



NZTech National Technology Strategy
Skills & Talent for the Tech Sector

BRIEFING PAPER

Advancing Women – to provide needed tech sector skills

July 2015

This NZTech briefing paper provides an overview of some of the many skills and talent development initiatives currently available within the New Zealand technology sector ecosystem. Based on research of what is available and our members' needs the paper discusses the potential impact of fragmentation and provides recommendations.

EXECUTIVE SUMMARY

It is common knowledge that there is a skills shortage impacting on the New Zealand tech sector. Short term solutions have focused on importing talent however this solution is only temporary as the rest of the world is also facing a shortage. Europe alone is forecasting to need more than 800,000 new IT professionals by 2020.

The New Zealand shortage is further exacerbated by a lack of women in the sector. According to the 2013 census, women make up only 23% of people employed in IT occupations and only 28% of people in all roles across the tech sector. The number of women planning to enter the sector is also declining with only 3% of 15 year olds in New Zealand considering a career in computing professions.

Additionally, there is mounting evidence that increasing the number of women in tech firms directly correlates to economic improvements. Research shows that companies with diverse teams gain access to the largest possible talent pool, allowing them to benefit from the different and complementary perspectives and leadership styles that women bring. This has been shown to improve profitability and returns.

If we combine the competitive imperative of increasing the number of women in the sector with the obvious need to also address the sector's growing skills gap it becomes even more important to ensure that programmes and initiatives are in place to actively address these challenges.

NZTech's research has found a plethora of initiatives already in place trying to help address the sectors skills shortages. Whilst it is promising that so many organisations are actively working on this issue, the fragmentation of effort and funding may be limiting the overall impact.

Therefore, NZTech recommends that any organisation considering investing in helping solve the skills shortage first considers currently active programmes rather than launching a new one. Additionally, NZTech recommends that the sector gets in behind a selection of current programmes that exhibit certain characteristics – well run with a good track record, national and scalable.

THE SKILLS SHORTAGE & WOMEN

The Global Skills Shortage

According to the recent ICT sector report from the Ministry of Business, Innovation and Employment (MBIE), computer systems design, a sub-sector of the technology sector, is growing with a compound annual growth rate of 5% and has added over 7,500 new jobs since 2010. This sub-sector alone now accounts for over \$1 billion in export revenues. An estimate of the broader tech sector – ICT plus hi-tech – has seen the tech sector become the third largest export earner and the fastest growing sector in New Zealand.

This growth in tech provides New Zealand with significant opportunities for economic growth and the government has been investing wisely to support it. Yet there is still one major barrier that hasn't been addressed in a cohesive fashion. Like the rest of the world, there is a skills shortage that is adding to business cost and in some cases negatively impacting on growth. The European Commission recently announced that by 2020 there will be a shortfall of over 800,000 IT staff in Europe. Here in New Zealand, a recent NZTech member analysis estimated a shortfall of over 10,000 skilled staff that will be needed by the sector over the next three years.

Given that the tertiary system produces just over 2,000 computer science graduates each year this leaves a significant shortfall. A large portion of that shortfall is currently being sourced offshore, yet with a global talent shortage this method will become increasingly costly and challenging.

It is the opinion of NZTech that a collaborative and concentrated effort must be applied now to nurture home grown talent in order to minimise the impact that this war for talent will have on our future growth opportunities and the New Zealand economy.

The Benefits of Improving Gender Balance

The shortage of people in technology overall is further exacerbated by a lack of women. According to data from the 2013 census women make up only 23% of the people employed across New Zealand in IT occupations. Even if we expand the view to all roles in the tech sector, including HR, marketing etc, women still only account for 28% of the sector. This challenge is not limited to New Zealand, with women accounting for only 25% of the US and UK tech sectors.

Internationally the number of women in the sector is actually declining and of those who study science and technology, only a third of females go into related work. We are observing similar trends here in New Zealand where now only 3% of 15 year olds females are planning a career in the tech sector.

It is obvious that if the sector is not attracting half of the population there is a large pool that could be drawn from to help alleviate the skills shortages. Additionally, the sector has increased need for 'softer' skills such as team work, communication and project management which may appeal more to females than has previously been the case.

Research by the Tertiary Education Commission and MBIE in 2013 on the mismatch between demand and supply of ICT skills in New Zealand found that soft skills were identified in almost all feedback as centrally important and growing in importance. The research also found that diversity of students, both in terms of skills and background was considered important, with a greater number of women entering the sector highly desirable.

If that research is not enough, possibly an even more compelling reason for increasing the number of females in the tech sector is an over whelming amount of research showing the economic benefits of better gender balance in tech companies.

For example, Professor Anita Woolley, an economist at Carnegie Mellon who studies group intelligence, conducted a study in 2010 of 699 individuals working in teams. They discovered that groups with at least one female member outperformed all-male groups in collective intelligence tests. Group intelligence, is more strongly correlated with diversity than with the IQs of individual member.

Research also shows that while having a diverse workforce benefits companies in many ways, specifically having more gender balance on the team can have a positive financial impact.

A study from Columbia University Business School of the top 1500 firms in the US from 1992 to 2006 found that firms with women in senior management positions enjoyed superior economic performance, especially companies focused on innovation.

In a paper “Why Diversity Matters” published in 2013, Catalyst, a not for profit that focuses on diversity in the workplace, studied the link between gender diversity in senior management and company financial performance in Fortune 500 companies. The key finding was that women in leadership roles increased return on equity by at least 53% and return on sales by at least 42%.

Taken together, the research provides a strong argument for the positive impact of hiring women on multiple measures of corporate performance. It shows that companies with diverse teams gain access to the largest possible talent pool, allowing them to benefit from the different and complementary perspectives and leadership styles that women bring – and realize the tangible rewards that arise when women and men work together to solve complex problems and accelerate innovation.

In light of this, advancing women is no longer just a corporate social imperative it is a competitive imperative.

So if we combine this competitive imperative with the obvious need to also address the sector’s growing skills gap it becomes even more important to ensure that programmes and initiatives are in place to actively address these challenges.

Figure 1: For better results, add women

Teams that have at least one female outperform all male groups in collective intelligence tests.



Source: The Case for Investing in Women, Anita Borg Institute, 2010.

Figure 2: Increase women, increase ROI

Fortune 500 companies that had at least three women directors saw:



Source: The Case for Investing in Women, Anita Borg Institute, 2010.

PROGRAMMES & INITIATIVES

A surprising outcome of the research for this paper is the discovery that there is actually a plethora of programmes and initiatives already in the market aimed at addressing the challenges of increasing the number of women in the sector and the skills gap in general. NZTech has identified over 70 specific programmes and there will be more. For a detailed list please refer to the appendix.

Programmes exist, or are under development, to cover requirements in a number of different areas. Some are national, some are very local. Some are specifically aimed at women, others are multi-gender. Some are publically funded, some are funded by generous companies and many are co-funded.

While there are a large number of initiatives in the market they can largely be grouped in terms of the type of problem they are trying to solve:

1. Increasing the immediate talent pool
2. Retraining or preparing a currently available workforce
3. Preparing & placing graduates
4. Developing future talent
5. Encouraging women and addressing diversity

Increasing the Immediate Talent Pool

While not the focus of this report, initiatives to address immediate talent needs do form a critical part of the tech skills ecosystem. Without enough home grown talent many companies are forced to source talent offshore. With an awareness that this is really only a short term solution most of the organisations undertaking offshore activities are also highly engaged in local initiatives to increase the talent pool. To support identification of offshore talent Immigration New Zealand manages a database of people looking for work in New Zealand.

Retraining or preparing a currently available workforce

The current logic from some parties is that more computer science graduates is the solution to the sector's talent shortage. Yet the sector is actually large and diverse, with a diverse set of needs and many different levels of skills required. Having made this observation a number of organisation have started providing what could effectively be considered bridging courses to help people without tech qualifications to gain enough experience to enter the sector. For example, the Dev Academy conducts an intensive 9 week course that teaches both programming skills and the soft skills needed to be effective in the workplace.

These bridging courses have also become a useful tool for helping international students transition from a private tertiary course into the local workforce. Industry Connect in Auckland has been helping international students transition into the workforce via soft skills training and on the job work experience projects.

Preparing and placing graduates

The transition from a computer sciences degree to full time work can be challenging for many students and employers. Tertiary institutes are starting to take a more active role in seeking ways to provide work ready students by introducing internships and work experience requirements. There are also a number of initiatives such as Summer of Tech that provide internship experience for students to help with their transition.

While many of the larger tech firms have some form of graduate recruitment programme in place, for smaller firms initiatives like NZTech's ICETech360 programme provide graduate placement and support for students and employers enabling a faster and smoother transition into the workforce.

Developing future talent

There are many activities aimed at school children which is ideal in terms of developing the long term pipeline. It is also important to influence children from an early age with research showing that around 12 years of age is a critical time when it comes to encouraging female students' interest in computer sciences. Research also shows that career aspirations become apparent before students enter high school, which supports the idea that learning at primary school is valuable, but that is also needs to be a positive experience. There are a number of great examples of initiatives that reach children at

these influential phases of their development including Code Clubs, the High Tech Youth Network, Kiwibots, OMG Tech and Gather Workshops.

Schools and teachers approach to tech subjects is also highly influential on the career choices of students. With the average age of teachers in New Zealand around 54 it is possible many of them feel that their students may know more about technology than they do. Add to this the fact that technology sits in the curricula alongside woodwork and cooking it can often be overlooked by students as an irrelevant subject. Consequently, teacher development is an important aspect of encouraging students into the sector and programs like The Mindlab aimed at both children and teacher development are paying dividends.

Young girls' career choices are also highly influenced by their parents, and their mothers in particular. Actively including parents in the initiatives targeting younger children not only helps raise the parents' awareness of the opportunities within the sector, it is also shown to help drive interest in the subjects from the children. Initiatives such as STEAM Ahead events for mothers and daughters are a perfect example.

Direct exposure to industry experience can also create or reinforce an interest in a sector. So programs, such as Future in Tech, that provide students fun and interesting opportunities to visit or work in real companies can also support career decision.

Encouraging women and addressing diversity

Women are the minority in technology and this has stimulated the desire for many of them to connect and support each other. On Meetup.com there are now almost 500 women in tech groups with over 150,000 members in 193 cities around the world. There is definitely a place for support networks however initiatives also need to be aimed at developing women leaders, directors and role-models. Given men make up the majority of leadership roles in the sector initiatives are also needed to influence them. Surely most of them would respond to simple economics – more women better returns.

OBSERVATIONS & RECOMMENDATIONS

There are many programmes available for developing skills and talents for the tech sector in New Zealand however most are small, poorly funded and in-frequent. There are a few that are national but even then most of them are also lacking the level of funding required to provide real scale, such as permanent employees.

There are also plenty of activities in place for encouraging women yet most of them are in effect support networks and will not change the overall opportunity for women in the sector. There is an enormous opportunity for women in the sector. Employment demand is high and expected to remain so and there is a growing recognition of the benefits of diversity. However, visibility needs to be raised of digital technology as an appealing career option for girls, with 12 years of age a key time, and recognition that parents are key influencers. Focused energy should be applied here.

With so many current initiatives in the market we may be suffering from fragmentation and a dilution of impact as funding and support is spread thinly. A key observation from this research is that appears to be room for some consolidation of initiatives. A well thought out consolidation should result in a wider impact by leveraging the existing programmes and drawing resource to the ones that are making a difference.

There is no right or wrong programme as every initiative is having a positive impact.

Yet, in order to better address the skills shortage NZTech believes that it should identify and amplify the programmes that are already having the biggest impact. As such, NZTech would encourage its members to support initiatives that are well run and have a good

track record, have a strong brand and/or approach to marketing in order to ensure maximum exposure and are national or have the ability to scale.

NZTech endorses the following initiatives:

1. Increasing the immediate talent pool

- Skill Finder

2. Retraining or preparing a currently available workforce

- Dev Academy
- Industry Connect

3. Preparing and placing graduates

- Summer of Tech
- ICETech 360
- ICT Grad Schools

4. Developing future talent

- Future in Tech
- High Tech Youth Network
- ICT Connect
- OMG Tech
- Code Club Aotearoa
- Gather Workshops
- Kiwibots
- The Mindlab
- STEAM Ahead Events
- She#

5. Encouraging women and addressing diversity

- STEAM Ahead
- Shadow Tech Day
- She# (www.shesharp.co.nz)

CONCLUSION

In summary, given the scale of the skills shortage, or skills mismatch, that the tech sector is facing, we, as a sector, need to work together and work smarter to help address it.

It seems obvious that women, who represent half of the population, yet only 25% of the sector, represent a practical solution to the problem. Additionally, given the plethora of research that also shows that having gender balance in tech companies improves their financial results, advancing women is no longer just a corporate social imperative it is a competitive imperative. So we need more women entering the sector.

There are plenty of programs and initiatives currently aimed at addressing the skills shortage. Yet with so many activities competing for the same funding support and the same teacher, student or parents' time there is a growing risk that there is too much fragmentation.

NZTech recommends that any organisation deciding to throw its support into addressing the skills gap should first start by considering what current program to support before launching their own.

NZTech also recommends that the sector gets in behind a selection of current programmes that exhibit certain characteristics – well run with a good track record, national and scalable. Focused energy will have the best impact.

APPENDIX: The Many Tech Skill Initiatives Available

Category	Programme	Organisation	Target	Region
Strategy				
	ICT Sector plan	MBIE	All	National
	ICT Workforce Skills Forum	MBIE	All	National
	Long term skills/Curriculum	MinEd/NZQA	All	National
	Nurturing Home Grown Talent	CDC	All	Canterbury
	Tertiary investment strategy	TEC	All	National
Increasing the immediate talent pool				
	Job Fairs (Australia, SXSW)	MBIE, INZ	All	International
	Job Fairs	EDA's	All	National
	Immigration policy	INZ	All	International
	New Zealand NOW	INZ	All	International
	Innovation Islands Campaign	INZ	All	International
	Skillsfinder Tool	INZ	All	International
	Tech Connect	INZ	All	International
Retraining currently available workforce				
	Conference and events	Multiple	All	National
	Dev Academy	Enspiral	Retraining	Wellington
	Free 4 U Computing	Unitec	Retraining	Auckland
	Industry Connect	Industry Connect	Work prep	Auckland
	International Computer Drivers License	IITP/Kiwiskills	Retraining	National
	Microsoft Virtual Academy	Microsoft	Online ICT	National
	Professional Training	Eg ACE Training	Development	National
	Vendor training	Multiple vendors	In person	National
Placement of current graduates				
	ICETech 360	NZTech/ICE	Tertiary	National
	Summer of Tech	Summer of Tech	Tertiary	Akl/Well
	Industry Connect	Industry Connect	Tertiary	Auckland
	Dunedin Sexy Summer Jobs	DCC	Tertiary	Dunedin
	Callaghan R&D Student Grants	Callaghan	Tertiary	National
	Corporate Intern Programmes	Multiple	Tertiary	National
	Tertiary Institute programmes	Multiple	Tertiary	National
Future talent pools				
	Bright Sparks	The Skills Org	Secondary	National
	Capital E Education	Wellington Museums	K-12	Wellington
	Code Clubs	Code Club Aotearoa	K-12	National
	Codeworx Challenge	Orion Health	Secondary	National
	Computer Science for High School	Google	Teachers	Akl/Chc
	Dunedin Careers Festival	DCC	Secondary	Dunedin
	Future in Tech	IPENZ	Secondary	National
	Gather Workshops	Gather	K-12	National
	Girlsinnov8	St Cuthbert College	Secondary	Auckland
	ICT-Connect	IITP	Secondary	National
	ICT Grad Schools	MBIE/TEC	Tertiary	Akl/Wel/Chc
	Kiwibots - VEX Robotics	Kiwibots	Secondary	International

NIWA Regional Science Fair	NIWA	Secondary	National
OMG Tech Workshops	OMG Tech Trust	K-12	National
Robo Cup Junior	Robotics NZ Trust	K-12	National
Robogals	Uni of Auckland	Secondary	Auckland
PopUp Science	PopUp Science	K-12	Wellington
Programming Challenge for Girls	PC4G	Secondary	National
Project X	IPENZ/IET	Secondary	Christchurch
Rails Girls	Ruby on Rails	Adults	Akl/Well
She#	Unitec and sponsors	Girls	Akl/Well
STEAM Ahead	Steam Ahead	Girls+Mums	Auckland
Student Accelerator Programme	Microsoft	Secondary	National
Te Papa	Te Papa Museum	K-12	Wellington
The Mind Lab	Unitec	K-12 + Teachers	National
The High Tech Youth Network	HTYN Trust	K-12	National
Encouraging women & addressing diversity			
IT women groups / meet ups	various	All	National
Computer Chicks	Cant Uni Comp Sci	Tertiary	Christchurch
ClojureBridge (coding for women)	Clojurebridge	Women	Auckland
Shadow Tech Day	MIT	Secondary	Auckland
Fantail Network	Multiple sponsors	Women	Auckland
Geek Girls Dinners Wellington	various	Women	Wellington
Global Women	various	Exec women	National
Maori ICT development fund	TPK	Maori	National
National Advisory Council of Women	Min. WomenAffairs	Women	National
NZ Tech Women	NZTech	Women	National
Other girls in tech groups	Various	Tertiary	National
Refactor	Refactor	Women	Auckland
Tech Girls	CPIT	Tertiary	Christchurch
TPK Maori Cadetship	TPK	Maori	National
W initiative	KPMG	Women	Akl/Well
Women on Boards	Governance NZ	Women	National
Women's mentoring programme	Uni of Auckland	Tertiary	Auckland
Women of Influence Awards	Westpac	Women	National



The New Zealand Technology Industry Association (NZTech) is the national voice for the technology sector in New Zealand.

NZTech is a not-for-profit association funded by members - the technology businesses in New Zealand and associated partners - from start-ups and local IT firms through to hi-tech manufacturers, major corporations and tertiary institutes.

NZTech works to increase New Zealand's prosperity through better use of technology and strategically focuses on enhancing skills and talents, driving business growth & exports, and guiding & supporting government policy. By actively encouraging relevant initiatives and policies that stimulate and advance the use of technology, together we aim to increase New Zealand's productivity, innovation and economic growth.

DISCLAIMER

Any opinion and analysis presented in this Briefing Paper are the opinion of the author of the paper, not the opinion of the members of NZTech. Any NZTech information that is to be used in press releases or promotional materials requires prior written approval from NZTech.

New Zealand Technology Industry Association
L1 Building C, 14-22 Triton Drive, Auckland 0632,
New Zealand, ph +64 9 475 0204, www.nztech.org.nz

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