

Divers IT y: Putting Gender on the Agenda

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ABSTRACT

Diversity creates a more productive, creative and dynamic society, with the Information Technology (IT) industry being one that offers opportunities for innovative, challenging, collaborative, and creative careers. While the diversity issue is not just confined to gender, the low representation of women in the IT industry is at the forefront of many diversity discussions. Statistics show that women only represent approximately 22 per cent of the tech workforce, with the literature suggesting several reasons for the under representation of women in IT. While there are many strategies and initiatives that try to address diversity issues in the IT sector, there has been little change in participation levels. This paper reviews the literature surrounding diversity issues and the gender imbalance in IT sector, and discusses approaches currently in place to encourage girls and women to consider a tech career as well as retaining them in IT education and IT roles.

Keywords: Diversity, IT industry, tech, gender, education.

1. INTRODUCTION

Attracting and retaining women in tech careers and introducing tech to young women as a choice of career is a worldwide issue affecting the IT sector. With the continuing skills shortage, and research confirming that tech firms that are gender balanced are up to 40 per cent more profitable, the imperative to encourage more women to pursue a career in technology is strong. The purpose of this paper is to examine diversity issues and the gender imbalance in IT education and the IT industry. A discussion of the possible influences affecting the underrepresentation of women in IT, such as gender stereotyping, lack of role models, lack of mentors and sponsors, and other barriers, is provided. A review of approaches and strategies used by industry associations, government agencies and tertiary providers in New Zealand to inspire and encourage women to enter IT education and careers is also a focus of this paper.

2. BACKGROUND

According to a Diversity and Inclusion report by Forbes (2012), a diverse workforce is critical to reflecting a global society and companies' customer base. It allows organisations to understand their clients' needs better and communicate more effectively. In addition, diversity drives innovation and fosters competitiveness

There are many definitions for diversity available in the literature and the word 'diversity' is becoming a buzzword and hot topic in education and industry alike. Trajkovski (2006) believes that regardless of how narrow or wide the definition is, based on context, the bottom line is 'being aware of what is there'. Greenberg (2004) provides a definition of workplace diversity as encompassing race, gender, ethnic group, age, personality, cognitive style, tenure, organisational function, education, background and involves how people perceive

themselves, and how they perceive others. Those perceptions in turn affect their interactions. From this definition it can be seen that diversity itself is largely a measure of representation, but may not cover the extent to which people are respected, treated and valued (Deloitte, 2017).

Inclusion is the enabler of diversity and is the next step to ensure a level playing field for everyone, to make sure that individuals feel encouraged, valued, and respected, and that they are able to contribute their talents to the success of the organisation (Diversity Council of Australia, 2017). Florentine (2017) agrees and believes that the focus should not only be on diversity, but on inclusion to create a welcoming environment where talent can truly thrive. Business leaders now know that diversity and inclusion is not just an issue of fairness, but is an issue of competitiveness that can create greater market share and increased revenues (Forbes, 2012). As an example, when Iain Anderson, co-founder of a UK communications group was invited to pitch for business with a Wall Street firm in 2017, he was asked to show his organisation's commitment to diversity and inclusion – 15 per cent of the scorecard for the pitch was based on this. Anderson stated that it was the hardest measure he had encountered to date (Hellier, David, & Buckley, 2018).

Diversity Works NZ (n.d.) believes that on a national level diversity creates a more productive, creative and dynamic society and improves our ability to see and connect with the world around us; and at an individual level, people need to feel included and valued in order to be successful in their work - without inclusion, there is a disengagement. Diversity Works NZ also cites the benefits of a competitive edge, talent attraction, and enhanced decision-making.

In a report commissioned by Forbes (2012) and conducted by Oxford Economics, a ranking of employee diversity across 50 global economies, 14 industrial sectors and nine occupations, it was found that Norway held the top rank in the global index of employee diversity, followed by New Zealand, Iceland, Australia, Switzerland, the Netherlands and Canada. The model built to measure this diversity took into account gender, age, ethnicity, disability, country of birth, skills and education, number of hours worked, language and geographical

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distribution. The second to top ranking given to New Zealand in the report confirms that New Zealand’s increasingly diverse population reflects the diversity found in the workplace. Figure 1 below shows the diversity of New Zealand’s population.

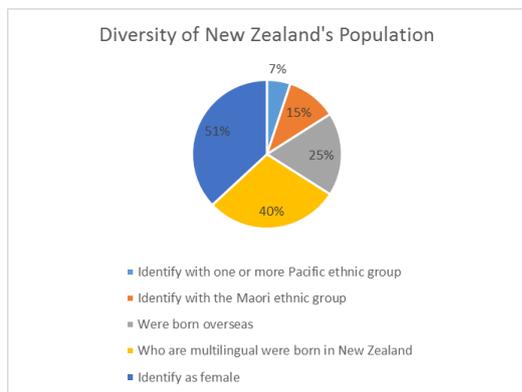


Figure 1: The diversity of New Zealand’s population (Deloitte, 2017, p. 9).

Despite New Zealand’s diverse population, and ranking highly on a global scale for employee diversity, a gender imbalance persists in certain industries as well as the roles that women hold in management and leadership positions. The IT industry is one of these industries where gender imbalance occurs throughout the pipeline. However, it is important not to just focus on the ‘pipeline problem’ as research suggests that company culture plays a significant role in driving women and underrepresented groups away from tech jobs (Ashcraft, 2015).

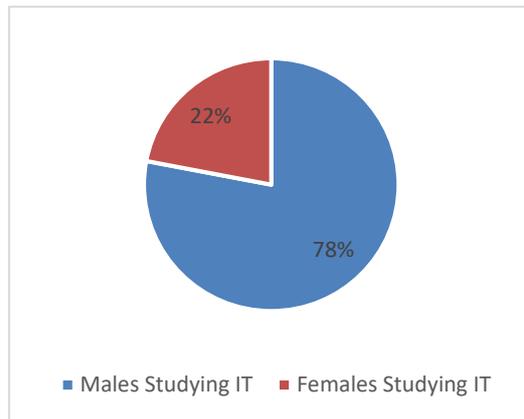
While there has been increased attention paid to the gender imbalance in the tech industry over the past two decades, there is still a disproportionate representation of women in IT roles. Graeme Muller, CEO of NZTech believes it is essential for tech companies to work with local government and education institutions to promote and showcase the IT industry as a career path for women, and the roles available (Lew, 2017). Carolyn Luey, MYOB General Manager agrees and states that “the declining number of women in tech – and the absence of diversity at a senior level as a result – is the community’s greatest challenge to-date, and will need significant, industry-wide action to ensure a sustainable, profitable and more inclusive workplace for all New Zealanders” (MYOB, 2017, p. 3).

3. LITERATURE REVIEW

3.1 Gender imbalance in the IT sector

The IT sector is the fastest growing industry in New Zealand and is a major contributor and competitor within the international technology scene. “With more than 28,000 companies employing around 100,000 people, the tech sector is the fastest growing and the third biggest industry in New Zealand” (Clark, 2017). One of the biggest issues currently facing the sector is the low number of women employed. Although women are now more highly qualified than men (in 2015 women gained 64 per cent of all degrees awarded), from the 1600 people who earned an IT degree in 2015, only 350 were women (Ministry for Women, 2017). It is alarming to note that since 2001 there has been a downward trend of women studying IT. In 2001 there was a reasonably equal representation of women and men who gained post-school IT qualifications, but this moved to 35 per cent of women studying in 2013 (Statistics New Zealand, 2015).

Figure 2: Males and Females Studying IT (Ministry for



Women, 2017, p. 5)

The gender imbalance has not been confined to New Zealand and is an issue affecting technology companies throughout the world. A McKinsey & Company report (Hunt, Prince, Dixon-Fyle, & Yee, 2018) found that telecom, media and technology companies, the majority of which were tech firms, were among those that have seen the greatest decline in diversity representation since a report conducted in 2015 (Hunt, Layton, & Prince, 2015). They believe that this could “reflect widely covered challenges that parts of the sector have faced with issues like gender bias, pay and promotion” (Hunt et al., 2018, p. 18).

As with IT companies in the rest of the world, the IT industry in New Zealand is suffering from an ongoing skills shortage. New Zealand’s Digital Future Manifesto, states that “the IT industry continues to experience a significant shortage of individuals with specialist skills and expertise in New Zealand. This is the largest impediment to growth in our sector and is a significant issue for the economy as a whole and that the prosperity of New Zealand is inextricably linked to how we embrace our future as a digital nation” (New Zealand’s Digital Future Manifesto, 2017). Statistics New Zealand (2017) states that of the approximately 100,000 people employed in ICT related roles in New Zealand, only 20,000 of these roles are held by women. A recent survey conducted by Absolute IT (2018) found similar results with 22 per cent of women employed in the industry. Such results suggest there is potential



to address the skills shortage by encouraging more women to consider a career in IT.

Figure 3: Region/gender split of IT professionals (Absolute IT, 2018)

3.2 Reasons for Underrepresentation

There is a plethora of research suggesting reasons for the under representation of women in IT careers and engagement in IT education. Influences such as family, the community, relationships with teachers, young people's hobbies and interests outside of school, and attitudes of peers, all play a part in shaping girls' career aspirations. In a recent ISACA Global Survey Report (ISACA, 2016) where 500 female members worldwide were surveyed it was suggested that there is a chicken-and-egg problem - "the lack of women in tech jobs discourages other women from entering the field. At the same time, currently employed women feel disempowered to engage with female role models, find mentors or participate in networking" (ISACA, 2016, p. 8).

3.2.1 Gender stereotyping

To some degree, all societies and cultures have stereotyped beliefs about career choices and paths for both males and females. From a very young age, women can be steered into traditionally female subjects, which can have a direct influence or effect on career choices or training opportunities later in life (Grainger, 1992). A New Zealand Council for Educational Research (2008) report identified that gender stereotypes continued to have a major influence on the career decisions of young people. UK studies have indicated that parental attitudes (reflecting wider societal attitudes) play a role in career decisions for girls, by being considerably more in favour of girls becoming teachers rather than engineers (Credit Suisse, 2014). Other UK research notes a robust body of evidence showing that children's interest in science is formed by age 14. It was found that at age 12 to 13, girls are more likely to aspire to arts careers than boys, and that boys are disproportionately more likely to agree that they are interested in careers in engineering. The perceived masculinity of science was identified as one reason for the low popularity of a science career in general (Archer, 2013). Xero employee, Rowena Joe said her biggest career influencer was her elder brother who studied towards an IT degree a couple years ahead of her - "it is the role models and people who influence you along the way who determine whether you go down a technical path" (Pullar-Strecker, 2017).

Andrea Hancox, NZTech's National Director of Government Relations appeals to all families, schools, organisations and companies to encourage females into tech and has the following message:

We need to look at parents, teachers, principals, career guidance counsellors and caregivers what advice are they giving young women today on their career choices when they leave school. What do they know about the technology sector and why it's so important to encourage students to consider a career in tech (Thomas, 2017, ¶. 9).

3.2.2 Lack of role models

Without role models and mentors, support and positive encouragement, barriers are raised by individuals themselves based on upbringing, perceptions and socialisation experiences. To challenge and change perceptions, clear guidance needs to be provided in regard to career options and roles that can be carried out within the industry (Rudman, 2002). Cohoon and Aspray (2006) describe a role model as "a person who serves as an example of the values, attitudes, and behaviours associated with a role" (p. 156). They believe that if you can see someone who is socially similar to yourself in a particular

role, the more likely it is that you will consider a similar role for yourself.

In the ISACA Global Survey Report (ISACA, 2016), when participants were asked why it might be that women are so underrepresented in technology fields, the number one answer was that information technology role models and leaders are predominantly male. Not surprisingly, the number two answer was that women perceive information technology as a male-dominated field. A recent MYOB Women in Tech report (MYOB, 2017) which found that too few female role models meant the tech industry continued to be male-dominated confirms this perception. MYOB's general manager Carolyn Luey states that there has "been a lack of role models, particularly high-profile ones, as people like to model themselves on someone that they know of or aspire to be, and if there aren't any there it is kind of hard to have that" (Shaw, 2018, ¶. 9).

3.2.3 Lack of mentors and sponsors

Women working in science, engineering and technology (SET) roles have identified isolation and a lack of mentorship as being one of the key barriers to their retention and advancement (Ashcraft, McLain, & Eger, 2016). In 2016, games artist Sarah Dixey joined the Wellington game developer PikPok and found that she was just one of five women in a company of 80 people. Dixey, who wasn't aware of the career options available until she was inside the industry, is keen to let girls know the options and encourage them to consider game development as a career that is also globally transferable (Lin, 2016). Eva Sherwood of Oracle New Zealand says that as one of the relatively few women working in tech in New Zealand, she has found the number of females able to act as mentors to other women coming up in the industry is very low. She believes that as women do not have role models to guide them through the early stages of their careers, they are not encouraged to put themselves forward for recognition, and they don't excel in the way they otherwise might have, meaning there are once again fewer women in a position to help the next generation. Sherwood also finds that for women like herself with an established and successful career in tech, the many requests from hopeful mentees can often not be met due to time constraints (CIO New Zealand, 2017a).

3.2.4 Barriers to women studying IT

The Ministry for Women (2017) believes that a creative and targeted approach to attract women into the digital technology sector is needed, along with a genuine commitment to diversity and inclusion to keep them there. The Ministry for Women believes it all starts with education, a sentiment also held by MYOB general manager Carolyn Luey (Shaw, 2018) who believes that education is vital to ensure more women get into the industry.

If education is so important in attracting women into a tech career, what are the experiences of women who either are interested in, or are studying towards an IT qualification? Below is a collection of narratives/experiences that illustrate some of the barriers that women still encounter.

Elizabeth Eastaugh, Director of Technology at Expedia (Bateman, 2015) shares her experiences:

"No one at school told me to go into technology. I took business studies at school and it wasn't until university when I took computer science that I realised I loved it".

She said at primary school she was told to be a nail technician, because she liked to look after her nails: *“There was no other careers advice on offer and it’s still the same today. You need to have people around you with similar opinions about having a career – any career – whether that message comes from school or home”.*

Eastaugh studied at the University of Essex and said she struggled to relate to some of the assignments: *“We had a robotics project where we built a football team and I didn’t understand the rules of a football match, so the boys had to explain it to me. I couldn’t really relate to it as it wasn’t something I was interested in, despite being interested in robotics”.*

The Ministry for Women (2017) surveyed 70 women aged 16-23 and asked them to describe the barriers imposed by their schools or parents. Below are some of their responses:

“My parents didn’t want me to study digital technology. They wanted me to study law. They didn’t believe I would get a job out of it. They didn’t understand”.

There wasn’t a big push for it at school. Some high schools don’t even consider it an option for girls”.

“It’s easy to feel isolated, especially in your first year. You don’t see many people like you in your classes”.

“In my first year, it took me six months to ask for help. For many women, there’s a feeling that you have to prove you can do it; that you deserve to be there”.

“I was invited to join a coding group in secondary school, but nearly all were boys and the environment didn’t feel right”.

“A guest speaker at high school started talking about race car suspension, but then changed his example to baby bouncers because he was at a girls’ school”.

“There was only one digital technology display at a careers expo, which was very busy. The boys were physically bigger so it was hard [for us girls] to see and find out more”.

“My class at high school did basic stuff, such as how to use Photoshop or build a website. I found it too easy so I taught myself stuff”.

4. DISCUSSION

4.1 Initiatives/programmes in New Zealand to attract and retain women in tech careers

There are many organisations, including government agencies, industry associations, and tertiary providers working on initiatives and programmes to close the gender gap in the tech sector. NZTech have identified over 70 programmes that are already in the market, aimed at addressing the challenges of increasing the number of women in the sector and to fill the skills gap. (New Zealand Technology Industry Association, 2015).

Table 1 shows a list of some of the initiatives that are specifically targeted at attracting and retaining women in tech education and careers.

Table 1: Initiatives to attract and retain Women in Tech

Examples of Initiatives	Organisation
Women in Tech Mentoring Circle	NZ Tech
Women’s Tech Exec Lunches	NZ Tech
Girl Geek Dinners	Various
NZTech Women	NZ Tech
Computer Chicks	University of Canterbury
IT Women groups/meet ups	Various
Clojurebridge (coding for women)	Various – Auckland Based
Shadow Tech Day	Founded by MIT, now delivered in partnership with NZTech
Fantail Network	Multiple Sponsors
Tech Girls	CPIT
W Initiative	KPMG
Women on Boards	Governance NZ
Global Women	Various
Women of Influence Awards	Westpac
Rails Girls	Ruby on Rails
Return to IT Pilot Programme	MBIE
Girl Code	Girl Code – Auckland Based
Programming Challenge 4 Girls	Various
She#	Unitec and Sponsors

There are many other initiatives such as scholarships, graduate programmes, and specific roles to manage diversity in organisations, and government guidelines to assist parents and teachers. Below are some examples from the Government Communications Security Bureau, Xero, Transpower, the Ministry for Women, and NZTech Women:

- In 2017, the Government Communications Security Bureau (GCSB) announced that they would be awarding four \$10,000 scholarships to women studying science, technology, engineering and maths subjects in their second year at a New Zealand tertiary institution. The Bureau is encouraging women to study these subjects and consider a career in cyber security. In addition to the scholarships, GCSB also run a graduate programme (Government Communications Security Bureau, 2017).
- Craig Hudson, Xero NZ Country Manager acknowledges that Xero can do better when it comes to gender diversity. They have seen positive change across the company in the past two years with 50 per cent of the executive team comprised of women and 40 per cent across all employees are women. Xero has recently hired its first Global Diversity and Inclusion Manager whose responsibility is to promote, encourage and strengthen diversity at Xero (Hudson, 2017).
- Transpower is very focused on increasing diversity in their workplace, one which is still largely male dominated in the technical area. It has put its support behind ShadowTech Day by providing workplace mentors to female students studying STEM subjects. CEO Alison Andrew says that “while we’re seeing more women study technology and engineering, we still have some work to do to attract and

retain more women in the workplace. This represents a largely untapped pool of talent for the tech industry” (CIO New Zealand, 2017b).

- The Ministry for Women (2017) has developed a guide called ‘Decoding Diversity’ aimed at education and training providers to encourage greater numbers of women and girls into technology education programmes. The guide provides strategies for attracting girls and women into tech education, such as showcasing the range of jobs and opportunities available and sharing information about tech pathways with career advisors and parents. The guide also provides strategies for retaining girls and women in tech education, strategies that highlight the importance of mentoring, networking, teamwork, and a consideration of teaching styles and use of language in the teaching environment.
- NZTech Women is a group of New Zealand tech, digital and ICT focused individuals from leading organisations that work together, with the support of NZTech, to address the shortage of women in tech roles. They help to inspire girls into technology, support the growth of women in tech roles and help to develop policy and actions for improving diversity in the tech workplace. Amongst the many activities they are involved in, they have set up a project to profile 100 successful TechWomen in New Zealand, launched a mentoring circle where women are matched with mentors, and run networking events throughout the country (TechWomen, 2018).

It is encouraging that there are many initiatives and strategies already in place, however NZTech (New Zealand Technology Industry Association, 2015) warns that the fragmentation of effort and funding may be limiting the overall impact. It recommends that any organisation attempting to help address the issues of diversity and the skills shortage first consider the initiatives/programmes currently in place.

5. CONCLUSION AND FURTHER RESEARCH

From a review of the literature, it is clear that diversity in the workplace is beneficial in many ways; not only does it improve financial results, but it also provides a competitive advantage. The tech sector is one that demands innovative, creative, and collaborative talent, but despite this, the sector remains a male-dominated environment. As long as there continues to be a low representation of women in IT, there will continue to be too few female role models and mentors in the tech sector. There are currently many initiatives and programmes in place to inspire and encourage women to consider a career in IT, initiatives that are well supported by industry, education providers and other organisations. What the authors were not able to determine from the research was the full extent of the strategies that individual tertiary providers are employing to encourage and retain female enrolments into tech education. Further research in this area may assist in providing a consistent and more co-ordinated approach to inspire female students to consider the opportunities that exist for fulfilling careers in the tech industry. The authors are also interested in exploring whether gender differences are considered when course content is being developed and delivered. This is an important aspect for education providers to consider, particularly in light of the evidence from women’s voices that barriers still exist in the learning environment and learning activities.

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