



Corporate Finance

Ministry of Science and Innovation Demand Study 2012

29 June 2012

Strictly private and confidential

Final report We accept no duty of care or liability to you or any third party for any loss suffered in connection with the use of this report.

Contents

Section	Page
Glossary of Terms	3
1. Executive Summary	4
2. Introduction and Scope	10
3. Background	12
4. Approach	15
5. Interview and Survey Analysis	18
6. Conclusion	36
7. Appendices	39-83
Appendix I – Terms of Reference	
Appendix II – Interview Questionnaire	
Appendix III – Online Survey Questionnaire	
Appendix IV – Summary of Firms Interviewed	
Appendix V – Survey Results	
Appendix VI – Importance / Satisfaction Matrices	

Glossary of Terms

In this report capitalised terms have the meaning given to them as defined below:

ATI	Advanced Technological Institute
BRANZ	Building Research Association of New Zealand
CRI	Crown Research Institute
ESR	Environmental Science and Research
HERA	Heavy Engineering Research Association
HVMS	High Value Manufacturing and Services
ICT	Information and communication technology
IP	Intellectual Property
IRL	Industrial Research Limited
ITRI	Industrial Technology Research Institute
MFAT	Ministry of Foreign Affairs and Trade
NIWA	National Institute of Water and Atmospheric Research
NZTE	New Zealand Trade and Enterprises
MSI	Ministry of Science and Innovation
NZ\$	New Zealand dollars
PRO	Public Research Organisations comprising eight universities, eight CRIs and Polytechnics.
R&D	Research and development
TBG	Technology for Business Growth Grant
TIDA	Titanium Industry Development Association

Contents

Section	Page
Glossary of Terms	3
1. Executive Summary	4
2. Introduction and Scope	10
3. Background	12
4. Approach	15
5. Interview and Survey Analysis	18
6. Conclusion	36
7. Appendices	39-83
Appendix I – Terms of Reference	
Appendix II – Interview Questionnaire	
Appendix III – Online Survey Questionnaire	
Appendix IV – Summary of Firms Interviewed	
Appendix V – Survey Results	
Appendix VI – Importance / Satisfaction Matrices	

1. Executive Summary

Introduction

- In 2011 the Ministry of Science and Innovation (MSI) commissioned a review by an independent panel to advise how the Government could better facilitate the development and growth of the High Value Manufacturing and Services (HVMS) sector. In April 2011 the independent panel issued a report, “Powering Innovation: Improving access to, and the uptake of research and development (R&D) in the HVMS sector”, (or the Powering Innovation Study).
- The Powering Innovation Study indicated that the HVMS sector has significant growth potential. However, this study also identified the need for the support and expertise of technology-focussed R&D, and assistance with commercialising technological innovation, if the HVMS sector is to significantly increase exports and productivity. The Powering Innovation Study identified the establishment of an advanced technology institute (ATI) as a key step in facilitating the provision of such support.
- In this context, Deloitte was commissioned by the MSI to undertake an independent assessment of the demand of HVMS firms for R&D and technological innovation services (or the Demand Study). The Demand Study specifically aims to inform a deeper understanding of:
 - How HVMS firms innovate in New Zealand;
 - The role public organisations play in this process;
 - HVMS firms’ perceptions of gaps or blockages in this process which could be addressed through an institutional response and/or through other mechanisms; and
 - The possible role an ATI could play, including the services and activities it could provide.
- The Demand Study was undertaken through a process that involved interviews with 44 firms identified by MSI and Deloitte as operating the HVMS sector. In addition a significantly larger number of firms were invited to participate in an on-line survey. Some 344 firms completed this survey. This report sets out the findings of the Demand Study.

Significance of HVMS Sector

- The Demand Study has confirmed the significance of the HVMS sector to the New Zealand economy. In particular the sector exhibits the following valuable attributes:
 - A sales orientation with a significant export focus.
 - Huge growth potential and expectations.
 - The employment of highly skilled workforces.
 - A material level of investment in R&D – with the significant weight of investment being directed at development rather than pure research and which primarily involves spending on internal resources (mainly people).
- The Demand Study also confirmed that continuous innovation was central to the on-going growth of firms in this sector.
- In this context, initiatives to support the innovation process appear to offer the potential for material benefits to New Zealand.

Understanding the Innovation Process

- In order to develop appropriate initiatives to support innovation it is necessary to understand the innovation process and, in particular:
 - Why businesses innovate;
 - How they go about the innovation process;
 - Where they look to for support with this process;
 - Any barriers that currently inhibit the process.
- Without this understanding there is a risk that initiatives will not be well targeted or – potentially – could impede rather than enhance innovation.

1. Executive Summary

Why Businesses Innovate

- While HVMS businesses innovate for multiple reasons there was a high degree of consensus as to the key drivers of innovation. In particular, the following drivers were identified:
 - The need to stay ahead of competitors.
 - In response to specific customer requirements.
 - In anticipation of future customer requirements.
 - In response to industry developments.
 - The need to integrate new technologies into existing products.
 - The identification of a specific gap in a market.
- PROs were not identified as an important initiator of the innovation process.

How Businesses Innovate

- HVMS firms identified a number of factors that were critical to the innovation process. Again there was a high degree of consensus as to the elements that were important to this process. In particular:
 - Customers, suppliers and the contributions of experienced staff were regularly identified as being central to the innovation process.
 - Firms usually had either formal or informal processes in place to capture the input of staff.
 - Attendance at international trade shows and other similar forums provided a source of new ideas and awareness of new technologies.
 - Innovation was seldom driven by “technology push” – mostly by “demand pull”.
 - A large part of the innovation process involves connecting changes in technology with changes in demand to ensure that firms stay ahead of competitors and customer needs.
 - Much of the innovation involves adapting existing services or products to incorporate new technologies or applying proven technologies to different products / markets.

- In addition to in-house research and development contract or joint R&D, prototyping and/ or the use of pilot plants and market research were activities that are routinely undertaken to support the innovation process.
- The contribution of PROs was not generally identified as being a critical component of the innovation process.

Access to Support

- Relationships and a desire to access the best services to meet a specific need characterised a firm’s approach to accessing the support they needed. Typically firms:
 - Look to their own internal resources first – skilled, experienced people with access to the right equipment.
 - When accessing external support, they look to existing relationships with known providers of specialist services.
 - Will go wherever they need to in order to access the services / capability they require.
 - Often look to suppliers or customers or wider networks for guidance as to where to access specialist support.
 - Will work in partnership with suppliers and customers through the development process.
 - Will work with research organisations on certain projects where these organisations, or individuals within that organisation, are known to have a specific capability in a relevant area.

1. Executive Summary

Experience with New Zealand PROs

- Firms' experiences with New Zealand PROs was varied.
 - Awareness of what support PROs could provide varied widely and tended to be based on past experience.
 - PROs were generally regarded as lacking in commerciality and unable to respond rapidly or with sufficient flexibility to meet the needs of business.
 - Often firms are looking for deep expertise to address a very specific issue which PROs are typically not able to provide or able to provide to the standards that could be accessed elsewhere.
 - Generally there was perceived to be a large gap between the primary research or academic focus of the PROs and the needs of business.
 - Where PROs were accessed, this support tended to be in the nature of access to equipment, laboratories or testing facilities or research or analysis in relation to specific problems that were less time bound.
 - Few of the relationships seemed to be genuinely strategic, where there was a long term relationship involving the R&D capability of a PRO and the commercialisation capability of a firm.
 - To the extent that PRO services were being accessed, Industrial Research Limited (IRL) was identified as the CRI that was accessed most often and the "Engineering" universities (Auckland and Canterbury) along with Massey were identified as the universities most commonly used.
- A number of firms provided very positive feedback on the wider (non PRO) support provided by several of the government agencies including New Zealand Trade and Enterprise (NZTE) (in particular), MSI due to the highly regarded Technology for Business Growth (TBG) or the TechNZ Funding Programme and Ministry of Foreign Affairs and Trade (MFAT).

Experience with International Service Providers

- New Zealand HVMS firms routinely access international capability for support with the innovation process. This engagement is characterised by:
 - A desire to access the world's best capability.
 - The "branding" benefit of having globally recognised expertise as part of the value chain.
 - The mitigation of risk provided by going to entities or individuals with deep expertise in a particular area.
 - The very broad range of services and entities accessed – there was no commonality identified in terms of the entities, people or services being accessed.
 - The importance of the firms' own networks in identifying where to go for this international support.

Making the Innovation Process Easier

- There was less consensus as to the impediments to the innovation process. However, issues identified included:
 - Access to funding, particularly smart capital through the growth phase where the capital providers bring value in the form of governance, connections and relevant sector experience in addition to funds.
 - Better access to risk capital or other funding support through the earlier stages of development – feedback on the TBG grant process was extremely favourable and is definitely seen as de-risking investment in the earlier stages of development.
 - Reducing compliance costs – there is an acceptance that there needs to be appropriate "barriers to entry" for firms entering into government sponsored programmes such as the TBG programme – but processes need to be simplified in relation to on-going support.
 - Better knowledge of what is available in terms of research programmes, facilities and capability to enable easier access to these.
 - A greater consistency as to how PROs contract their support services.
 - PROs having a better understanding of business imperatives.

1. Executive Summary

Would Firms use an ATI?

• There is not a consistent view as to whether firms would use an ATI. Usage would depend on a range of considerations including:

- Access to funding to support research and earlier stage development and capital for growth as firms mature.
- The customer focus of the entity – in particular an ability to apply technical skills to solve business problems within tight timelines.
- Access to genuine – not generic – expertise.
- Contractual arrangements – in particular price and ownership of Intellectual Property (IP).
- A knowledge of what services / capabilities were available.

How could an ATI Support Innovation?

• There was limited consensus as to how an ATI could best support innovation. The more common themes identified included:

- Facilitating easier access to skills and capabilities.
- A market orientation that bridges the gap between the research focus of PROs and the applied research / development needs of business.
- Contributing to the rebuilding of the “deep science and engineering” skills that some firms consider New Zealand to have lost.
- Facilitating a better linkage between universities, who provide the service, engineering and mechanical graduates, and businesses who see the need and opportunities for such graduates.
- Having a strong “virtual” dimension – particularly to enable businesses to have visibility of the different types of technologies being developed and to facilitate access to national expertise.
- Facilitating the sharing of facilities and high-end science and engineering capability.
- Marketing New Zealand as an innovation centre.

- There is a reasonably consistent view that best use is not being made of existing resources and capabilities – whether in the PROs or the private sector. Therefore, initiatives that contribute to the overall system working better were considered likely to be more beneficial than a single institutional response.

Concerns About the ATI Concept

- A number of concerns were expressed with the ATI concept, the more common of these included:
 - A risk that the ATI would displace existing services – particularly those already available in the private sector.
 - The ATI could be too generalist in nature.
 - The ATI could create further confusion as to where businesses go to access support – the ATI might further fragment rather than consolidate capability.
 - The ATI could invest in expensive facilities and equipment without having the requisite skills and experience to utilise these assets to solve business problems.
 - A lack of confidence that a new entity will be any more effective than the current PROs.

1. Executive Summary

Potential Demand for ATI Services

- There was a broad range of views as to the likely demand for services. Based on our evaluation of the responses we consider that demand is most likely to be concentrated in the following areas:
 - As a mechanism for accessing funding.
 - Calibration and testing of services, including access to laboratory, prototyping and testing facilities.
 - Contract R&D.
 - As a portal for accessing facilities and expertise.
 - As a mechanism for networking and sharing of ideas.
- Our assessment is that demand is likely to be fragmented at least initially until the ATI builds its reputation for expertise in specific fields and for its ability to team easily with business. Further, the HVMS sector is very broad in terms of the range of products/services being developed – which, in turn, are often directed at very niche markets. Most firms have found ways to address the need for support through the innovation process. Therefore, demand for the services offered by a ATI will depend on whether the services are better or easier to access than current support arrangements.
- The technical support that firms require tends to be very specific to their needs. Larger, more mature firms have in general recruited and developed their internal capability to meet these needs – in this respect activities that might otherwise be undertaken within an ATI or equivalent organisation are undertaken within the firms themselves. Smaller and earlier stage businesses are more likely to have a need to access a range of support.
- Most organisations are willing to pay for services on a fee-for-services basis where the price is based on fair commercial terms. The earlier the stage of the research/development support being looked for, the greater the desire for risk sharing. This de-risking of investment could be effected through a range of mechanisms, such as access to TBG funding (or the like) or through joint venture arrangements – but not at the risk of compromising ownership of IP.

Concluding Comment

- The Demand Survey identified a high level of consistency as to why firms innovate and how they go about the innovation process.
- The extent to which firms used PROs to support them, the PROs accessed and the nature of the services sought was far less consistent. Similarly, apart from the difficulty of accessing appropriate funding, firms identified a broad range of barriers to innovation.
- Given that firms' use of and experience with PROs varies so widely and their views as to the barriers to innovation are broad it is unsurprising that firms also have widely varying views as to what would make an ATI successful and the services that would most commonly be sought from an ATI.

Contents

Section	Page
Glossary of Terms	3
1. Executive Summary	4
2. Introduction and Scope	10
3. Background	12
4. Approach	15
5. Interview and Survey Analysis	18
6. Conclusion	36
7. Appendices	39-83
Appendix I – Terms of Reference	
Appendix II – Interview Questionnaire	
Appendix III – Online Survey Questionnaire	
Appendix IV – Summary of Firms Interviewed	
Appendix V – Survey Results	
Appendix VI – Importance / Satisfaction Matrices	

2. Introduction and Scope

Purpose of Report

- Deloitte has been instructed by the MSI (or “the Client”) to undertake a comprehensive assessment of the demand of HVMS firms for R&D and technological innovation services to inform a deeper understanding of:
 - How HVMS firms innovate in New Zealand.
 - The role Public Research Organisations (PROs) play in this process.
 - HVMS firms’ perceptions of gaps or blockages in this process which could be addressed through an institutional response and / or through other mechanisms; and
 - The possible role an ATI could play, including the services and activities it could provide.

Scope of Work

- Our work has been undertaken under the Terms of Reference attached as Appendix I.
- Our work has included analysis and findings on:
 - Businesses in the HVMS sector in New Zealand, such as firms which develop, provide and utilise highly technological manufactured goods and services. This includes firms across biotechnology, processing, manufacturing of electronics, robotics, sensing and scanning devices, medical devices, drugs, agritechnologies, digital and information and communication technology (ICT) technologies.
 - R&D and technological innovation services, such as those which either directly, or through facilitation, develop and transfer knowledge, know-how and technology to businesses, which enable them to develop and/or improve products, services, processes or organisations.
 - Channels through which HVMS firms in New Zealand currently choose to or would like to access services including through:
 - the use of in-house teams and recruitment of skilled personnel.
 - contracting or co-investing with suppliers of innovation services.
 - other channels including interactions with value chain participants, reverse engineering, etc.

Report Use

- This report is intended for MSI, for the purposes outlined above. Deloitte accepts no responsibility for any reliance that may be placed on this report should it be used by any other party that has not been expressly agreed in writing by Deloitte.

Report Conventions

- Figures presented in this report are in New Zealand (NZ\$) unless otherwise stated and have been rounded to the nearest thousand. Tables have not been adjusted to correct minor rounding errors.

Statement of Qualifications and Independence

- Deloitte is one of the world’s leading professional services firms. Deloitte has extensive experience of undertaking similar surveys to establish industry or sector views on topics of significance.
- Deloitte and its partners are independent of MSI. The firm is not the auditor of MSI.
- Deloitte will receive a fee for the preparation of this report based on its normal time charges. Deloitte Corporate Finance will receive no other direct financial benefit for the preparation of this report.

Contents

Section	Page
Glossary of Terms	3
1. Executive Summary	4
2. Introduction and Scope	10
3. Background	12
4. Approach	15
5. Interview and Survey Analysis	18
6.. Conclusion	36
7.. Appendices	39-83
Appendix I – Terms of Reference	
Appendix II – Interview Questionnaire	
Appendix III – Online Survey Questionnaire	
Appendix IV – Summary of Firms Interviewed	
Appendix V – Survey Results	
Appendix VI – Importance / Satisfaction Matrices	

3. Background

Context for the Review

- In 2011 MSI commissioned a review by an independent panel to advise how Government could better facilitate the development and growth of the HVMS sector through enhancing the level of access to, and uptake of, R&D services. Rapid development of the HVMS sector is considered to have the potential to generate a step-change in the economic growth and social wellbeing of New Zealanders.
- In April 2011 the independent panel issued the Powering Innovation Study, which indicated that the HVMS sector has significant growth potential. However, this study also identified the need for the support and expertise of technology-focussed R&D, and assistance with commercialising technological innovation, if the HVMS sector is to significantly increase exports and productivity. The Powering Innovation Study identified the establishment of an ATI as a key step in facilitating the provision of such support.
- Subsequently, the Government has announced its intention to transform IRL into an ATI. This institutional response will be part of a broader suite of changes designed to lift innovation in the HVMS innovation ecosystem.
- Given the scale and scope of the likely institutional changes, the MSI is undertaking a number of analyses into different aspects of the HVMS innovation system, including firms' demand for R&D and technological innovation services, and the supply landscape. These "building blocks" will inform future policy decisions around the establishment of the ATI and related supporting initiatives.
- The Demand Study aims to provide an independent assessment of the demand of HVMS firms for R&D and technological innovation services and, where possible, quantify the nature and extent of demand for services that an ATI might provide.
- Specific areas to be covered by the Demand Study include:
 - Identification of the range of R&D and technological innovation services currently utilised and demanded by HVMS firms including:
 - o Technology-based services (facilities, technological platforms, high-capital services); and
 - o Advisory and other non-technological services (e.g. advice, connections, business strategy, IP management, HR).
 - For different services (and where possible by sub-sector), to identify the level of demand (including geographic concentration and firm willingness to pay), the extent to which demand varies by firm size, the extent of collaboration (i.e. where services are jointly commissioned), and the nature / level of government support provided.
 - The research and technological development capabilities, including major technology platforms, research teams and dedicated infrastructure, including laboratories and testing facilities, required to deliver the services being sought.
 - Identified / perceived bottlenecks including issues around preferred delivery mechanisms / locations / ease of access; availability and quality of services being sought; impact of current tax and IP rules and relative strengths / weaknesses of different provider options.

3. Background

Defining the HVMS Sector

- For the purposes of the Demand Study, the HVMS sector is considered to include:
 - Firms which develop, provide and utilise highly technological manufactured goods and services. This includes firms across the range of biotechnology, processing, manufacturing of electronics, robotics, sensing and scanning devices, medical devices, drugs, agri-technology, digital technology, and ICT, including the application of technology developments to the more traditional manufacturing sector in New Zealand (e.g. meat, wool and wood processing).
 - Providers of R&D and technological innovation services, i.e. services which either directly, or through facilitation, develop and transfer knowledge, know-how and technology to businesses, which enable them to develop and / or improve products, services, processes or organisations.

The Nature of Innovation

- An understanding of the nature of innovation as it applies to the HVMS sector is an essential component of the Demand Study. Innovation may be an iterative organic process with linkages and interactions at many levels. Innovation typically occurs as a result of a “technology push” or “demand pull” process.
 - Technology push projects are often seen as a “pipeline”: a linear commercialisation model that progresses from idea to full market establishment via stages in research, proof-of-principle development, prototype, product beta-testing in trial markets and market launch.
 - Demand pull projects occur following the identification of a market need that triggers industry-led innovation. This process represents the large bulk of science and technology innovation in New Zealand.

- Innovation may also begin with lateral thinking that takes an existing technology and applies it in a new manner or in a new market. Project partnerships between R&D institutions and industry may produce spin-off ideas that result in new and often unexpected developments.

Support for Innovation in New Zealand

- Researchers, engineers, business development managers, and underpinning physical R&D infrastructure in New Zealand available to HVMS firms, are provided by eight universities and eight Crown Research Institutes (CRIs), and to a lesser extent various polytechnics (collectively these are referred to as Public Research Organisations or PROs) - as well as a number of industry-supported private sector research associations and organisations.
 - Universities and CRIs both focus on basic and applied research, as well as some consultancy activities with business and industry.
 - However, CRIs engage more with strategic and tactical research as well as consultancy that supports specific industry sectors; for example, AgResearch, Plant and Food Research, Scion, IRL, or public good objectives, such as Environmental Science and Research (ESR), GNS Science, Landcare Research and the National Institute of Water and Atmospheric Research (NIWA).
 - Other R&D organisations tend to be more narrowly industry focussed; for example, the Building Research Association of New Zealand (BRANZ) and the Heavy Engineering Research Association (HERA).

Contents

Section	Page
Glossary of Terms	3
1. Executive Summary	4
2. Introduction and Scope	10
3. Background	12
4. Approach	15
5. Interview and Survey Analysis	18
6. Conclusion	36
7. Appendices	39-83
Appendix I – Terms of Reference	
Appendix II – Interview Questionnaire	
Appendix III – Online Survey Questionnaire	
Appendix IV – Summary of Firms Interviewed	
Appendix V – Survey Results	
Appendix VI – Importance / Satisfaction Matrices	

4. Approach

Introduction

- Our approach to this engagement has involved the following steps
 1. Reference the Powering Innovation Review and subsequent policy announcements to set the context for the Demand Survey.
 2. Establish an HVMS “population” to be addressed through the process, such that relevant entities and sectors are targeted.
 3. Determine an appropriate sample of organisations to participate, such that the results of the project can be relied upon.
 4. Design an interview structure in a way that gathers the information necessary to enable appropriate qualitative and quantitative assessments to be made based on one-on-one interviews with selected firms.
 5. Design of an online survey, in consultation with the MSI, to enable the views of a much larger sample of HVMS organisations to be analysed.
 6. Analyse and report back on the findings from the interview and survey process to provide MSI with substantive qualitative and quantitative information to inform the ATI establishment process.

Establish an HVMS Population

- The initial phase of our engagement was to profile potential firms which would be suitable for our interview and survey processes. This phase was completed in several steps:
 1. The MSI providing a list of potential target organisations based off a range of databases to which it had access;
 2. The MSI provided list was consolidated with a schedule of firms identified by Deloitte to create a “long list” of potential companies to interview or survey;

3. The list of clients was profiled and segmented in terms of size, sector / sub-sector and geography, and discussions were held with the MSI in determining the final 50-60 firms which would be part of the interview phase;
4. Deloitte, in consultation with the MSI, agreed a final list of interviewees based on a range of criteria including location, size and sub-sector;
5. The interview sample was weighted towards more established firms, known to be active in R&D;
6. Companies not selected to be interviewed were surveyed online.

Design Questionnaire

- A questionnaire was developed by Deloitte, with the input of the MSI, to ensure a suitable range of questions were asked to meet the objectives of the interviews. The questionnaire had four major questions and was targeted at gaining an insight into;
 - How each business undertakes R&D.
 - How they innovate in New Zealand;
 - Perceptions of gaps or blockages in the current process which could be addressed through institutional response or other mechanisms.
 - Their view on possible roles an ATI could play and the services and activities it could provide.
- The questionnaire is included as Appendix II.

Undertake Interviews

- Interviews were undertaken either face-to-face or by phone. The interviews were conducted by two person Deloitte teams, with each team being partner or senior manager led. Four senior Deloitte staff were involved in the interview process to increase the independence and objectivity of the interview process.

4. Approach

Undertake Interviews (continued)

- Interview notes were written up and shared between the interview teams and with the MSI.
- Key themes and findings were then extracted and synthesised.

Online Survey

- In addition to the interview process above, a further 2000 firms were approached to participate in an online using the SurveyGizmo survey tool. SurveyGizmo is an enterprise-grade online surveying tool.
- The online survey is included as Appendix III and was designed to increase the overall reach of the project to ensure a broader mix of firms, in terms of size, sector and location, were included.

Findings

- The qualitative and quantitative results from the interview and survey processes were reviewed and analysed to assist in informing the development of an ATI.

Firms Interviewed and Surveyed

- It has proven difficult to establish an HVMS population to interview / survey given the fragmented nature of the sector and the absence of common industry or trade bodies. The organisations interviewed and surveyed covered multiple sub-sectors, scales and locations. As a consequence, it is hard to generalise about these businesses. However, the following attributes, which are relevant to an assessment as to the likely demand for support services, were relatively common:
 - The businesses are largely New Zealand-owned;
 - Growth aspirations / expectations are extremely high;
 - Firms invest heavily in R&D, but mainly on development;
 - The primary development spend is on internal resources – mostly on people.
- A summary of the profile of the firms interviewed and surveyed is set out on Page 19.

Contents

Section	Page
Glossary of Terms	3
1. Executive Summary	4
2. Introduction and Scope	10
3. Background	12
4. Approach	15
5. Interview and Survey Analysis	18
6. Conclusion	36
7. Appendices	39-83
Appendix I – Terms of Reference	
Appendix II – Interview Questionnaire	
Appendix III – Online Survey Questionnaire	
Appendix IV – Summary of Firms Interviewed	
Appendix V – Survey Results	
Appendix VI – Importance / Satisfaction Matrices	

5. Interview and Survey Analysis

Firm Profile Analysis

- The table opposite sets out a summary profile of the 44 firms that agreed to be interviewed and 344 firms surveyed.
- Firms taking part in the interview and survey process were asked to provide some background information in relation to their relative size (in terms revenue and FTEs), the proportion of export sales relative to total sales, and the proportion of New Zealand ownership. More detailed profile information in relation to firms interviewed is provided in Appendix IV including firm geographical location and also sub-sector analysis.
- The segmentation analysis was used to better interpret the survey and interview results. Specifically we note the following highlights:
 - Around 80% of surveyed firms had annual sales of less than \$10 million, indicating a higher proportion of smaller firms were included in the survey than were included in the interview sample, where only around 40% had annual sales of less than \$10 million.
 - Around 40% of surveyed firms generated more than 50% of sales from exports, whereas this statistic was significantly higher for the interview sample (around 70% of firms interviewed generated more than 50% of sales from exports).
 - There was a high degree of New Zealand ownership in both the interview and the survey samples.
- The larger and broader sample of firms accessed through the survey created an ability to “drill down” into the survey responses to test the extent to which these varied as different parameters were changed. In particular the sensitivity of survey responses to changes in the following parameters was tested:
 - Size.
 - Ownership.
 - Location.
- This further analysis did not reveal any material variation in responses when these were segmented by the different parameters above.

Segmentation Categories	Bands			
Sales (\$m)	< 1	1 - 10	10 - 50	> 50
Survey Analysis	128	144	47	26
%	37%	42%	14%	8%
Interview	4	14	-	26
%	9%	32%	-	59%
FTEs	< 10	11 - 50	51 - 100	> 100
Survey Analysis	140	92	20	92
%	41%	27%	6%	27%
Interview Analysis	9	9	5	21
%	20%	20%	11%	48%
Export Revenue (%)	< 25	26 - 50	51 - 75	76 - 100
Survey Analysis	154	54	42	94
%	45%	16%	12%	27%
Interview Analysis	9	5	7	23
%	20%	11%	16%	52%
NZ Ownership (%)	< 25	26 - 50	51 - 75	76 - 100
Survey Analysis	17	7	12	307
%	5%	2%	4%	89%
Interview Analysis	2	4	-	38
%	5%	9%	-	86%

Source: Based on Survey results (344 respondents) and Interview results (44 respondents)

- Heat maps have been used to illustrate the responses from the survey. The heat maps have also been segmented by the four revenue groups - less than \$1m, \$1m - \$10m, \$10m - \$50m and greater than \$50m.
- The heat maps can be used to show the different responses from firms in the four different revenue segments.

5. How Firms Innovate

Level of Innovation Activity and Factors Considered Critical to Innovation

- The table opposite highlights the significant level of innovation activity that takes place within the New Zealand firms surveyed, and specifically confirms:
 - Around 79% of firms surveyed had introduced either a new or significantly improved goods or services in the past 12 months.
 - Around 58% of firms surveyed had introduced either a new or significantly improved operational processes in the past 12 months.
- Both the survey and interview analysis highlighted that innovation is a critical business process. From the interview process it is clear that innovation needs to be led from the top of the organisation (or by owners and senior management), supported by technical management and capability. Other common themes included:
 - Innovation tends to be market led and driven by current or prospective market needs identified through interaction with customers.
 - A heavy focus on watching out for industry developments as a means of identifying new opportunities.
 - The need to stay ahead of competitors.
 - The need to integrate new technologies into existing products.
 - Often innovation comes from being an “early adopter” of new technologies, rather than through internal development, and firms creating novel solutions to existing problems.
 - Innovation frequently comes from a mix of providing technical solutions to meet specific client current or anticipated needs and individual creativity outside of this process.

	Revenue Band				Total Response
	\$0 - \$1m	\$10m - \$50m	\$1m - \$10m	> \$50m	
Introduced any new or significantly improved goods or services in the past 12 months					
Yes	66%	82%	82%	76%	79%
No	34%	18%	18%	24%	21%
Introduced any new or significantly improved operational process in past 12 months					
Yes	57%	64%	67%	62%	58%
No	43%	36%	33%	38%	42%

Source: Survey. Note that information above is based on the total positive responses in relation these questions

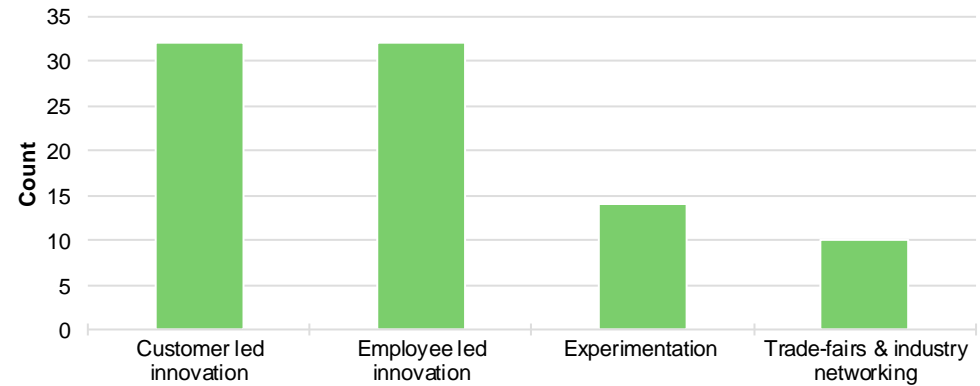
- The interview process also highlighted that innovation tends to be based around continual improvement of existing products / services or identifying new, tangential markets in which to deploy existing skills / technologies. Few businesses were focussed on the commercialisation of products / services developed through pure research. The exception to this was in the case of entities that had been spun-off out of CRIs or universities.
- We note that high value manufacturing can involve a significant “assembly” component where a major part of the overall process is connecting different componentry to complement the “original” IP created by a firm in order to produce a product or service.

5. How Firms Innovate

Interview Analysis – Key Sources of Innovation

- The majority of firms interviewed identified customers, suppliers and staff as being major sources of innovation. A lot of innovation involves understanding where customers needs are heading and linking different developments, in often different fields, to develop enhanced products or services. Other common themes included:
 - Research into and an understanding of market trends and needs is a key influence – with successful firms effectively balancing their customer needs with the commercial viability of new or enhanced products.
 - Having identified opportunities for innovation through interaction with customers and market analysis, most firms look to their own internal resources first – skilled, experienced people with access to the right equipment to drive the innovation process.
 - Innovation was not typically initiated by interaction with specialist R&D providers, but rather R&D providers were used on a project basis, to help solve specific issues where these could not be addressed internally, consequently they are seen as part of the “ecosystem” used to solve problems rather than to drive product development.
 - A lot of innovation comes from the “shop floor” with experienced technical staff applying a problem solving attitude to a specific problem or opportunity – employees were seen as a very significant source of ideas / innovation and most firms had either formal or informal arrangements set up to facilitate this process.
 - The intuitive /problem solving New Zealand culture was seen as a big driver of innovation – but also meant that innovation tends to be focussed on solving the “next problem” to further enhance a product or service or to address issues with current products or services – this includes innovations down the value chain acting as catalysts for future innovations / enhancements.
 - Employee led innovation typically comes from brainstorming and experimentation with techniques and materials.

Sources of Innovation



* Based on a sample size of 44 firms

Source: Interview Analysis

- Innovation practices range from informal systems to highly structured arrangements.
- The supply chain is a major source of innovation – but for some firms this process is becoming more complex as supply chains globalise – particularly with more product manufacturing moving offshore, requiring new relationships to be established.
- Attendance at global Industry shows and the like is a significant source of ideas both in relation to understanding customer needs and identifying new or emerging technologies that can be applied to further develop products / services.
- “Technology push” from PROs is not a major driver for innovation.
- Firms that have been spun out of larger entities or PROs (CRIs in particular) do look to their “host” entity for ideas and support.

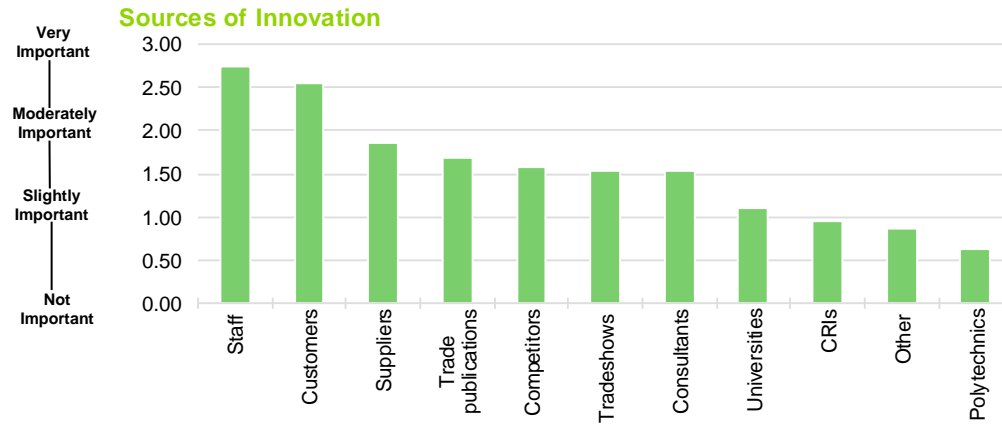
5. How Firms Innovate

Survey Analysis – Key Sources of Innovation

- The chart (top) and table (bottom) opposite summarises how firms surveyed perceive the importance of various sources of ideas and information for innovation.
- Firms surveyed were asked to categorise the relative importance with which they viewed various sources of ideas and information for innovation; with 0 being “not important”, up to 3 being “very important”. The analysis was consistent with the findings through the interview process and highlights the following:
 - Staff and customers are considered important sources of innovation, with overall average scores of around 2.7 and 2.6 respectively.
 - Suppliers, competitors, trade associations and consultants are considered moderately important sources of innovation, with overall average scores between 1.5 and 1.8
 - Universities, CRIs and polytechnics are considered to be less important sources of innovation, with overall average scores of less than 1.0.
- The table opposite (bottom) provides a size segmentation analysis of these results and confirms these views are relatively consistent across all firm sizes. This analysis has been overlaid with a heat map (or colour coding) to visually highlight the respective importance placed on various sources of innovation (blue shading indicates greater importance, and green indicates lesser importance).

Survey Analysis – Activities used to support innovation

- Firms surveyed indicated that apart from in-house research and development, contract or joint research and development, prototyping and / or the use of pilot plant and market research were activities that are routinely used to support the innovation process.



Source: Survey Results

Sources of Innovation	Revenue Band				Average
	\$0 - \$1m	\$1m - \$10m	\$10m - \$50m	> \$50m	
Staff	2.64	2.77	2.89	2.85	2.74
Customers	2.54	2.55	2.53	2.52	2.55
Suppliers	1.82	1.79	1.95	2.05	1.85
Trade publications	1.78	1.72	1.46	1.57	1.69
Competitors	1.61	1.59	1.42	1.71	1.57
Tradeshow s	1.40	1.65	1.59	1.57	1.54
Consultants	1.65	1.63	1.28	1.67	1.54
Universities	1.20	1.18	0.68	1.48	1.10
CRIs	0.90	1.10	0.70	1.35	0.96
Other	0.88	0.91	0.77	1.29	0.87
Polytechnics	0.67	0.66	0.54	0.62	0.63

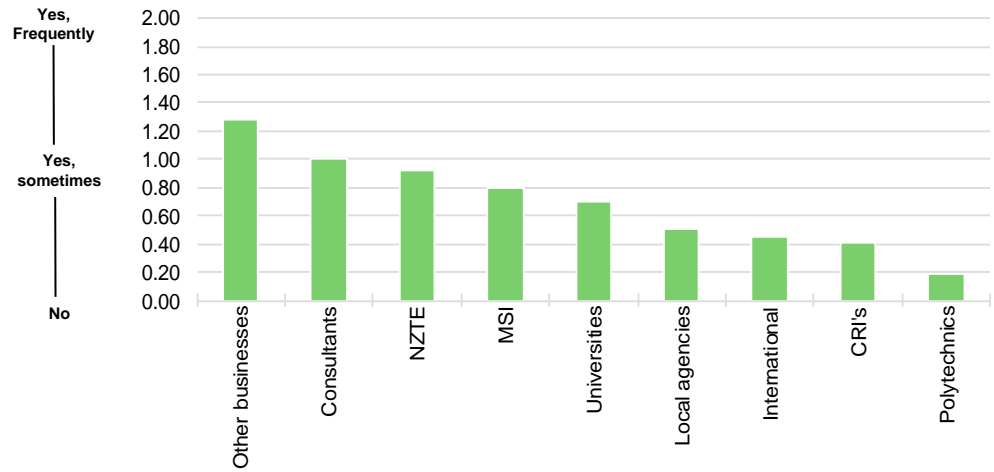
Source: Survey Results

5. Sources of Innovation Support

Where Firms Source Technical Support for Innovation

- The chart (top) and table (bottom) opposite summarises where firms source technical support for innovation. Firms surveyed were asked to rank where the business had engaged with various service providers in the last 2 years; with 0 being “no”, 1 being “yes sometimes”, and 2 being “yes frequently”. The analysis highlights the following:
 - Other businesses (including customers and suppliers) were named as those entities that firms most frequently engaged with to assist with technical development of innovation, with an overall average score of around 1.3.
 - Firms frequently engage with advisors and other consultants to assist with innovation, with an overall average score of around 1.0.
 - Firms also regularly engage with NZTE and MSI, with overall average scores of 0.9 and 0.8, respectively.
 - To a lesser extent PROs are utilised as sources of technical support for innovation. In particular universities had an overall average score of around 0.7 and CRIs and Polytechnics had scores of 0.40 and 0.20, respectively. Engagement with PROs is further expanded upon below.
- The table opposite (bottom) provides a size segmentation analysis of these results and confirms these views were generally consistent across all firm sizes. However, large firms tended to engage more frequently with CRIs and also with other international based technical providers.
- The survey indicated that where firms are looking for external support R&D, scientific and technical equipment and prototyping are the services most commonly sought.
- The chart on page 24 identifies what services and support firms surveyed look to innovation service providers for.

Sources of Technical Support



Source: Survey Results

Source of Technical Support	Revenue Band				Average
	\$0 - \$1m	\$1m - \$10m	\$10m - \$50m	> \$50m	
Other businesses	1.25	1.25	1.42	1.29	1.28
Consultants	1.04	1.04	0.84	1.14	1.01
NZTE	0.79	1.01	1.05	1.00	0.93
MSI	0.89	0.80	0.58	0.90	0.80
Universities	0.70	0.76	0.38	0.90	0.69
Local agencies	0.71	0.51	0.24	0.24	0.51
International	0.37	0.50	0.50	0.67	0.46
CRIs	0.30	0.46	0.39	0.76	0.41
Polytechnics	0.21	0.19	0.16	0.10	0.19

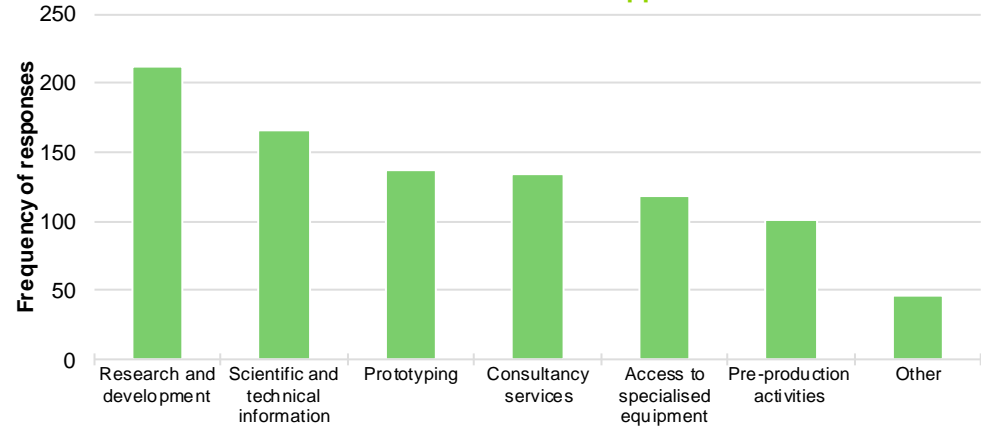
Source: Survey Results

5. Sources of Innovation Support

Further Commentary Related to Sources of Technical Support

- A key theme established during the interview process was that relationships and the need to get the best services or support are key drivers of engagement with external service providers. Other common themes established through the interview process included:
 - Many of the businesses with larger “technical workforces” had a high proportion (greater than 50%) of staff who had come from overseas.
 - International staff are seen as important due to their technical training and – more particularly – their depth of relevant experience. The larger firms not only have substantial internal capability but also established global networks that provide specific technical input to the innovation process.
 - Typically centres of excellence / individuals with a specific capability have been identified and are contracted to provide specific services or solutions – for example Elmcom in Nottingham in the United Kingdom is seen as a world leader in switch design.
 - Support is identified primarily through networks with customers often providing direction as to where requisite skills can be accessed.
 - Essentially organisations looked to establish where the “world’s best” exists for a specific capability and reach out to that capability on an as required basis. They build expertise within a trusted network of providers; and by going to the “worlds best” there is confidence that the right service will be delivered quickly and for a fair price.
 - Entities approached included overseas universities (or often specific individuals within a University), large multi-national organisations with very substantial in-house research capability (Du-Pont for example) and other specific private sector organisations with globally recognised expertise in a particular aspect of a process.
 - The tendency is to look for whoever has done a particular type of work before and use their findings or capabilities; and in terms of purer R&D there is a view that this rarely fits exactly to the challenge faced by industry – the key is to find linkages between what is being done and what the needs are so as to facilitate the evolution of the R&D into outcomes that can be applied to solve specific problems.

Use of services and support



Source: Interview Results

Utilisation of NZ PROs

- The table below summarises the utilisation of New Zealand PROs:

PRO Utilisation - Interview and Survey Results	One Relationship	Multiple Relationships	Total
Survey			
Universities	58	24	82
CRIs	12	4	16
Both	-	74	74
	70	102	172
Interview			
Universities	8	6	14
CRIs	7	4	11
Both	2	12	14
	17	22	39

Source: Survey and Interview. Note that of the 344 firms surveyed 172 did not have any relationship with PROs while of the 44 firms interviewed 5 did not have any relationship with PROs

5. The Role of Public Research Organisations

Utilisation of NZ PROs

- The interview analysis highlighted that 39 firms (representing around 89% of the total 44 responses) had directly engaged with a CRI or a University and within that group further analysis confirmed:
 - 14 firms had engaged with universities only (6 firms had multiple relationships with universities);
 - 11 firms had engaged with CRIs only (4 firms had multiple relationships with CRIs); and
 - 14 firms had engaged with both universities and CRIs (this includes multiple relationships).
- The survey analysis highlighted that 172 firms (representing around 60% of the total 287 responses) had directly engaged with a CRI or a University in the last 2 years; and within that group further analysis confirmed:
 - 82 firms had engaged with universities only (24 firms had multiple relationships with universities);
 - 16 firms had engaged with CRIs only (4 firms had multiple relationships with CRIs); and
 - 74 firms had engaged with both universities and CRIs (this includes multiple relationships).
- The table opposite provides an analysis as to how location influences the choice of PROs. The analysis is based on survey responses where firms were willing to provide details of their location. Key points include:
 - The majority of firms used PROs which were local to their business, for example, Auckland University and AUT were used most by those firms located in the Auckland region. However, the survey indicated a significant level of demand for AUT services from firms in the Canterbury region.
 - Out of the CRIs the survey suggests that IRL is the most active across the country, followed by AgResearch and Scion.

Type of PRO used	Location						All
	Auckland	Hamilton	Wellington	Canterbury	Dunedin	Other*	
Universities							
Auckland	22	3	2	1	1	4	33
AUT	9	1	-	12	-	-	22
Lincoln	2	1	-	2	-	1	6
Massey	6	3	1	3	-	6	19
Canterbury	3	-	2	13	-	3	21
Waikato	1	5	-	-	-	-	6
Otago	1	-	2	2	2	2	9
Victoria	-	-	5	1	-	1	7
Other	9	5	5	2	-	3	24
CRIs							
IRL	6	1	6	5	2	4	24
MSI	-	-	1	-	-	2	3
Scion	4	-	-	-	-	5	9
AgResearch	2	3	1	1	-	2	9
GNS	-	1	2	-	-	-	3
NWA	-	-	1	-	1	-	2
BRANZ	1	-	-	-	-	-	1
Other	4	3	3	5	-	10	25

*Note: Other includes all cities which are not part of the 5 main centres

Source: Positive responses from survey

Further Commentary Related to Firms' Experiences of NZ PROs

- In general utilisation of New Zealand PROs and related experiences varied widely and awareness of what support PROs could offer tended to be limited to any previous involvement. Some other common themes are noted as follows:
 - The PROs most routinely accessed by the companies interviewed were IRL and the Universities of Auckland and Canterbury (though the other universities were also mentioned) and other CRIs GNS, Scion.

5. The Role of Public Research Organisations

Further Commentary Related to Firms' Experiences of NZ PROs (continued)

- The survey results identified Auckland, Massey and Canterbury universities as the universities most commonly accessed and IRL, AgResearch and Scion were identified as the CRIs used most often.
 - Where these PROs are accessed testing is a major area of service sought – for example “why is this material failing?”, or “how would this material react under these circumstances?” More generally PROs are accessed when firms had a specific technical problem that needed solving.
 - Accessing testing equipment / expertise is another common area of demand but the cost of having testing undertaken in New Zealand is cited as a major cause for concern by some firms.
 - Some more “blue sky” projects is undertaken but generally only where there is funding support available (e.g. TechNZ grants).
 - IRL is identified as being strong in the materials testing area and is considered to be good at a technical level, but not particularly commercial as to how it provided its advice – “hedging of bets” and not equipped to provide fast solutions to problems that need to be solved quickly due to commercial imperatives (both due to process issues and an ability to respond to commercial imperatives).
 - Experiences with universities are highly variable – we received considerable feedback that while the universities tried to have industry offerings these tended not to work well - with the universities lacking an understanding of the commercial objectives of their industry.
 - Universities were utilised where they could provide relevant equipment (for example the use of laboratories) or where they had people with a specific competency.
- Overall a broad range of organisations were identified as having contributed to firms' innovation. However, of the public organisations MSI and the provision of funding support, was identified most often as the organisation and the key factor, that made the most significant difference in promoting innovation. Universities and CRIs are most valued for their provisions of research and commercialisation services.

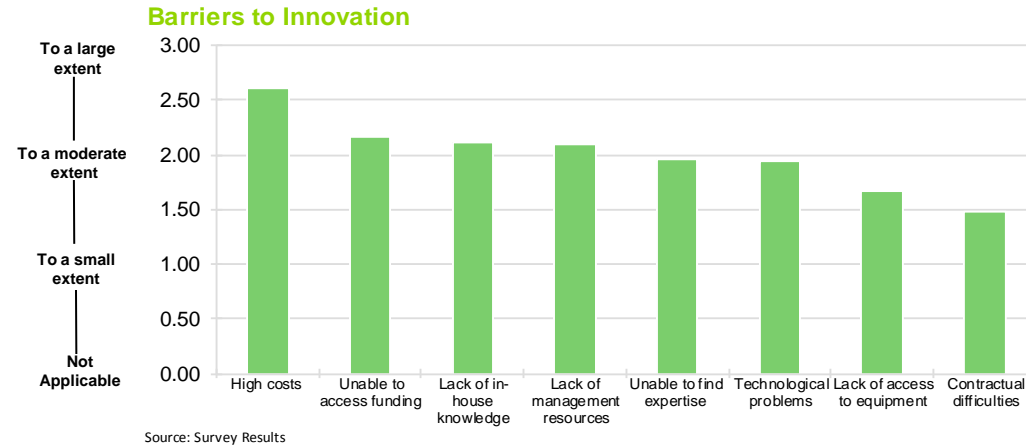
Comments related to Offshore Technical Support Providers

- Many of the firms interviewed had experience with international providers, and generally experiences were favourable. Key themes identified included:
 - Providers are very specific to the needs of the particular business and the range of services accessed was very broad.
 - Australian and US universities are referred to as suppliers of services – but the range of services sought was broad (physics, steel analysis, computer modelling, 3D analysis etc.).
 - Relationships are critical to identifying appropriate providers – in any given sector there are specific entities, both private and public, that are regarded as world leaders in a specific service or capability.
 - Reputation is based around a proven record for delivering / innovating in a particular area – accessing these entities or individuals materially de-risks the innovation process as there is a high level of confidence that the right service will be delivered, accurately and on appropriate commercial terms.
 - In many situations the firm had identified the right sources of assistance through their own networks, with customers and suppliers often being a source of direction / contacts.

5. Issues and Barriers to Innovation

Summary of Barriers and Issues to Innovation

- The chart (top) and table (bottom) opposite summarises where firms perceive issues and barriers to innovation to arise. Firms surveyed were asked to categorise the relative significance with which they viewed various barriers and issues for innovation; with 0 being “not applicable”, up to 3 being “to a large extent”. The analysis highlights the following:
 - High costs associated with undertaking innovation projects are considered the most significant concern, with an overall average score of around 2.6.
 - Other factors as listed are all considered has having a moderate impact on a firms ability to undertake innovation activities, with overall average scores ranging from around 1.5 to 2.0.
- The interview process highlighted that limited access to capital results in most firms making do with what they have (incremental innovation) rather than being bold and taking risks with disruptive innovation that might need more innovation and science investment.
- Firms frequently commented that not knowing what assistance and support is available, led to work around solutions and firms ‘making do’. The need for consistent funding was highlighted as a requirement if firms are to have confidence in medium term project development.
- The survey results tested firms’ views on to how well they understand how to get support for innovation. Of the firms that responded 53% indicate that they know well or very well how to get the support, 31% are neutral and 16% consider their understanding to be poor or very poor. This response was relatively consistent across all firms surveyed.
- A number of firms commented favorably on the importance of the support provided by government agencies including NZTE (in particular), MSI through the highly regarded TBG programme, and MFAT. However, the effectiveness of these agencies is compromised somewhat by staff turnover and the difficulties associated with the need to work with multiple agencies at times.
- The table opposite (bottom) provides a size segmentation analysis of these results and confirms these views were relatively consistent across all firm sizes.



Issues and Barriers to innovator	Revenue Band				Average
	\$0 - \$1m	\$1m - \$10m	\$10m - \$50m	> \$50m	
High costs	2.72	2.56	2.52	2.60	2.62
Unable to access funding	2.21	2.27	2.03	1.86	2.17
Lack of in-house know ledge	2.00	2.17	2.14	2.24	2.11
Lack of management resources	1.97	2.19	2.25	2.06	2.10
Unable to find expertise	1.85	2.00	1.89	2.25	1.95
Technological problems	1.88	1.93	1.97	2.19	1.94
Lack of access to equipment	1.67	1.71	1.60	1.70	1.67
Contractual difficulties	1.51	1.45	1.44	1.62	1.48

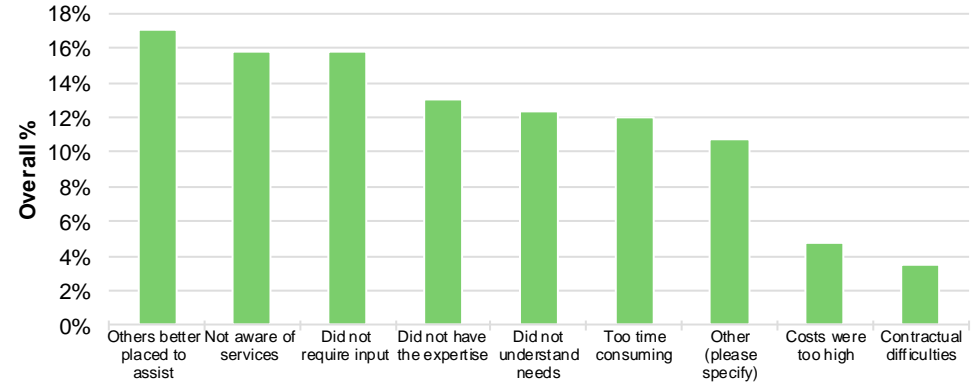
Source: Survey Results

5. Issues and Barriers to Innovation

Barriers and Issues Specific NZ Universities and CRIs

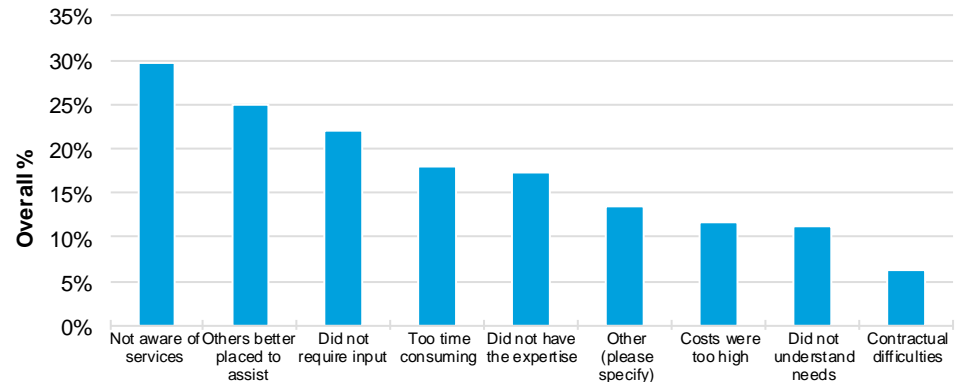
- The charts opposite summarise various reasons why firms have not engaged with universities and CRIs
- Firms surveyed were asked in the survey, if they did not engage with universities or CRIs, whether any of the reasons as listed were applicable. In the case of universities the analysis highlighted:
 - ‘Other were better placed to assist’ was noted as a key reason firms had not engaged with universities.
 - Other key reasons noted included, ‘firms were not aware of what services were available’ or ‘universities did not have the required expertise and / or did not understand the needs of the firm’, or merely ‘firms did not require input from a University’.
 - To a lesser extent other factors including contractual and cost issues, and also time resource constraints were noted.
- In the case of CRIs the analysis highlights:
 - ‘A lack of awareness of what services are available’ was noted as a key reason firms had not engaged with CRIs.
 - Other key reasons noted included, ‘others were better placed to assist’ or ‘CRIs did not have the required expertise’, or merely ‘firms did not require CRI input’.
 - Other factors as listed included contractual and cost issues, and also time resource constraints.
- Size segmentation analysis of the above results confirms these views were relatively consistent across all firm sizes, although larger firms appear to have a better understanding of what services universities and CRIs can offer and are less concerned about cost and other potential issues such as understanding the firms needs and contractual difficulties associated with engaging a University or a CRI. Detailed segmentation analysis or heat maps are included in Appendix V.

Issues with Universities



*The above chart is based on the overall percentage of affirmative responses within each of the four revenue segments relative to the number of firms surveyed - 320 firms
Source: Survey Results

Issues with CRIs



*The above chart is based on the overall percentage of affirmative responses within each of the four revenue segments relative to the number of firms surveyed - 304 firms
Source: Survey Results

5. Issues and Barriers to Innovation

Further Commentary Related to Barriers to Innovation

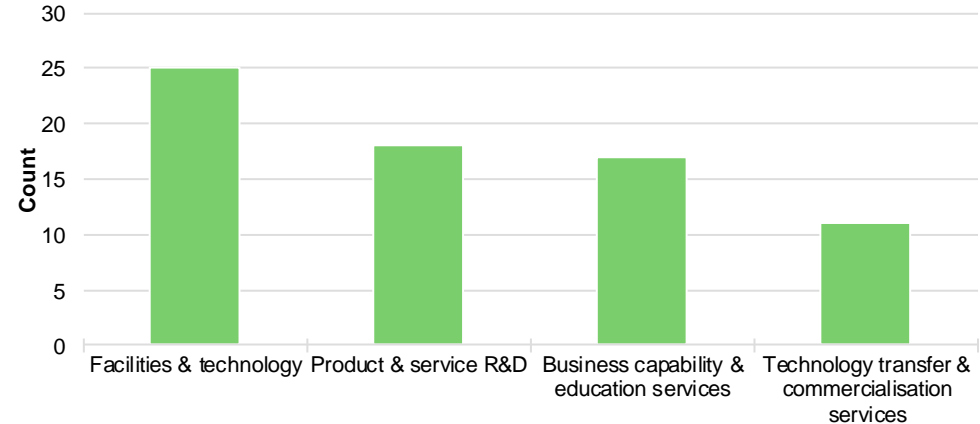
- The interview process identified that services were primarily accessed on the basis of previous relationships, though in some cases other agencies such as NZTE or MSI had acted as referrers. Other issues and problems identified during the interviews are noted as follows:
 - Cost was frequently identified as an issue, and it is sometimes much cheaper to do a in-house project or go offshore where the cost is less and there is greater comfort that the right service will be provided.
 - Access to funding, particularly smart capital through the growth phase where the capital providers bring value in the form of governance, connections and relevant sector experience in addition to funds;
 - Reducing compliance costs – there is an acceptance that there needs to be appropriate “barriers to entry” for firms entering programmes such as the TBG programme – but processes need to be simplified in relation to on-going support;
 - Other issues with the PROs included a lack of commerciality and a tendency to go “wider” whereas the need was for real depth of research or analysis to solve a specific problem.
 - A lot of PROs want to work in new and novel areas of science, which does not match the timeframe, or risk businesses want to take.
 - Often interaction is costly in terms of the time and cost of educating the scientists with the industry or domain knowledge necessary to solve a specific problem.
 - A number of respondents identified a lack of commercial experience and up to date know-how as being an inhibitor of using PROs – in a very fast moving world it is very hard for personnel at a PRO to stay in touch with how technologies are being applied in the real world.
- Experiences with the PROs varies widely, but in a limited number of cases genuinely strategic relationships were identified where the needs and expectations of both parties are understood. These tended to occur where there had been a long standing relationship between a specific firm and a specific PRO.
- Firms find that it is often difficult to align expectations in terms of timeframes and a PROs focus on theory versus its ability to understand and assist to solve a specific business problem.
- PROs can occasionally be significant competitors on certain projects.
- Overall the quality of the experience comes down to the individuals involved and their specific attitude to collaboration.

5. Potential Role for an ATI

How the Government could better support Innovation

- The table opposite summarises responses from the firms interviewed with respect to the potential roles they believe an ATI could play.
- This analysis highlights that the provision of technology facilities and business related services were seen as the most likely areas where an ATI could provide support.
- However, ultimately whether firms will use the services available from an ATI will depend on a range of factors including: customer focus; genuine expertise; price; and timeliness.
- Responses in relation to this line of questioning varied widely and included the following areas where it was perceived an ATI should focus its activities:
 - Providing R&D grants or facilitating access to credits or the like for firms with a good history of innovation.
 - Facilitating access to other Venture Capital money.
 - Aggregating demand for specialist equipment not currently available in New Zealand.
 - Facilitating the sharing of high end engineering and scientific capability.
 - Facilitating new thinking into existing problems or processes.
 - Facilitating easier access to the right skills and capabilities and reducing fragmentation of service offerings, including helping firms identify and connect with other businesses developing similar IP or applications.
 - Rebuilding the “deep science” knowledge and experience that some firms perceive New Zealand has lost.
 - Acting as a mechanism for pulling all resources together and making the ATI a “one-stop” place for information and facilitating access.

Possible roles an ATI could play



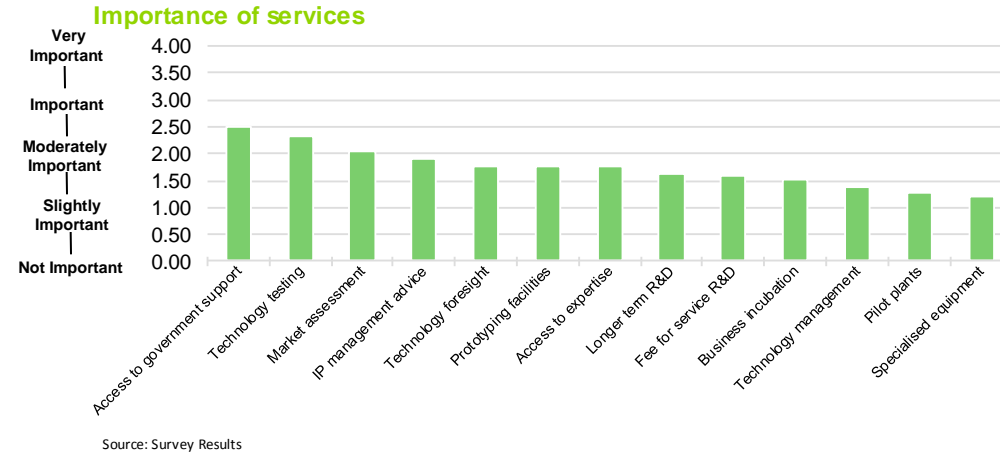
* Based on a sample size of 44 companies

- Making the ATI a “virtual” organisation which is open to the market so as to enable businesses to see the different types of technologies’ being developed including better access to “national” expertise (a portal to PRO capability).
 - Facilitating improved co-ordination of government and local government support – multiple agencies are approaching the same entities with fragmented offerings.
 - Promoting a change in the mind-set of both industry and research institutions to facilitate better collaboration.
 - Reducing the risk of investment by providing or facilitating access to testing equipment for firms to use until they have confidence in the project and can justify building the equipment in-house.
- It was also noted that significant promotion of an ATI will be required to ensure that its role and capabilities are understood. The ATI will need to be an agile rather than a compliance focussed organisation.

5. Potential Role for an ATI

Importance of Technical Services and Innovation Support

- The survey indicated that 58% of the firms that responded considered that there is a role for an ATI to play in supporting the HVMS sector.
- Further, the survey provides additional analysis with respect to the potential roles an ATI could play. Specifically the survey asked firms how important it is to obtain access to various innovation and technology services, and also how satisfied firms are in respect of their abilities to provide or access various innovation and technology services.
- The chart (top) and table (bottom) opposite summarises how important firms viewed the ability to obtain access to various innovation and technology services.
- Firms surveyed were asked to categorise the relative importance with which they viewed various innovation and technology services; which ranged from 0 being “not important” up to 4 being “very important”. The analysis highlights the following:
 - Access to government support, including R&D grant funding, had the highest overall average score of around 2.5 (between “moderately important” and “important”).
 - Technology testing services and market assessment, had the next highest overall average scores of around 2.3 and 2.1 (both slightly above “moderately important”).
 - Other factors as listed, had overall average scores ranging from around 1.2 to 1.9 (between “slightly important” and “moderately important”).
 - The heat map opposite (bottom) provides a size segmentation analysis of these results and confirms smaller firms place greater importance on being able to obtain access to the specified services. Specifically, firms with revenues of less than \$1 million had a combined average score of 2.0 across all services, as compared to firms with revenues greater than \$50 million which had a combined average score of 1.5. Technology testing with a score of 2.4 is the most important service for firms in the greater than \$50 million bracket.



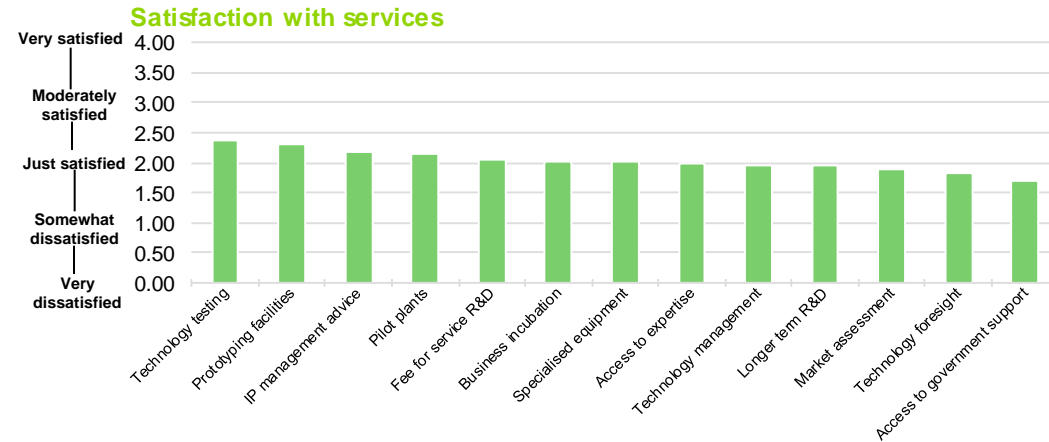
Importance of services	Revenue Band				Average
	\$0 - \$1m	\$1m - \$10m	\$10m - \$50m	> \$50m	
Access to government support	2.87	2.47	2.77	1.90	2.51
Technology testing	2.33	2.32	2.32	2.38	2.34
Market assessment	2.57	1.97	2.15	1.55	2.06
IP management advice	2.18	2.21	2.00	1.30	1.92
Technology foresight	1.89	2.09	1.71	1.40	1.77
Prototyping facilities	2.19	1.55	1.83	1.45	1.76
Access to expertise	2.19	1.59	1.89	1.32	1.75
Longer term R&D	1.65	1.47	1.71	1.65	1.62
Fee for service R&D	1.53	1.45	1.63	1.76	1.59
Business incubation	2.05	1.47	1.47	1.05	1.51
Technology management	1.66	1.57	1.50	0.84	1.39
Pilot plants	1.42	1.30	1.18	1.15	1.26
Specialised equipment	1.55	0.83	1.26	1.19	1.21

Source: Survey Results

5. Potential Role for an ATI

Satisfaction of Technical Services and Innovation Support

- In order to further assess the potential demand for services from an ATI surveyed firms were asked to identify how satisfied they are in respect of their ability to provide or access various innovation and technology services and also how important they considered these services to be.
- The chart (top) and table (bottom) opposite summarises these responses.
- Firms surveyed were asked to categorise their relative satisfaction levels in respect of their abilities to provide or access various innovation and technology services; with 0 being “very dissatisfied”, up to 4 being “very satisfied”. The analysis highlights the following:
 - Access to government support, including R&D grant funding, had the lowest overall average score of around 1.7 (slightly below “just satisfied”).
 - Access to technology testing and proto-typing services and also IP management advice had the highest overall average scores between 2.2 and 2.4 (slightly above “just satisfied”).
 - Firms reported satisfaction levels of between 1.8 and 2.1 in respect of the various other innovation and technology services as listed in the survey (ranging from slightly below to slightly above “just satisfied”).
- The table opposite (bottom) provides a size segmentation analysis of these results and confirms overall smaller firms were less satisfied than larger firms in respect of their abilities to provide or access various innovation and technology services. Specifically, firms with revenues of less than \$1 million had a combined average score of 1.9, as compared to firms with revenues greater than \$50 million which had a combined average score of 2.3.



Source: Survey Results

Satisfaction with services	Revenue Band				Average
	\$0 - \$1m	\$1m - \$10m	\$10m - \$50m	> \$50m	
Technology testing	2.26	2.43	2.38	2.38	2.36
Prototyping facilities	2.29	2.36	2.24	2.38	2.32
IP management advice	2.14	2.06	2.10	2.47	2.19
Pilot plants	2.06	2.27	1.98	2.27	2.14
Fee for service R&D	1.87	2.06	2.01	2.31	2.06
Business incubation	1.81	2.03	1.86	2.43	2.03
Specialised equipment	1.83	2.14	1.86	2.20	2.00
Access to expertise	1.79	1.91	1.92	2.38	2.00
Technology management	1.75	1.88	2.03	2.20	1.96
Longer term R&D	1.63	1.97	1.97	2.20	1.94
Market assessment	1.71	1.88	1.84	2.13	1.89
Technology foresight	1.67	1.76	1.70	2.13	1.82
Access to government support	1.67	1.53	1.67	1.88	1.69

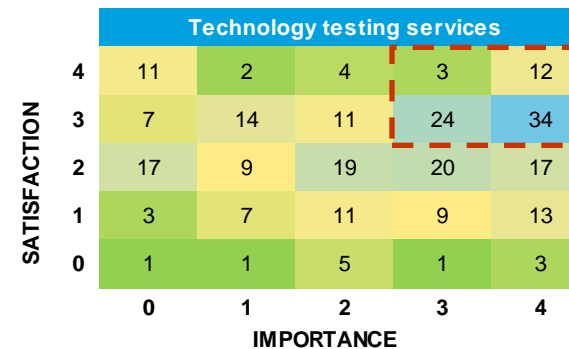
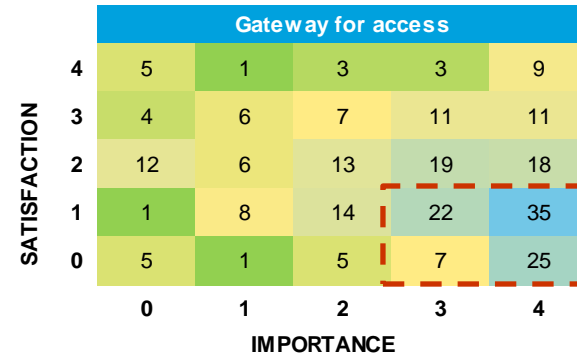
Source: Survey Results

5. Potential Role for an ATI

Combining Importance and Satisfaction Analysis

- The tables opposite highlights the findings of both the importance and the satisfaction scores summarised on Pages 31 and 32. The analysis in the first table highlights the innovation and technology services that firms view as the most important, but have expressed the least satisfaction in terms of their ability to access those innovation and technology services. Therefore this implies the areas of greatest need for these services, and a potential role for an ATI.
- Further matrices are set out in Appendix VI which summarise the responses in relation to other services, but the tables presented opposite are highlighted because they demonstrate the areas firms surveyed considered for gateway for access ‘the most important and least satisfaction’ and for technology testing services the ‘most important and most satisfied’, specifically:
 - Top table opposite ‘gateway access’ - had the highest score in the four panels on the bottom-right (89), indicating this area is considered important but firms are relatively unsatisfied with the current availability of these services.
 - Bottom table opposite ‘technology testing services’ – had the highest score in the four panels on the top-right (73), indicating that this area is considered important and firms are relatively satisfied with the current availability of these services.
- Smaller firms are generally less satisfied than larger firms in respect of their abilities to provide or access various innovation and technology services; and they also place greater importance on being able to obtain access to innovation and technology services.
- Other comments provided by firms in relation to the potential role of an ATI, tended to highlight concerns as to whether an ATI would be able to provide skills and capabilities relevant to a wide range of sectors and firms at differing stages of maturity.
- As a general observation the additional matrix analysis, as set out in Appendix VI, did not provide definitive results, as scores tended to cluster around the middle panels and / or the left hand side (indicating lower priority and importance). However, areas where current need is indicated includes technology foresight, market assessment and IP management.

Importance Satisfaction Highlights



Note: Blue shading indicates greater frequency, and green indicates lower frequency.

5. Potential Role for an ATI

Specific ATI Services of Potential Interest

- The survey identified the following roles in particular as being moderately to very important for an ATI:
 - Improving firms ability to undertake R&D and commercialisation successfully.
 - Facilitating connection to the right expertise and capability.
 - Acting as a centre of excellence for technology focused R&D.
 - Facilitating better connections and networking between firms and research organisations.
- The survey also identified industrial design, manufacturing and services processes, ICT (including computer networks and software engineering) and measurement and technical analysis as the areas of scientific knowledge and technology development capability most relevant to firms.
- Firms surveyed identified research into specific applications as being more important than applied research (moderately favoured) and strategic research (least favoured).
- Through the interviews a range of potential services were identified. Responses varied widely. Services commonly mentioned included:
 - R&D grants / facilitating access to credits or the like for firms with a good history of innovation.
 - Brokering access to funding services and providing a focus for investors
 - A core capability in science / engineering.
 - Process / product calibration and testing services.
 - Validation or efficient access to testing services to enable firms to demonstrate compliance with relevant standards on a cost effective basis.
 - Contract R&D and R&D partnerships.
 - Training and knowledge sharing.
 - Prototyping and piloting facilities – mainly to provide equipment.
 - Computer-aided design (CAD / CAM) services.

- Assistance with commercialisation and linkage to international expertise.
- IP management.
- Facilitating better usage of existing equipment – through mechanisms such as the renting or sharing of equipment.
- The feedback that we received from the firms interviewed was that demand would likely be fragmented – at least until the ATI demonstrated a track record of competence in specific areas.

Willingness to Pay

- Most firms are prepared to pay for project based / problem solving or services assistance on a fee for service basis provided the price is reasonable for the service provided. In many instances these firms already pay for support from a range of providers. The key barrier to paying for PRO services is value for money / ease of doing business.
- For purer R&D firms see significant benefit in de-risking this spend through finding support mechanisms like the TBG grant – but are still wary of losing control over IP. They see that the payback to the Crown from the investment comes in terms of employment and tax rather than a claim on the IP created

Specific ATI Services Not of Interest

- Services not of interest varied according to the nature / scale of the business interviewed but included:
 - IP management / protection.
 - Commercialisation.
 - A number of firms were not interested in any of the services suggested as possible offerings by the ATI.
- Questions were raised as to whether a single institution such as an ATI would have the depth of capability across enough areas to be effective. It was suggested that a better response might be to have a network of specialist niche entities such as GNS, TIDA (Titanium Industry Development Association) and HERA with better information about/ promotion of the services available from such organisations.

5. Potential Role for an ATI

ATI Competing with Other Services:

- The responses varied as to whether firms are concerned that an ATI might end up competing with existing services. There was not a general concern that there would be such displacement. However, there are some concerns as follows:
 - The establishment of an ATI could create further confusion or fragmentation of an already fragmented PRO sector.
 - Examples were offered of situations where PROs had invested heavily in equipment that already existed in the Private Sector and that pricing strategies had seen private providers forced out of the market.
 - While a number of businesses saw testing / calibration being a useful core competency for the ATI others saw that this capability could displace existing providers.
 - It is important that the ATI doesn't replicate existing facilities that are available and force private providers out of the market.
 - The ATI might compete with current services offered by IRL if these are not fully included in the ATI.
 - The ATI might invest in expensive facilities / equipment without having the requisite skills and experience to utilise these assets to solve business problems.
 - Whether a new entity will be more effective than the current PROs in supporting the innovation process.

Contents

Section	Page
Glossary of Terms	3
1. Executive Summary	4
2. Introduction and Scope	10
3. Background	12
4. Approach	15
5. Interview Analysis	18
6. Conclusion	36
7. Appendices	39-84
Appendix I – Terms of Reference	
Appendix II – Interview Questionnaire	
Appendix III – Online Survey Questionnaire	
Appendix IV – Summary of Firms Interviewed	
Appendix V – Survey Results	
Appendix VI – Importance / Satisfaction Matrices	

6. Conclusion

- The Demand Study used a combination of structured interviews and an online survey to illicit responses from participants in the HVMS sector to four key questions:
 - How HVMS firms innovate.
 - Where firms source technical support from to assist in the innovation process.
 - The issues and barriers to innovation faced by HVMS firms.
 - The potential role of an ATI.
- On balance the interview process was directed at larger, more established firms whereas the online survey canvassed the opinions of a wider group of firms including a relatively greater proportion of smaller, less established businesses.
- The larger and broader sample of firms accessed through the survey created an ability to “drill down” into the survey responses to test the extent to which these varied as different parameters were changed.
- Results from the survey did suggest that the smaller HVMS firms are less export-orientated and, on balance, have less interaction with PROs.
- Notwithstanding the different approaches to the process or differences in the population targeted there was a significant degree of commonality in the findings. In particular:
 - Staff and customers are overwhelmingly the most significant driver of innovation.
 - PROs are not seen as material contributors to the innovation process.
 - There is a high degree of fragmentation as to where firms go for technical support.
 - Access to funding and an ability to find the right support are common barriers to innovation.
- Key reasons why PROs were not looked to for support included the view that firms had the necessary capability in-house, PROs did not have the expertise or other organisations had more relevant expertise and there was a lack of awareness as to the services available.
- Respondents to both the interview and survey processes expressed a broad range of preferences as to the services that might be accessed from an ATI.
- Based on our evaluation of responses, we consider that demand is most likely to be concentrated in the following areas:
 - As a mechanism for accessing funding.
 - As a provider of calibration, testing and prototyping services.
 - As a provider of contract R&D.
 - As a mechanism for accessing facilities and expertise.
 - As a mechanism for networking and sharing of ideas.
- Through the interview process in particular there was a significant sense that many of the component parts necessary to better support innovation in the HVMS sector already exist – what is needed is intervention (incentives and information) to get the “system” working better.

6. Conclusion

- Our assessment is that demand is likely to be fragmented at least initially until the ATI builds its reputation for expertise in specific fields and for its ability to team easily with business. Further, the HVMS sector is very broad in terms of the range of products / services being developed, and are often directed at very niche markets.
- In addition most firms have found ways to address the need for support through their internal innovation process. Therefore, demand for the services offered by an ATI will depend on whether the services are better or easier to access than current support arrangements or if some activities that could be undertaken by the ATI are currently being done in-house by firms.
- The technical support that firms require tends to be very specific to their needs. Larger, more mature firms have in general recruited and developed their internal capability to meet these needs – in this respect activities that might otherwise be undertaken within an ATI or equivalent organisation are undertaken within the firms themselves. Smaller and earlier stage businesses are more likely to have a need to access a range of support.
- Most organisations are willing to pay for services on a fee-for-services basis where the price is seen as commercial / fair. The earlier the stage of the research / development support being looked for, the greater the desire for risk sharing. This risk sharing could be effected through a range of mechanisms, such as access to TBG funding (or the like) or through joint venture arrangements – but not at the risk of compromising ownership of IP.
- A number of concerns were expressed with the ATI concept, the more common of these included:
 - A risk that the ATI could displace existing services – particularly those already available in the private sector.
 - The ATI could be too generalist in nature.
 - The ATI could create further confusion as to where businesses go to access support – the ATI might further fragment rather than consolidate capability.
 - The ATI could invest in expensive facilities/equipment without having the requisite skills and experience to utilise these assets to solve business problems.

Concluding Comment

- The Demand Survey identified a high level of consistency as to why firms innovate and how they go about the innovation process.
- The extent to which firms used PROs to support them, the PROs accessed and the nature of the services sought was far less consistent. Similarly, apart from the difficulty of accessing appropriate funding, firms identified a broad range of barriers to innovation.
- Given that firms' use of and experience with PROs varies so widely and their views as to the barriers to innovation are broad it is unsurprising that firms also have widely varying views as to what would make an ATI successful and the services that would most commonly be sought from an ATI.

Contents

Section	Page
Glossary of Terms	3
1. Executive Summary	4
2. Introduction and Scope	10
3. Background	12
4. Approach	15
5. Interview Analysis	18
6. Conclusion	36
7. Appendices	39-83
Appendix I – Terms of Reference	
Appendix II – Interview Questionnaire	
Appendix III – Online Survey Questionnaire	
Appendix IV – Summary of Firms Interviewed	
Appendix V – Survey Results	
Appendix VI – Importance / Satisfaction Matrices	

Appendix I – Terms of Reference

Scope of Work

1. Start Date:

24 February 2012

2. End Date:

16 April 2012

3. Services:

The Supplier(s) must undertake and deliver the Services as described below.

Description of Services

Context

The High Value Manufacturing and Services (HVMS) sectors have significant growth potential but they need support and expertise of technology-focussed research & development, and assistance with commercialising technological innovation, if they are to significantly increase exports and productivity. To better support innovation in the HVMS sectors, the Government has announced its intention to transform Industrial Research Limited (IRL) into an advanced technological institute. This institutional response will be part of a broader suite of changes designed to lift innovation in the HVMS innovation ecosystem. Given the scale and scope of the likely institutional changes, the Ministry is commissioning a number of analyses into different aspects of the HVMS innovation system, including firms' demand for R&D and technological innovation services, and the supply landscape. These "building blocks" will inform future policy decisions around the establishment of the ATI and related supporting initiatives.

This particular workstream is aimed at identifying and, where possible, quantifying the nature and extent of demand for services that an ATI might provide.

Aims/objectives

To undertake a comprehensive assessment of the demand of HVMS sector firms for R&D and technological innovation services, to inform a deeper understanding of:

- (a) how HVMS firms innovate in New Zealand;
- (b) the role that public organisations play in this process (including CRIs, universities, engineering schools and polytechnics);
- (c) HVMS firms' perceptions of gaps or blockages in this process which could be addressed through an institutional response and/or through other mechanisms; and
- (d) their view on possible roles an ATI could play and the services and activities it could provide.

Scope of work

In scope:

- Businesses in the high value manufacturing and services sectors in New Zealand, i.e. firms which develop, provide and utilise highly technological manufactured goods and services¹. This includes firms across the biotechnology, processing, manufacturing of electronics, robotics, sensing and scanning devices, medical devices, drugs, agritechnologies, digital and ICT technologies, including the application of technology developments to the more traditional manufacturing sector in New Zealand (e.g. meat, wool and wood processing).
- R&D and technological innovation services, i.e. services which either directly or through facilitation, develop and transfer knowledge, know-how and technology to businesses, which enable them to develop and/or improve products, services, processes or organisations.

¹ Work underway on a profile of the HVMS sector will define the boundaries of the "sector of interest" for the purposes of this and other work related to the ATI.

Appendix I – Terms of Reference

- The channels through which HVMS firms in NZ currently choose to or would like to access such services, including through:
 - The use of in-house teams and recruitment of skilled personnel (including secondments, graduate fellowships, joint appointments, employment of new graduate scientists/engineers);
 - Contracting or co-investing with suppliers of innovation services, including CRIs, universities, other research organisations, professional services (eg consulting engineers, technology licensing professionals – including offshore providers of such services);
 - Other channels including interactions with value chain participants (e.g. customers and suppliers), reverse engineering, etc.

Out of scope:

- Policy settings relating to innovation and innovation services, including funding levels, governance arrangements and the role of government agencies - except to the extent they are identified by the sector as influencing demand for innovation services (whether the level of demand or the mechanism through which it operates).
- Policy settings related more generally to economic development and firm growth including capital market failures, the role of incubators, and market insight/testing services such as those provided by NZTE – again, except to the extent they are identified by the sector as influencing demand for innovation services.

Deliverables

The **output** required from the Supplier(s) for this project is a report to the Ministry of Science and Innovation which provides a comprehensive assessment of the current level and nature of HVMS sector demand for R&D and technological innovation services. This will require quantitative and qualitative information-gathering from the sector on the type of internal and external innovation services/sources currently used and potentially required (gap analysis), willingness-to-pay, potential future demand, the sector's assessment of current supply, and geography and time issues.

Areas to be covered include:

- Identification of the range of R&D and technological innovation services currently utilised and demanded by HVMS firms including:
 - Technology-based services (facilities, technological platforms, high-capital services)
 - Advisory and other non-technological services (e.g., advice, connections, business strategy, IP management, HR)
- For different services (and where possible by sub-sector), to identify the level of demand (including geographic concentration and firm willingness to pay), the extent to which demand varies by firm size, the extent of collaboration (ie where services are jointly commissioned), and the nature/level of government support provided.
- The research and technological development capabilities, including major technology platforms, research teams and dedicated infrastructure including laboratories and testing facilities, required to deliver the services being sought.
- Identified/perceived bottlenecks including issues around preferred delivery mechanisms/locations/ease of access; availability and quality of services being sought; impact of current tax and IP rules; relative strengths/weaknesses of different provider options.

Appendix I – Terms of Reference

Approach

This is a significant piece of work which needs to be done in a compressed timeframe. The Supplier will assess the requirements above and develop a proposed approach and project plan which will deliver the work to a high level of quality within the time and resources available. If necessary the scope and scale of the project will be tailored in discussion with the selected Supplier. It is expected that the work will require:

- Desktop analysis/review of relevant work already undertaken including documentation held by MSI including submissions to the HVMS Review, the HVMS Sector profile currently being prepared and other studies/reviews relating to business demand for innovation services (including those currently underway, outlined below).
- Extensive stakeholder engagement is expected to be most significant component of the work. An appropriate range of stakeholders need to be identified and interviewed to ensure a comprehensive assessment can be made of the strengths and weaknesses of the current system from a user perspective, and of potential demand. This should include both known existing users of R&D and related innovation services, to understand their experience of the existing services, as well as firms which do not currently access such services - across an appropriate range of subsectors/technology platforms.
- Analysis of the MSI contract database, responses to previous HVMS investment rounds (to the extent this is permitted under confidentiality agreements) and others where possible to understand the types and level of innovation that firms are currently undertaking and the services and resources this requires.
- For the avoidance of doubt, this project will not include interviews with suppliers of R&D and related innovation services, which is part of a separate exercise.

- Options for stakeholder engagement will be discussed with the Supplier but it is expected that a combination of individual 1-1 interviews, and a number of focus group discussions will be required to meet the requirements of breadth and timeline.

Specific tasks the Supplier(s) is expected to complete include:

- Agree the approach to be followed to deliver the required report, including how other work underway can feed into the project, how stakeholder interviewees should be selected and the engagement process, and prepare a project plan for the work
- Work closely with the MSI Project Director to agree messaging around process and approaches to stakeholders
- Work closely with the MSI Project Director to ensure close linkage between this project and other work underway which could inform selection of stakeholder interviewees or other aspects of this project
- Select stakeholders and complete interviews, including meeting with members of MSI's science and business teams, and Chief Science Advisor; an appropriate range of businesses in the HVMS sector; and other key individuals. The final set of interviewees and the interview schedules and guidelines will be agreed with the MSI Project Director
- Meet weekly with the MSI Project Director to discuss progress, issues arising and risks that require mitigation
- Submit a draft report to MSI and meet with MSI and the ATI Project Reference Group to discuss feedback on the draft
- Submit a final report to MSI.

Appendix II – Interview Questionnaire

Name	
Organisation	
Email address	
Date	

Background: The Government has announced its intention to increase support for innovation in the high value manufacturing and services sectors, including the establishment of an Advanced Technology Institute (ATI).

Initial Hypothesis: New Zealand’s HVMS sectors require improved support and expertise of technology focussed research & development, and assistance with commercialising technological innovation, if they are to significantly increase exports and productivity. There are a number of different services which could be provided, and a range of mechanisms which could be used to deliver them to firms. This questionnaire is to explore which services would best meet the needs of the HVMS sectors in New Zealand, and the role an ATI could play in ensuring access to these.

Definitions:

- **Innovation services:** Innovation services are broadly defined and can include activities undertaken to develop new or enhance existing products or services or to create new and improved processes. Activities can include, but are not limited to, research and development, proof of concept and prototyping, and commercialisation.
- **Research and development:** Business R&D includes investigative work that has an actual or potential use for the business in the development of new or technically-improved materials, products, devices, processes or services. It includes design, construction and operation of prototypes where the main objective is technical testing, and the operation of pilot plants to obtain experience (ie not for directly commercial purposes). R&D ends when work is no longer experimental and pre-production begins.
- **Non-R&D innovation activities:** For the purposes of this interview, key pre-production and commercialisation activities of interest include pre-production development, tooling-up, trial production runs and work to get production or control systems working smoothly. They also include the acquisition of knowledge through access to patents, non-patented inventions, licenses, patterns and services, machinery and equipment, or through disclosure of know-how. They do not include market research, development of distribution channels or other marketing activities.

Appendix II – Interview Questionnaire

Potential services to be provided by an ATI:

Possible functions:

Product and service R&D

Facilities and technology

Business capability and education services

Technology transfer & commercialisation services

Related services:

- Contract R&D/ R&D partnerships

- Access to facilities – including pilot facilities
- Access to specialist technology

- Staff training (e.g. technology management courses)
- Linkage to international expertise

- IP management
- Market analysis & technology foresight services

- Process/product calibration and testing

- Prototyping

- Internships & industry placements (access to students)

- Brokering access to specialist firms/reference sites

1. How do you innovate?

(a)

How does your business innovate?
What factors are critical to your ability to innovate?

(b)

Where do the ideas/information that drive your innovation activities come from? For example, do you involve external parties in idea generation/problem solving/development?

Appendix II – Interview Questionnaire

2. Engagement with innovation service providers

(a)	Where do you go to access support and assistance for technological innovation?	
(b)	<p>What has been your experience with NZ Public Research Organisations (PROs)?</p> <p>PROs include universities, polytechnics and Crown Research Institutes</p>	
(c)	What has been your experience with international R&D, technology development and specialist service firms?	
<p>Based on your experience above:</p>		
(d)	What support (if any) would make the innovation process easier for your business?	
(e)	Has there been any form of support that you have required, but not been able to find/procure?	

Appendix II – Interview Questionnaire

3. The proposed Advanced Technology Institute (ATI)

The Government is looking to improve support for innovation and commercialisation across NZ's HVMS sector, including the establishment of an ATI. This section looks to explore which services would be of most value to your business, and which of these could be carried out by the ATI (a list of potential functions is on page 2 of this questionnaire).

(a)	How could the government and the ATI best support your business' innovation needs?	
(b)	What would be your likely demand for the ATI's services?	
(c)	What support services are you not interested in?	
(d)	Do you believe that the ATI will displace/compete with existing services?	
(e)	Do you have any other comments on the support provided or required by NZ HVMS businesses?	

4. Organisational information

(a)	What are your growth targets/aspirations over the short, medium and long term?							
(b)	Which revenue grouping best represents your organisation?	<table border="0"> <tr> <td>Less than \$1 million</td> <td>Between \$1 & \$5 million</td> <td>Between \$5 & \$10 million</td> </tr> <tr> <td>Between \$10 & \$50 million</td> <td>Between \$50 & \$100 million</td> <td>Greater than \$100 million</td> </tr> </table>	Less than \$1 million	Between \$1 & \$5 million	Between \$5 & \$10 million	Between \$10 & \$50 million	Between \$50 & \$100 million	Greater than \$100 million
Less than \$1 million	Between \$1 & \$5 million	Between \$5 & \$10 million						
Between \$10 & \$50 million	Between \$50 & \$100 million	Greater than \$100 million						
(c)	What proportion of your revenue is earned offshore?							
(d)	How many people does your organisation employ?							
(e)	How much does your organisation invest in research and development each year?							
(f)	Is your business 100% NZ owned? If not, what is the level of overseas ownership?							

Appendix III – Online Survey Questionnaire

High Value Manufacturing and Services Survey



Ministry of Science & Innovation: Innovation support for the HVMS sector

Background: The government has announced its intention to increase support for innovation in the high-value manufacturing and services sectors, including the potential establishment of an Advanced Technology Institute (ATI). The focus of this survey is to understand what services would be of most benefit to businesses and how they could best be provided.

Who should complete this survey? We would prefer the survey to be completed by your CEO, but if this is impracticable we would appreciate you passing it on to a senior manager who is familiar with your business innovation process.

The survey is delivered in 5 sections:

1. Your current innovation activities
2. Who you work with on innovation - engagement with existing service providers
3. What services you would likely use if provided by an ATI
4. General company information
5. Other information and general comments

The questions should take only 15-20 minutes to complete, and space is provided at the end of the survey for additional comments and suggestions you may have.

We are aware that innovation is a sensitive issue for many firms, and we will ensure that all results are kept under the strictest confidence.

Section 1: Innovation and your business

For the purposes of this survey innovation includes the development or introduction of any new or significantly improved activity for your business. This includes products, processes and methods that this business was the first to develop, and those that have been adopted from other organisations.

1. During the last year, did your business:

	Yes	No
Introduce onto the market any new or significantly improved goods or services?	<input type="radio"/>	<input type="radio"/>
Introduce or implement any new or significantly improved operational process (i.e. method of producing goods or services)?	<input type="radio"/>	<input type="radio"/>

2. Which of the following activities did your business undertake to support innovation over the last year? Mark all that apply.

<input type="checkbox"/> In-house research and development	<input type="checkbox"/> Protection of IP
<input type="checkbox"/> Contract or joint research and development	<input type="checkbox"/> Prototyping and/or use of pilot plant
<input type="checkbox"/> Industrial design	<input type="checkbox"/> Technical consultancy
<input type="checkbox"/> Acquisition of machinery and equipment	<input type="checkbox"/> Market research
<input type="checkbox"/> Access to specialised machinery not owned by the company	<input type="checkbox"/> Other (please specify) <input style="width: 100px;" type="text"/>
<input type="checkbox"/> Acquisition of knowledge or technology (e.g. licensing of IP)	

3. How important are the following sources of ideas and information for innovation in your business?

	Not important	Slightly important	Moderately important	Very important
Staff (of your business or within the business group)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suppliers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional advisors, consultants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trade publications, the internet and other literature	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conferences, tradeshows, and exhibitions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Universities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Polytechnics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crown Research Institutes (e.g. Industrial Research Limited)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix III – Online Survey Questionnaire

Other research organisations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
------------------------------	-----------------------	-----------------------	-----------------------	-----------------------

4. Please list any other sources of ideas and information for innovation that are important to your business.

(Separate your answers with a comma)

5. To what degree did the following hamper the ability of your business to innovate?

	Not Applicable	To a small extent	To a moderate extent	To a large extent
High costs to undertake, develop, and introduce	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unable to access funding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of in-house technical knowledge or know-how	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unable to find or access the right external expertise or capability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of management resources	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of access to the required machinery and equipment (e.g. pilot plant)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contractual difficulties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technological problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Please list any other factors that have limited your ability to innovate.

(Separate your answers with a comma)

7. How well do you think your organisation understands how to get support for innovation?

- Very Poor Poor Neutral Well Very well



Ministry of Science & Innovation: Innovation support for the HVMS sector

Section 2: Who you work with

The purpose of this section is to understand how you interact with existing providers of research and related services, and to understand the benefits and challenges of these interactions

8. In the last two years, has your business engaged with any of the following innovation service providers about its research and/or technology development needs?

	No	Yes - sometimes	Yes - frequently
Professional advisors, consultants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other businesses (suppliers, customers, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Universities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Polytechnics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Crown research institutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New Zealand Trade & Enterprise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ministry of Science & Innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local economic development agencies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
International service providers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Please list any other types of service providers with whom you have engaged for your research and/or technology development needs.

(Separate your answers with a comma)

10. What type of services/support were you seeking from the providers you engaged with?

- To purchase consultancy services
- Scientific and technical information services (e.g. testing, certification, analysis)
- Research and development
- Access to specialised equipment or facilities
- Prototyping and other proof of concept

Appendix III – Online Survey Questionnaire

- Pre-production activities (e.g. trial production runs, tooling up)
- Other (please specify)

11. Of the providers you engaged with, which have made the most important contributions to your business? (List up to three)

(Separate your answers with a comma)

12. In what way did these providers contribute to your business?

13. If you have engaged with universities, polytechnics, or Crown Research Institutes, please specify which ones below.

	Institution
Universities	<input style="width: 90%;" type="text"/>
Polytechnics	<input style="width: 90%;" type="text"/>
Crown Research Institutes	<input style="width: 90%;" type="text"/>

14. If your business did not engage with Crown Research Institutes, what were the reasons?

- The business did not require input or expertise
- Crown Research Institutes did not have the expertise required
- Other organisations were better placed to assist
- Not aware of what Crown Research Institutes had to offer
- Costs were too high
- Crown Research Institutes did not understand your business needs
- Too time consuming

Contractual difficulties

Other (please specify)

15. If your business did not engage with Universities, what were the reasons?

- The business did not require input or expertise
- Universities did not have the expertise required
- Other organisations were better placed to assist
- Not aware of what Universities had to offer
- Costs were too high
- Universities did not understand your business needs
- Too time consuming
- Contractual difficulties
- Other (please specify)



Ministry of Science & Innovation: Innovation support for the HVMS sector

Section 3: Potential engagement with an Advanced Technology Institute

The government is to establish an Advanced Technology Institute to support innovation in New Zealand's high value manufacturing and services businesses. This organisation will both provide, and facilitate access to, a range of services to meet firms' needs. This section is to determine the range of services that would be most beneficial to your firm's innovation, and the way in which those services could best be provided.

16. Do you consider there is a role for an Advanced Technology Institute to support innovation in the Manufacturing and Services sector?

Appendix III – Online Survey Questionnaire

Yes No Don't know

17. How important do you believe the following roles are for an Advanced Technology Institute?

	Not important	Somewhat important	Moderately important	Very important
Help you improve your ability to undertake R&D, and commercialise it successfully	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Put you in touch with the right expertise and capability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Build better connection and networking between firms in the same industry subsectors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Build better connection and networking between firms and research organisations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Encourage/facilitate better flows of skilled staff between firms and research organisations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Be a centre of excellence for technology focussed R&D	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Please list any other roles that you think an Advanced Technology Institute should play.

(Separate your answers with a comma)

19. How important do you think it is that the Advanced Technology Institute should conduct the following types of activity?

	Not important	Somewhat important	Moderately important	Very important
Strategic research (i.e. further from market, but clear link to market or industry need)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Applied research (i.e. closer to market, technology development with multiple potential applications)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Specific application (i.e. specific product or process development, with immediate commercialisation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. How important are the following services to your business?

	Not important	Slightly important	Moderately important	Important	Very important
Technology testing services (e.g. product analysis, calibration and certification, process testing)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prototyping facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pilot plants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Large scale or specialised research equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitate/broker access to specialised expertise and/or networks (in NZ and internationally)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Carry out industry-focussed R&D on a contracted fee for service basis for business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Carry out industry-focussed R&D in longer term programmes of work in partnership with business and other research organisations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology management courses for business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IP management advice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Market assessment/analysis services including international	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology foresight services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business incubation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Act as a single gateway for access to government support e.g. business R&D grants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. How satisfied are you with your ability to provide or access these services, at the right quality, when you need them?

Appendix III – Online Survey Questionnaire

	Very dissatisfied	Somewhat dissatisfied	Just satisfied	Moderately satisfied	Very satisfied
Technology testing services (e.g. product analysis, calibration and certification, process testing)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prototyping facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pilot plants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Large scale or specialised research equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facilitate/broker access to specialised expertise and/or networks (in NZ and internationally)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Carry out industry-focussed R&D on a contracted fee for service basis for business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Carry out industry-focussed R&D in longer term programmes of work in partnership with business and other research organisations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology management courses for business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IP management advice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Market assessment/analysis services including international	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology foresight services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business incubation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Act as a single gateway for access to government support e.g. business R&D grants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. In a typical year, how much does your business spend on product and process innovation? Include the cost of: R&D, design, prototyping and proof of concept, other pre-production activities.

23. What areas of scientific knowledge and technology development capability are most relevant for your business? (Mark all that apply)

- Measurement and technical analysis
- Imaging
- Sensing and scanning
- Mechatronics and robotics
- Electronics
- Digital media and services
- Computer networks, software engineering, other ICT
- Plastics and polymers
- Advanced materials and nanotechnology
- Food and biotechnologies
- Energy / power systems
- Manufacturing and services processes
- Industrial design
- Sustainable production
- Other



Ministry of Science & Innovation: Innovation support for the HVMS sector

Section 4: Company information

This section gathers information about your company in terms of revenue, number of employees, etc. All information will be kept strictly confidential

24. What manufacturing sectors is your company in?

- Food & Beverage
- Textiles, clothing and footwear
- Non-metal Materials
- Metal Materials
- Basic Chemicals
- Electrical Equipment and Appliances
- Machinery and Equipment
- Scientific Instruments
- Electronic Equipment (ICT)
- Other (please specify)

Appendix III – Online Survey Questionnaire

Polymers & Rubber

Pharmaceuticals

Not in manufacturing sector

25. What services sector is your company in?

Digital & Creative

Mining - Extraction & Exploration

Energy Generation & Transmission

Heavy and Civil Engineering

Engineering, Surveying & Mapping

Scientific Research and Testing

ICT Services, Design & Publishing

Telecommunications

Other (please specify)

Not in services sector

26. How many employees (FTE) in your company?

- 0 - 10
- 11 - 50
- 51 - 100
- > 100

27. What is your company's gross annual revenue?

- \$0 - \$1m
- \$1m - \$10m
- \$10m - \$50m
- > \$50m

28. What proportion of your revenue is earned offshore?

- 0% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%

29. What proportion of your expenditure is on R&D?

- 0 - 5%
- 6 - 10%
- 11 - 20%
- 21 - 50%
- 50-100%

30. What proportion of your business is New Zealand owned?

- 0% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%



Ministry of Science & Innovation: Innovation support for the HVMS sector

Section 5: Other information and comments

31. Are there any other comments or suggestions you would like to make about the role, functions, or services of an Advanced Technology Institute, or any other issue relating to innovation services for your business?

Appendix III – Online Survey Questionnaire

32. Would you be comfortable for us to contact you directly to follow up your responses if we wished? If so, please provide contact details

First Name

Last Name

Title

Company Name

Company Location

Email address

Contact number



Thank you for taking our survey. Your response is very important to us.

Appendix IV - Summary of Firms Interviewed

Specific Company Information

Number	Sector	Location	Sales \$m	R&D Investment \$m	Employees	% Export Revenue	% NZ Ownership
1	Medical	Auckland	>100	13	520	65%	100%
2	ICT - Network Technology	Auckland	50 - 100	3	180	99%	20%
3	Specialised Aviation Engineering	Auckland	1 - 5	0	4	5%	100%
4	Consumer and Household Products	Auckland	>100	4.5	3300	80%	38%
5	Health Technologies	Auckland	>100	40	330	86%	82%
6	Consumer and Household Products	Auckland	5 - 10	0.15	23	10%	100%
7	Food Processing Technologies	Auckland	5 - 10	0.3	21	60%	100%
8	Light Industrial	Auckland	50 - 100	0.5	92	74%	100%
9	Specialised Electrical Technologies	Auckland	<1	0.25	4	100%	100%
10	Steel Products and Steel Fabrication	Auckland	>100	0.2	300	5%	100%
11	Specialised Engineering	Auckland	1 - 5	0.3	8	0%	100%
12	Light Industrial	Auckland	>100	4	616	80%	100%
13	Specialised Electrical Technologies	Auckland	5 - 10	3	10	25%	100%
14	ICT - Network Technology	Auckland	50 - 100	4.5	90	96%	97%
15	Light Industrial	Auckland	50 - 100	9	32	100%	100%
16	Light Industrial	Auckland	50 - 100	-	400	85%	100%
17	Light Industrial	Auckland	50 - 100	2	90	90%	100%
18	Health Technologies	Christchurch	<1	0.08	1	90%	100%
19	Specialised Electrical Technologies	Christchurch	>100	0.2	900	90%	0%
20	ICT - Communications	Christchurch	1 - 5	1	18	10%	100%
21	Specialised Electrical Technologies	Christchurch	>100	14	>800	70%	100%
22	Light Industrial	Christchurch	5 - 10	3.5	150	70%	100%
23	Light Industrial	Christchurch	>100	10	500	50%	100%
24	Health Technologies	Dunedin	<1	0.4	1	0%	100%
25	Food Processing Technologies	Dunedin	50 - 100	7	300	85%	95%
26	Specialised Electrical Technologies	Hamilton	5 - 10	0.2	60	95%	100%
27	Agri Products	Hamilton	50 - 100	0.25	30	75%	100%
28	Agri Products	Hamilton	>100	11	1000	70%	100%
29	Agri Products	Hamilton	1 - 5	-	100	90%	100%
30	Specialised Aviation Engineering	Hamilton	5 - 10	-	130	95%	100%
31	Health Technologies	Kaikati	50 - 100	2	110	99%	95%
32	Specialised Industrial Engineering	Mount Maunganui	50 - 100	1	175	10%	100%
33	Steel Products and Steel Fabrication	New Plymouth	50 - 100	0.3	35	30%	100%
34	Steel Products and Steel Fabrication	New Plymouth	50 - 100	0.5	400	40%	10%
35	Light Industrial	Wellington	1 - 5	2	7	100%	100%
36	Light Industrial	Wellington	1 - 5	2	18	95%	48%
37	Specialised Industrial Engineering	Wellington	<1	0.75	5	80%	100%
38	Light Industrial	Wellington	50 - 100	2	90	40%	100%
39	Building Materials	Wellington	>100	0	700	20%	100%
40	Specialised Industrial Engineering	Wellington	1 - 5	0.25	5	90%	100%
41	Specialised Industrial Engineering	Wellington	50 - 100	1.2	120	80%	100%
42	Specialised Industrial Engineering	Wellington	1 - 5	2	20 - 30	99%	76%
43	Specialised Industrial Engineering	Wellington	>100	1.27	2390	27%	93%
44	ICT - Network Technology	Wellington	50 - 100	0.65	25	95%	10%

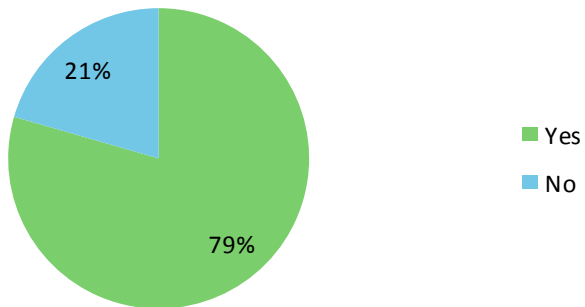
Appendix V – Survey Results

Section 1: Innovation and your business

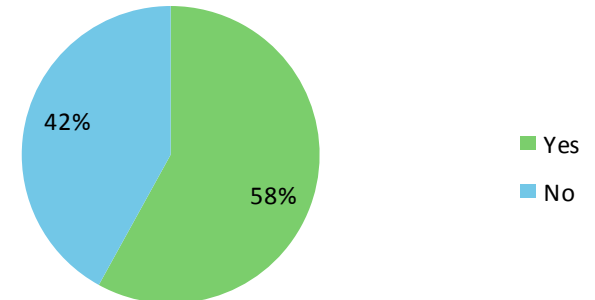
1. During the last year did your business:	Yes	No	Blank	TOTAL
Introduce onto the market any new or significantly improved goods or services?	240	62	42	344
Introduce or implement any new or significantly improved operational process?	181	131	32	344

Note - based on 270 positive responses

During the last year did your business introduce onto the market any new goods or services?



During the last year did your business introduce onto the market any new or significantly improved operational process?



Appendix V – Survey Results

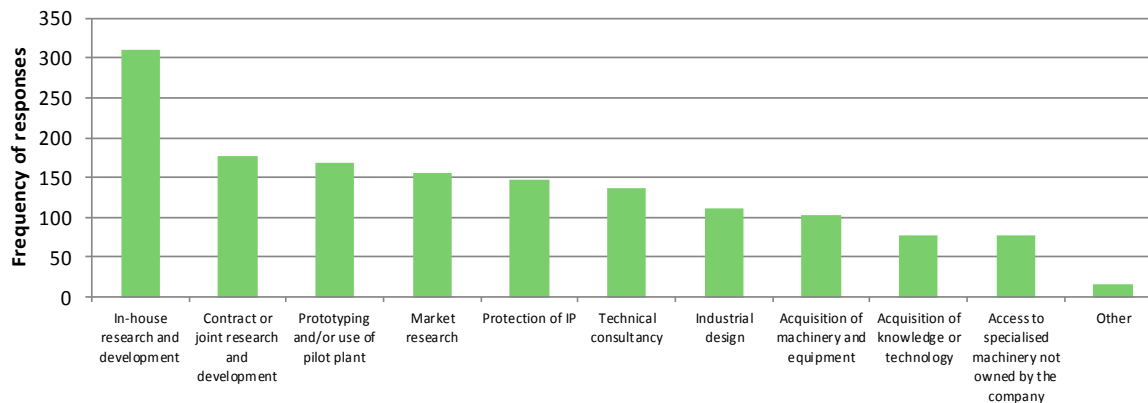
Section 1: Innovation and your business

2. Which of the following activities did your business undertake to support innovation over the last year?

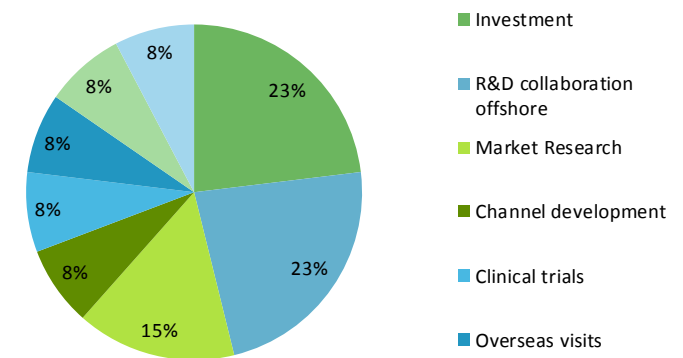
In-house research and development	310
Contract or joint research and development	178
Prototyping and/or use of pilot plant	168
Market research	155
Protection of IP	148
Technical consultancy	137
Industrial design	111
Acquisition of machinery and equipment	103
Acquisition of knowledge or technology	78
Access to specialised machinery not owned by the company	77
Other	16

Note - based on 340 positive responses

Which of the following activities did your business undertake to support innovation over the last year?



Innovation activities - other



Appendix V – Survey Results

Section 1: Innovation and your business

2. Which of the following activities did your business undertake to support innovation over the last year	Revenue Band				Total
	\$0-\$1m	\$1m-\$10m	\$10m-\$50m	>\$50m	
In-house research and development	92	109	35	18	254
Contract or joint research and development	51	66	17	14	148
Prototyping and/or use of pilot plant	57	60	17	13	147
Market research	50	51	17	16	134
Protection of IP	52	49	15	10	126
Technical consultancy	46	45	16	11	118
Industrial design	37	43	8	4	92
Acquisition of machinery and equipment	22	38	12	9	81
Acquisition of knowledge or technology (e.g. licensing of IP)	21	25	12	10	68
Access to specialised machinery not owned by the company	25	26	6	6	63
Other (please specify)	5	9	-	-	14

Note - table displays only those firms which specified their revenue band (280 firms)

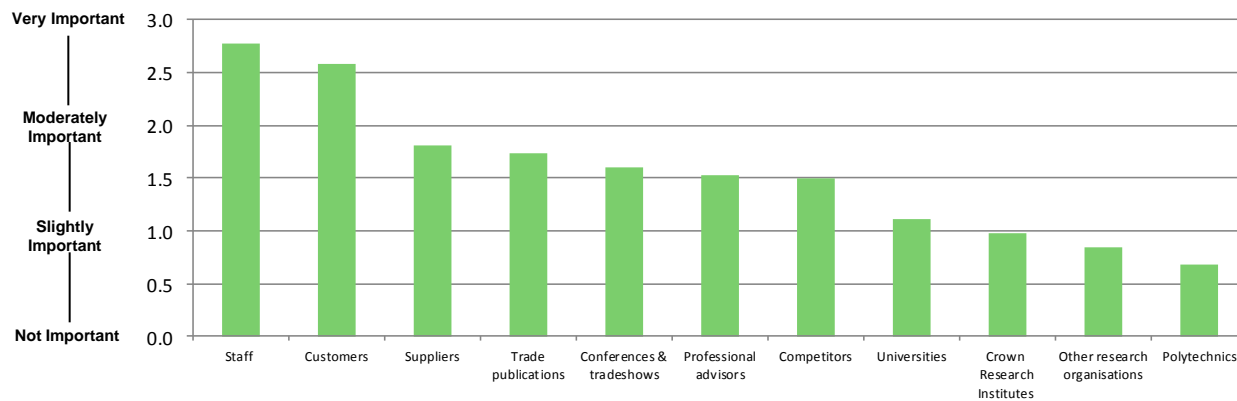
Appendix V – Survey Results

Section 1: Innovation and your business

3. How important are the following sources of ideas and information for innovation in your business?	Not important	Slightly Important	Moderately Important	Very Important
Staff (of your business or within the business group)	2	2	19	109
Customers	3	5	36	88
Suppliers	12	39	38	38
Competitors	21	44	47	20
Professional advisors, consultants	20	44	45	22
Trade publications, the internet and other literature	10	41	54	26
Conferences, tradeshows, and exhibitions	14	46	48	22
Universities	45	45	24	18
Polytechnics	72	39	11	9
Crown Research Institutes (e.g. Industrial Research Limited)	57	36	22	16
Other research organisations	58	36	24	7

Note - based on 340 positive responses

Average importance of sources of ideas and information for innovation



Appendix V – Survey Results

Section 1: Innovation and your business

4. Please list any other sources of ideas and information for innovation that are important to your business

Internet	12
Network	10
Staff	8
Customers	8
Industry	8
Overseas	7
Professional Advisors	6
Published Data	3
Suppliers	2
Television	2
Trade publications	2
Universities	2
Conferences	1
Competitors	1
Note - based on 241 positive responses	

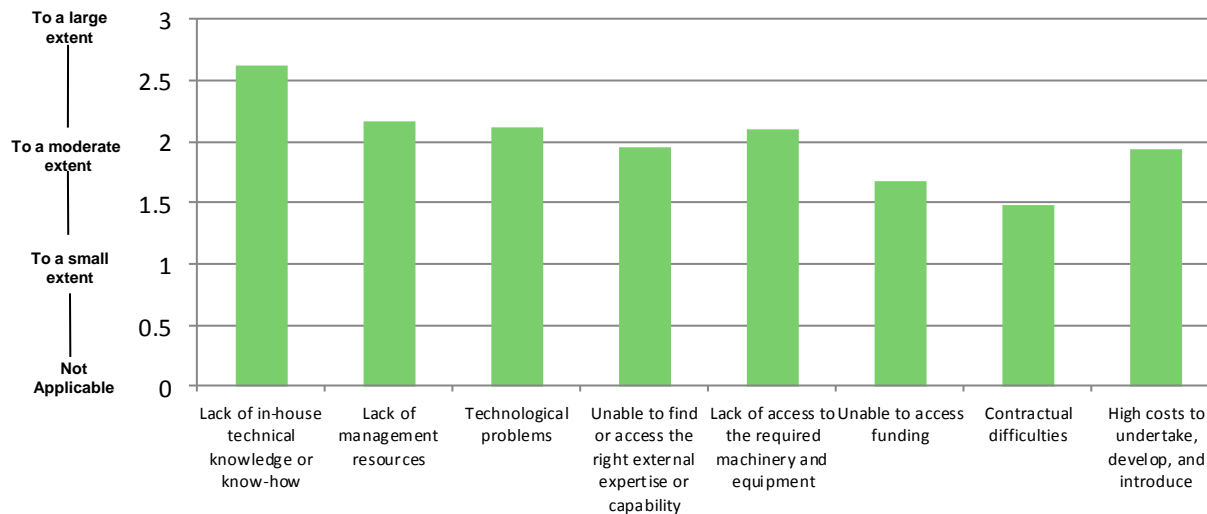
Appendix V – Survey Results

Section 1: Innovation and your business

5. To what degree did the following hamper the ability of your business to innovate?	Not Applicable	To a small extent	To a moderate extent	To a large extent
High costs to undertake, develop, and introduce	162	9	48	115
Unable to access funding	107	57	70	94
Lack of in-house technical know ledge or know -how	19	67	142	101
Unable to find or access the right external expertise or capability	33	88	134	74
Lack of management resources	26	77	120	108
Lack of access to the required machinery and equipment	18	148	115	47
Contractual difficulties	10	198	89	32
Technological problems	17	107	114	89

Note - based on 336 positive responses

Average extent of issues which hamper innovation



Appendix V – Survey Results

Section 1: Innovation and your business

6. Please list any other factors that have limited your ability to innovate

General business environment	20
Funding	19
Time	15
Equipment	4
Commercialising	2
Note - based on 241 positive responses	

7. How well do you think your organisation understands how to get support for innovation?

Very Poor	Poor	Neutral	Well	Very Well
10	45	103	129	48

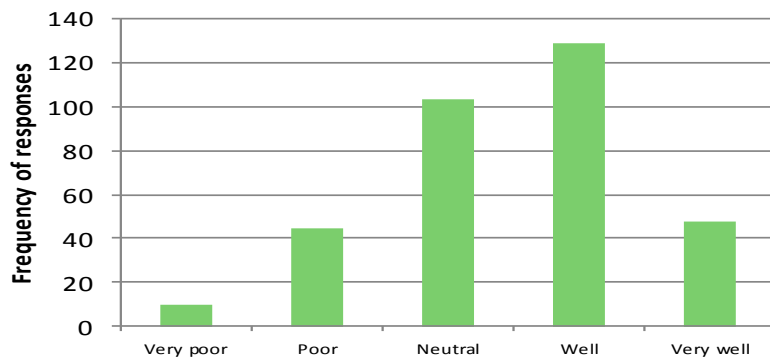
Note - based on 335 positive responses

7. How well do you think your organisation understands how to get support for innovation?

	Revenue Band				Total
	\$0-\$1m	\$1m-\$10m	\$10m-\$50m	>\$50m	
Very poor	3	6	0	0	9
Poor	11	16	4	2	33
Neutral	33	32	17	6	88
Well	37	46	14	10	107
Very Well	19	17	3	3	42

*Note - Table displays only those firms which specified their revenue band (279 firms)

How well does your organisation understand how to get support for innovation?

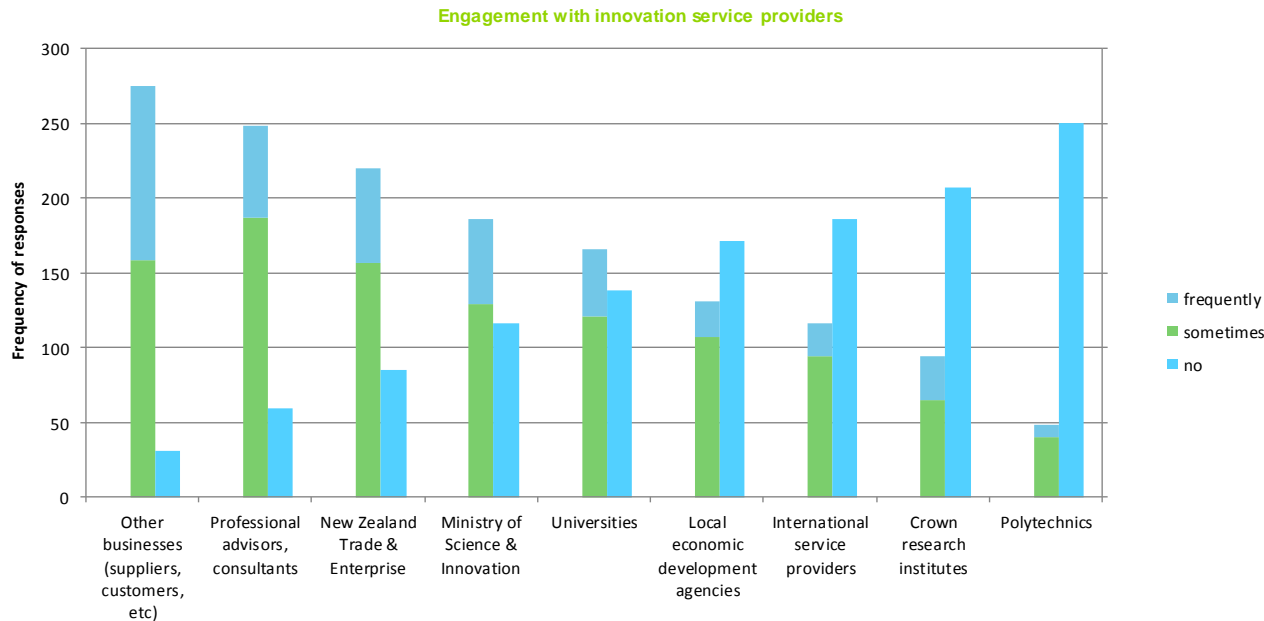


Appendix V – Survey Results

Section 2: Who you work with

8. In the last two years, has your business engaged with any of the following innovation service providers about its research and/or technology development needs?	No	Yes-sometimes	Yes-frequently
Professional advisors, consultants	59	187	61
Other businesses (suppliers, customers, etc.)	31	158	117
Universities	138	121	45
Polytechnics	250	40	8
Crown research institutes	207	65	29
New Zealand Trade & Enterprise	85	157	63
Ministry of Science & Innovation	116	129	57
Local economic development agencies	171	107	24
International service providers	186	94	22

Note - based on positive 312 responses



Appendix V – Survey Results

Section 2: Who you work with

9. Please list any other types of service providers with whom you have engaged for your research and/or technology development needs

Professional Advisors and consultants	19
Overseas providers	12
Customers	3
Business Network	1
Internal	1
Industry Research Providers	1

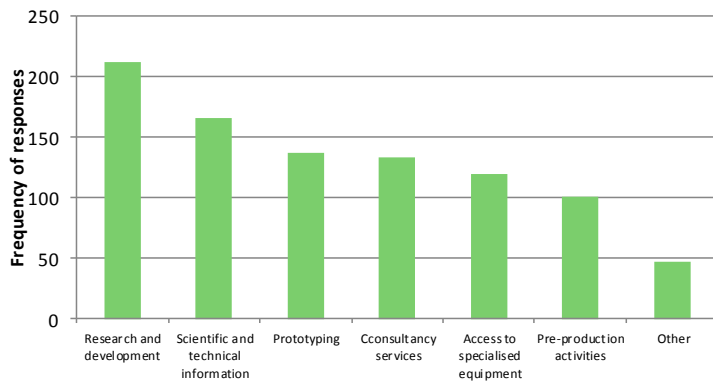
Note - based on 37 positive responses

10. What type of services/support were you seeking from the providers you engaged with?

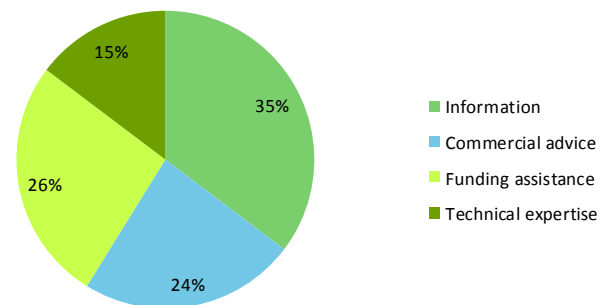
Research and development	212
Scientific and technical information services	166
Prototyping and other proof of concept	137
To purchase consultancy services	134
Access to specialised equipment or facilities	119
Pre-production activities (e.g. trial production runs, tooling up)	101
Other	47

Note - based on 304 positive responses

Use of services and support



Other services and support



Appendix V – Survey Results

Section 2: Who you work with

10. What type of services / support were you seeking from the providers you engaged with?	Revenue Band				Total
	\$0-\$1m	\$1m-\$10m	\$10m-\$50m	>\$50m	
Research and development	65	88	25	15	193
Scientific and technical information services	47	63	20	19	149
To purchase consultancy services	39	59	16	9	123
Prototyping and other proof of concept	56	50	9	7	122
Access to specialised equipment or facilities	46	41	11	9	107
Pre-production activities (e.g. trial production runs, tooling up)	41	38	5	4	88
Other	13	13	8	2	36

*Note - Table displays only those firms which specified their revenue band (280 firms)

Appendix V – Survey Results

Section 2: Who you work with

11. Of the providers you engaged with, which have med the most important contributions to your business?

Private Company	111
Universities	24
CRIs	16
Consultants	15
Economic Development Agencies	11
MSI	10
Customers	7
NZTE	7
Suppliers	5
None	5
Polytechnics	4
IRD	2

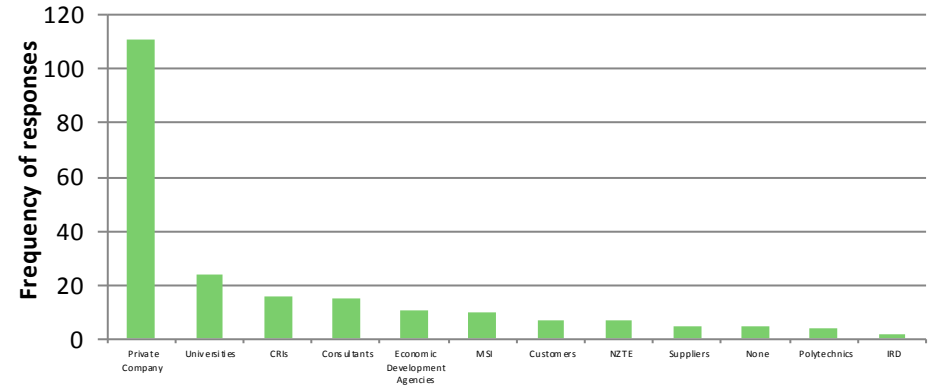
Note - based on positive 217 responses

12. In what way did these providers contribute to your business?

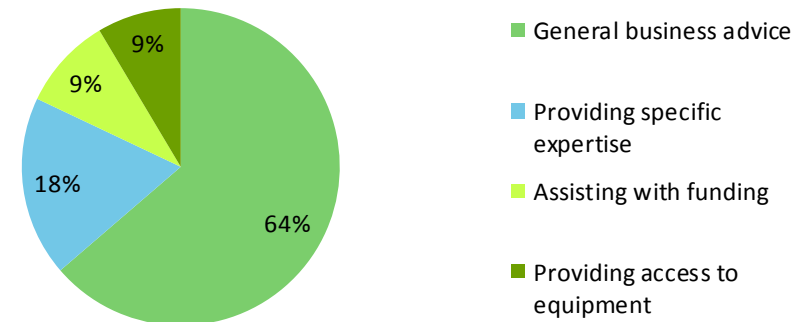
General business advice	149
Providing specific expertise	43
Assisting with funding	22
Providing access to equipment	20

Note - based on positive 234 responses

Use of services and support



How providers contribute



Appendix V – Survey Results

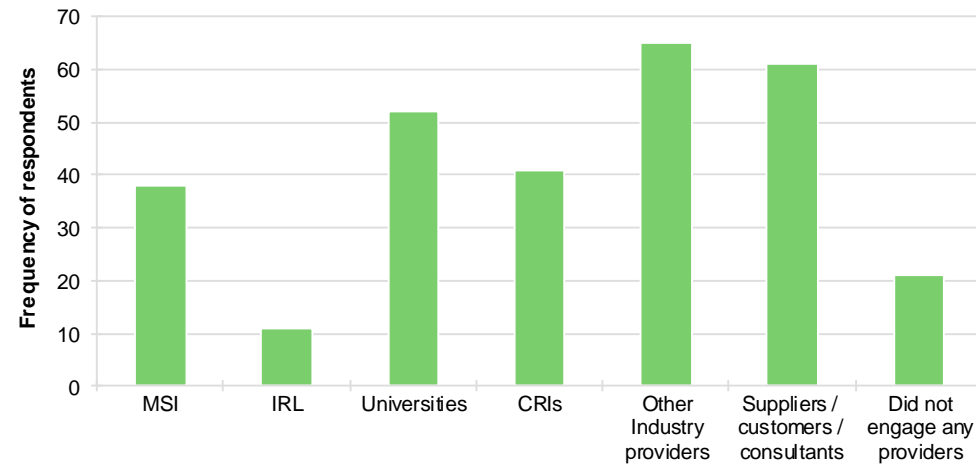
Section 2: Who you work with

11. Of the providers you engaged with, which have made the most important contributions to your business? Number of firms

MSI	38
IRL	11
Universities	52
CRIs	41
Other Industry providers	65
Suppliers / customers / consultants	61
Did not engage any providers	21

Note - based on 231 positive responses

Use of services and support



12. In what way did these providers contribute to your business

Provider	Funding support	New products / ideas	Provided expert contacts	Research and Commercialisation	Design services / new products they want
MSI	37	6	-	3	1
IRL	1	5	3	6	-
Universities	1	10	8	31	8
CRIs	7	8	4	19	5
Other Industry providers	5	11	4	40	5
Suppliers / customers / consultants	17	16	1	26	17
Total	68	56	20	125	36

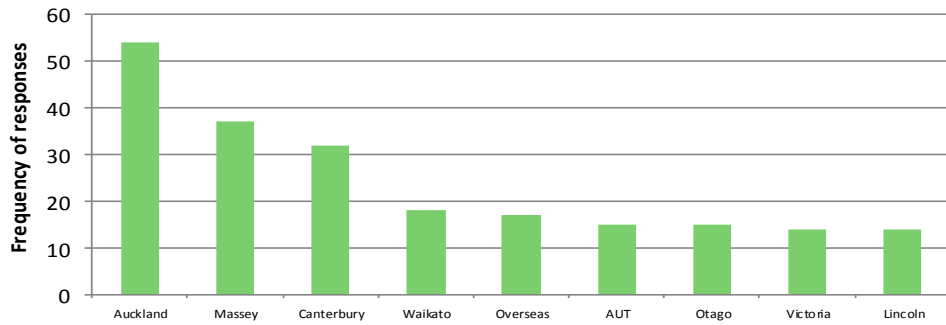
Note - based on 231 positive responses

Appendix V – Survey Results

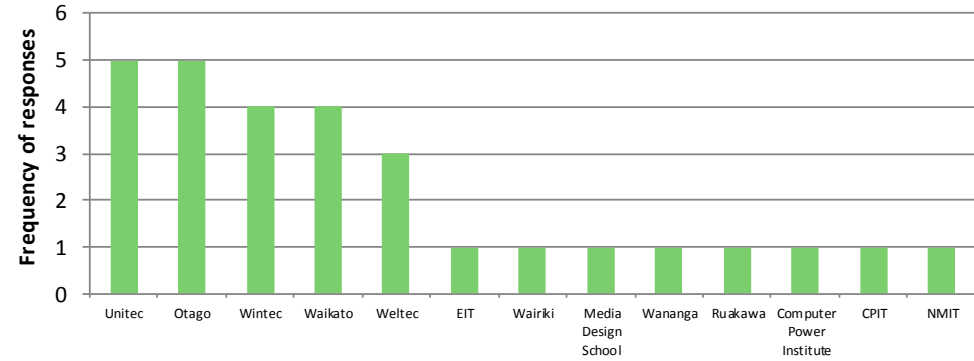
Section 2: Who you work with

13. If you have engaged with universities, polytechnics, or Crown Research Institutes, please specify which ones

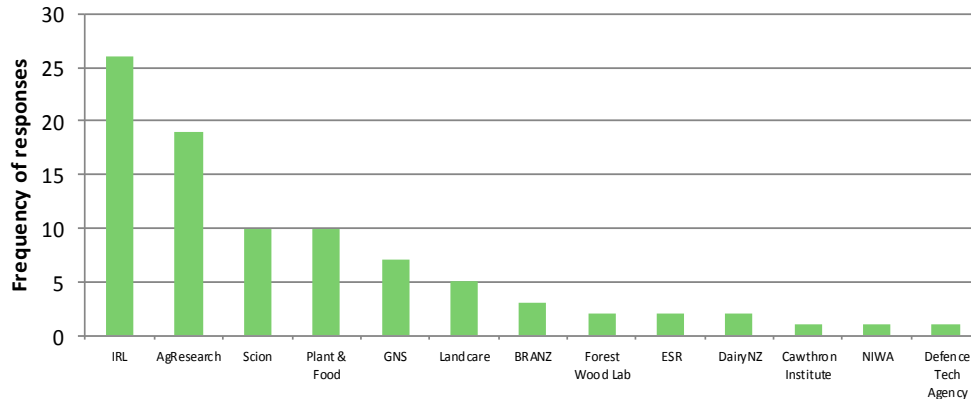
University engagement



Polytechnic engagement



CRI engagement



Appendix V – Survey Results

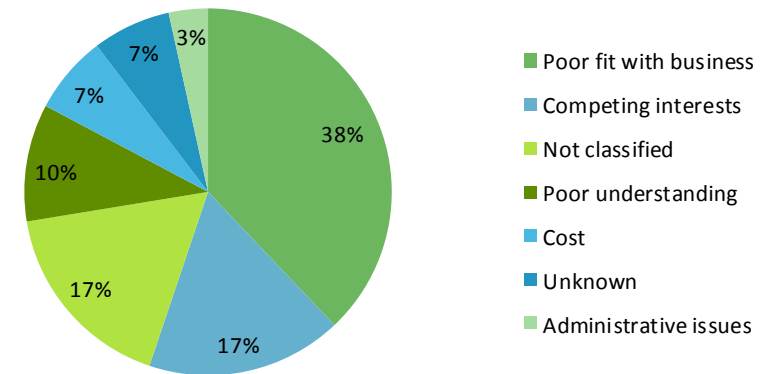
Section 2: Who you work with

14. If your business did not engage with Crown Research Institutes, what were the reasons?

Not aware of what Crown Research Institutes had to offer	104
The business did not require input or expertise	66
Other organisations were better placed to assist	66
Crown Research Institutes did not have the expertise required	62
Too time consuming	58
Costs were too high	43
Crown Research Institutes did not understand your business needs	36
Contractual difficulties	19
Other	42

Note - based on 230 positive responses

Other reasons for not engaging with CRIs



Issues with CRIs	Revenue Band			
	\$0 - \$1m	\$1m - \$10m	\$10m - \$50m	> \$50m
Not aware of what Crown Research Institutes had to offer	34%	37%	29%	19%
The business did not require input of expertise	21%	16%	32%	19%
Other organisations were better placed to assist	27%	15%	29%	29%
Crown Research Institutes did not have the expertise required	24%	22%	13%	10%
Too time consuming	26%	13%	18%	14%
Costs were too high	22%	12%	3%	10%
Crown Research Institutes did not understand your business needs	15%	12%	8%	10%
Contractual difficulties	8%	5%	3%	10%
Other (please specify)	14%	17%	8%	14%

Note - the above table represents the percentage of firms which stated with their revenue band and responded to at least one of the issues with CRIs (270 firms)

Appendix V – Survey Results

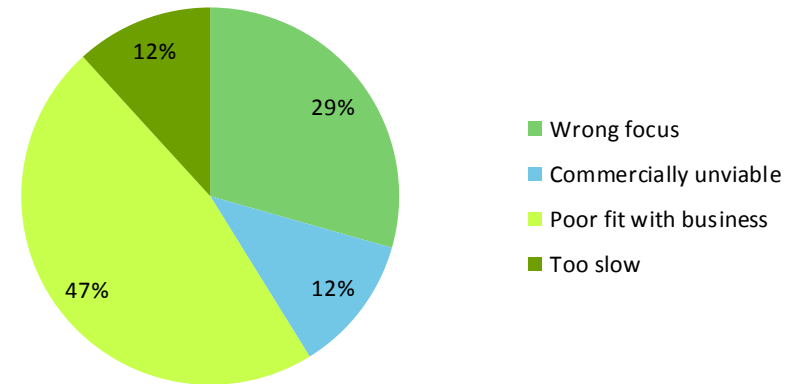
Section 2: Who you work with

15. If your business did not engage with Universities, what were the reasons?

Not aware of what Universities had to offer	60
The business did not require input or expertise	49
Other organisations were better placed to assist	48
Universities did not have the expertise required	41
Too time consuming	39
Universities did not understand your business needs	36
Costs were too high	20
Contractual difficulties	12
Other	27

Note - based on 169 positive responses

Other reasons for not engaging with universities



Issues with Universities	Revenue Band			
	\$0 - \$1m	\$1m - \$10m	\$10m - \$50m	> \$50m
Not aware of what Universities had to offer	23%	20%	16%	5%
The business did not require input or expertise	16%	14%	24%	10%
Other organisations were better placed to assist	14%	15%	29%	10%
Universities did not have the expertise required	13%	14%	21%	5%
Too time consuming	14%	11%	13%	10%
Universities did not understand your business needs	14%	10%	11%	14%
Costs were too high	10%	7%	3%	0%
Contractual difficulties	5%	4%	0%	5%
Other (please specify)	12%	7%	11%	14%

Note - the above table represents the percentage of firms which stated with their revenue band and responded to at least one of the issues with universities (320 firms)

Appendix V – Survey Results

Section 3: Potential engagement with an ATI

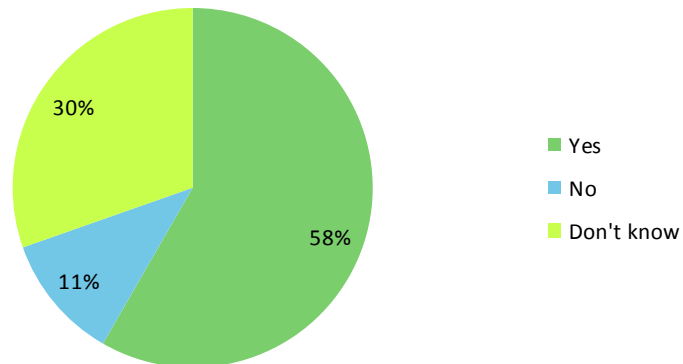
16. Do you consider there is a role for an ATI to support innovation in the Manufacturing and Services sector?	Yes	No	Don't know
	165	32	86

Note - based on 283 positive responses

16. Do you consider there is a role for an ATI to support innovation in the Manufacturing and Service sector?	Revenue Band				Total
	\$0-\$1m	\$1m-\$10m	\$10m-\$50m	>\$50m	
Yes	66	61	24	8	159
No	9	14	3	6	32
Don't know	29	39	11	7	86

*Note - Table displays only those firms which specified their revenue band (280 firms)

Is there a role for an ATI to support HVM&S innovation?



Appendix V – Survey Results

Section 3: Potential engagement with an ATI

17. How important do you believe the following roles are for an ATI?	Not important	Slightly Important	Moderately Important	Very Important
Help you improve your ability to undertake R&D, and commercialise it successfully	31	43	56	146
Put you in touch with the right expertise and capability	33	44	73	123
Be a centre of excellence for technology focussed R&D	34	56	71	109
Build better connection and networking between firms and research organisations	39	56	92	85
Build better connection and networking between firms in the same industry subsectors	55	74	70	73
Encourage/facilitate better flows of skilled staff between firms and research organisations	59	74	76	59

Note - based on 169 positive responses

Appendix V – Survey Results

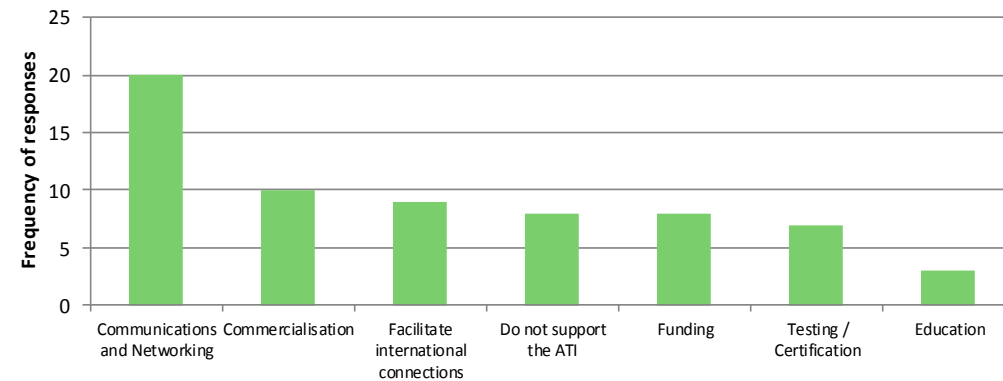
Section 3: Potential engagement with an ATI

18. Please list any other roles you think an ATI should play

Communications and Networking	20
Commercialisation	10
Facilitate international connections	9
Do not support the ATI	8
Funding	8
Testing / Certification	7
Education	3

Note - based on 65 positive responses

Other roles the ATI could play



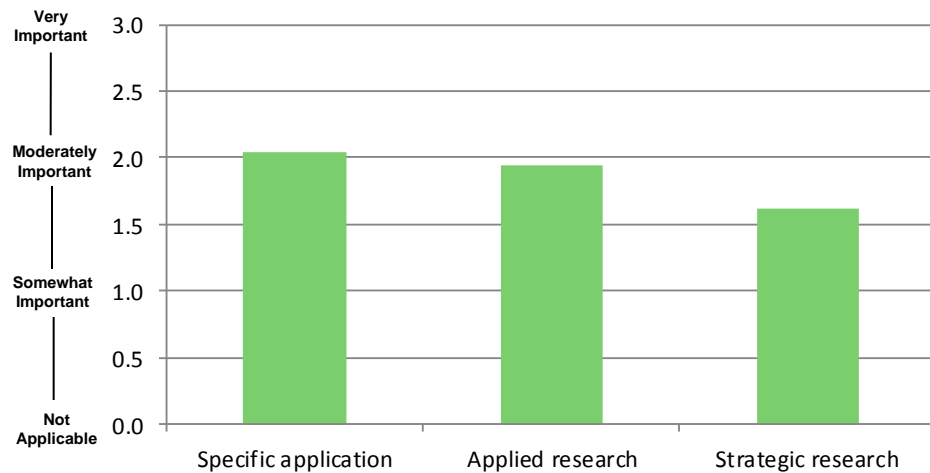
Appendix V – Survey Results

Section 3: Potential engagement with an ATI

19. How important do you think it is that the ATI should conduct the following types of activity?	Not important	Slightly Important	Moderately Important	Very Important
Specific application	37	42	64	128
Applied research	33	46	92	97
Strategic research	47	80	74	69

Note - based on 274 positive responses

Average importance of activity types



Appendix V – Survey Results

Section 3: Potential engagement with an ATI

20. How important are the following services to your business?	Not important	Slightly Important	Moderately Important	Important	Very Important
Act as a single gateway for access to government support	32	24	43	71	108
Technology testing services	48	37	53	64	80
Market assessment/analysis services including international	44	38	55	78	60
Prototyping facilities	70	53	45	60	52
IP management advice	39	62	65	71	42
Facilitate/broker access to specialised expertise and/or networks	48	64	59	65	37
Business incubation	73	59	59	46	35
Carry out industry focussed R&D in longer term programmes of work in partnership with business and other research organisations	69	63	64	48	31
Carry out industry focussed R&D on a contracted fee for service basis for business	73	62	74	36	29
Technology foresight services	52	66	63	62	28
Large scale or specialised research equipment	115	51	42	38	27
Pilot plants	123	38	50	37	26
Technology management courses for business	67	85	51	47	22

Note - based on 285 positive responses

21. How satisfied are you with your ability to provide or access these services, at the right quality, when you need them?	Very dissatisfied	Somewhat dissatisfied	Just satisfied	Moderately satisfied	Very satisfied
Prototyping facilities	16	40	86	72	34
IP management advice	18	58	88	57	34
Technology testing services	12	43	82	90	33
Pilot plants	15	46	96	43	23
Act as a single gateway for access to government support	43	80	68	39	22
Carry out industry focussed R&D in longer term programmes of work in partnership with business and other research organisations	22	66	88	35	22
Carry out industry focussed R&D on a contracted fee for service basis for business	21	52	94	53	20
Business incubation	26	58	82	53	18
Market assessment/analysis services including international	23	80	80	46	18
Technology management courses for business	17	61	93	44	17
Technology foresight services	22	81	90	29	17
Facilitate/broker access to specialised expertise and/or networks	25	60	84	57	16
Large scale or specialised research equipment	18	48	109	38	12

Note - based on 278 positive responses

Appendix V – Survey Results

Section 3: Potential engagement with an ATI

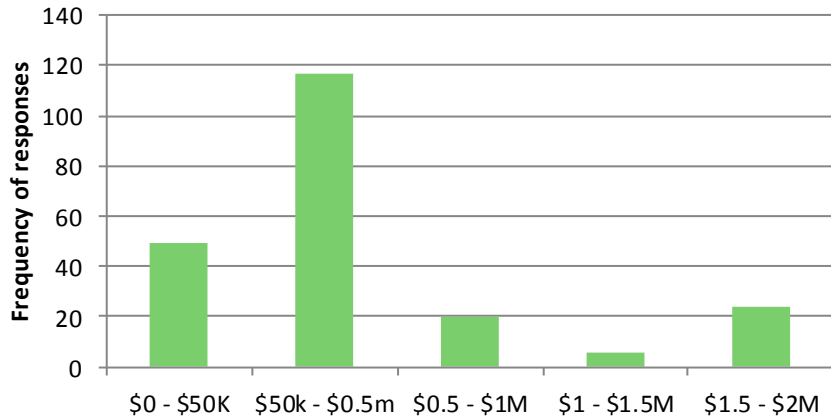
22. In a typical year, how much does your business spend on product and process innovation?

Average \$691,000
 Note - based on 216 positive responses

Q22. Average Spend on R&D	\$0 - \$1m	\$1m - \$10m	\$10m - \$50m	> \$50m
Average (\$000)	\$ 590	\$ 558	\$ 658	\$ 2,349

Note - based on 205 positive responses

Distribution of R&D spend



Appendix V – Survey Results

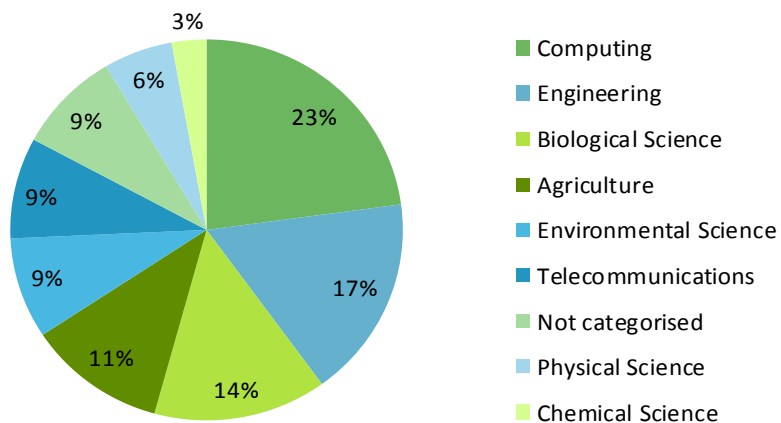
Section 3: Potential engagement with an ATI

23. What areas of scientific knowledge and technology development capability are most relevant for your business?

Industrial design	126
Manufacturing and services processes	124
Computer networks, software engineering, other ICT	118
Measurement and technical analysis	113
Electronics	95
Plastics and polymers	92
Digital media and services	65
Sensing and scanning	64
Advanced materials and nanotechnology	54
Food and biotechnologies	53
Sustainable production	53
Mechatronics and robotics	48
Energy / power systems	45
Imaging	41
Other	41

Note - based on 280 positive responses

Scientific capability - other



Appendix V – Survey Results

Section 3: Potential engagement with an ATI

23. What areas of scientific knowledge and technology development capability are most relevant for your business?	Revenue Band				Total
	\$0-\$1m	\$1m-\$10m	\$10m-\$50m	>\$50m	
Industrial design	45	58	14	6	123
Manufacturing and services processes	46	45	20	9	120
Computer networks, software engineering, other ICT	36	53	17	10	116
Measurement and technical analysis	38	49	19	7	113
Electronics	34	41	10	9	94
Plastics and polymers	41	36	7	5	89
Sensing and scanning	20	33	7	4	64
Digital media and services	24	28	8	3	63
Advanced materials and nanotechnology	18	26	4	6	54
Food and biotechnologies	20	20	6	5	51
Sustainable production	19	19	8	3	49
Mechatronics and robotics	18	25	4	1	48
Energy / power systems	22	10	8	3	43
Imaging	20	16	4	1	41
Other	19	15	7	-	41

*Note - Table displays only those firms which specified their revenue band (280 firms)

Appendix V – Survey Results

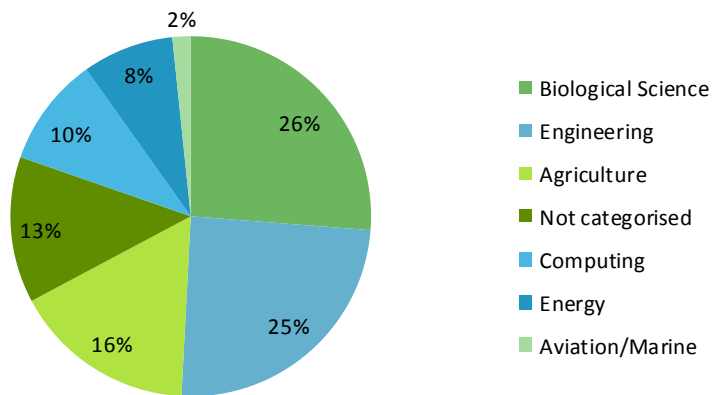
Section 4: Company information

24. What manufacturing sectors is your company in?

Food & Beverage	31
Textiles, clothing and footwear	14
Non-metal Materials	21
Metal Materials	25
Basic Chemicals	4
Polymers & Rubber	25
Pharmaceuticals	13
Electrical Equipment and Appliances	27
Machinery and Equipment	37
Scientific Instruments	15
Electronic Equipment (ICT)	36
Other (please specify)	83
Not in manufacturing sector	60

Note - based on 254 positive responses

Manufacturing sectors - other



Appendix V – Survey Results

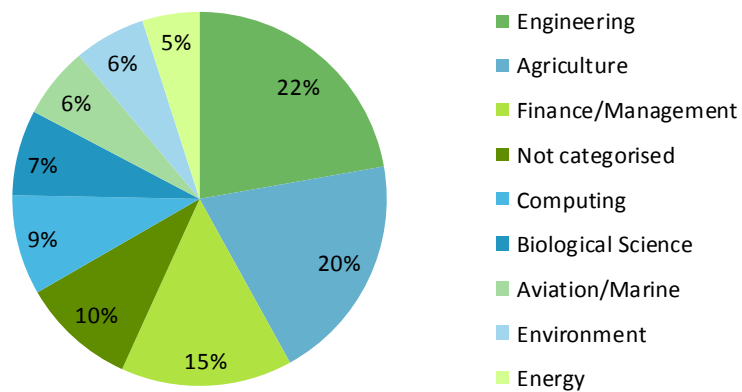
Section 4: Company information

25. What services sectors is your company in?

Digital & Creative	26
Mining - Extraction & Exploration	6
Energy Generation & Transmission	14
Heavy and Civil Engineering	4
Engineering, Surveying & Mapping	15
Scientific Research and Testing	33
ICT Services, Design & Publishing	59
Telecommunications	13
Other (please specify)	105
Not in services sector	49

Note - based on 280 positive responses

Services sectors - other



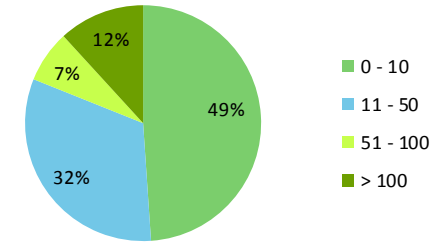
Appendix V – Survey Results

Section 4: Company information

26. How many Employees (FTE) in your company?

0 - 10	137
11 - 50	90
51 - 100	20
> 100	33
Note - based on 280 positive reponses	

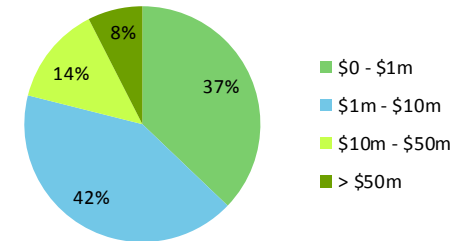
Employees (FTE)



27. What is your company's gross annual revenue?

\$0 - \$1m	104
\$1m - \$10m	117
\$10m - \$50m	38
> \$50m	21
Note - based on 280 positive reponses	

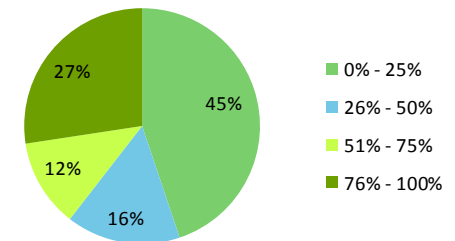
Gross Annual Revenue



28. What proportion of your revenue is earned offshore?

0% - 25%	126
26% - 50%	44
51% - 75%	34
76% - 100%	77
Note - based on 280 positive reponses	

Offshore Revenue



Appendix V – Survey Results

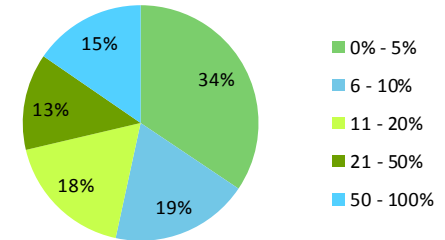
Section 4: Company information

29. What proportion of your expenditure is on R&D?

0% - 5%	96
6 - 10%	53
11 - 20%	50
21 - 50%	37
50 - 100%	43

Note - based on 280 positive reponses

R&D Expenditure

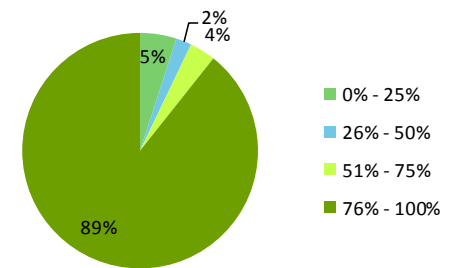


30. What proportion of your business is New Zealand owned?

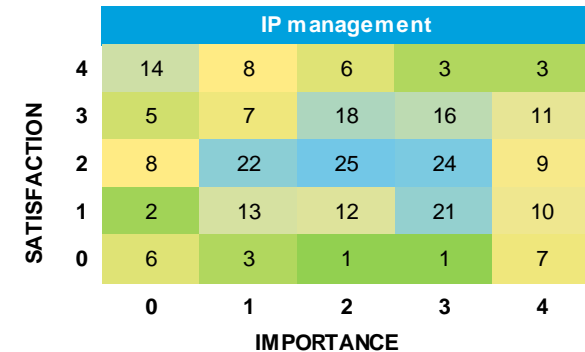
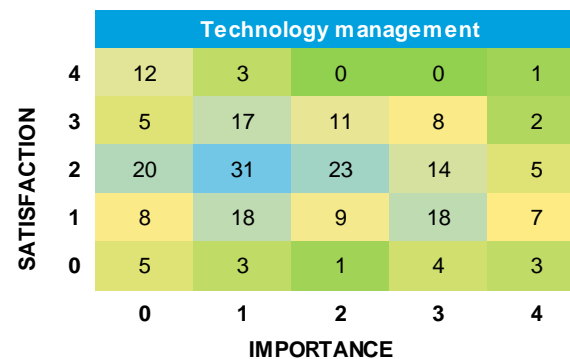
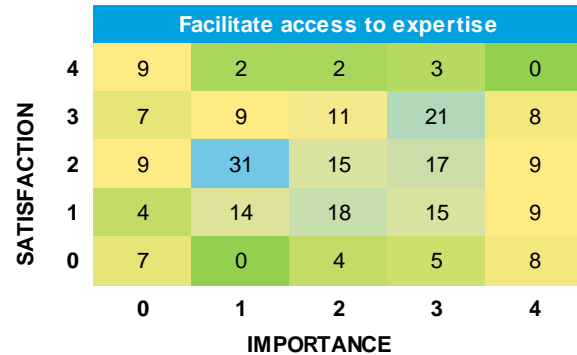
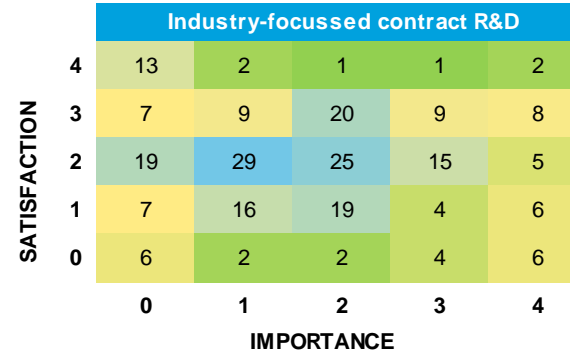
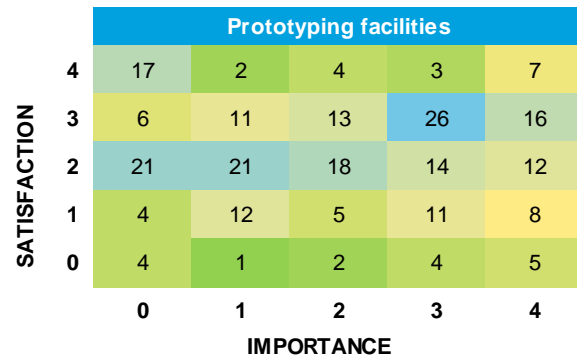
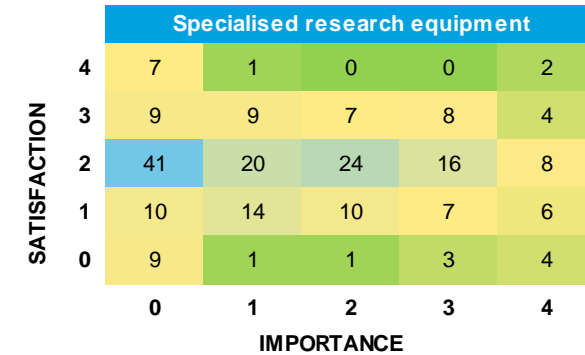
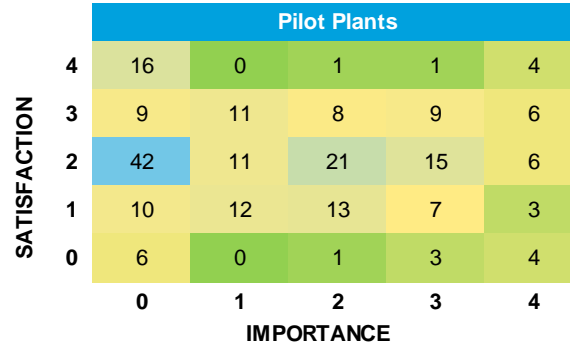
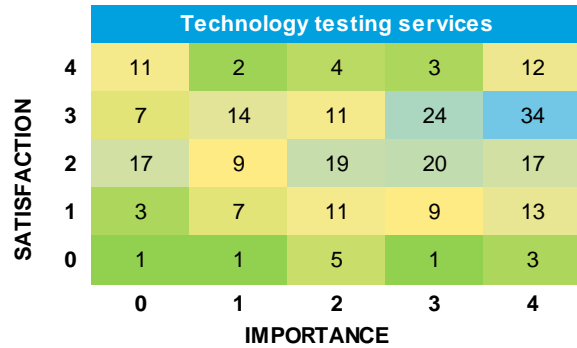
0% - 25%	14
26% - 50%	6
51% - 75%	10
76% - 100%	251

Note - based on 280 positive reponses

NZ Ownership

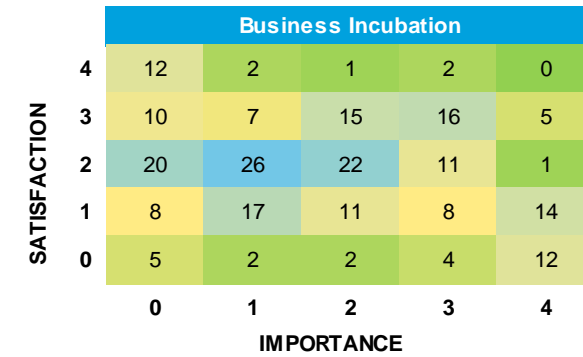
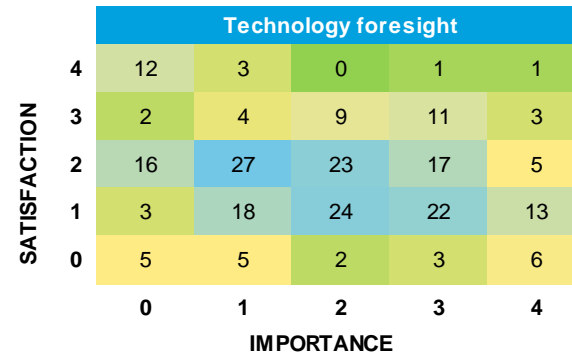
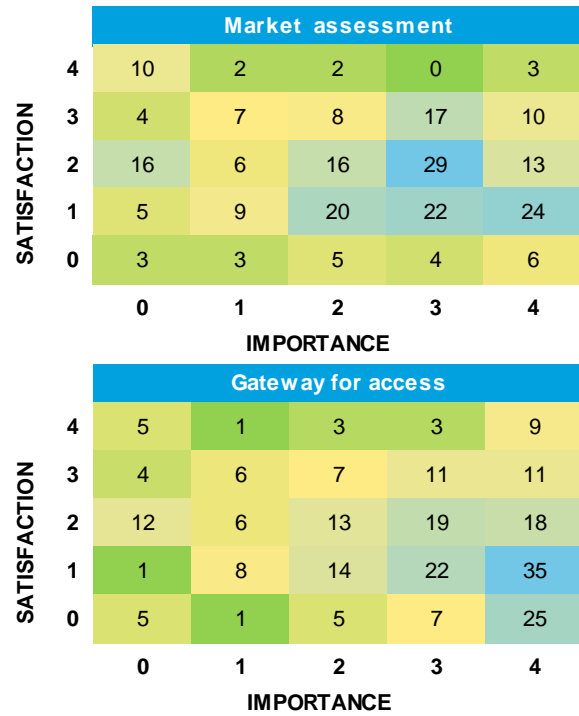


Appendix VI – Importance / Satisfaction Matrices



Note: Blue shading indicates greater frequency, and green indicates lower frequency.

Appendix VI – Importance / Satisfaction Matrices



Note: Blue shading indicates greater frequency, and green indicates lower frequency.

Deloitte.

About Deloitte

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a UK private company limited by guarantee, and its network of member firms, each of which is a legally separate and independent entity. Please see www.deloitte.com/nz/about for a detailed description of the legal structure of Deloitte Touche Tohmatsu Limited and its member firms.

Deloitte provides audit, tax, consulting, and financial advisory services to public and private clients spanning multiple industries. With a globally connected network of member firms in more than 140 countries, Deloitte brings world-class capabilities and deep local expertise to help clients succeed wherever they operate. Deloitte's approximately 169,000 professionals are committed to becoming the standard of excellence.

Deloitte New Zealand brings together more than 900 specialists providing audit, tax, technology and systems, strategy and performance improvement, risk management, corporate finance, business recovery, forensic and accounting services. Our people are based in Auckland, Hamilton, Wellington, Christchurch and Dunedin, serving clients that range from New Zealand's largest companies and public sector organisations to smaller businesses with ambition to grow. For more information about Deloitte in New Zealand, look to our website www.deloitte.co.nz.

Confidential – this document and the information contained in it are confidential and should not be used or disclosed in any way without our prior consent.

© 2012 Deloitte. A member of Deloitte Touche Tohmatsu Limited.