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TOWARD BETTER UNDERSTANDING THE CORPORATE INNOVATION LANDSCAPE IN NEW ZEALAND USING INDUSTRIAL RESEARCH LTD'S "WHAT'S YOUR PROBLEM NEW ZEALAND?" COMPETITION DATA: ANALYSIS AND PROPOSITIONS

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ABSTRACT

This paper utilises a unique data set to investigate New Zealand's corporate innovation landscape. It examines a sample of kiwi firms with true "innovative intent", and their efforts to gain external R&D support from Industrial Research Limited (IRL), a Crown Research Institute. Aggregated data from over 100 applications to IRL's "What's Your Problem New Zealand?" competition, held in 2009, informs of these companies' location, size, age, export orientation, sector, and research problem type. We divide the competition entrants into three categories: "strayers", "contestants", and "finalists", and consider their aforementioned characteristics in relation to each other and, where possible, to the median New Zealand firm. From this, we advance 14 propositions regarding the nation's corporate innovation landscape, and suggest some potential implications for policy makers.

INTRODUCTION

If New Zealand is to successfully maintain or improve its standard of living in today's information age, it must keep pace in dynamic, globally competitive environments. Any nation's economic growth in the 21st century, it is widely accepted, will be related to its commitment to science and technology, and New Zealand's future depends, in part, upon the strategic innovation of firms of all sizes: small, medium and large.

Yet New Zealand business expenditure on R&D (BERD) has, in recent years, consistently underperformed in the OECD rankings. In 2007, NZ firms spent 0.5 per cent of GDP on research and development, which was well below the OECD average of 1.5 per cent.[1] This placed NZ BERD 23rd out of 27 nations for which figures were available, or ahead of just Hungary, the Slovak Republic, Poland, and Greece.[2]

Without getting into arguments about whether New Zealanders are able to significantly increase R&D spending, it is clear that in order to remain competitive these relatively small amounts need to be well-targeted. Consequently, there is a need for good information about the characteristics and needs of NZ firms with innovative intent and whether their investments of time and other resources into R&D are likely to be successful so that firms and government policies can be more effective.

This paper reports on a unique opportunity to develop such information. In 2009, as a result of a nationwide competition focused on identifying companies with interesting problems that they would like to solve, Industrial Research Limited gathered over 100 sets of data from a cross-section of firms possessing what we might call "innovative intent" – firms that wanted to apply expertise to do business differently, and better, and were prepared to make the necessary investment. We were given access to this data, under certain provisions.[3] In the paragraphs below we use this data to develop fourteen propositions about New Zealand firms with innovative intent, how they may be better served by the "science system", and the New Zealand innovation landscape in general.

BACKGROUND

Industrial Research Ltd (IRL) is a government-owned research institute employing approximately 300 people, the vast majority of whom are based in Petone, Wellington, with much smaller satellites in Christchurch and Auckland. The Crown Research Institute (CRI) is charged with supporting innovation in New Zealand businesses via technology and knowledge transfer. As a CRI, IRL is also expected to be financially viable and provide an acceptable rate of return on equity.[4] Each year, around 70 per cent of its funding comes from

Government grants, and the remaining 30 per cent from commercial research contracts.[5] In recent times, there has been some debate as to whether IRL's location in Wellington is isolating it from its customers. Some have suggested that it should get "closer to business" by relocating to Auckland; others that it should be closer to business by being "broken up" and more greatly geographically dispersed.

IRL's CEO Shaun Coffey addressed the country's comparatively low levels of business investment in R&D during the global recession of 2009.[6] He proposed a closer relationship between science and commerce, arguing that "world-class R&D will always underpin world-leading, high-value products and services". He recommended that NZ firms make better use of the expertise at IRL and other research and development providers to improve their competitiveness in overseas markets. Coffey argued this was especially important during the prevailing "tough times", in which industry, Government, and R&D providers needed to "collaborate more closely than ever before".[7]

Hoping to raise the profile of R&D in New Zealand and forge new relationships with NZ businesses, IRL announced the "What's Your Problem New Zealand?" (WYPNZ) competition in March 2009.[8] It was an open invitation for NZ firms to describe their challenging R&D problem that, if selected and solved by IRL, would advance their business and contribute to the national economy. IRL offered the winning firm $1 million of research and development at its facilities.[9]

The brainchild of IRL scientists Paul Benjes, Nick Long, Madhusudan Vasudevamurthy and Robert Holt, the competition may be seen as a development upon open innovation and crowdsourcing practices that have recently emerged, and which take advantage of "Web 2.0" to operate in the "grey areas" that have developed between the traditional discrete distinctions of "firms" on the one hand, and "markets" on the other.[10] Indeed, the IRL staff members who dreamt up the competition had initially found inspiration from the public competitions held by NASA since 2005, with which it hoped to expedite the creation of new technologies that might one day contribute to a space elevator programme.[11]

104 NZ firms answered IRL's call,[12] and submitted two-page application forms detailing their WYPNZ proposals. An independent judging panel was formed from several business and science leaders: specialists in market development, commercialisation, investment, intellectual property and science, and biotechnology.[13] In the first selection stage, 16 firms were rejected as "strayers" with proposals that were inapplicable or not well-targeted enough to IRL's set of research capabilities.[14] From the remaining 88 applicants ten finalists were selected in June 2009.[15] They were chosen for having the most clearly defined

research problems, whose technical solutions would directly lead to the claimed benefits for the New Zealand economy.[16] For stage two of the selection process, the ten finalists were required to prepare a more detailed form in consultation with IRL science and commercialisation experts. They then presented their R&D problems to the judging panel and underwent a probing Q&A session.[17] The judges wanted accurate descriptions of the finalists' businesses, R&D problems, financial benefits from the $1 million spend, and abilities to reach growing markets.[18] They determined that according to these criteria, the ten finalists were "all well deserving of the million dollars worth of R&D spend".[19] However, as had been clearly stipulated throughout the competition's rules and marketing there could only be one winner, and in August 2009 Resene was selected as the competition winner. Their application was focussed on the problem and possibilities of creating a commercially viable paint made of materials that were "sustainable", or not harmful to the environment.[20]

METHOD

Having followed the competition with some interest since its inception, we applied for Victoria University funding to study the data generated by WYPNZ. Funding was approved and IRL kindly agreed to let us see the data in aggregated form and to interview key personnel involved in managing the competition.

We were particularly interested in researching WYPNZ as we recognized that analysing the competition application forms and applicant characteristics represented a unique and potentially extremely insightful view of the corporate innovation landscape in New Zealand. We believed this to be the case for a number of reasons.

First, WYPNZ isolated firms with active innovative intent: that is, firms had to be actively thinking about innovation "right now" in order to apply. This contrasts with the kinds of firms that are typically the focus in case studies, that is, firms that were innovators in the past and may or may not have innovative intent now. It also contrasts with the kinds of studies that rely on questionnaires to ask whether firms saw themselves as innovators, the answers to which are not necessarily correlated to the truth.

Second, the competition was open to all-comers, not just those who had been identified by another agency or body as having potential to turn innovative intent into value creation, or firms in need of development. This provided a more objective "ground up" picture of the innovation landscape and, within this, the issues with which firms are grappling.

Third, it was a requirement for all WYPNZ entrants to fill in the same structured "entry form". This created a data-set that was very easy to manipulate and which would allow for direct comparisons and analysis.

Fourth, because this was an entry form questionnaire designed to help participants articulate their problems that IRL might solve, rather than a research questionnaire or direct application for funding, we believed that firms were less likely to "second guess" or write the answers that they thought the researchers or funding agencies might value or want to hear, thus making for more objective data.

Fifth, the competition contained a built-in and relatively objective proxy for firms with innovative intent who are successful in gaining external support: the judges' selection of 10 finalists from over 100 applicants. Their selection criteria determined, fairly objectively, the most innovative, realistic and marketable decile of applicants. Moreover, the judges' statement that all the finalists were "well deserving of the million dollars worth of R&D spend" shows how well they measured up to the selection criteria.

Sixth, WYPNZ also created a set of applications that were poorly articulated or directed: the set that we described as "strayers", or applicants that could not be taken further as entrants into the competition. This set, we believed, could be a useful proxy for those attempts to seek help with innovation that are least likely to be successful.

In our analysis, we compared the characteristics of competition applicants in terms of their location, size, age and export orientation, their proposed R&D problem types, and the dates IRL received their applications. We compared these characteristics across the categories that WYPNZ promoted: "total WYPNZ Entrants", "WYPNZ Strayers", "WYPNZ Contestants" and "WYPNZ Finalists", and wherever possible we compared these groups to the characteristics of New Zealand firms in general, which we term "All NZ firms". Following this approach, we hope to have created a picture, in microcosm, of the landscape for corporate innovation in New Zealand.

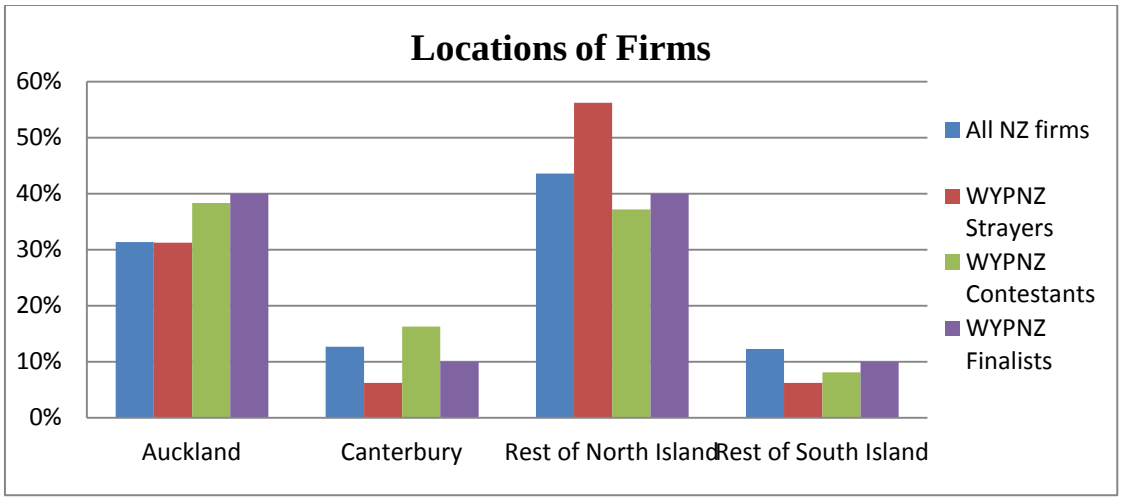
In the proceeding paragraphs, we summarise our findings with graphs and observations, and develop fourteen corresponding propositions relating to New Zealand's innovation landscape. Given the size of the sample and IRL's particular focus on manufacturing, it may not represent New Zealand firm behaviour in other sectors. We therefore choose to develop tentative propositions for further discussion and more intensive research, rather than general statements of fact or hypotheses. Subsequently, these graphs, observations and propositions are arranged into the following sections: the location of the applicants; the size of the companies applying; the age of the companies; their export

orientations; the types of problems the companies where trying to articulate and the sectors in which they operate; the dates on which applications were received; and "other"; before summarizing our results and making some concluding observations.

LOCATIONS OF APPLICANTS

The geographical spread of WYPNZ Entrants, shown in figure 1, was largely representative of the distribution of New Zealand firms in general. This is also true of those selected as finalists. The only notable variation in this data was to be found in a slight over-representation of WYPNZ Strayers in the "Rest of North Island" category, however, this may be explained by the disproportionate number of smaller companies from this region applying (see section 5 below).

Figure 1[21]: LOCATIONS OF FIRMS



From these findings we may advance the following propositions:

Proposition 1: No geographic region in New Zealand has more or less "innovative intent", or indeed innovative capability, than any other.

Proposition 2: IRL's primary location in Wellington appears to have no significant bearing on encouraging or discouraging firms from any particular geographic region to relate to it.[22]

SIZE OF COMPANIES (FTE EMPLOYEES)

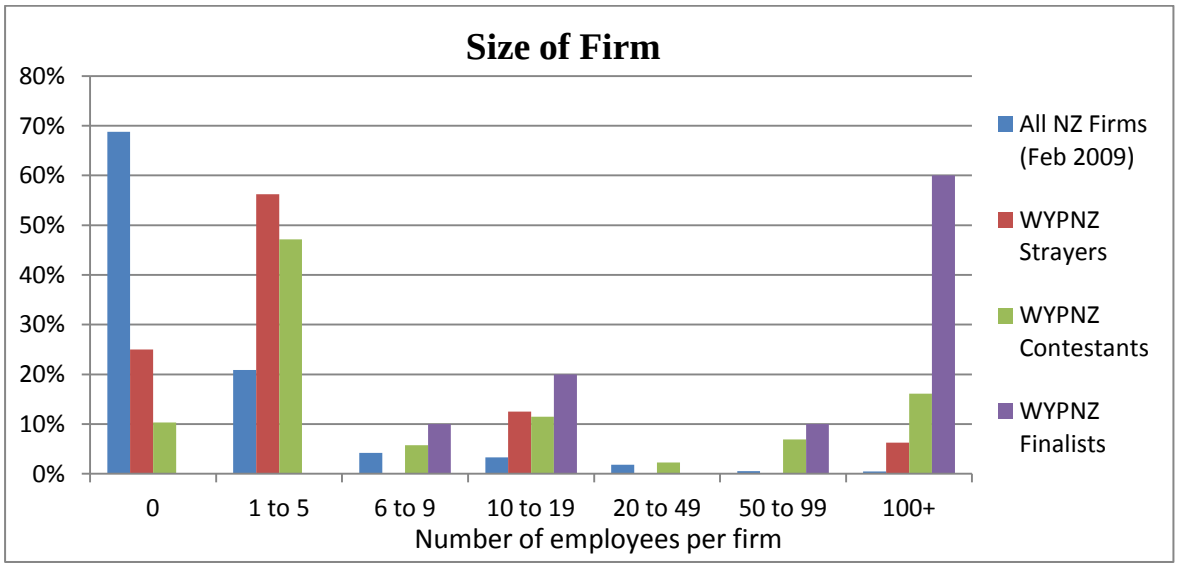
While there are many potential measures of firm size, the measure that was most reliably indicated to us from the WYPNZ data (as we cross-checked this with other data sources) was

full time equivalent employees. At the time of the competition in 2009, the proportion of kiwi firms investing in R&D increased with size: 6 per cent of kiwi firms sized 6-19 employees; 10 per cent of firms with 20-49 employees; 14 per cent of companies sized 50-99 employees; and 20 per cent of firms with 100 employees or more.[23] Yet this does not presuppose that the variously sized firms would seek guidance and/or help to develop their in-house innovations in relative proportions, and this is demonstrated by an analysis of the size of the WYPNZ Entrants.

All three separate categories that the WYPNZ Entrants came to be divided into (Strayers, Contestants and Finalists) were typically larger than the median New Zealand firm, with under-representation in the "0 employee count" category (not surprisingly as these are generally "paper" companies), and over-representation in the "10 to 19" and "100+ employee count" categories.

Moreover, of the WYPNZ Entrants, the smaller firms were heavily skewed to the Strayers, and the larger firms to the Finalists. A firm within the Finalists group was ten times more likely to have 100 or more employees than a firm in the Strayers group.

Figure 2: SIZE OF FIRM



These findings suggest to us the following propositions:

Proposition 3: Larger firms are more likely to seek guidance/help to develop innovation/s and are more likely to be successful in gaining interest and attention. Related to this, smaller firms' innovative ideas are less formulated and directed, or more difficult to categorise in conventional ways. This may speak to an absorptive capacity argument whereby firms need

to be of sufficient size to have their own internal R&D/technical capability, and in turn effectively articulate their R&D needs and absorb findings.

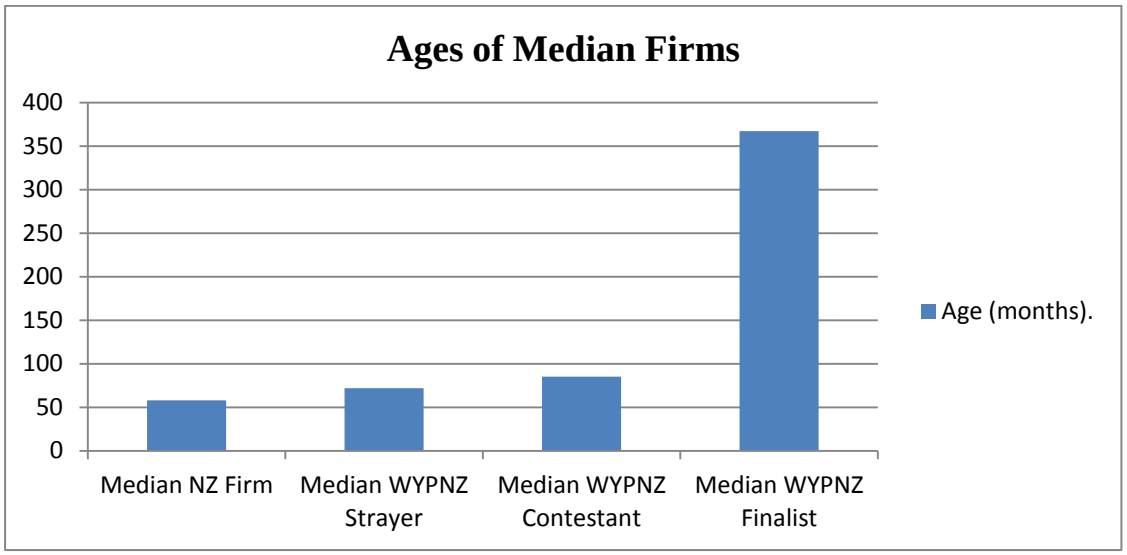
Proposition 4: There exists something of a medium-sized company "gap" in New Zealand's corporate innovation landscape regarding firms that seek outside guidance and help. Despite the fact that a higher proportion of medium firms invest in R&D than smaller firms (as shown in the 2009 Survey), we have found that far fewer firms sized 20-99 entered the WYPNZ competition than not only smaller firms, but also larger firms.[24]

Age of Companies

The median New Zealand firm was incorporated on 15th July 2004.[25] As of the WYPNZ deadline, this firm was 58 months old, or four years and ten months. The WYPNZ Entrants were typically older firms. The median WYPNZ Strayer was 14 months older than the median NZ firm, while the median WYPNZ Contestant was 13 months older still, and the median WYPNZ Finalist was 282 months older than that.

The median WYPNZ Strayer was incorporated in May 2003. As of the WYPNZ deadline, this firm was 72 months, or six years old. The median WYPNZ Contestant was incorporated in April 2002, making it 85 months old, or seven years and one month. The median WYPNZ Finalist was incorporated in October 1978, and thus at the WYPNZ deadline this firm was 367 months, or 30 years and seven months old.

Figure 3: Ages of Median Firms



From the data relating to firm age shown in figure 3 we propose the following:

Proposition 5: Older firms are more likely to seek guidance/help to develop innovation/s.

Proposition 6: Older firms' innovative ideas are better formulated or easier to categorise in conventional ways and are subsequently more likely to gain interest and attention.

EXPORT ORIENTATION OF COMPANIES

In the year of the WYPNZ competition in 2009, 18 per cent of New Zealand firms were exporters.[26] Yet the WYPNZ Entrants were much stronger exporters; all WYPNZ Finalists, four-fifths of Contestants, and three-quarters of Strayers were selling into overseas markets at the time of the competition.

Figures for the median number of export markets held by NZ Manufacturers are unavailable. But for the WYPNZ Strayers, this was 1.5, followed by 5 for Contestants and 31 for Finalists. Given, as we have seen above, that the Finalists were typically the larger and older firms of the WYPNZ Entrants, it stands to reason that they should also have a slightly higher proportion of exporters with a significantly larger number of established overseas markets. The distribution of export destinations varied between the WYPNZ Entrant groups, but making comparisons between these figures is at times misleading. For example, there were only four WYPNZ Strayer exporters, which meant that only one of these firms needed to be exporting to a rare export destination, such as Namibia, for this market to be a destination for 25 per cent of the Strayer exporters. Meanwhile, the WYPNZ Contestant exporters, which numbered 46, would need 12 firms to be exporting to a particular destination to show a comparable proportion. By way of reference, nine Contestant exporters were exporting into the major export destination of the United Kingdom, or just 20 per cent.

Moreover, analysing the major WYPNZ Contestants' and Finalists' export destinations is not particularly fruitful. The Finalists, being much more prolific exporters than their fellow contestants, are a large subset of the WYPNZ Contestants category. Not surprisingly, comparing the top five export destinations of the WYPNZ Contestants and Finalists makes for similar reading: (Contestants: Australia, USA, UK, China, Canada; Finalists: Australia, USA, China, Canada, India).

Figure 4: EXPORTING FIRMS

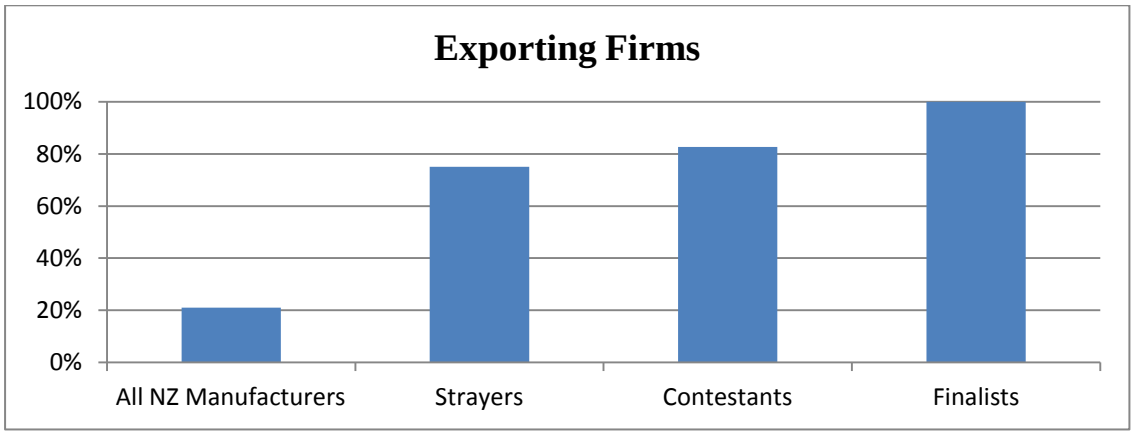
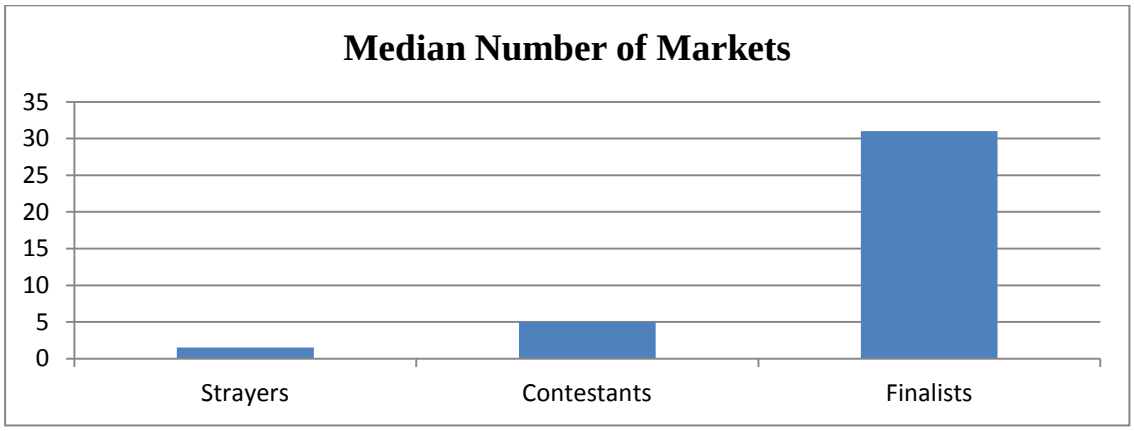


Figure 5: MEDIAN NUMBER OF MARKETS



From the data outlined in figures 4 and 5 we can advance the following propositions:

Proposition 7: New Zealand exporters are more likely to have innovative intent.

Proposition 8: The greater the number of export markets the company relates to, the better it is at defining and presenting innovation problems.

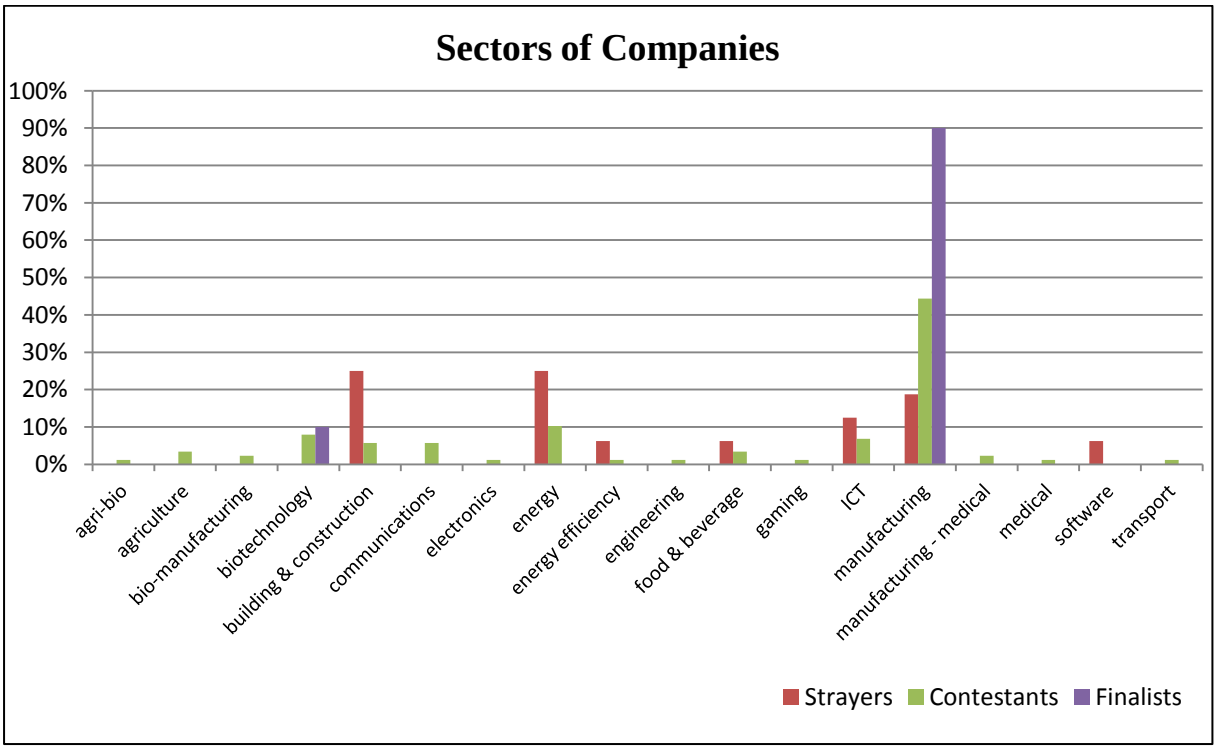
These propositions appear to reinforce what is termed the LBE, or "learning-by-exporting" hypothesis, which has been advanced to explain the generally better performance indicators of exporters. A discussion paper published by New Zealand's Reserve Bank in 2010 defined the "learning" part of LBE as partly applicable to innovation. It argues that exporters gain "improved access to new knowledge and technologies through greater contact with offshore suppliers, customers and competitors; and higher profits, economies of scale and greater incentives to develop specialised products for larger markets".[27] We will

therefore explore the LBE literature further to assess whether our research offers a contribution.

Sectors of Applicant Companies and Problem Types

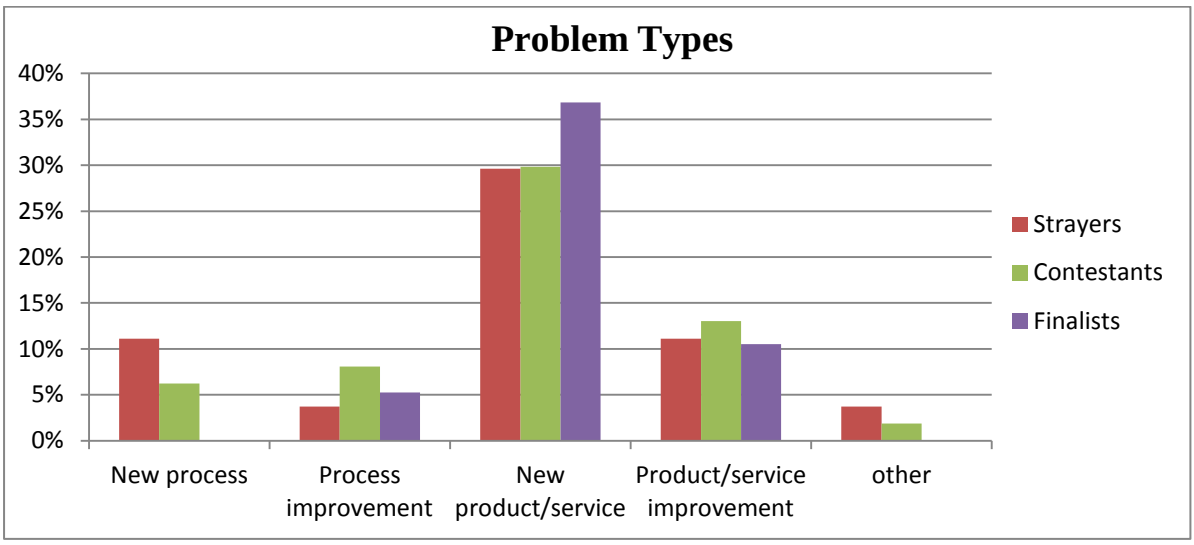
With respect to the sectors from which the WYPNZ Entrants hailed, we found that the Finalists were very much over-represented in the manufacturing sector relative to the Contestants. However, this is likely to be appropriate given that IRL's focus and areas of expertise are very closely aligned to manufacturing within New Zealand's science system. Furthermore, Statistics New Zealand's Business Operations Survey shows that in 2009, manufacturing was the industry with the highest proportion of companies investing in R&D at 20 percent relative to the national average of 8.[28] However, Figure 6 below may offer useful "food for thought" for IRL and others within the science system wanting to reflect on whether IRL should be expanding their focus/expertise into other related areas (such as bio-tech, energy and ICT), and how inquiries from these sectors might be redistributed to other Crown Research Institutes or other entities, or dealt with in partnership with such entities.

Figure 6: Sectors of Companies



Another way to examine the WYPNZ proposals is to make use of IRL's categorisation of "problem type". The term refers the type of R&D problem submitted by each of the WYPNZ Entrants, which IRL categorised along the lines of new or improved processes or products and services. Within the WYPNZ Entrants, the spread of problem types in Strayers and Contestants was roughly the same. WYPNZ Entrants were approximately 5 times more likely to enter with a new product or service idea than with a new process issue. New product WYPNZ proposals were more than two times more common than product/service improvements. Process improvement proposals were more common than proposals of new processes. Finalists had a far higher proportion of new products/services than the contestant sample. No new process proposals made the final.

Figure 7: PROBLEM TYPES



These findings on problem types suggest to us the following propositions:

Proposition 9: New product/service ideas may be easier/more likely to be surfaced than product/service improvements, new process innovations and process improvements.

Proposition 10: New product/service ideas and innovations are more likely to be understood, valued and supported by external bodies than process innovations.

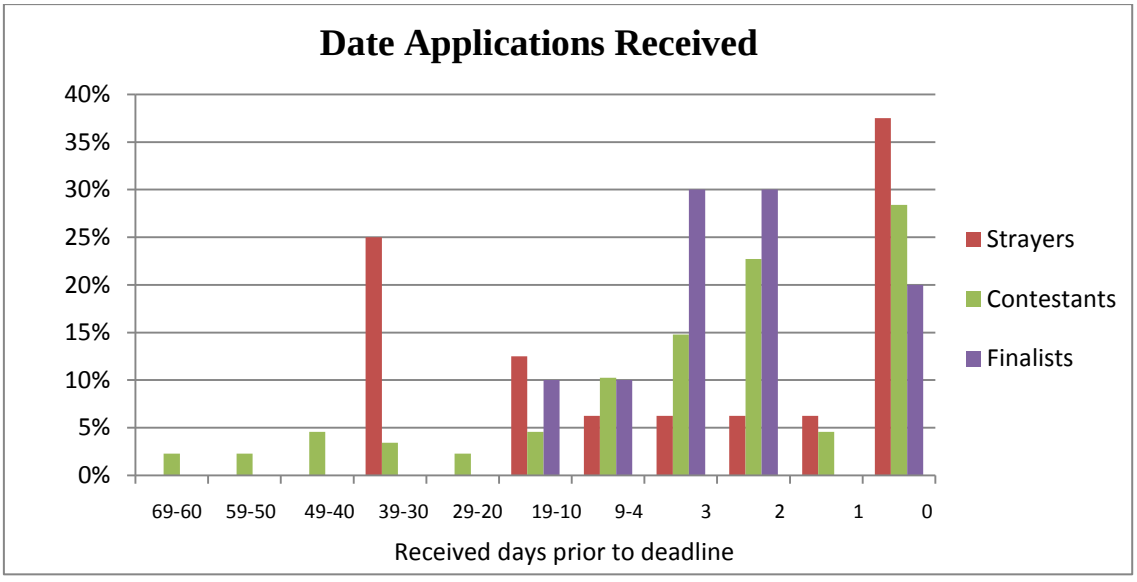
Proposition 11: New process ideas may be difficult to articulate and categorise (hence their over-representation as "strayers").

When Applications were Received

There was significant variation in the dates IRL received applications from the WYPNZ Entrants. 37.5% of Strayers submitted their application on the day of the deadline, which compares to 28.4% of Contestants and 20% of Finalists. This might suggest the perils of leaving one's application until the last minute. But the Strayers' applications were not rejected for poor quality, but rather for their inapplicability to IRL's skills set. Still, we could argue that last-minute applications are more likely to be from firms who are somewhat misguided in their search for innovation support.

Perhaps the most interesting insight is from IRL's perspective, and their estimations of how the competition was fairing in terms of participation. In the first 63 days since the first application was received, only roughly 30% of Contestants had submitted their applications, and the remaining 70% submitted in a rush during the final three days.

Figure 8: Date Applications Received



In the light of these findings we propose the following:

Proposition 12: New Zealand firms may only devote themselves to developing thinking around innovation once more pressing day-to-day issues are attended.

Proposition 13: Later applications for innovation funding/support may be rushed, and these applications are less likely to be successful in garnering support.

OTHER FINDINGS

In analysing the nature of the applicants to WYPNZ, one other factor stuck out as worthy of further attention. Only three of the 104 WYPNZ Entrants were publicly listed on the NZ Stock Exchange, of which two were Finalists and the third was a Contestant. It would seem that the NZ Stock Exchange is not particularly receptive to tech firms, and that the Alternative Market has not met the needs of all firms with innovative intent. This leads us to the following proposition:

Proposition 14: Such a small percentage of New Zealand companies with innovative intent being listed on the stock exchange may contribute to making it difficult for people to invest, and feel directly involved, in innovation in New Zealand.

CONCLUSIONS

In our preliminary analysis of the WYPNZ application forms and applicant demographics, the location, size, age, export orientation, types of problems and the innovations required to solve them, and the application behaviour of the WYPNZ Entrants were found to be of particular interest.

From analysing the applicant demographics described above and relating these to other data on the nature of the New Zealand corporate landscape, we have generated several propositions that necessitate further, more intensive research. We aim to conduct interviews with the various competition stakeholders, such as key IRL staff, and select WYPNZ Strayers, Contestants and Finalists, to seek further insights into our propositions. However, we do believe that analysing this uniquely insightful data set has enabled us to propose a solid range of findings that should inform decisions about New Zealand's science system, or at least be discussed by those in positions who make such decisions. Table 1 below provides a summary of the propositions outlined in this paper based on our initial analysis of the WYPNZ data, and a summary of the potential implications of these propositions for policy makers and other stakeholders in corporate innovation in New Zealand.

TABLE 1: A SUMMARY OF THE WYPNZ STUDY'S PROPOSITIONS AND POTENTIAL IMPLICATIONS FOR POLICY MAKERS

Proposition	Potential implications
1. No geographic region in New Zealand has more or less "innovative intent", or innovative capability, than any other.	Innovation clustering (at least in manufacturing in general) may not be occurring New Zealand. Attention should be spread evenly across the country rather than targeted to specific regions.
2. IRL's location in Wellington has no significant bearing on encouraging or discouraging firms from any particular geographic region to relate to it.	The physical location of a research institute may not be as important as some might think in terms of engagement with business.
3. Larger firms are more likely to seek guidance/help to develop innovations and are more likely to be successful in gaining interest and attention. Related to this, smaller firms' innovative ideas are less formulated and directed, or more difficult to categorise. This may speak to an absorptive capacity argument whereby firms need to be of sufficient size to have their own internal R&D/technical capability, and in turn effectively articulate their R&D needs and absorb findings.	Smaller firms may need intervention at an earlier stage to help them develop their innovative intent and see this intent result in successful support.
4. There exists something of a medium-sized company "gap" in New Zealand's corporate innovation landscape regarding firms that seek outside guidance and help.	As other studies have indicated, New Zealand faces a challenge in growing companies from medium-sized to large. Part of the challenge may be encouraging the effective innovative intent of those medium-sized companies.
5. Older firms are more likely to seek guidance/help to develop innovation/s.	It may be valuable to develop ways in which newer companies can improve their skills in formulating applications for help with developing innovation. Older companies as mentors or advisors may be part of the solution.
6. Older firms' innovative ideas are better formulated or easier to categorise in conventional ways and are subsequently more likely to gain interest and attention.	
7. New Zealand exporters are more likely to have innovative intent.	Given that exporting and effective innovative intent may be closely related, systems that encourage exporting and innovation should be integrated or part of the same system.
8. The greater the number of export markets the company relates to, the better it is at defining and presenting innovation problems.	
9. New product/service ideas may be easier/more likely to be surfaced than product/service improvements, new process innovations and process improvements.	More education work could be done in encouraging firms and funding agencies, CRIs and other parts of the science system to recognise value and promote process innovation in addition to product and service innovation.
10. New product/service ideas and innovations are more likely to be understood, valued and supported by external bodies than process innovations.	
11. New process ideas may be difficult to articulate and categorise.	
12. New Zealand firms may only devote themselves to developing thinking around innovation once more pressing day-to-day issues are attended.	More help may be needed to encourage firms to think through, seek help and apply early for innovation support services.
13. Later applications for innovation funding/support are less likely to be successful in garnering support.	
14. A very small percentage of New Zealand companies with innovative intent are listed on the stock exchange.	Finding ways of increasing the public visibility of firms with innovative intent, and promoting how New Zealanders can invest in them, should be encouraged.

NOTES

[1] OECD. (2010). *OECD Science, Technology and Industry Outlook 2010*. OECD Publishing, 206.
[2] OECD. (2009). *Main Science and Technology Indicators*, OECD Publishing, (2009)1: 47.
[3] Primary among these provisions was that the data was to be aggregated to ensure anonymity wherever possible.
[4] IRL. (2010). Statement of Core Purpose. Retrieved October, 2011, from www.irl.cri.nz/about-us/who-we-are/statement-core-purpose
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[13] IRL. (2009). Win-win for What's Your Problem New Zealand? finalists. Retrieved February, 2010, from http://www.irl.cri.nz/newsroom/news/win-win-whats-your-problem-new-zealand-finalists; and IRL. (2009, June 18). Finalists chosen for $1 million R&D competition. *Scoop*.
[14] IRL staff termed these companies "no fits".
[15] IRL. (2009, June 18). Finalists chosen for $1 million R&D competition. *Scoop*.
[16] Robert Holt, personal communication, 16 October, 2011.
[17] Robert Holt, personal communication, 16 October, 2011; and IRL. (2009, June 18). Finalists chosen for $1 million R&D competition. *Scoop*.
[18] Churchouse, N. (2009, August 18). Resene wins $1m of research expertise. *Dominion Post*, 2nd ed.
[19] Eng, M. (2010, March). Capturing Media & Public Attention – IRL's Million Dollar R&D Competition, presented at the NZ Bio Conference, Auckland, p. 2.
[20] IRL. (2009, August 17). Science contest hands million-dollar research to paint company. *New Zealand Press Association*.
[21] Source for "All NZ Firms" data: Statistics New Zealand. (2009). New Zealand Business Demography Statistics: February 2009. Wellington: Cathryn Ashley-Jones, p. 5.
[22] As the source that provided "All NZ Firms" data divided New Zealand into four regions, we were restricted to doing the same in our analysis of the WYPNZ Entrants for the sake of comparability. However, we also examined the locations of WYPNZ Entrants in more detail, at the cost of comparability to "All NZ Firms", for the purpose of investigating whether the WYPNZ competition results were potentially influenced by IRL's location being in Wellington. We did this by taking the Strayer/Contestant/Finalist categories as indications of fail/compete/succeed in gaining attention as innovative firms seeking support. We found that Wellington Strayers were slightly over-represented relative to Total WYPNZ Entrants Strayers, (and thus Wellington Contestants were slightly under-represented). We found that Wellington Finalists were relatively proportionate to Total WYPNZ Finalists. We also found that Auckland Strayers/Contestants/Finalists were almost perfectly representative of Total WYPNZ Entrants Strayers/Contestants/Finalists, as the following table shows:

	Total WYPNZ Entrants	Wellington Entrants	Auckland Entrants
Strayers	15% (16/104)	27% (3/11)	13% (5/38)
Contestants	85% (88/104)	73% (8/11)	87% (33/38)
Finalists	10% (10/104)	9% (1/11)	11% (4/38)

This suggested to us that IRL's location, in this virtual age, had no bearing on the results of the competition.
[23] Statistics New Zealand. (2010). Business Operations Survey: 2009 Tables. Wellington: Geoff Bascand, Table 5: Business Activities. Retrieved November, 2011, from

http://www.stats.govt.nz/browse_for_stats/businesses/business_growth_and_innovation/business-op-survey-2009-tables.aspx

[24] While the former might be expected simply because there are so many more smaller NZ firms (26,000 vs. 8,000), the latter is certainly not expected given that, according to the Business Operations Survey, there are 5-6 times as many medium-sized firms as there are large firms with 100+ employees. Indeed, the number of medium firms investing in R&D in 2009 was (6,243 x 10%) + (1,749 x 14%) = 869, and the number of large firms was 1,539 x 20% = 308. Thus we would expect to see around 3 times as many firms sized 20-99 applying as WYPNZ Entrants than larger firms, but in fact there were 8 medium-sized Contestants and 14 large Contestants.

[25] This date was generated, using the following website, from a database search for all firms ever registered in New Zealand that are currently still in business. New Zealand Government (2011). The New Zealand Companies Office Register. Retrieved June, 2011, from http://www.business.govt.nz/companies

[26] NB: This figure applies to kiwi firms with six or more employees. Statistics New Zealand. (2010). Business Operations Survey: 2009 Tables. Wellington: Geoff Bascand, Table 5: Business Activities. Retrieved November, 2011, from http://www.stats.govt.nz/browse_for_stats/businesses/business_growth_and_innovation/business-op-survey-2009-tables.aspx

[27] Reserve Bank of New Zealand. (2010). Exporting and performance: Market entry, expansion and destination characteristics. Discussion Paper Series DP2010/07, September, New Zealand. Richard Fabling and Lynda Sanderson. p. 2. Retrieved October, 2011, from http://www.rbnz.govt.nz/research/discusspapers/dp10_07.pdf

[28] Statistics New Zealand. (2010). Business Operations Survey: 2009 Tables. Wellington: Geoff Bascand, Table 5: Business Activities. Retrieved November, 2011, from http://www.stats.govt.nz/browse_for_stats/businesses/business_growth_and_innovation/business-op-survey-2009-tables.aspx

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