



**Small Enterprise Association of Australia and New Zealand**  
28<sup>th</sup> Annual SEAANZ Conference Proceedings  
1-3 July Melbourne 2015

# Constraints to innovation in New Zealand: an exploratory study

Rebecca Whyte<sup>a</sup>

<sup>a</sup> Massey University - College of Business, contact – Email: bexwhyte13@hotmail.com

## Abstract:

This research explores factors that constrain innovation in New Zealand. An exploratory research methodology informed by innovation policy experts, industry leaders and SME business executives was adopted to understand the current state of the innovation system. A high functioning national innovation system is reliant on the diffusion of knowledge generated through science and research activities. The New Zealand innovation system has fragmented science and research components, and it lacks a mechanism to diffuse knowledge through many actors within the system. Policy makers are unable to articulate the full breadth of the system, which is signified by the finding that there is a complete absence of a map of the innovation system. Due to the economic growth that is required to achieve higher living standards for New Zealanders, adapting the innovation system model to ensure that it meets the needs of the companies that it aims to support is significant.

**Keywords:** Innovation, commercialisation, management, leadership, culture.

©copyright Whyte (2015) all rights reserved.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

## **INTRODUCTION**

It is widely acknowledged that greater innovation has a positive effect on economic growth (MBIE, 2014a; Dutta et al, 2014; Clark, 2012; Wong et al, 2005). The National-led Government's Business Growth Agenda (BGA) sets out the ambitious target of increasing the ratio of exports to GDP to 40 percent by 2025 (MBIE, 2014a). This means that exports have to double in real terms. To achieve economic growth and an increase in exports the New Zealand government is investing in innovation; specifically on commercialisation of research and development (R&D). Lifting the level of R&D investment remains a challenge in the New Zealand context as New Zealand has a small number of large firms that undertake their investment in R&D offshore. Businesses are currently investing 0.58 percent of GDP, while the target is 1.0 percent of GDP (MBIE, 2014a). The OECD average is 2.3 percent (OECD, 2011).

The government is investing in a number of different areas to achieve their high-level goal of "creating the right business environment and incentives to encourage New Zealand's business sector to double their expenditure on R&D to more than one percent of GDP." (MBIE, 2014a, p.45). The interventions range from implementing changes to the tax treatment of R&D, increasing and reforming contestable funding, boosting skills in science, technology, engineering and maths, and creating more Centres of Research Excellence (MBIE, 2014a).

Investment in the science and innovation system will be increased to \$1.5 billion in 2015/16, compared to investment of \$1.0 billion in 2008/09, an increase of 54 percent (MBIE, 2014a; MBIE, 2014f). Despite the increased expenditure and investment in BGA priority areas, the government is yet to articulate a compelling story of how the interventions help companies striving for increased R&D investment and international growth.

In an attempt to develop a conceptual model that will assist in thinking about the design of the New Zealand innovation system, a set of research questions needs to be developed. To better understand what a possible set of research questions might be, this research sought the views of small and medium-sized business executives who participated in an international study tour.

## **RESEARCH METHODOLOGY**

This research has been informed by a wide range of key informants to gain a broad understanding of the New Zealand innovation system. The key informant interviews and a literature review exploring the theory of innovation systems and the current policy and performance of the New Zealand innovation system led to the hypothesis that forms the basis of the research question: What is constraining innovation in New Zealand? A sample of small and medium-sized business executives provided critical insights based on their observations from study tours to the United States & Canada and Europe. The critical insights and the findings from the literature were synthesised uncover key themes. A series of propositions were developed that make a claim about the current state of innovation in New Zealand. These propositions form the basis of research questions to be validated in further empirical study that will help inform the design of the New Zealand innovation system.

## FINDINGS

### *The No.8 wire mentality is counter to what will drive 21st century commercialisation*

The No. 8 wire mentality refers to a unique aspect of New Zealand's culture. It is based on the idea that we have the ability to invent new things out of the resources available at hand. Early settlers had to make-do with the resources that were available to them, and excelled in hands-on practicality. New Zealand's immigration policy of the 1960's and 1970's focused on "people with trade skills – again practical people who won their living with their hands" (Smale, 2013, p.66). The No. 8 wire mentality reinforces the idea of tinkering in the garden shed, making do, and often leads to compromise. In a world that increasingly faces wicked problems that have no clear solutions, good enough no longer cuts it. The No. 8 wire mentality is ingrained as a celebrated part of New Zealand's national psyche. But some propose that the myth is actually counter to what will drive 21<sup>st</sup> century commercialisation (Bridges & Downs, 2014; Smale, 2013; NZTE, 2009; Hendy & Callaghan, 2013).

Some of the key themes raised by respondents can be traced back to the No.8 wire mind set. A lack of understanding of what customers need and a lack of awareness of how to create value can be traced back to the idea of garden shed inventions. The idea of creating something in the garden shed to solve an individual's problem misses the point of innovation. Innovation requires a new product, services or experience to be commercially viable. Something created in the garden shed lacks creating something that a customer needs, something that is scalable and replicable, and something that will add value to customers (Innovation Council, 2015). A report commissioned by NZTE (2009, p.12) offers five key reasons that go to explaining why New Zealand businesses typically miss the opportunity to capture value from our innovation efforts:

1. **Satisficing:** Satisficing refers to the tendency that many New Zealand business owners have set their sights on achieving enough wealth creation to have the "bach, boat and BMW" (NZTE, 2009 cited in Rowarth, 2013). I witnessed this in action during a recent consulting assignment undertaken in the Kapiti/Horowhenua region. The business owners wanted to grow the company, but it appeared their own tolerance for putting in the "hard yards" required over the next 10 years would compromise the lifestyle they had been able to create as they grew the business from scratch as new immigrants. The idea of having to sacrifice their hard earned lifestyle at the expense of growing the business through innovative product lines and service offerings was a barrier to pursuing the change needed.
2. **Thinking for our customers:** The report notes "for a people known for their openness and who travel so much, we find it incredibly difficult to see the world through other people's eyes." The report goes on to note our assumptions in thinking for our customer "erode[s] our value proposition and we deny ourselves the opportunity to tailor our products to the exact needs of our customers, present them for optimum affect and thereby create the best possible value" (NZTE, 2009, p.13). This was another theme identified by the respondents. In contrast to what was seen in the international study tour locations, participants observed that New Zealand businesses tend to design products and services for their own needs, rather than for the needs of the customers they exist to serve. The report (NZTE, 2009, p.14) notes that our tendency to think for our customers is further adversely impacted by our

“export heritage”, where our channels to market (importers, distributors, and retailers) are between us and our customers. This can make it difficult to ensure that the company’s brand is consistent to what is intended due to the involvement of “middle-men”. When we do get feedback from the customer it tends to be from those involved in channels to market, rather than the end-user.

3. **Self-reliance isn’t the asset we think it is:** The No.8 wire mentality is characterised by the isolation that early settlers faced. A fierce independent streak (Hofstede, 2005 cited in NZTE, 2009) means we do many tasks on our own – and this affects many aspects of business, from the “way we structure our businesses, the capital structures that we adopt, and the processes that we use for product and market development” (NZTE, 2009, p.14). I also observed this behaviour during the consulting assignment, where two of the local businesses that we worked with showcased this behaviour. As pointed out in the NZTE report, the impact of this on how the businesses were funded (debt finance secured over the family home), resulted in increased risk avoidance designed to protect their assets.
4. **How the *tall poppy syndrome* affects innovation:** Tall poppy syndrome is described as the “knocking down of high achievers” (Kirkwood, 2007). One study found that over half of the forty New Zealand entrepreneurs that participated in the study had experienced tall poppy syndrome, which resulted in them “‘staying under the radar’, not telling people they owned a business, and not ‘flaunting’ their wealth” (Kirkwood, 2007, abstract). Tall poppy syndrome was one of the factors that respondents highlighted as constraining innovation in New Zealand. The NZTE report (2009) found that because of New Zealanders reluctance to stand out from the crowd due to the critical feedback that we may receive from others, we tend to put too much emphasis on “repeated tinkering to reduce the chance of getting it wrong and delaying market entry and exposure to vital feedback and customer driven innovation.” (NZTE, 2009, p.17). This is compounded by our low assertiveness, a negative attitude to failure, and an inability to provide and receive constructive criticism (Smale, 2013, p.64).
5. **Why we don’t value intellectual assets:** The NZTE report notes that “we accord most respect to practical achievers” (NZTE, 2009, p.16). The tendency to value this again harks back to our admiration of our early settlers and their “hands-on” nature to getting work done. This was supported by one respondents’ comment that “we spend more time developing muscle for sport rather than the muscle in our heads”. A common discussion that I have with others about the state of innovation in New Zealand is about the lack of media interest in our innovators. It is common to see sports stars held up as heroes and role models on the front page of the newspaper, but how can we get our innovators out of the business pages (at best) and on to the front page?

### ***Innovation is seen as the domain of start-ups and big business***

Respondents observed that the New Zealand attitude appears to be that innovation is domain of big business. The New Zealand business landscape is dominated by those that are self-employed, micro, small and small-medium businesses. A recent report states that 97 percent of enterprises in New Zealand are small businesses (employing 0-20 employees). They employ 40 percent of our total workforce and contribute to over 30 percent of GDP (MBIE, 2014d). Given the dominance of small

businesses, the economy is missing out on a significant contribution if these businesses feel that innovation is not their domain.

I have previously highlighted that New Zealanders' propensity to satisfice is one negative factor in the No. 8 wire mentality. It is therefore interesting to see that a third of small business owners report starting their business for lifestyle reasons (MBIE, 2014d, p.7). It appears the dream of the "bach, boat and BWM" is alive and well.

Small businesses (micro, small and SME) have an employee turnover rate of 15-16 percent, higher than what is seen in larger businesses with an employee turnover rate of 14 percent. Due to the lower number of employees, the turnover rate in a small business has a greater impact than in a larger business. Employee turnover rate is a good measure of workforce stability and the dynamism of a business. New talent can bring fresh ideas to old problems, which may increase innovation. Conversely, a high employee turnover rate can be costly to a small business as the time spent getting new employees up to speed can take away from more productive activities, the cost to recruit can be expensive, and the opportunity cost of having a position vacant can be felt more heavily in a small business where other staff are not able to pick up additional tasks. Time spent on staffing and organisational issues can divert business owners' attention from innovation activities.

Small business owners are often closer to their employees as smaller teams see closer relationships. This could also result in a more intimate understanding of the impact that job losses would have on their employees. My experience of working with small business owners in the Kapiti/Horowhenua region reinforced this. Business owners felt a huge burden of responsibility for their employees, particularly those that had been with the firm for a number of years. While innovation does have an element of risk, it does not always result in realised risk. Small business owners may unconsciously hold back from innovating for fear of failure, as failure may result in needing to make staffing cuts.

The link between the mind-set of management and the culture of a business is also cause for concern. The culture of an organisation is a major contributing factor in its performance (Heskett et al., 1994). The New Zealand Management Capability Index (2013) found that SME owners see people development as a low priority. In part, this could be attributed to the fact that a third of small business owners start their businesses due to lifestyle reasons. Organisations are only as good as the human resources they employ, and an organisational leader sets the tone for how the organisation will perform. There appears to be a lack of commitment to develop the staff in SME businesses. If small business owners are only in the business for the lifestyle, a growth mind-set may be lacking.

### ***Mentoring and funding go hand in hand***

Some respondents commented on various aspects of mentoring models and funding sources. Respondents observed that the mentoring model appears to be largely ineffectual and outdated. Mentoring appears to be ineffectual in that it can feel like a shallow experience; advice that is forced on mentees rather than a partnership; or that the mentor is involved out of self-interest rather than a genuine desire to see the company succeed. Mentoring models appear to be outdated in that there is often a mismatch in expectations; mentors appear to hold all the power in the relationship; and in many cases there is an expectation that the mentor will take an equity stake in the business in return for the time and advice provided.

In the case of start-ups, many accelerators and incubators expect ownership equity ranging from 4 - 10 percent in return for access, exposure, seed funding, advice, brand extension opportunities and networks. Angel investors also offer investment, advice, support and networks in return for ownership equity. But what if the start-up doesn't want to give up ownership equity in the early stages?

There is plenty of advice for early stage entrepreneurs that "bootstrapping" is the best way to fund the business when in the early stages through building the business with the founders' own money, or borrowing from family and friends or through personal bank loans. Start-ups that bootstrap can find it difficult to attract credible mentors who are willing to work with them without exchange of investment for equity.

Crowd funding platforms are also changing the way start-ups think about early stage funding. There are broadly four different types of crowd funding available in New Zealand (Mass Catalyst, 2014): donation crowdfunding; reward crowdfunding; debt crowdfunding; and equity crowdfunding. These different types of crowdfunding are challenging the existing thinking of mentoring in return for investment. Companies that do not want to give up equity can launch a reward crowdfunding campaign that essentially provides them with pre-sales and, depending on what platform they list with, global brand exposure. Equity crowdfunding platforms have also changed the playing field. Start-ups can now raise capital by effectively skipping previous funding maturity steps, such as through angel investors and venture capitalists, and jump to the benefits of an initial public offering without the costly process.

These new processes impact the relationship between mentoring and funding in different ways. Start-ups that choose a reward crowdfunding platform find it difficult to attract credible mentors without giving up equity in return for investment, access to their networks and advice. Start-ups that choose an equity crowdfunding platform have given up equity in the company without the benefits of what angel investors or venture capitalists can offer in return for investment and equity.

There is also concern about the quality of mentoring on offer. There appears to be an assumption that a high net-worth individual that has the capacity to invest as an angel investor has the capability required to effectively mentor the founder. In the same way that organisations expect technical experts to be capable managers, or we assume that excellent sports players will be excellent coaches, that we assume that because a person has successfully gained their own wealth through growing their own business, that they will have the ability to convert that experience in to helpful advice for the founder.

Export companies need specialist mentoring advice that can guide them through a high-growth path. If capital for growth is being sought, the funder needs to be capable and willing to support the company through the growth phase.

***New Zealand lacks a depth of talented executive managers that can lead high-growth companies in to international markets***

A number of aspects relating to the capability of executive managers were raised in the data collection. It is reasonable to expect that a talented executive manager would have experience and capability in areas such as: deeply understand the value proposition that the company offers to their

customers; reconcile the tensions between balancing short-term cost and long-term value creation; undertake effective long-term planning; experience in communicating with market analysts and the media to maximise public exposure and capital market reputation; have experience in navigating funding issues; are able to draw on excellent professional and personal networks; see the value in collaboration with others, but are ruthlessly determined and competitive in the right markets; navigate through risky situations; and experience in managing an “A” team in a high-growth company.

Capability in these areas is often gained through “crucible experiences” (Thomas, 2008). Thomas found that “practice trumps talent”. Expert performance requires five key components: a thorough grasp of method; ambition; instruction; feedback; and deliberate practice (p.69). Executive managers taking high-growth export companies in to international markets need to have knowledge and experience in balancing developing business discipline with staying entrepreneurial, handling pressure for aggressive growth from equity partners, scaling management systems, creating and executing strategies to move fast, operating efficiently, and expanding in to new markets. Learning through theory will only get a leader so far. To learn through doing, along with the ability to turn crucible experiences in to lessons on leadership and learning, is what separates a novice from a seasoned leader.

So why does New Zealand appear to lack a depth of talented executive managers that are capable of leading high-growth companies into new markets? One line of inquiry that warrants further research is the relationship between a capital market failure and a lack of depth of talented executive managers.

Evidence of a capital market failure is mixed. A working paper by Gerritsen and Sundakov (2011) states that there are significant constraints that face small New Zealand exporters in raising capital for growth. Gerritsen and Sundakov find that “off-shore investors can add value to New Zealand businesses that may not be provided by investors based at home, but that a difficult condition attached to this value is that off-shore investors generally want the business relocated to their country of origin or the firm’s main target market.”(p.4) The Treasury does not find evidence of a market failure, but points to a lack of expertise and information (Treasury, 2002, p.26). They do concede that due to challenges in establishing offshore distribution channels to support growth might explain why “so many promising New Zealand companies are sold to foreign firms in the same industry.” (Abstract, Treasury, 2002). There is anecdotal evidence that companies are choosing to go offshore because the angel investor and capital markets in New Zealand undervalue companies. To get a higher valuation, some companies are choosing to look for investment from offshore so as not to get diluted too soon. Early dilution can impact on future funding rounds.

Regardless of whether the reason why many companies rely on growth opportunities through overseas investors through strategic choice or capital market failure, it does appear that this occurs. It is worth exploring the impact that this has on the depth of talented executive managers. As noted in the working papers by both the Treasury (2002) and Gerritsen and Sundakov (2011), companies that are invested in by overseas venture capitalists are more likely to move out of New Zealand, either to be closer to their key markets and distribution channels, or the connections that the investor provides. This in turn sees the executive management team heading offshore. A key aspect of an innovation ecosystem is that the executive managers are recycled back in to the system to go

on to lead the next high-growth company (Accenture, 2013). Anecdotally, executive managers can find it difficult to relocate back to New Zealand after leading high-growth companies in new markets due to the level of experience and lifestyle they have enjoyed. Because many of the capabilities of talented executive managers are gained through “crucible experiences” (Thomas, 2008), New Zealand is in the unique position of needing to constantly develop executive managers that are capable of leading high-growth export companies.

Distance from international markets is another contributing factor to the underperformance in this area. New Zealand’s unique context of distance from markets and small domestic markets means that we are reliant on export markets for economic growth. As noted by the observations made by respondents, exporters need to understand the customers they are designing products, services and experiences for to successfully outsell local competitors in international markets. Design thinking is a proven method for creating superior value propositions for customers and developing competitive advantage in the marketplace. A core principle in design thinking is to empathise with the user – through immersion, observation or empathy interviews. It is therefore critical that New Zealand business leaders prioritise understanding their customers and their environment better.

So how do we respond to the problem of the lack of depth of talent executive managers? One response worth considering is expanding the talent pipeline. An approach can be borrowed from the “investment approach” that was recently applied in to the welfare system and is now rolling out through the rest of the public sector. The investment approach, led by Hon Paula Bennett, is an approach that sees the calculation of lifetime costs of those that receive benefits from the government. Investment is targeted at high cost or high risk groups to provide “wraparound” support in an attempt to divert a path of welfare dependency that has been identified in some population groups. Taking the idea of where in the pipeline investment should be targeted, we may find that providing investment to children at a young age to develop a “conceptual value” for innovation and an open, collaborative way of working will have the greatest impact. It is worth understanding where transformative shifts will result from increased investment, relative to marginal shifts.

Successful companies have strategies in place to develop the talent within their firm by creating and nurturing a pipeline of emerging leaders. But how do you respond to the idea of the talent pipeline on a national level? Many of our emerging, innovative companies began as small start-ups. Innovators do not necessarily come through the traditional talent development path in larger enterprises. Investment in human capital needs to be developed through training and education. Respondents noted concerns about the state of the New Zealand education curriculum and its ability and effectiveness in developing innovators. There are also concerns about the mismatch between the education provided at universities level and what is expected from industry (Burt et al., 2013).

### ***Personal debt levels reduces the pool of would-be innovators***

There is plenty of advice for early stage entrepreneurs that “bootstrapping” is the best way to fund the business when in the early stages of growing a start-up. Angel investors and venture capitalists are looking for founders that are willing to show their commitment by investing their own money in to the business. That capital often comes from building the business with the founders’ own savings, or borrowing from family and friends or through personal bank loans. In the early stages of a

business, bank loans will often be secured against personal assets due to the lack of physical assets to secure the loan against. This can put the family at risk, and may mean that the founder makes decisions to protect the personal asset, such as the family home, rather than making the best decisions for the business.

But private debt is a significant issue for New Zealand, with overvalued house prices and high household debt compared with incomes (RBNZ, 2014). In the 20 years to 2011, total housing and consumer loan debt has increased around six-fold in dollar terms (RBNZ, 2015). Despite housing affordability issues, New Zealanders remain “obsessed” with home ownership, more so than in many other countries (NZIER, 2014). Sixty-five percent of New Zealand households owned their home in 2013 (Statistics New Zealand, 2013), and nearly 70 percent of New Zealand’s household debt can be contributed to housing (NZIER, 2014). New Zealand’s obsession with home ownership is largely a cultural one (NZIER, 2014; New Zealand Initiative, 2013). Economic growth flourishes when people invest in productive investment such as business, rather than housing. Investment in housing relies on future capital gains to repay debt fuelled through mortgages (NZIER, 2014).

Anecdotally, the cost of living is high in New Zealand with higher costs for services, and food and beverages. In part, this is attributed to the distance from international markets for imports of goods, and the small scale of the domestic market to reach economies of scale for the delivery of services or the production of food and beverage.

So with the high-level of household debt and high living costs, the amount of disposable income or capital available for investment in start-ups for individuals could be a constraint for would-be innovators. Because bank loans to fund investment are often secured against the family home, the level of risk tolerance for an individual to pursue an innovative idea may hold back the would-be innovator from committing to execution of their idea. Angel investors and venture capitalists want to see a level of personal financial commitment to an early stage idea as a way of assessing whether the start-up is worthy of their investment. The rise of crowdfunding options in reward, debt and equity may change the dynamic how early stage start-ups are invested, but this does potentially leave a gap in the access to appropriate mentoring that the benefits that that will bring to an company undertaking a growth path.

### ***The power of diversity of thought is undervalued***

Respondents highlighted opposing views on what skills are required for innovation to flourish. A lack of investment in science, technology, engineering and math – often referred to as the STEM subjects – was raised by some respondents. The Draft National Statement of Science Investment policy seeks an increase in the number of teachers with STEM qualifications, and an increase in the number of Bachelors and post-graduate degree completions in STEM subjects (MBIE, 2014b, p.29). An increase in STEM capability is said to be important due to the pace of technological change and the nature of future employment opportunities (MBIE, 2014b, p.30). New Zealand’s focus on investing in STEM subjects to support innovation and economic growth are in line with international trends (Dyson, 2010; National Science and Technology Council, 2013).

However, investment in STEM subjects alone can lead to unintended consequences. As highlighted by one respondent that works in a science and research dominated organisation, an over reliance on STEM capabilities can led to an imbalance between products and services that are developed in R&D

labs, and products and services that will add value to customers. The respondent provided examples of where the research and development team create inventions based on developing their own theories, but when these inventions are put in to the market, the customer-facing sales team find that uptake is lower than anticipated. A change in leadership of the organisation resulted in the introduction of a new customer-centric strategy. The organisation introduced design thinking techniques to better understand the needs of customers over a two-year period. The team leading the design thinking work had a wealth of information on customers' habits, behaviours, wants, needs, and the factors that influenced their purchasing decisions. However, the newly acquired customer insights are often rejected by the R&D teams as they don't value the information. It appears that there is an over reliance on historical, scientific information, rather than insights that can help to better understand what drives customers and to predict future purchasing behaviour (Martin, 2009).

There are calls to expand the STEM acronym to STEAM to include arts/design (Rhode Island School of Design, 2015). In a world that faces increasing "wicked problems" – where there are multiple definitions of a problem, contradictory symptoms, and changing requirements – the tools and methods of design thinking offer a new model for creative problem solving (Department for Business, Innovation and Skills, 2014). There is an increasing acceptance that arts and design capability is an important skill set for innovation. Research conducted by the UK Design Council found that design accelerates science and technology commercialisation and increased value (UK Design Council, 2014, p.5). Many innovative companies are looking to design thinking techniques to better understand their customers in order to create superior value propositions and gain a competitive advantage in the market place (Anderson et al., 2006). Brown describes design thinking as "a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success." (IDEO, 2015). It is a proven, repeatable problem solving protocol that any business or profession can employ to better understand problems that enable the creation of more meaningful solutions. Because design thinking takes a holistic approach to understanding the problem from multiple angles and personal perspectives, appreciating diversity of thought is a core foundational principle of design thinking.

The argument over whether we focus on STEM or STEAM is missing the point. As in the example of the respondent discussed above, the missing link is the ability and willingness of organisations to accept a different way of thinking, even when it is present. It is no good having both present if a different way of thinking is not valued in organisations. To allow innovation to flourish, STEM and design capabilities need to be supported by an acceptance of diversity of thought.

### ***Culture is at the heart of it***

The themes outlined above all have aspects of culture at the heart of it. And that should not be surprising. Smale states that "Creativity, innovation, and initiative are psychological processes (Rank et al., 2014, p.518 cited in Smale, 2013, p.63)." Smale goes on to state, "The innovation process is a function of how individuals and groups of people think (and behave) across the entire business process" (p. 63). Economists highlight that the health of New Zealand's regions play a significant role in the economy. Strong regions provide opportunities and a livelihood for its residents (MBIE, 2014e,

p.3). While that may be true, discussion needs to extend to understanding the role that individuals and culture has within that.

Smale (2013) raises an interesting argument that New Zealand's culture is a natural fit with the invention/initiation phase of innovation, but that we rank poorly on factors that would enhance the implementation phase. This relative strength in the initiation stage of the innovation process helps to explain a number of the observations made by the respondents. New Zealand appears to favour competition over collaboration. Individualism is strong in the initiation phase, which indicates a leaning towards competition rather than collaboration. Respondents commented that one of the most memorable aspects of the regions that they visited was the level of collaboration seen, particularly between universities, industry and government. The No.8 wire mentality can in part go to explaining why collaboration is not commonly seen in the New Zealand context. The fierce individual streak, not trusting experts, and a lack of being able to provide or accept constructive criticism all go to explaining why competition is more prevalent than collaboration.

Fear of failure also comes through strongly, and it is seen at the individual level, the firm level, and the regional level. Fear of failure among SME businesses was discussed previously. Fear of failure within large, publicly listed firms was also noted by respondents. They noted that growth plans were often capped due to fear of the reaction from market analysts and senior executives. There appears to be a contradiction whereby executive managers say they want their staff to take risks, but if the risk is realised, they are assessed harshly and their performance is questioned.

Another cultural aspect that I observed in the Kapiti/Horowhenua region was how local councils and the chamber of commerce held up small business owners as examples of excellence within the community. The veneer of the "local business hero" can ultimately be damaging for the business owner. New Zealand culture already sees that we don't trust experts and have a fierce independent streak. The impact of local councils and the chamber of commerce putting a local business owner on a pedestal can mean that small business owners feel like the need to uphold that persona. They can feel like they are unable to seek the help of experts, and they can also feel intimidated by truly innovating their products and services due to the level of risk inherently involved in changing from the status quo. Because many business owners, and their local community, find it difficult to separate the success or otherwise of the business from the owner, the possibility of risking the lifestyle that they have so carefully built up gets to their core sense of self, their standing in the local community, and their sense of purpose. This reinforces the satisficing tendency, which is further compounded by the finding that satisficers are likely to be happier than maximisers because they set lower standards against which to judge their circumstances (Schwartz et al. 2002 cited in Smale, 2013. p.65).

## **POLICY IMPLICATIONS**

This study found that national policy settings suggest there is a significant productivity performance gap, with some economists stating the economy should be 40 percent more productive than current performance. This research has sought to explore the reasons for the productivity gap. The Government's Business Growth Agenda (BGA) sets the ambitious target of increasing exports as a percentage of GDP to 40 percent by 2025. A key lever towards this goal is to enhance the level of innovation, specifically targeting an increase in business research and development expenditure.

This research has therefore looked at the design of the innovation system to determine if it is structured and operating in a way to achieve the BGA targets.

This research found that a high functioning national innovation system is reliant on the diffusion of knowledge generated through science and research activities. The New Zealand innovation system appears to have fragmented science and research components of the system, and it lacks a mechanism to diffuse knowledge through many actors within the system. Policy makers are unable to articulate the full breadth of the system, which is signified by a finding from this research project that there is a complete absence of a map of the New Zealand innovation system. There is an implicit assumption that the innovation system should support the achievement of the BGA targets and the individuals and companies that contribute to those goals, although the users, and indeed the owner of the system, are unclear.

A number of key themes were uncovered, with the finding that cultural factors play a significant role in the apparent lack of knowledge sharing throughout the innovation system. The New Zealand culture, driven by the Number 8 wire mentality, sees that New Zealanders are uncomfortable sharing information and favour a competition mindset over a collaborative mindset. The Number 8 wire mentality is counter to what will drive commercialisation in the 21<sup>st</sup> century. It is a cultural myth that is ultimately unhelpful as it reinforces the misconception that invention, that is the creation of something new, will inherently lead to commercialisation of the invention. The protective mindset sees New Zealanders unwilling to share their ideas. This research proposes that without a formal mechanism and incentives to share knowledge through the system the systematic diffusion of knowledge will not occur. The innovation system is underperforming because a systems approach relies on the diffusion of knowledge – something that New Zealanders are not naturally good at doing.

This research report has highlighted that innovation is not an independent process. Innovation is a process of activities, from idea generation to commercialisation, that occur over a period of time. Innovation occurs at multiple levels – at the national level, the regional level, and at the firm level. Organisations are only as strong as the people they employ, which highlights the importance that individual mind-sets, attitudes and behaviours have within an organisation.

If we consider that the services provided within the New Zealand innovation system are in place to support companies to invest in business R&D and to support companies that are growing their exports, then those businesses should be viewed as the customer. Programmes such as NZTE's "Better by Design", and programmes run by incubators and accelerators endorse taking a customer-led approach to designing services. However, it appears that the assessment of innovation services is still being undertaken at a top-down, macro level instead of understanding whether the services provided meet customers' needs in order to maximise the overall goal of increasing innovation to achieve growth in exports as a percentage of GDP.

It follows that the design of the national innovation ecosystem needs to take a user-centric approach. The system currently appears to be structured around department votes rather than focusing on the needs of the users that it exists to serve. A deep understanding of the different and diverse users' needs to be understood to enable the development of superior value propositions that will help those businesses achieve growth in exports. Users in different sectors and industries will have different needs, and those needs will vary depending on what part of the

commercialisation pipeline they are currently in. For example, users in the technology sector may have very different needs to those in the agricultural sector.

The range of different users in the national innovation system also highlights that innovation is much broader than science and research activities. Policy makers are unable to articulate the breadth actors in the system. This points to the management truism that “if you can’t define it, you can’t measure it; and if you can’t measure it, you can’t manage it”. The full value of the \$1.5 billion that is being invested in the science and innovation vote is unlikely to be fully exploited if policy makers are unable to articulate what the full system looks like. A single owner for the innovation system needs to be identified to enable greater coordination of innovation activities.

This research has highlighted that decisions and behaviours that drive people on an individual level may significantly impact the effectiveness of national policy settings. A systems approach to the innovation system places more importance on the system as a whole operating more effectively than the performance of its individual parts. An effective innovation system is reliant on the diffusion of knowledge to create value. The impact of culture on the business environment indicates that a lack of willingness to share information could be a major contributing factor in the ineffectual nature that recent reports have found to characterise innovation system.

The rise in founder-led start-ups requires a different approach to developing human capital. Emerging leaders are traditionally developed through talent development strategies in high-performing firms. With the rise in founder-led start-ups, the leadership capability of the founder needs to be developed in a different way. This could be delivered through a government owned supplier, a private enterprise, or it may be best delivered through a public-private partnership.

The relevance and effectiveness of executive business education is also worth explicitly targeting. This needs to be experiential learning that can provide a more practical application. The leadership attributes required for innovation include behaviours such as self-awareness and personal leadership, challenging assumptions and beliefs, ability to seek out the right problem to be solved, the ability to re-imagine business models and to embrace change. The importance of working in collaboration cannot be overstated. An experiential learning process is required that allows leaders to work through “crucible experiences” to uncover the lessons in leadership and in continuous learning.

The importance of founders and business owners understanding the scale of international markets is also critical in the design of the New Zealand innovation system. Innovation and invention is not the same thing. Innovations need to be repeatable and scalable. This is particularly important given the shift in economic power to Asia and the size of markets in Asia. Because New Zealand has a small domestic market, some founders and business leaders have difficulty in even imagining the scale of operation required to export in to countries such as India and China. This requires founders and business owners to “think big” from day one of operations in the same way that Rod Drury did with Xero. Xero listed on the New Zealand stock exchange on day one of operation with the vision of raising enough capital to scale up production as fast as possible. Commercialisation in the 21<sup>st</sup> century is less about the quality of the invention, and more about speed to market and execution. The scale of international markets is difficult for some founders and business leaders to comprehend. Full immersion learning programmes in these countries will be the most effectual way

of helping emerging leaders to see the opportunities and challenging in entering new, emerging markets.

## REFERENCES

- Accenture. (2013). Silicon Valley Tech Innovation Ecosystem – Infographic. Accessed 16 March 2015 from <http://www.accenture.com/us-en/Pages/insight-silicon-valley-tech-innovation-ecosystem-infographic.aspx>
- Anderson, J. C., Narus, J. A., & Van Rossum, W. (2006). Customer value propositions in business markets. *Harvard Business Review*, 84(3), 90.
- Bridges, J., & Downs, D. (2014). *No. 8 re-wired: 202 New Zealand inventions that changed the world*. Auckland: Penguin, 2014.
- Burt, M., Smith, M., Young, M. (2013). *Creating the business school engine for NZ Inc. Massey University Executive MBA Special Paper*.
- Clark, D. N. (2010). Innovation management in SMEs: active innovators in New Zealand. *Journal of Small Business & Entrepreneurship*, 23(4), 601-619.
- Department for Business, Innovation and Skills. (2014). *Our plan for growth: science and innovation*. Accessed 15 March 2015 from [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/387780/PU1719\\_HMT\\_Science\\_.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/387780/PU1719_HMT_Science_.pdf).
- Dutta, Soumitra., Lanvin, Bruno., and Wunsch-Vincent, Sacha. (2014). Global Innovation Index 2014. Accessed 16 March 2015 from <https://www.globalinnovationindex.org/userfiles/file/reportpdf/GII-2014-v5.pdf>.
- Dyson, J. (2010). *Ingenious Britain: Making the UK the leading high tech exporter in Europe*. Accessed 15 March 2015 from [http://www.russellgroup.ac.uk/uploads/Dyson-report-Ingenious\\_Britain1.pdf](http://www.russellgroup.ac.uk/uploads/Dyson-report-Ingenious_Britain1.pdf).
- Gerritsen, B., and Sundakov, A. (2011). *Access to capital markets for small New Zealand exporters: Is there a market failure?*. Accessed 16 March 2015 from [http://nzae.org.nz/wp-content/uploads/2011/08/Sundakov\\_and\\_Gerritsen\\_\\_Access\\_to\\_Capital\\_Markets\\_for\\_Small\\_NZ\\_Exporters.pdf](http://nzae.org.nz/wp-content/uploads/2011/08/Sundakov_and_Gerritsen__Access_to_Capital_Markets_for_Small_NZ_Exporters.pdf)
- Hendy, S., & Callaghan, P. (2013). *Get off the Grass: Kickstarting New Zealand's Innovation Economy*. Auckland University Press.
- Heskett, J. L., & Schlesinger, L. A. (1994). Putting the service-profit chain to work. *Harvard business review*, 72(2), 164-174.
- IDEO. (2015). *About us*. Accessed 16 March 2015 from <http://www.ideo.com/about/>.
- Innovation Council. (2015). *Why New Zealand's "Number 8 wire" mentality is bad for the economy*. Accessed 16 March 2015 from <http://www.innovationcouncil.org.nz/index.php/access-resources/browse-the-library/item/why-new-zealand-s-number-8-wire-mentality-is-bad-for-the-economy>.
- Kirkwood, J. (2007). Tall poppy syndrome: Implications for entrepreneurship in New Zealand. *Journal of Management and Organization*, 13(4), 366-382.

- Martin, R. L. (2009). *The design of business: why design thinking is the next competitive advantage*. Harvard Business Press.
- Mass Catalyst. (2014). *Four types of crowdfunding explained*. Accessed 16 March 2015 from <http://blog.masscatalyst.com/4-types-of-crowdfunding-explained/>.
- Ministry of Business, Innovation and Employment (2014a). *Business Growth Agenda Future Direction*. Accessed 16 March 2015 from <http://www.mbie.govt.nz/pdf-library/what-we-do/business-growth-agenda/bga-reports/future-direction-2014.pdf>.
- Ministry of Business, Innovation and Employment. (2014b). *Draft National Statement of Science Investment, 2014 – 2024*. Accessed 16 March 2015 from <http://www.msi.govt.nz/assets/MSI/Update-me/News/draft-NSSI-statement-consultation.pdf>.
- Ministry of Business, Innovation and Employment. (2014d). *Small Business Sector Report 2014*. Accessed 16 March 2015 from <http://www.mbie.govt.nz/what-we-do/business-growth-agenda/sectors-reports-series/pdf-document-library/the-small-business-sector-report-2014.pdf>.
- Ministry of Business, Innovation and Employment. (2014e). *Regional Economic Activity Report*. Accessed 15 March 2015 from <http://www.mbie.govt.nz/what-we-do/business-growth-agenda/regions/documents-and-image-library/rear-2014.pdf>.
- Ministry of Business, Innovation and Employment. (2014f). *Science and Innovation: Briefing to the Incoming Minister*. Accessed 15 March 2015 from <http://www.mbie.govt.nz/about-us/publications/BIMs/2014-bims/science-innovation.pdf>.
- National Science and Technology Council. (2013). *Federal Science, Technology, Engineering and Mathematics (STEM) education: 5-year strategic plan*. Accessed 15 March 2015 from [https://www.whitehouse.gov/sites/default/files/microsites/ostp/stem\\_stratplan\\_2013.pdf](https://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf).
- New Zealand Institute of Economic Research. (2014). *The Home Affordability Challenge*. Accessed 15 March 2015 from <http://nzier.org.nz/publication/the-home-affordability-challenge-nzier-working-paper-20144>.
- New Zealand Trade and Enterprise. (2009). *Playing to our strengths: Creating value for Kiwi firms*. Accessed 16 March 2015 from <http://www.forte-management.co.nz/resource/NZTE%20playing%20to%20our%20strengths.pdf>.
- Organisation for Economic Cooperation and Development. (2011). *R&D expenditure*. Accessed 16 March 2015 from [http://www.oecd-ilibrary.org/sites/sti\\_scoreboard-2011-en/02/05/index.html?itemId=/content/chapter/sti\\_scoreboard-2011-16-en](http://www.oecd-ilibrary.org/sites/sti_scoreboard-2011-en/02/05/index.html?itemId=/content/chapter/sti_scoreboard-2011-16-en).
- Reserve Bank of New Zealand. (2014). *Financial Sustainability Report*. Accessed 15 March from [http://www.rbnz.govt.nz/financial\\_stability/financial\\_stability\\_report/fsr\\_may14.pdf](http://www.rbnz.govt.nz/financial_stability/financial_stability_report/fsr_may14.pdf).
- Reserve Bank of New Zealand. (2015). *Household debt*. Accessed 15 March 2015 from [http://www.rbnz.govt.nz/statistics/key\\_graphs/household\\_debt/](http://www.rbnz.govt.nz/statistics/key_graphs/household_debt/).
- Rhode Island School of Design. (2015). *STEM to STEAM*. Accessed 15 March 2015 from <http://stemtosteam.org/>.
- Smale, Tony. (2013). Why understanding national culture is necessary in order to understand innovation performance. *New Zealand Science Review Vol 70 (3) 2013*, 62-67.

- Statistics New Zealand. (2013). *2013 Census Quick Stats: About Housing*. Accessed 15 March 2015 from <http://www.stats.govt.nz/Census/2013-census/profile-and-summary-reports/quickstats-about-housing.aspx>.
- The Treasury. (2002). *Growing Pains: New Zealand Qualitative Evidence on Hurdles to Exporting Growth*. Accessed 15 March 2015 from <http://www.treasury.govt.nz/publications/research-policy/wp/2002/02-10/>.
- Thomas, R. J. (2008). *Crucibles of leadership: How to learn from experience to become a great leader*. Harvard Business Press.
- UK Design Council. (2014). *Innovation by design: How design enables science and technology research to achieve greater impact*. Accessed 15 March 2015 from <http://www.designcouncil.org.uk/sites/default/files/asset/document/innovation-by-design.pdf>.
- Wong, P. K., Ho, Y. P., & Autio, E. (2005). Entrepreneurship, innovation and economic growth: Evidence from GEM data. *Small Business Economics*, 24(3), 335-350.