product development equipment and staff. Callaghan Innovation will have a clear line of sight to the full range of product development services across New Zealand and through its CSMs will

connect firms to those services. Examples would be networking with providers of 3D printing capabilities at Otago Polytechnic, or sending firms to the mechanical pulping, screening and cleaning plant at Scion for developing innovative wood products.

National Science Challenges

The Callaghan Innovation Business Case connects directly to the National Science Challenges (NSC). The challenges, especially Challenge #10: Science for Technological Innovation, have huge potential to further the commercialisation of innovation across many industry sectors. Maintaining a clear line of sight to the needs of firms and the realities of global competition will ensure the challenges achieve their potential to drive not just science, but the transfer of science to commercially viable products.

The formation and evolution of the National Technology Networks could be considered an integral element of implementing this challenge, as they will draw together researchers and end-user businesses that will support the development of collaborative work programmes within the challenge framework. Work done on other challenges will likely also be carried out by the research teams that make up the networks. Callaghan Innovation anticipates taking a proactive leadership role in Challenge #10 in particular, and will align its Research and Technical Services and the National Technology Networks to achieve the NSC objectives.

VIII. Domestic and International Partnerships

The mission of Callaghan Innovation and the goals of this Business Case cannot be achieved without active engagement by many institutions and individuals in both the government and private sectors. Reference to these partnerships has been made throughout this Business Case but it is worth discussing the role of partnerships as a specific strategy.

Domestic Partnerships: The mission of Callaghan Innovation is the shared mission of all New Zealanders. From entrepreneurs to government officials, to KEA members living overseas, to high school students making career choices – all New Zealanders have the potential to impact the commercialisation of innovation and its economic impact. The importance of NZTE as a partner has been raised above. However, the following organisations are also particularly important partners:

- Universities, their commercialisation units, Institutes of Technology and Polytechnics (ITPs), industry research organisations, Centres of Research Excellence (CoREs), CRIs and private research organisations will be the backbone of the National Technology Networks that form the collective national SETD capability in each field. Callaghan Innovation relies on these organisations to share their capabilities in databases accessible to firms; to adapt their research methodology to the speed and responsiveness needed by firms; and to work collaboratively on determining where new investments in expensive research equipment and expertise should be made.
- Organisations that provide capital are important partners for Callaghan Innovation, since access to capital will frequently be essential for firms to invest in SETD capabilities and growth. Banks, venture capital and private equity firms, NZVIF, angel investors and the New Zealand stock exchanges, such as NZX, are all critical to funding the growth of HVMS firms. Callaghan Innovation will maintain close relationships with the financial sector to be able to direct firms appropriately to these sources of smart capital.
- KiwiNet and other commercialisation partners will be important and will link with Callaghan Innovation to provide investment panel services to evaluate start-up innovations for firms.
- Economic Development Agencies (EDAs) play a critical role in stimulating sustainable economic development and increasing prosperity in regional and local communities. Callaghan Innovation is working with EDAs to identify opportunities to partner on initiatives that will support the commercialisation of innovation by firms in the regions.

Callaghan Innovation is collaborating with the EDAs to ensure that its services are accessible to firms.

- Policies and programmes established by government through MBIE and MFAT, and initiatives of the Prime Minister's Chief Science Advisor, provide another driving force in accelerating commercialisation. Callaghan Innovation expects to be an operational arm of these policies, and also a source of feedback and expertise to help guide them.
- Working closely with tertiary education providers on curricula and career pathways, including innovative internships, will be critical to ensuring technical graduates meet the current and future needs of firms in New Zealand.
- Constructive engagement with the media is an important means by which Callaghan Innovation can keep the importance of HVMS business growth in the public eye, and communicate success stories that encourage venture capital investment and inspire entrepreneurs to pursue growth strategies.

International Partnerships

- Building on the Joint Science and Technology Cooperation Committee meetings with the European Union in Brussels, Callaghan Innovation will be the single point of contact into New Zealand firms for EU networks such as EEN, EUREKA, EraSME and CORNET. By formalising New Zealand's links to these R&D networks, Callaghan Innovation can open up access to the vast databases, matchmaking events, regulatory advice and funding mechanisms of these EU organisations.
- Callaghan Innovation will seek out similar R&D networks in Asia and the USA, including working with networks that have been identified by the Chief Science Advisor, to further expand the access of New Zealand firms to global resources and opportunities.
- Callaghan Innovation will form strategic partnerships with successful international institutes such as the Fraunhofer-Gesellschaft in Germany, both to support business access to global services and also to adapt knowledge gained from initiatives that have fostered commercialisation success.
- Relationships forged with other countries' ambassadors to New Zealand can also form linkages into those countries' innovation processes and outcomes. Foreign embassies in New Zealand provide opportunities for joint sponsorship of guest speakers and technology events.
- An active relationship with KEA is a means by which Callaghan Innovation can connect firms to the resources and networks of New Zealanders living abroad.

IX. Equity Ownership in Firms

Historically the former IRL at times sought to raise funds and commercialise research by setting up for-profit companies either alone or in partnership with one or more outside firms. Callaghan Innovation will not continue this practice. Not only have past examples of such ventures rarely been profitable, but equity ownership in firms is not part of the Callaghan Innovation mission and the management effort needed to enable these firms to achieve and retain profitability is often substantial. These equity ownership situations can create a significant distraction for Callaghan Innovation's management and technical staff, taking time and resources away from helping all HVMS firms accelerate their commercialisation of innovation. Callaghan Innovation measures its success by the profit growth of its clients, not by setting up its own business ventures.

Callaghan Innovation will continue to meet its contractual obligations to firms it currently owns while seeking to transition out over time in a manner appropriate to each entity. Exit strategies are well under way for most inherited businesses. That said, Callaghan Innovation will continue to retain equity in entities that are vehicles for providing our Research and Technical Services e.g.

The FoodBowl. Such organisations will be operated with a goal of at least partial cost recovery through fees from firms that use the services, but will not be operated with the expectation of either making a profit or growing beyond the scale needed to support the firms that use these services.

X. Intellectual Property

Another distinction between Callaghan Innovation policy and past practices at IRL is in the treatment of intellectual property. Callaghan Innovation will, through its research and technical services, likely generate some inventions and technologies that can be patented. The firm for whom the services are being provided will own the intellectual property and be encouraged to protect these inventions by obtaining patents, trademarks or maintaining trade secrets as appropriate.

Where there is no firm with the immediate need to protect, or interest in protecting, a patentable invention, Callaghan Innovation will apply for a patent with a view to protecting the intellectual property for New Zealand. As soon as an existing or new firm has need of that intellectual property, and is demonstrably able and intending to commercialise it, the IP rights will be made available to that business. In other cases, where appropriate in the national interest, the IP will be open to all firms in New Zealand.

XI. Strategy for the Māori Economy

Māori economic development and the growth of the New Zealand economy are closely linked; improvements in one will add measurable benefits to the other. Callaghan Innovation will ensure that it is actively supporting and addressing the needs of Māori businesses to grow and be competitive in the global market. The key pou or pillars of Callaghan Innovation's Māori Economy are Leadership, Strategic Partnerships and continual Māori Business Outcome Monitoring (review). The Callaghan Innovation Board will be supported by a Māori Advisory Group that will be tasked with guiding and supporting the Board's Māori Innovation Initiatives. Māori participation in all Callaghan Innovation programmes requires detailed Māori Strategic and Operational Plans, which are currently under development and will be completed along with the establishment of the Board's Advisory Group early in fiscal year 2014.

Key to the success of our future engagement with Māori businesses is the recruitment of the GM Māori Economy. This role is embedded in the organisational structure at senior executive management level, reporting directly to the Chief Executive. The recruitment process is expected to be completed in the first six months of fiscal year 2014. The GM Māori Economy will work closely with the Māori business strategy leaders in NZTE, MBIE and Te Puni Kōkiri to promote a 'one plan' approach for Māori businesses and government. This approach is consistent with the contribution that these combined organisations are making to the transformational actions in *He kai kei aku ringa* – a blueprint for Māori economic development through to 2040.

Visits to Māori organisations and marae, sponsorship of training for Māori leaders, such as the Stanford University bootcamp, and periodic hui to assess progress and brainstorm new ideas will be ongoing elements of the Callaghan Innovation approach.

Māori Innovation



Government research expertise and funding has helped Māori corporation Maraeroa C plant the foundations of a high-value export industry.

Ginseng is growing in Maraeroa C's Pureora forestry block that could be worth \$1000/kg.

The corporation was introduced to ginseng by CRI Plant & Food Research in 2006.

Government grants allowed Maraeroa C to investigate the project's commercial feasibility and have CRI Scion map the central North Island forests best suited to growing ginseng.

The result: Some five hectares have been planted, with the first trial harvest soon, and there is a nursery with about a million seedlings ready for harvesting and transplanting.

This success was made possible through the combined support of government grants and expertise from two CRIs. Callaghan Innovation will connect across the system to ensure Māori businesses benefit from the same coordinated, fit-for-purpose support.

XII. Collaborative Innovation Projects

These projects will be established through collaboration between New Zealand businesses and SETD providers to deliver attractive new technology-based solutions that can be shared by and benefit multiple firms. For example, these may be based around emerging global technologies (e.g. 'Big Data' issues associated with the deployment of sensing technologies), local opportunities (e.g. Christchurch rebuild) or resource utilisation (e.g. ironsand refining).

Callaghan Innovation will build, support or adopt strategic consortia of New Zealand firms to pursue these opportunity-driven collaborative innovation projects (CIPs). The consortia will be based around product and development value-chains, and will enable collaboration between New Zealand firms (supported by appropriate SETD input) to address market opportunities of scale.

Callaghan Innovation's role will include discovering and validating opportunities; assessing the potential for domestic capability to provide a compelling solution; bringing together the right consortium of domestic and international capabilities; coordination and project management; and realising wider commercialisation and export opportunities for New Zealand industry. Over time, Callaghan Innovation expects to see significantly increasing levels of co-funding, plus cost recovery from businesses and SETD providers involved in these projects.

Each CIP will be run by a Project Manager. The projects will link closely to Accelerator Services, with CSMs assisting the Project Managers to identify firms and capabilities to be involved and highlight potential opportunities.

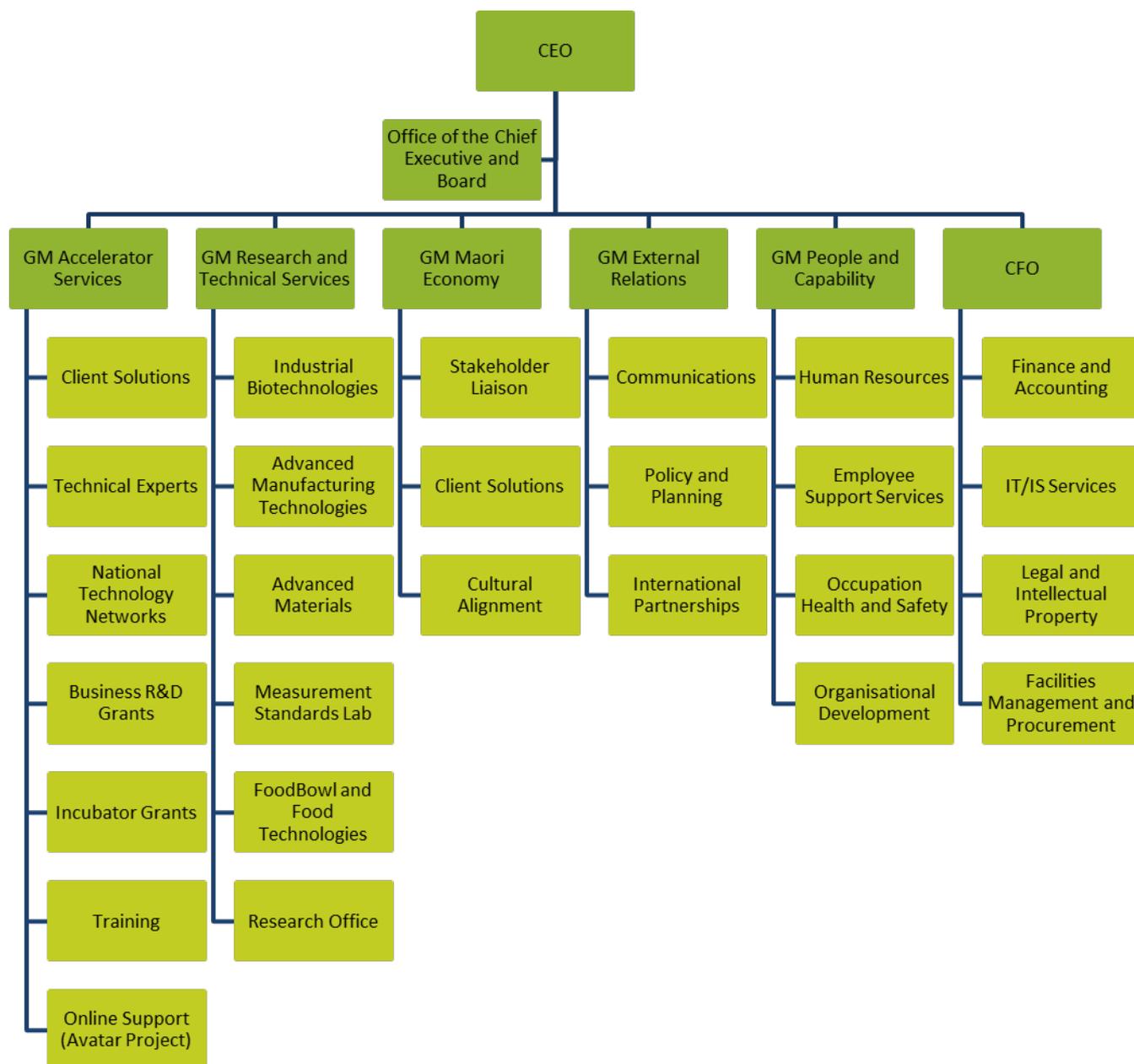
XIII. Organisation Structure

To perform the roles and achieve the transitions described above, the functions within Callaghan Innovation will be organised as shown in the chart below.

The organisation includes two operating groups that design and deliver the products and services described earlier. Separate groups are responsible for Accelerator Services and for Research and Technical Services, each under the direction of a General Manager reporting to the CEO. These two groups are the primary operational capability of Callaghan Innovation focused on direct delivery of services to firms. A third operating group, Māori Economy, will focus specifically on providing all Callaghan Innovation services to Māori-owned businesses.

The GM Māori Economy is a newly created position focused on ensuring that all Callaghan Innovation's strategies, support functions and services are inclusive of, and fully engaged with, the Māori economy. This executive position ensures that Callaghan Innovation has a targeted strategy to drive the acceleration of innovation by firms within the Māori economy, albeit the strategy will be delivered by each of the delivery groups within the organisation.

The three remaining groups provide the supporting governance and administration functions for the organisation. These are:



Supporting the three operations groups will be the following:

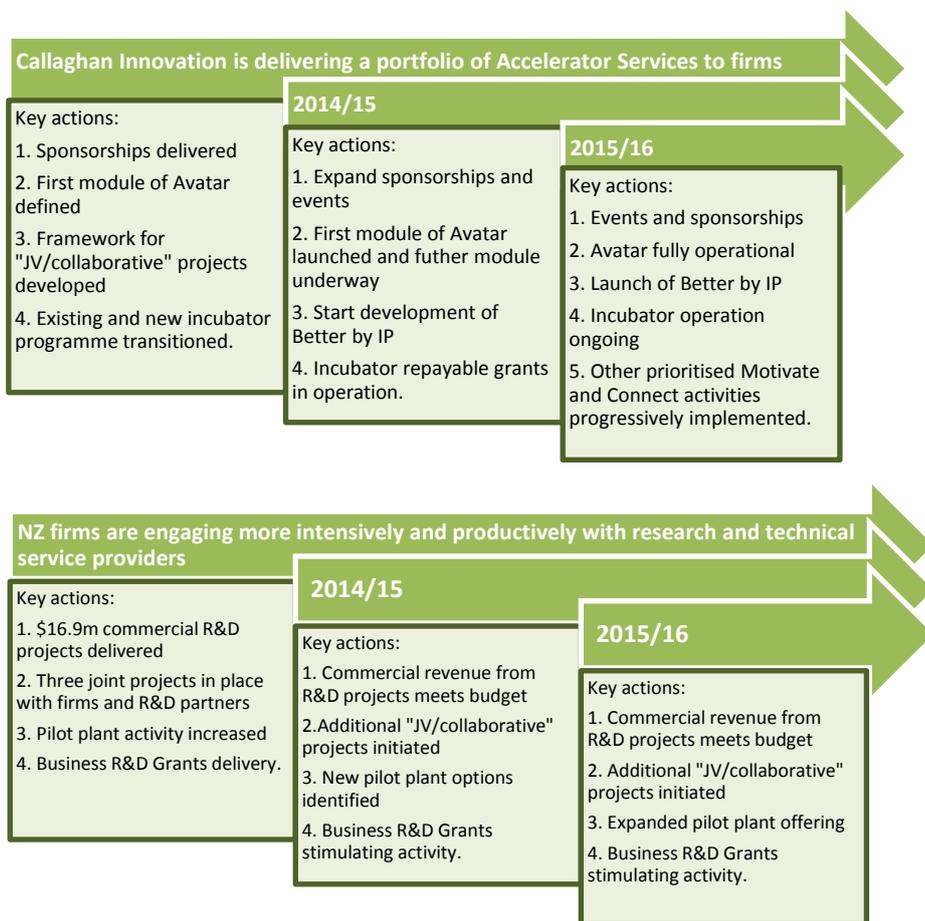
- The CFO, whose responsibilities include not only finance and accounting but also IT, legal and procurement functions. Responsibility for procurement and strategic assets, including real estate decisions, will be included in the CFO's team.
- The GM People and Capability will manage the core human resources functions, such as employee relations, job descriptions, sizing and compensation, and a training function focused on developing the skills of Callaghan Innovation employees. Occupational Health and Safety expertise and procedures will be provided for the organisation by this group.
- The GM External Relations will be responsible for: ensuring accurate and consistent information and reports are communicated to all external stakeholder groups including MBIE, NZTE and the Treasury; delivery of all reporting and planning requirements and provision of Ministerial support; and communications with the media. This group will also provide assistance to the GM People and Capability with preparing materials for internal communications to employees. The forging of partnerships with international networks will also be the responsibility of this group.

XIV. Geographic Locations and Real Estate Rationalisation

Accommodation needs for delivering the Business Case portfolio of services over the next three years have been evaluated. In Christchurch, the original six locations will be condensed to four by the end of calendar year 2013. These locations will be on two-year leases to allow flexibility to relocate in the planned innovation precincts, both downtown and at the University of Canterbury. In Auckland we are exploring the possibility of transferring staff currently at Balfour Road, Parnell, to a planned University of Auckland site in Newmarket and/or to the innovation precinct at Wynyard Quarter. A search is in progress for a headquarters location in Wellington, with headquarters staff temporarily working from the Gracefield site. Plans for the Gracefield site as an innovation precinct have been discussed above.

XV. Roadmap for the Top Ten Outcomes 2013-2016

Key actions planned for achieving each of the top ten outcomes over the three years of this Business Case are summarised in the roadmap below:



Establishment of a team of Client Solutions Managers who work with firms to help them access the RTS and Accelerator Services

Key actions:

1. Recruit GM Accelerator Services
2. Internal and external recruitment process for first 15 Client Solutions Managers (CSMs: formerly Innovation Agents)
3. Implement client engagement processes and tools (based on NZTE)
4. Pilot development of joint client engagement plans with NZTE.

2014/15

Key actions:

1. Recruit and train second tranche of CSMs
2. Review pilot of joint client engagement plans with NZTE
3. Implement joint client segmentation process with NZTE.

2015/16

Key actions:

1. Recruit third tranche of CSMs
2. Review impact of CSMs and identify opportunities to increase impact.

A number of technology networks have been established

Key actions:

1. Model for technology networks established.
2. Food and sensing networks established
3. Software network set up in alignment with NZTE Digital HIP.

2014/15

Key actions:

1. Review model from first 12 months of running technology networks
2. Identify additional network opportunities and prioritise.

2015/16

Key actions:

1. Set up two new networks based on priority needs.

Callaghan Innovation has transformed its internal R&D capabilities

Key actions:

1. Establish process for rolling reviews of RTS science services
2. Define initial portfolio of new services for RTS
3. Map capability requirements for new services against existing skills.

2014/15

Key actions:

1. Develop implementation plan for new service offerings
2. Trial two new services
3. Implement rolling reviews of RTS science services (number of reviews to be set once services are defined).

2015/16

Key actions:

1. Revise first two services based on learnings from pilots
2. Trial third new service
3. Rolling reviews of RTS science services continue (number of reviews to be set once services are defined).

NZ research capabilities have been strengthened by transfer to appropriate universities/CRIs of some Callaghan Innovation research personnel

Key actions

1. Potential capability transfers identified
2. Negotiations commenced with relevant institutions
3. Staff transfers 100% completed.

2014/15

Key actions:

1. Determine whether the review of capability requirements to support the new RTS service offering results in identification of additional transfer opportunities.

2015/16

Key actions:

1. Negotiate additional science transfers (if required)
2. Transfer staff (if required).

The Gracefield site has been revitalised

Key actions: 1. Concept design and development 2. Site investigation 3. Feasibility study undertaken.	2014/15	2015/16
	Key actions: 1. Potential development partners identified 2. Range of development options scoped 3. Preferred option identified 4. Business case completed.	Key actions: 1. Contract development partners 2. Project plan approved 3. Site redevelopment commences.

Māori-owned businesses are well-represented among the firms the CSMs are working with

Key actions: 1. Recruit GM Māori Economy and team 2. Engage with priority iwi/Trusts/Māori organisations 3. Develop Memorandums of Understanding 4. Initiate two projects, including one focused on food.	2014/15	2015/16
	Key actions: 1. Implement action plan for growing capability of internal staff to engage successfully with Māori organisations 2. Continue engagement with priority iwi/Trusts/Māori organisations 3. Initiate additional projects.	Key actions: 1. Review success of year 1 & 2 engagements and projects and identify improvement opportunities 2. Continue engagement with iwi/Trusts/Māori organisations 3. Run or collaborate on an event focused on innovation in the Māori economy.

Other countries are starting to notice the NZ model of accelerating commercialisation

Key actions: 1. Establish firm linkages into two international networks 2. Participate in missions, workshops, round table discussions with international delegations 3. Develop strategy for international relationships.	2014/15	2015/16
	Key actions: 1. Support firm/international linkage 2. Establish innovation linkages with priority countries as per strategy 3. Ongoing participation with incoming delegations.	Key actions: 1. Support firm/international linkage 2. Innovation linkages with priority countries result in joint initiatives 3. Ongoing participation with incoming delegations.

Callaghan Innovation works in partnership across all NZ stakeholder organisations

Key actions: 1. Pilot project with Products Accelerator 2. Role in National Science Challenge established 3. Deliver against MoUs with key stakeholders.	2014/15	2015/16
	Key actions: 1. Ongoing role in National Science Challenge 3. Deliver against MoUs with key stakeholders .	Key actions: 1. National Science Challenge 2. Review of effectiveness of MoUs with key stakeholders.

XVI. Key Performance Metrics

The proposed metrics and goals for achieving Callaghan Innovation's mission are summarised in the tables below:

KEY PERFORMANCE OUTCOMES

- Increase in contribution of HVMS firms to GDP/capita
- Increase in contribution of high-value exports to total exports

Resulting from:

- Growing Business Expenditure on Research and Development (BERD) to 1% of GDP
- Doubling the revenues of the portfolio of TIN100 firms
- Growing the portfolio of Māori HVMS businesses
- Expanding other groups of firms, such as through the Food Innovation Network.

Table: Callaghan Innovation major outcome indicators

Outcome	Logic	Indicators
Increased contribution of HVMS firms to GDP/capita	HVMS firms can deliver higher-than-average margins and economies of scale in niche global markets to lift New Zealand's overall productivity.	Growing BERD to 1% of GDP (government target). Growth in contribution of high-value exports to total export growth (contribution to government target of increasing exports to 40% of GDP).
Broader base	Diversity in specialisation provides more opportunities for innovation at the margins of existing products and services.	Number of firms undertaking R&D. Export product, service and market mix. <i>Source: Statistics NZ</i>
Higher intensity	Increases in private sector R&D lead to increases in GDP; NZ business R&D is low, relative to comparator countries.	R&D expenditure by business as % of GDP. <i>Source: Statistics NZ</i>
Higher value	Leveraging more value from the same level of R&D and other innovation raises productivity.	Value and number of firms in HVMS medium and high technology exports. <i>Source: Statistics NZ</i>

Table: Callaghan Innovation Impact indicators

Impact	Logic	Indicators
Better business ability to innovate and commercialise	Most New Zealand businesses are micro-scale by global standards and many do not have sufficient in-house skills and expertise. Raising skills and capacity through publicly funded services will result in more successful commercialisation of innovation. As more businesses succeed, more businesses are likely to follow.	Value and number of triadic patents. BERD % GDP. BERD financed from abroad % GDP. Number of firms accessing Callaghan Innovation business services. Business satisfaction rating survey against benchmarked public sector services delivery. <i>Sources: Patents Office, Statistics NZ, Callaghan Innovation survey</i>

Table: Callaghan Innovation Impact indicators (continued)

Impact	Logic	Indicators
<p>Stronger innovation culture and awareness</p>	<p>Businesses don't know what they don't know. Greater awareness will make it more likely that businesses will invest (more) in high-value innovation.</p> <p>Graduates will be more likely to consider starting or going into business.</p>	<p>Number of HVMS innovating firms.</p> <p>Number of HVMS innovating firms doing R&D.</p> <p>Value of R&D carried out by HVMS innovating firms.</p> <p>Number of first-time Callaghan Innovation business customers.</p> <p><i>Sources: Statistics NZ, Callaghan Innovation</i></p>
<p>Stronger networking and information sharing</p>	<p>Leads to more efficient use of resources through scale, awareness, alignment and shared services.</p> <p>Leads to more innovation ideas through increasing the contact between different types of knowledge.</p> <p>Economic geography suggests innovation and wealth creation is correlated with urban size. NZ needs to act as a single city to mitigate the lack of urban scale relative to other countries.</p>	<p>Measurements of domestic network intensity using proxies:</p> <ul style="list-style-type: none"> - Co-authoring - Co-invention - Co-patenting. <p>International co-authoring, co-invention, co-patenting.</p> <p>Level of use and access to Callaghan Innovation's online services.</p> <p><i>Sources: Patents Office, Statistics NZ, Callaghan Innovation</i></p>
<p>Easier access to world-class SETD services and skills</p> <ul style="list-style-type: none"> - Research - Technical - Commercial - Project management 	<p>Businesses have identified the need to get faster and easier access to the SETD resources, services and facilities they need to innovate.</p> <p>New Zealand has a high proportion of small SMEs that have limited capacity to provide their own in-house resources and expertise and need to access it elsewhere.</p>	<p>Number of businesses accessing public SETD organisations for assistance.</p> <p>Number of Callaghan Innovation referrals in/out.</p> <p>Research organisations' private sector income.</p> <p>Value of Callaghan Innovation SETD services to businesses/clients.</p> <p><i>Sources: Patents Office, Statistics NZ, Callaghan Innovation, Survey</i></p>
<p>More public SETD capacity including:</p> <ul style="list-style-type: none"> - Pilot and scale-up facilities - Open-licencing - National technology networks 	<p>Growing firms face challenges in the 'Valley of Death'. This can be supported with more and better infrastructure and better leverage of public investment through national platforms.</p> <p>Non-exclusive licencing in areas that support multiple business opportunities will drive more innovation opportunities from the same technology.</p>	<p>BERD % GDP.</p> <p>Growth in the number of people with advanced SETD skills in the private sector.</p> <p>Number of open or non-exclusive licences to businesses.</p> <p>Value of business co-investment in public R&D and commercialisation.</p>
<p>More innovation-ready graduates and entrepreneurs</p>	<p>It is harder for NZ to grow and retain large HVMS businesses here, owing to our economic geography, so we are likely to be more reliant on smaller dynamic SETD-intensive businesses operating in niche markets.</p> <p>Business dynamic statistics indicate new business creation and young businesses will be significant drivers of HVMS growth over 10-20 years.</p>	<p>Number of graduates moving between firms and research organisations.</p> <p>Number of firms reporting lack of skills as barrier to innovation.</p> <p>Number of HVMS businesses 2-5 years old.</p>

XVII. Financials

The preceding commentary reflects the considerable planning in place for Callaghan Innovation and the clarity we now have as we move from an establishment phase to an operational phase.

The tables below reflect the financial implications of this Business Case. They are based on the following key assumptions:

- **Transfer of fundamental research.** Callaghan Innovation will focus on near-market research and progressively exit from early-stage research. Teams whose staff are currently predominantly involved in early-stage, fundamental research work will be transferred. Two teams, Carbohydrate Science and Superconductivity, are scheduled to transfer to Victoria University from early 2014. The financial impact of this change is the need to reflect the reduced cost (salary, scientific direct cost and overheads) and revenue from the cessation of these functions. There is a part-year impact in 2013/14 and a one-off cost of transfer.
- **Contestable funding.** The previous organisation was heavily reliant on government-funded research grants. Some run-out of past funding is reflected in the financial performance below. Crown funding that remains within Callaghan Innovation by and large reflects the public good benefits inherent in our operations, for example, maintaining a national measurement standard system.
- **Grants management.** Callaghan Innovation is responsible for the management of over \$140m per annum in grants to business. It is expected that approximately 650 grants will be awarded in the current year, ranging from \$13,000 to \$1.5m per grant. From 1 November 2013, some further (Incubator Fund) grants will be administered by Callaghan Innovation. Grant expenditure and the associated cash flows are accounted for outside the financial statements presented below.
- **Commercial revenue.** Callaghan Innovation is expected to grow its commercial revenue in future years as it works with commercial firms to increase New Zealand's SETD exports. Commercial revenue is forecast to grow from almost \$15m in the current year to over \$19m in two years' time. In order to ensure that both competitive neutrality and pricing decisions are transparent, co-funding guidelines have been agreed that clarify the mix of Crown subsidy and commercial contribution to scientific outputs produced by Callaghan Innovation. The financial statements that follow are consistent with these co-funding guidelines.

Capital expenditure is forecast to increase over the next two years as Callaghan Innovation moves from managing its existing assets to making an investment in key assets. These investments will be subject to business cases and reflect the need for supporting technology (most notably the Avatar initiative discussed in this Business Case) and for redevelopment of the Gracefield campus into an optimal configuration. Additional third-party funding is likely to be required for the Gracefield campus development, but this has yet to be assessed.

Personnel cost is a key driver. The Business Case is predicated on 412 staff in July 2013 gradually reducing to 388 by July 2016. The mix of staff is likely to change as the number of business-focused staff increases and the number of corporate and purely scientific staff is reduced.

The revised Financial Statements for Callaghan Innovation are as follows.

CALLAGHAN INNOVATION FINANCIAL PROJECTIONS

REVENUE AND EXPENDITURE	2014	2015	2016
	\$000	\$000	\$000
REVENUE			
Crown appropriation			
New appropriation	20,000	30,000	30,000
Grants funding	6,256	6,256	6,256
Other departmental transfers	3,678	2,378	2,378
Strategic Investment (ex-core funding)	22,913	18,523	21,658
MSL	5,764	5,764	5,764
Crown funding through appropriations	58,611	62,921	66,056
Contestable funding			
Committed (tail of existing contracts)	13,137	6,315	4,855
Assumed won in 2013 (of \$7m maturing)	3,975	4,300	3,925
Net Impact of April 2013 Contestable Bid Outcomes	(3,514)	(4,300)	(3,925)
Other Contestable Funding Impacts - RIA and Timing	776	0	0
Other (replacement) income	0	0	0
Total contestable funding	14,374	6,315	4,855
Commercial revenue			
Tied to contestable	1,626	545	241
Top 3 commercial clients	5,500	7,500	7,500
Other commercial	7,848	9,869	11,725
Total commercial revenue	14,974	17,914	19,466
Other	2,499	2,499	2,499
Total Revenue	90,458	89,649	92,877
OPERATING EXPENDITURE			
Personnel	40,519	44,373	42,941
Direct Opex	21,202	19,307	16,863
Project Expenses	600	750	200
Property Costs	7,280	7,592	7,597
Other Opex	15,290	10,201	13,306
Depreciation	6,073	7,076	8,163
Total Operating Expenditure	90,963	89,300	89,070
Interest income / (expense)	539	421	426
Net Surplus / Deficit	34	771	4,234

BALANCE SHEET	Opening	2014	2015	2016
Cash / Bank	14,629	12,254	8,732	12,521
Receivables	4,173	3,344	3,798	4,038
Prepayments	1,270	1,270	1,270	1,270
Work-in-progress	416	709	828	891
Other Current	260	232	271	292
Current Assets	20,749	17,809	14,899	19,013
Payables and Accruals	8,907	9,761	9,423	9,346
Revenue in Advance	3,703	3,703	3,703	3,703
Current Liabilities	12,610	13,464	13,127	13,049
Net Working Capital	8,139	4,345	1,773	5,963
Investments	0	0	0	0
Fixed Assets	35,418	39,245	47,588	57,631
Other Term Liabilities	374	374	374	374
Net Assets	43,183	43,216	48,987	63,221
Shareholders Funds	43,183	43,216	48,987	63,221

CASHFLOW	2014	2015	2016
	\$000	\$000	\$000
Surplus	34	771	4,234
Add back Depreciation	6,073	7,076	8,163
Movement in Working Capital	1,418	(949)	(401)
Operating Cash Flow	7,525	6,897	11,996
Capital Expenditure	(9,900)	(15,420)	(18,206)
Capital Appropriation drawdown	0	5,000	10,000
Net Cash Flow	(2,375)	(3,522)	3,790
Plus Opening Cash	14,629	12,254	8,732
Closing Cash	12,254	8,732	12,521

Table: Capital expenditure – base case and indicative future spend (Note these Capex tables have not changed)

\$m	2013/14	2104/15	2015/16
SET Delivery – business as usual:			
Earthquake strengthening project for GlycoSyn	1.000	1.000	
Ongoing site maintenance	1.250	1.250	2.250
Replacement SETD Equipment	4.050	4.050	4.050
IT-related investment:			
Internships marketplace design and build	0.200		
Diagnostic/audit tool design and integrate	0.200	0.200	
IT systems (business as usual)	0.500	0.500	0.500
New finance and documents systems	0.500	0.500	
Avatar development and build	0.250	0.750	
Joint CRM development and implementation	1.000	0.685	

Other Capex	0.700	0.800	0.700
Total base capital expenditure	9.650	9.735	7.300

Table: Capital expenditure – base case and indicative future spend (continued)

\$m	2013/14	2104/15	2015/16
Capex below used for depreciation estimates for P&L – does NOT reflect actual Capex needed for Gracefield and other precinct developments			
Gracefield innovation precinct development:			
Business case in first year	0.250	1.700	6.900
Christchurch precincts (UC & downtown):			
Fit-out and re-location costs			4.000
Auckland facilities consolidation:			
Fit-out and re-location costs		4.000	
Total Capex included in financial projections	9.900	15.435	18.200

XVIII. Key Risks and Mitigation Strategies

- Build business confidence in Callaghan Innovation:** Callaghan Innovation can only be successful if firms see value in its role and trust its services and advice. Callaghan Innovation will continue to engage frequently with firms, listening to their concerns and priorities and visibly demonstrating responses to those needs. A communications plan in the business media will promote success stories and raise firms' awareness of how Callaghan Innovation has assisted other companies and can assist them. The Callaghan Innovation brand will be associated widely with the companies we support in a campaign analogous to the 'Intel Inside' concept on computer hardware.
- Funding model:** Considerable work remains to be done to align existing funding with this Business Case. Callaghan Innovation will work closely with MBIE, including through the NSC process, to ensure that funding is appropriately allocated to the initiatives and priorities of the Business Case. In-depth discussion with firms will ensure funds are spent on the research and technical services that most quickly impact commercialisation and for which firms are therefore most willing to pay. Over the course of 2013/14, Callaghan Innovation will work with MBIE to ensure an appropriate charging regime is developed and implemented for these services, consistent with Auditor-General and Treasury guidelines. Pricing of services and a co-funding policy will avoid the potential crowding out of other providers, while meeting the need to ensure an uptake of services that meets the government's objectives. Institutions co-locating at the Gracefield innovation precinct will be a source of rent and capital investment in the buildings they use.
- Commercial revenue** is anticipated to grow from almost \$15m currently to \$19.5m in three years' time. The resources to help achieve this are contained in this Business Case but are not yet on board. There is a risk during 2013/14 that the current revenue target will not be achieved. A plan of action is underway to target revenue growth and this is being closely monitored by the Board. Beyond 2014, while the targeted increase is challenging, we believe forecast commercial revenue is achievable.
- Re-orienting SETD focus towards near-market research and technical services:** The recommended Business Case for Callaghan Innovation involves changing some long-term programmes that originate as far back as the DSIR era. There will be staff that feel uncomfortable with this approach and may feel their roles and even their employment are at risk. Communication with staff is critical to a successful transition. Key SETD leaders and scientists are involved in implementing the changes to ensure fundamental research goes to the best place and that valuable research capability within New Zealand is preserved.

- **Attracting and retaining staff:** Callaghan Innovation’s mission is dependent on diverse skills and sound experience across a wide range of disciplines. To date, newly created positions at Callaghan Innovation have attracted strong applicant pools. Internal initiatives focused on organisational development and creating a dynamic and positive work environment will be key to attracting and retaining talent.

XIX. Conclusion

This Business Case represents the culmination of work over many months during the establishment phase of Callaghan Innovation, the early launch stage, and the subsequent appointment of the CEO. The document reflects deepening insight into the complex network of stakeholders who are important partners in achieving Callaghan Innovation’s mission. It defines some significant choices about how Callaghan Innovation will operate, how it will collaborate with other organisations, and how it will invest its resources in its formative years. The results of these choices, by 2016, will be the Top Ten Outcomes described in the Business Case vision.

The actions and outcomes defined in this Business Case represent only initial steps in a much longer journey towards a strong and diverse economy for New Zealand – an economy that combines an extensive base of technology-enabled agriculture with fast-growing high-value manufacturing and service industries. It is a journey requiring both patience and a sense of urgency. The destination is clear – a high quality of life for current and future generations of New Zealanders. New Zealand will be, in Sir Paul Callaghan’s words, “a place where talent wants to live”.