Boosting the Commercial Returns from Research

- Submission by Griffith University -

Department of Education – Department of Industry

Know more. Do more.

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Introduction

Translation of research outcomes into commercial outcomes is one of the cornerstones of Griffith University's strategy to become one of the most influential universities in Australia and the Asia-Pacific region.

Our mission "is to engage in outstanding scholarship that makes a major contribution to society and to produce ground-breaking research". The Griffith University Act 1998 incudes as functions of the University the application and commercial exploitation of research outcomes with government, industry, and the broader community.

Griffith University has established *Griffith Enterprise*, the commercialisation and innovation office of the University, with the aim of ensuring that Griffith's expertise, research capabilities, innovations and knowledge are utilised by government, industry, and the community.

This is achieved through consultancy and commercial research engagements, ensuring that industry and government partners access Griffith's unique research capabilities, facilities and know-how to conduct research and development that they cannot perform in-house. Additionally, Griffith transfers patented technologies and methods to industry through licensing arrangements with industry partners, and establishes 'enterprises' to ensure knowledge-based products and services are directly available to industry and government.

Griffith University welcomes and supports the Government's initiative to improve translation of research into commercial outcomes.

The Discussion Paper "Boosting the Commercial Returns from Research" recognises the strength of Australian higher education and research institutions in conducting world-class research and generating highly innovative outputs. It also recognises the fact that Australia needs to improve how innovation outputs are translated into commercial outcomes to ensure the Nation's competitiveness is maintained.

In the following sections, Griffith University would like to comment on the Discussion Paper "Boosting the Commercial Returns from Research", and provide our view on the key assumptions, interpretations and proposed strategies to improve uptake of innovations from Australian research institutions by the Australian industry.

Prof Ned Pankhurst
Senior Deputy Vice chancellor
Griffith University

Setting National Research Priorities

Griffith University welcomes the concept of National Research Priorities. Such priorities could strategically align academic and industry research with the research needs of our Nation. Targeted investment that enables research institutions and industry to address the National Research Priorities will be critical.

To truly boost the Nation's competitiveness, funds directed toward the National Research Priorities should ideally be additional to the current research funding made available by the Federal Government.

Any re-distribution of research funds within the existing funding envelop will require careful consideration, as the associated consequences and risks for the Australian research and innovation ecosystem are high.

Directing Funding

An increasingly faster-changing global environment means that any National Research Priorities should be a 'compass' for research, not the 'map'.

Australia needs be nimble and able to respond in short timeframes.

Flexible interpretation of the National Priorities will therefore be important, recognising that this needs to be balanced with a strategic approach that drives industry transformation and long-term investment.

Industry-led Funding

The R&D Tax incentive scheme plays an important role in any industry-led research, and Griffith welcomes its continuation but notes that its effectiveness would be improved if access by larger companies was once more supported.

This scheme could be supplemented by strategic industry-focused research funding. This funding could preferentially be awarded to industry entities located in Australia as grant recipients and project leaders, under the conditions that at least one Australian research institution is involved and funded through the grant.

This would enhance collaboration between industry and Australian research institutes and the funding of projects that address unmet needs of Australian industry entities.

By seeking partners for joint grant applications, potentially long-term relationships could be seeded and forged.

Curiosity-led Research Funding

To ensure that the Australian economy is able to compete in an increasingly knowledge-based global economy, continued support for high quality curiosity-driven research will be required.

Curiosity-driven research often underpins breakthrough invention. For example, curiosity-driven research led to outcomes such as Barry Marshall and Robin Warren's treatment for *Helicobacter* (Nobel Prize in Physiology 2005).

Curiosity-led research also often underpins the necessary human, physical and intellectual assets required for technology leadership and innovation.

A worldwide leading example is the German Max-Planck Society, which is constantly delivering highly commercial outcomes from curiosity-driven research through its commercialisation company Max-Planck-Innovation. Since 1970, Max Planck Innovation has concluded more than 1,800 commercialisation agreements, started 90 companies and received more than Euro 230 million in licensing revenues.

Multi-disciplinary Approach

Any market-based innovation in a modern economy requires blending 'STEM'-based skills with the disciplines embodied in the humanities, arts, and social sciences ('HASS') – such as market research, customer-led design, international business, social marketing, languages and so on.

The disciplines are complementary, rather than substitutes. Foregoing one stream for another could lessen rather than enhance new to market innovation, economic development and competitiveness.

Accordingly, any funding allocations by the government fundamentally need to consider both STEM and HASS streams.

Fostering Collaboration between Industry and Higher Education Institutions

Based on an OECD study[1], Australia performs poorly when looking at collaborations between industry (both large entities and SMEs), and the higher education and public research institutions. The Discussion Paper also lists a number of other criteria, where Australia underperforms compared to its OECD peers, including the proportion of researchers working in business, number of publications co-authored by industry and the research sector, and new-to-the-world innovations.

However, Australia is arguably performing exceptionally well when adapting or modifying new innovations developed by others, which is a strong indication that generally Australian industry is technology-savy and open to innovation.

Griffith University welcomes the Government's commitment to establish strong incentives for higher education institutions and their academic staff to collaborate with industry and to translate research outcomes into Industry.

We support developing and implementing a strategy to target three main issues:

- Creating stronger incentives for research-industry collaboration;
- Supporting research infrastructure; and,
- Providing better access to research.

Creating stronger incentives for research-industry collaboration

Researchers in academic institutions require research funding and recognition of their achievements.

If the government specifically funds research-industry collaboration and Universities and the Government recognise successful research-industry collaborations for individual and institutional performance and access to further funding, researchers will actively seek to engage with industry to conduct collaborative research.

Research Funding

Appropriate recognition of experience in research-industry collaboration for the award of funding would strongly incentivise research staff to engage in such activity.

Both, the ARC linkage scheme and the CRC scheme currently award funding to projects of relevance for industry. ARC linkage projects typically focus on narrower outcomes and have a small number of collaborating entities, while the CRC scheme typically targets a field of research, where success requires the collaboration of a large number of contributors from academia and industry. Both programs contribute to research-industry collaboration, and should continue, but recognising

[1] Eurostat (CIS-2010)

that improved effectiveness and efficiencies for each program should continue to be sought.

To supplement these programs, Government could consider establishing related competitive grant schemes that specifically address the unmet needs of the Australian industry and that are aligned with the National Research Priorities. A key success factor could be a modified award mechanism: Instead of the academic partner being the driver of the process and being the primary awardee of the grants, the process could be driven by industry entities, which need to engage with academic partners to be eligible for the grants. This model would enhance the likelihood that research projects focus on unmet needs of the Australian industry. It has been successfully utilised in Germany for more than 3 decades and ensured that the Government supports projects of interest for industry and industry and academia conduct collaborative R&D.

Block Grants

Griffith University supported the replacement of the Institutional Grants Scheme (IGS) with the Joint Research Engagement (JRE) program from 2010. This placed greater emphasis on end-user research by providing additional incentive to support collaboration with commerce and industry, the public sector and community partners. The JRE program, which included the removal of ACG funding from the funding formula, led to an immediate redistribution of block funding to universities that earn a higher proportion of their research income from Category 2, 3 and 4 sources. Four years on, Griffith remains supportive of the policy intent of rewarding university-industry collaboration and takes the view that JRE achieves this. The University is not confident that this can be further improved through the current research block funding mechanisms. If the Government wants to achieve even greater collaboration and mobility with industry then the programs and incentives need to be much more direct, rather than through the block grant mechanisms which often reward institutions several years after the initial collaboration occurred.

Recognition of research-industry collaboration

Griffith University rewards performance in research-industry collaboration, through recognition and promotion. Both are critical to enhancing the likelihood of such collaborations.

We encourage the Government and the Australian funding bodies to recognise commercialisation activities as equivalent to scholarly success, especially when considering funding for applied research.

The section "Measurement of Outcomes" (subsequently) provides further reflection on this topic.

Supporting research infrastructure

Griffith University is strongly committed to NCRIS, through Compounds Australia, and the ANFF.

The University has unique research infrastructure that it regularly makes available to industry, either through utilising the infrastructure for commercial research projects sponsored by industry or researchers from industry working at Griffith's premises.

Examples include the Queensland Microtechnology Facility, the Eskitis Institute, the Institute for Glycomics and the clinical trial facilities at Griffith's Gold Coast campus.

We welcome the Government's commitment to develop a roadmap for long-term research infrastructure investment and will contribute to the respective consultations.

Providing better access to research

Griffith University actively supports the dissemination of knowledge and IP.

Griffith Enterprise, the University's Commercialisation and Innovation Office, actively markets research capability and IP to industry, with the aim of meaningful engagement and further development driven by the needs of our industry partners.

It also enhances access to evidence-based knowledge through the establishment of 'enterprises' that provide knowledge-based products and services directly to industry, government and community.

However, there are several nation-wide initiatives that could be considered by Government to further enhance access by industry to research at higher education institutes.

Strengthening IP Guidelines for Researchers

A clear and consistent approach to ownership of intellectual property ("IP") from government funded research projects would be welcomed.

Universities can only successfully protect, develop and commercialise IP, if they have unambiguous title to the IP developed by research staff. Industry will only collaborate with higher education institutes if they have certainty regarding intellectual property rights associated with any collaboration.

5 years after the decision of the Full Federal Court in the "University of Western Australia v Gray" case, there is still not a unified approach to ownership of IP developed by University staff and students.

This issue can be solved by strengthening the position of the ARC / NHMRC "National Principles of Intellectual Property Management for Publicly Funded Research", which warrants ownership of IP from public funded projects by the research institution.

Amending Section 15 of the Patents Act 1990 to ensure that all IP developed by an employee is owned by the employer, would also clarify ownership and be consistent with the Copyright Act 1968.

The benefits of this approach were exemplified by Germany's decision in 2001 to abolish the so-called "Professor's Privilege" and grant ownership of IP developed by Professors and other research staff to the German Universities (the employers). The period since that initiative has seen significant strengthening of German Universities' commercialisation activities.

Nation-wide Portal

Businesses can struggle to identify potential research partners. Similarly, University engagement and commercialisation offices do not have sufficient resources to identify the plethora of potential partners. While all partners in the innovation process wish to collaborate, the search costs associated with identifying and "matching" are very high.

A Nation-wide portal that enables matching of University research and development capabilities, equipment and facilities with the unmet needs of industry, would reduce 'search costs' and therefore have the potential to facilitate collaborative research and development activities.

To enhance visibility of Griffith's IP, *Griffith Enterprise* utilises its website[2] and iBridge[3], a US-based platform for sharing of ideas, research and knowledge. Various other international platforms exist that also may warrant consideration.

Open Access

The NHMRC and the ARC have already mandated open access to published research outcomes from NHMRC and ARC grants through their Policies on the "Dissemination of Research Findings" (NHMRC) and "Open Access Policy" (ARC). Universities make student's theses available through their libraries and open access depositories.

Griffith University supports appropriate open access to research publications and educational resources[4] within a framework that also supports commercialisation. In a very short timeframe from internal disclosure, new IP created by staff at Griffith is assessed and - if appropriate – protected. That allows staff to publish the respective innovation, without any substantial delay.

However, there are several issues that require further careful consideration.

Most international publishers hold copyright on any manuscripts published in their journals. This can be mitigated by deposition of earlier versions of manuscripts in open access depositories.

Another challenge for universities publishing in open access journals is the "Excellence in Research for Australia" (ERA) framework, which is based on publications and citations in leading (mostly non-open access) journals.

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[2] http://www.griffith.edu.au/griffith-enterprise

[3] http://www.ibridgenetwork.org/

[4] http://www.griffith.edu.au/library/open-access

So far, Universities cannot preferentially publish in open access journals without risking their ERA rankings.

Accordingly, a broad national policy approach to the assessment of research quality is required to enable more publications in open access journals.

Improve Commercialisation Knowledge

Through specialised organisations such as Knowledge Commercialisation Australasia and the Licensing Executive Society Australia New Zealand, Universities are training their commercialisation workforce.

However, it is challenging for many commercialisation offices and entities to attract and retain highly skilled and experienced staff.

Griffith University would welcome a Government initiative to support commercialisation offices with direct funding, including proof–of-concept funds that allow them to attract the best staff and to develop opportunities to a stage, where industry would be interested in collaborating and partnering.

Collaborating with SMEs

AusIndustry's "Research Connections" program recognises that a mix between support in identifying SME's knowledge gaps, facilitation of connections to research providers and funding support is required to entice SMEs to become more research active. It recognises that the majority of SME's have flagged a lack of funds as the main reason why they do not create innovations[5].

There are acute barriers inhibiting collaboration between higher education institutes and SMEs. These include:

- high search costs associated with matching potential solutions to SME customer needs. These costs could be reduced through the Nation-wide Portal (above).
- transaction costs associated with securing mutually favourable intellectual property rights and benefit sharing arrangements (relative to the size and nature of potential collaborations). Many of the measures outlined herein could also reduce these costs.
- the required investment by SMEs relative to available funds, risks and expected returns. Various Government funding incentive programs exist, but would need to be further explored to enhance collaborative activity in this sector.

Griffith University is meeting many of these challenges through its 'enterprise' strategy. Here, the University establishes internal business units for the purpose of making knowledge-based products and services directly available to industry and government customers.

[5] "Australian Small Business - Key Statistics", Australian Government Department of Innovation Industry, Science and Research, Industry Policy and Economic Analysis Branch (2011)

In the SME space for example, the University's Asia-Pacific Centre for Franchising Excellence[6], established to assist franchise businesses make better business decisions, provides to the franchise sector independent research-based knowledge (through for example, newsletters, blogs, webinars and e-products) and education (through for example, courses, workshops, seminars, events and e-classes).

IP Tool Kit

Based on a proposal by the Chief Scientist and the Advisory Council on Intellectual Property (ACIP), the IP Toolkit aims to assist universities, publicly funded research organisations and industry parties, including SMEs, to more easily enter into appropriate collaboration agreements.

Griffith University has contributed to the May 2014 consultation conducted by the Department of Industry.

The University considers that a set of appropriate templates could successfully set expectations of the partners and thus would assist to easier establish appropriate terms for R&D collaborations and commercialisation of IP created in these collaborations.

The experience with the Lambert Toolkit[7] in the United Kingdom has demonstrated that while the template proposals are rarely utilised "as is", they are very helpful in defining a minimum consensus between the negotiating parties.

Easy Access IP

Several Universities have adopted, or are considering the adoption of the Easy Access IP approach to facilitate better access to research. Under this approach, IP is offered to industry to develop for free, with simplified one-page agreements replacing complicated licensing negotiations.

The Easy Access IP model may be attractive for Universities that have a large IP portfolio, especially an extensive and expensive patent portfolio, and that are limited by their resources to proactively manage and commercialise the portfolio.

[6] www.**franchise**.edu.au/
[7] http://www.ipo.gov.uk/**lambert**

It is our view that Universities should not accumulate a massive, non-commercialised IP portfolio. Universities that have done so have pursued a long on-going process that has allowed the accumulation of such IP portfolios, without sufficient resources to manage and commercialise the IP.

Easy Access IP approach may provide a means to solve the 'symptom' (i.e. the accumulation of a massive non-commercialised IP portfolio). However the approach does not address the fundamental issue. Patents are commercial tools, and should be pursued only as part of a commercialisation strategy and investment decision (to gain a return on investment).

Griffith University's approach is to actively manage its IP portfolio. The University only protects IP that has sufficient potential commercial value or that is highly strategic ("core") for the University. Griffith University does not protect IP that can be commercialised without protection.

This enables the University to focus resources on a highly commercial and strategic IP portfolio, and allows a proactive and very effective management of the IP portfolio together with tight control of the respective budget.

In many fields, innovations do not require early stage patent protection, as any company that wants to develop and market the innovation, needs to build their own strong and highly valuable IP portfolio, which is still possible at a later stage of product development. The same is true for IP provided under the Easy Access IP approach. It is by definition early-stage and less valuable, and requires substantial further R&D – which will create new IP, on top of the licensed Easy Access IP.

Griffith University makes early-stage and less valuable IP immediately available to industry and the public, by publishing. This allows free use of the IP for everyone and strongly supports and furthers innovation. Through publications, Griffith researchers build track record in their field. Publications are utilised as an engagement tool, rather than costly non-commercial patent applications.

Entrepreneurship

Universities have an extraordinary potential to enhance economic growth. They have a role to play from local SME support and supply chain creation to primary technology leadership and breakthrough invention.

Early-stage Funding Gap

Meaningful early-stage funding is core to advancing new-to-market or radical innovation. However, as the Discussion Paper rightly identifies, the absence of meaningful early-stage funding in Australia is a major barrier to commercialisation and new business formation and growth.

Whilst there is no shortage of capital in Australia, major difficulties lie in the efficiency of the capital markets' allocation processes and the ability to deal with risk, uncertainty, high cost and regulatory impediments incurred when investing in new-to-market or radical innovation opportunities. These market 'failures' necessitate the need for Government to assist, if new-to-market or radical innovation is to emerge from an Australian base.

Whilst there are many innovations emanating from Public Research Institutes and Universities in Australia, the absence of meaningful early-stage funding means they cannot be advanced to a stage where they are commercially attractive – either to industry partners or investors.

This seriously impairs 'commercial deal flow' and therefore impairs both industry collaboration and the attraction of investors to seed and early-stage venture capital investment.

As 'commercial deal flow' *leads* industry collaboration and investment, the early-stage funding gap must *first* be addressed.

At Griffith University, *Griffith Enterprise* (its commercialisation and innovation office) manages a proof-of-concept fund. The proof-of-concept fund has provided the essential funding to advance several opportunities and to attract global industry partners. However, the available opportunities grossly outweigh discretionary capital.

This phenomenon is not unique to Griffith University and indeed not unique to Australia.

Many foreign jurisdictions have recognised this, and faced with an ever-increasing need to innovate to remain competitive in a global marketplace, directly address the issue through the provision of significant direct funding for proof-of-concept and early-stage investment.

For Australia to compete for innovative and entrepreneurial business and activities, and for the policy objectives detailed in the Discussion Paper to be achieved, a

similar substantial commitment of direct funding to help scientists commercialise their ideas is first required.

Other ways Universities Assist In This Space

Universities can play an important role in supporting entrepreneurship.

Education

Griffith is committed to building the local entrepreneurial skill base, and is implementing entrepreneurial education, both through formal degree and also through *Griffith Enterprise's* Commercial Knowledge Programs (focused mainly on staff and PhD students).

Griffith further assists in up-skilling its students through its Industry Affiliates Program – which has allowed more than 1,200 final-year students to complete an industry placement and project as part of their studies. Griffith also aims to include work integrated learning experiences in all of its degree programs and courses[8].

Student Enterprises

Griffith has established 'Student Enterprises', which immerse students in the process of innovation and entrepreneurship. Student Enterprises are student centric and course embedded. Their focus is on helping students to create new product, build networks of relevance, take products to market, develop skills, grow experience, build portfolios and track records, which together kick start their careers.

For example, Griffith's *Seed* Project is focused on creating the next generation of music entrepreneurs. Each year students from music, art, film, and multi-media compile an album of peer-assessed student music, undertake a concert series, collaborate with industry, and sell product through various digital platforms.

Student Enterprises also complement work integrated learning programs at Griffith (internships with industry) and entrepreneurship education courses and workshops.

Enterprises and Enterprising Activities

As previously stated, Griffith University is also implementing a much broader model of commercialisation; which includes 'enterprises' (or new 'internal' ventures) that support the direct delivery of products and services to industry. Enterprises by their very nature immerse staff in entrepreneurial activity whilst driving an overarching goal to ensure that knowledge created at Griffith is made available and put to use by industry, government and community.

[8] http://www.griffith.edu.au/learning-teaching/teaching-and-learning/work-integrated-learning

Incentivising Staff to commercialise

Griffith University considers that incentives are a key tool to entice research staff to develop products and services that could be commercialised.

Griffith University provides a number of incentives to entice staff to conduct consultancy and commercial research and to consider IP protection and commercialisation of research outcomes, including:

- an appropriate commercialisation policy framework[9];
- establishment and ongoing support of *Griffith Enterprise* as a dedicated University office that supports staff in all commercialisation activities, including consultancy and commercial research;
- awarding surplus from consultancy and commercial research projects to staff as direct reward or to advance further research;
- the University's investment in IP protection and prosecution; and,
- sharing 50% (70% for artists) of commercialisation net income with creators of IP (gross commercialisation revenues less IP protection cost).

The University also recognises commercialisation activity when promoting staff and assessing publication outcomes.

As a direct measure of these strategic initiatives, around 30% of Griffith academic staff have been involved in commercialisation activities since *Griffith Enterprise's* establishment.

Accordingly, we encourage the Government and the Australian funding bodies to recognise commercialisation activities as equivalent to scholarly success, especially when considering funding for applied research.

[9] Before commercialising IP, Griffith University and the creators enter a Commercialisation Agreement that includes assignment of the IP to the University, and details how Griffith Enterprise will commercialise the IP, how the creators will be involved in the commercialisation process and what the University will provide to them.

Measurement of Outcomes

Currently, research success is mainly recognised by Government through the Excellence in Research for Australia (ERA) initiative. The Higher Education Research Data Collection (HERDC) process recognises research-industry collaboration.

The Government is currently utilising the HERDC process to assess a University's success in collaborating with industry and in its commercialisation activities. The categories 2 - Other Public Sector Research Income, 3 - Industry and Other Research Income and 4 - Co-operative Research Centres (CRCs) already recognise engagement, joint research activity and commercialisation success.

However, these measures solely focus on income and do not fully reflect the extent and success of research commercialisation activities.

Engagement and Collaboration

Engagement and collaboration are keys for the successful translation of research outcomes. Therefore, the Government should consider additional measures, e.g. the number and percentage of academic staff engaged in industry collaborations and commercialisation activities.

IP Protection

Protection of intellectual property is an important factor for the translation of research outcomes, where the industry requires strong IP protection for successful commercialisation of a technology.

However, the number of patent applications filed and prosecuted, or granted patents, do not reflect such success.

Patents involve an investment decision: They are commercial tools that require significant investment, and should not be filed for the sake of filing, but only for the purpose of supporting commercialisation and associated return on investment.

Universities usually do not produce and sell products that are protected by patents; industry partners do. Accordingly, the driver behind filing patents should be to enable an industry partner (licensee) to protect, develop, manufacture and sell innovative products or provide innovative services.

Experience in Europe has shown that a KPI on the number of patents filed simply multiplies filing of non-commercially valuable patents (Germany and Spain).

A better measure relating to patents and other IP rights is the percentage of patents / IP rights that have been commercialised vs. non-commercialised patents.

Recognising the Full Extent of Impact

Another measure for translation of research into outcomes valuable for Australia is 'Impact'.

The ARC has defined "Impact" as "… *the demonstrable contribution that research makes to the economy, society, culture, national security, public policy or services, health, the environment, or quality of life, beyond contributions to academia*."

Impact provides a much broader performance measure than commercialisation income. It also recognises translation that may have no commercial benefit for the University, but significant benefit to the community.

To better determine and illustrate the benefits higher education institutes deliver to Australia, Griffith University proposes to include non-monetary benefits as well as monetary-benefits, and categorise these in three 'Orders of Impact':

- First order impact (tangible research outcomes)

  (e.g. a vaccine candidate; an educational program; a public health intervention program; a new electronic system)

- Second order impact (delivery of product or service to the community)

  (e.g. number of vaccinations; number of schools implementing the program; delivery through therapists to families in need; products utilising the new electronic system)

- Third order impact (impact on people using the product or having received the service)

  (e.g. reduction in incidents of disease and costs and improved quality of life; improvement in literacy and numeracy skills; reduction in need for intervention and associated costs and improved quality of life; reduction in e-waste and associated costs).

  'Third order impact' is typically where significant returns on the public's investment in research are manifest.

"Impact" also should include change of legislation and professional practice.

The United Kingdom, through the Research Excellence Framework (REF), is utilising Impact to allocate a portion of block funding to Universities.

Griffith University considers that a similar approach in Australia should be considered to ensure the first, second and third-order benefits delivered to the community by the University can be further enhanced.

Capitalising on the Medical Research Future Fund

The new Medical Research Future Fund would enable the Government to fund new initiatives in the Life Sciences and broader Health field.

Griffith University considers that a significant portion of any future funding should support collaboration between Universities and hospitals, to enhance collaborative translational projects.

Clinical research should have high priority, including research into health service innovation and delivery of allied health services.

There is also ample opportunity for funding of industry-led development projects focused on:

- Treatment of disease (e.g. new effective and affordable drugs)
- Early detection of disease (e.g. diagnostics)
- Prevention of disease (e.g. vaccines, healthy-living programs and associated social marketing campaigns to improve effectiveness of delivery)
- Better delivery (e.g. medical devices and patient management systems).

It is through a broad and holistic approach to solving health challenges that the Government can expect significant first, second and most importantly, third order Impact (refer previous section).