

# Exploring Gender Dynamics in the New Zealand Technology Sector: An Exploratory Analysis of Women's Perspectives and Experiences.

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## Abstract

This research delves into the gender dynamics within the technology sector in New Zealand, aiming to address the prevalent under-representation of women in the workplace. The study examines whether the prevalent under-representation of women in the field arises from gender bias and explores women's viewpoints on their experiences working in the technology sector. Employing a non-probability sampling technique, specifically snowball sampling, the primary data collection method involves a survey administered to approximately 200 women working in the technology domain across diverse industries in New Zealand. The survey explores women's perspectives on various aspects of working in tech Industry, drawing distinctions between those who have consistently been in the technology sector and those who transitioned from other industries.

The research examines women's unique experiences and viewpoints on critical factors such as workplace environment, work-life balance, skills development/training, and mentoring and networking opportunities in the technology industry. Augmenting the survey data, in-depth interviews with participating women provide nuanced insights into their experiences. The study not only highlights distinctive attributes that women bring to the technology sector but also proposes strategies for organisations to leverage these attributes effectively.

Furthermore, the research suggests methodologies for organisations to retain and advance their female workforce into more specialized technical roles, fostering a more inclusive and equitable environment. This paper contributes to the ongoing dialogue on gender diversity in technology by presenting a comprehensive analysis of women's experiences and proposing actionable strategies for organisational growth and development. In future, this research and methodology can be replicated across in other countries for more extensive global study.

## Background and context for the survey

This research aims to shed light on the unique challenges that women in New Zealand encounter in the technology field.

### **Objectives:**

- Explore the perspectives and experiences of women working in the Tech industry in New Zealand.
- Identify potential barriers and challenges they encounter.
- Investigate their views on whether organisations are adequately promoting gender diversity and inclusion.

- Examine their perspectives on career progression within the Tech sector.

**Goals:**

- Raise awareness and advocate for increased gender diversity within the Tech industry in New Zealand.
- Cultivate a workplace environment that is more inclusive and supportive, empowering women in Tech.

## **Survey Methodology**

The survey targeted women employed in roles such as Engineers, Developers, Solution Architects, Tech Leads, Delivery Managers, or Product Managers within the New Zealand technology sector. The survey, conducted using Google Forms, involved circulating the survey link widely.

Notably, the survey lacked institutional sponsorship in the industry. The organiser reached out to individuals through her own organisation, securing support from the Chief Technology Officer for internal promotion. Additionally, survey information spread through informal channels like word of mouth, and advocates for women in various organisations supported this by spreading the survey through their organisations. This study employed a non-probability sampling technique known as Snowball Sampling.

As a result, the participant pool comprised women with a high level of motivation to participate, although the specific reasons for this motivation remain unknown. Data collection took place from September to December 2023, with nearly 200 women completing the survey, of which 187 were from New Zealand. The study focused on this subset of 187 participants.

Few of the women who completed the survey in NZ volunteered to share more about their stories and experiences over a Zoom call. These conversations were recorded and form the basis of the subsequent analysis.

## Summary of Results – Survey & Interviews

This segment provides a summary of the survey findings and detailed insights gleaned from interviews. The survey comprised multiple sub-sections, with summaries provided for each of them below.

### INITIAL SPARK IN TECHNOLOGY

Numerous women initially found their interest piqued by the problem-solving aspects of technology and expressed a strong inclination to further explore this domain. One might naturally assume that this would translate to a higher representation of women in technical roles like Engineers and Developers. However, the survey unearthed fascinating insights into the respondent demographics. There is a significant presence of women in technical positions, notably Engineers and Developers, especially among those aged 18 to 44. The number of women taking on non-technical roles such as Product Managers and Delivery Managers increased with age.

AGE	ROLE TYPE	
	Non Technical Role	Technical Role <sup>1</sup>
18-24		12
25-34	13	37
35-44	25	33
45-54	25	18
55-64	10	10
65 or older	2	2
<b>Grand Total</b>	<b>75</b>	<b>112</b>

Interviews revealed that some organisations make efforts to achieve gender balance during graduate recruitment. However, this balance tends to become skewed within a few years.

Through interviews with respondents, several factors emerged as reasons for transitioning out of technical roles:

- Family obligations, which often lacked the necessary support for after-hours work and obligations to upskill after-hours (such as certifications, courses etc).
- Societal perceptions favouring women's soft skills, leading to encouragement to pursue management roles rather than advancing in technical positions.
- Preferential treatment of men in the organisation for senior technical roles, resulting in a natural progression of women out of technical positions.
- Limited availability of technical advancement opportunities within the organisation.

Some women noted that female candidates are notably absent from applications for senior technical roles, even when these positions are openly advertised. The few female candidates who apply and get through to technical interviews are considered to exhibit nervousness and lack of confidence which in fact comes down to differences in problem solving and conflict management techniques exhibited by women compared to men. These interviews are perceived

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<sup>1</sup> Engineering, Platform/App Administrator, Developers, Testers, Architects, Analyst, Tech Leads fall under this category.

as lacking inclusivity and are primarily catering to male candidates, thereby hindering women from showcasing their unique qualities and contributions they can bring to the industry. In certain instances, men are selectively chosen and favoured for senior technical roles, while many women are not even informed of these opportunities as they arise.

Presently, there is a higher concentration of women in technical roles related to API integration, functioning as developers or testers, with minimal or no representation in infrastructure, security, or networking teams.

## **CAREER TRANSITION TO TECHNOLOGY**

About 47% of respondents had transitioned into the Tech Sector from a different job profile.

And about 80% of them transitioned when they were less than 35yrs of age and 17% transitioned between 35 to 44 years of age.

Many respondents underwent transitions driven by their own passion and self-initiative. These efforts encompassed various strategies such as identifying and leveraging transferable skills from previous careers, pursuing formal education and training, engaging in self-study, undertaking coding projects for practical experience, and participating in online tech communities. However, support from organisational professional development programs, career transition programs, networking, or mentoring was scarce.

Interviews and additional feedback provided by survey respondents highlighted an insufficient attention given to the subtler soft skills that are key to even technical roles, which results in women being considered only on their technical skills and not being valued for the additional benefits they bring with other soft skills as well.

## **TRANSITION TO CLOUD-BASED TECHNOLOGIES**

Around 59% of respondents utilise cloud-based technologies for deploying applications or platforms. Of the total number of women interviewed, only 2.5% respondents expressed disinterest in incorporating them into their work.

Interviews showed women are very receptive to acquiring new technical skills if given the opportunity. Moreover, many respondents expressed long-term career goals focused on learning, and adaptation (see section on long-term career goals).

Less than 10% of respondents who use cloud-based technologies started their careers in a cloud environment. Over 50% of respondents acquired cloud development skills while working in an on-premises environment. Additionally, more than 40% of respondents transitioned to cloud-based technologies due to alignment with business goals.

Interviews with several respondents further showcased their adaptability to changing technology scenarios.

Most women enhanced their skills in using cloud-based technologies through hands-on experience at work (87%), followed by utilising online learning platforms like Cloud Guru and Udemy (53%), and engaging in independent study and practice of coding or other tech-related skills (53%). Fewer women actively sought out mentors for upskilling in this area (27%),

attended tech meetups or conferences to stay updated (24%), or contributed to open-source projects in collaboration with tech communities (4%). Similarly, only a small percentage enrolled in programming bootcamps for intensive training (6%) or participated in hackathons or coding challenges to enhance their tech skills (10%).

Among respondents who are currently not using cloud-based technologies, nearly 80% express a strong interest in transitioning to such technologies. However, they anticipate encountering several challenges or barriers, including a lack of awareness regarding where to begin, unclear career pathways, insufficient relevant experience, and limited opportunities in the workplace.

This sentiment was echoed in interviews, where participants emphasised the absence of clear and concise pathways for advancement in technical roles in their workplaces.

## **WORKPLACE CULTURE & ENVIRONMENT**

45% of respondents believe that their workplace actively promotes gender diversity and inclusion. Meanwhile, 37% of respondents see potential for further improvement in this regard. A small percentage of respondents, 6%, perceive that gender diversity and inclusion are not fully integrated into their workplace culture, while an even smaller 3% feel that these principles are not part of their workplace culture at all.

Following the interviews some of the issues in workplace culture were highlighted.

- Women who raised concerns about pay equity in their workplaces or questioned certain default behaviours towards women were subjected to unfair treatment.
- Women were in situations where they had to provide after-hours support or work longer hours without additional compensation in their workplaces.
- In highly technical engineering roles, men often do not anticipate encountering women, and consequently, they may struggle to understand how to effectively interact with them. This results in women feeling isolated in the workplace.

Close to half of the respondents have faced situations where their gender influenced their opportunities for career advancement. 7% of respondents feel that their gender significantly limited their opportunities. Conversely, 36% of respondents have not encountered any notable impact of their gender on their career progression.

Interviews unveiled that women perceive missing out on advancement opportunities by not adhering to traditional masculine behaviours. Many women inherently hesitate to promote themselves, yet they feel compelled to exhibit traits that deviate from their natural inclinations to garner recognition in the workplace. Some behaviours that may be viewed as assertive in men are perceived as aggressive in women.

Close to half of the respondents, nearly 50%, have encountered gender-related microaggressions<sup>2</sup> periodically. Approximately 9% of respondents have observed such behaviour occurring more frequently. On the other hand, 30% of respondents have neither experienced nor witnessed gender-related microaggressions in their workplace.

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<sup>2</sup> *Microaggression is a subtle, often unintentional, and indirect form of discrimination or bias that communicates derogatory or negative messages to individuals based on their gender or personal characteristics.*

Interviews uncovered instances of workplace microaggressions, which could manifest as:

- Women being frequently interrupted or spoken over during meetings or discussions, which undermines their contributions and diminish their presence in the conversation.
- Men taking credit for ideas or work that women have contributed, either intentionally or unintentionally, which erodes recognition and opportunities for advancement.
- Instances where women seek support for technical tasks, only for men to take over and sometimes complete the work.
- Colleagues or superiors may make inappropriate or sexist remarks or jokes, creating a hostile or uncomfortable work environment for women.
- Women encounter situations where their skills or expertise are underestimated or questioned, based on gender stereotypes or biases.
- Women are excluded from networking opportunities, important projects, or career advancement pathways, contributing to feelings of marginalisation, and limiting their professional growth.
- Women are assigned stereotypically "female" tasks or responsibilities, such as administrative/management duties, regardless of their qualifications or career aspirations.

In many cases, these behaviours are deeply ingrained, often occurring unconsciously, without men being consciously aware of them.

68% of respondents have pursued technologies and skills based on their personal interests, irrespective of gender considerations. Meanwhile, 20% of respondents have faced gender-related challenges, but these obstacles have not entirely dissuaded them. A small proportion of respondents (4%) have encountered bias that significantly influenced their selection of technologies and skills.

## **WORK-LIFE BALANCE**

44% of respondents have discovered strategies to harmonise work and life within the technology industry. However, 39% of respondents have encountered instances where their gender influenced their work-life balance, although these occurrences were not overpowering. A notable 14% of respondents faced distinct challenges that significantly impacted their work-life balance.

During interviews, it was emphasised that many respondents opted to transition to non-technical roles due to difficulties in achieving a balance between work and life. This was attributed to the additional support hours expected in technical roles and the necessity for upskilling outside of regular working hours.

## **SKILL DEVELOPMENT & TRAINING**

The prevalent resources or support provided by organisations for skill development and training primarily include facilitating easy access to online learning platforms, offering feedback/performance reviews, and conducting regular training programs. Few respondents have had opportunities to utilise networking or mentorship programs as part of their skills development.

The primary perceived barriers when seeking opportunities for skills development or training are time constraints (54%) and financial barriers (29%). Meanwhile, 27% of respondents have not encountered any barriers. A minimal percentage of respondents (4%) have faced gender-related barriers.

## **MENTORSHIP AND NETWORKING OPPORTUNITIES IN WORKPLACE/INDUSTRY**

28% of respondents perceive mentorship and networking opportunities as severely restricted in scope and inadequately publicised or accessible. Another 23% of respondents are cognisant of some mentorship avenues, albeit limited in scope. Conversely, 25% of respondents are unaware of such opportunities and have not engaged in any mentoring programs. Additionally, 15% of respondents note the absence of mentorship programs specifically tailored for women.

Approximately 12% of respondents have derived significant benefits from mentorship programs, although the majority either have not experienced such benefits (28%) or have not had the opportunity to participate in such programs (26%).

Interviews with respondents unveiled the challenges faced by technical women in securing mentors, particularly due to their Under-representation of women in lead or principal roles. Some women also cited experiencing imposter syndrome, which deterred them from mentoring other women.

Networking within technical teams can pose challenges for women, particularly as after-work gatherings may lack gender inclusivity, often resembling a boys' club. This can make it challenging for women, especially those in the minority, to integrate into the team culture. Some women joining a team as the only female team member, may also experience feelings of exclusion.

## **LONG-TERM CAREER GOALS**

Advancing into leadership roles (50%) and becoming technical experts (44%) emerged as the primary long-term career goals for respondents, coupled with a dedication to continuous learning and adaptation (57%).

Notably, only a small percentage of respondents identified contributing to open-source projects (4%) and pursuing entrepreneurship or startups (9%) as long-term career aspirations.

Merely 10% of respondents believe they have sufficient support structures in place to achieve their long-term goals. Some respondents indicated having limited support (22%), while a majority acknowledged that support levels vary depending on the organisation (47%) and location (2%).

## **ACTIONS TO BE TAKEN FOR FOSTERING INCLUSIVE ENVIRONMENT**

The top five actions recommended by the respondents for fostering inclusive environment in workplaces are, Equal Opportunities and Pay Equity (72%), Flexible Work Arrangements (70%), Representation in Leadership (65%), Mentorship and Support Programs (61%) and Transparency and Accountability (49%).

Regarding the specific actions taken by respondents to promote inclusivity, a significant portion expressed uncertainty about how to address gender-related issues (21%) and have not yet taken any specific actions (25%). Among those who have acted, efforts include mentoring and supporting others (18%), advocating in their workplace or industry (11%), and participating in diversity initiatives (10%).

## Discussion

The results of the survey and interviews highlighted the following,

- Women who commence their careers in the New Zealand tech sector often begin in highly specialised technical roles. However, many transition to roles such as Product Manager, Delivery Manager, or People Manager, while relatively few progress to becoming Lead or Principal Engineers or Solution Architects or Enterprise Architects. There is a lack of female representation in areas such as Infrastructure, Security, and Network.
- Women who enter the tech sector through transition typically fall below the age of 35. This career shift is primarily driven by their personal passion and is facilitated via self-directed or independent learning approaches. Women often encounter limited access to networking and mentorship programs for skills development. This implies greater self-effort when contemplating career transitions, as the available support structures for facilitating such transitions appear to be limited.
- Women also acknowledge the perceived necessity to exhibit masculine behaviour in the tech sector for success in both technical and non-technical roles.
- Majority of women who were surveyed, work in Cloud Technology and they have utilised self-directed or independent strategies to upskill themselves. Very few women have adopted collaborative strategies for upskilling, such as seeking mentorship, attending meetups, conferences, participating in hackathons or other community events.
- Women are receptive to learning and adopting to the changing technology landscape, however the respondents who currently do not use the latest technology anticipate the following challenges or barriers for upskilling, lack of awareness regarding where to begin, unclear career pathways, insufficient relevant experience, and limited opportunities in the workplace.
- In the Technology sector, pay inequality is widespread, and it's often accepted within organisations that a wage gap of 5% is not problematic. Pay inequity, unfair treatment and unequal opportunities for senior technical roles are some of the key challenges that women face in workplaces.



The above results can be summarised as,

### ***Observations in Tech Roles***

Organisations make efforts during graduate recruitment to achieve gender balance in technical roles. However, this balance becomes skewed when considering senior technical positions. Consequently, many women are compelled to rely on self-directed and independent learning methods for their learning and development, as they have fewer opportunities for mentorship in the technical roles they aim to pursue. This limitation also results in reduced networking opportunities for them.

### ***Observations in both Tech and Non-Tech Roles***

Both women in technical and non-technical positions frequently encounter microaggressions, which often negatively affect women in technical roles, leading some to seek opportunities in non-technical fields. Conversely, women in non-technical roles may feel pressured to suppress their natural personal traits and adopt more masculine behaviours.

## **Existing Research and its relevance to this study**

### ***Gender behavioural stereotypes and its impact on Women.***

#### **Impact on their self-confidence**

In their study conducted at a University, Yau & Cheng (2012) shed light on the confidence disparity between male and female students in utilising technology for learning. They attributed this phenomenon to socially constructed gender imbalances in computing, rather than inherent differences in learners' abilities. These imbalances are shaped by dominant stereotypes widely accepted in society, dictating predetermined masculine and feminine behaviours (Bern, 1981).

Studies indicate that women exhibit significantly lower self-efficacy for traditional male-dominated occupations (Gomez & Alvarez, 2020). In environments characterised by gendered institutional norms, such as the technology sector, the limited presence of female role models reinforces a culture that prioritises the display of masculine behaviours. As a result, individuals embodying these traits often receive preferential treatment, while the unique qualities of women are marginalised. This exclusionary culture restricts women's opportunities for networking and mentorship, which can potentially undermine their self-confidence (Herbst, 2020).

Jahanbakhsh, Jomehri & Mujembari (2015) assert in their study that when women diverge from the traditional gender roles defined by society, they are often met with a lack of support, which can significantly diminish their self-confidence. This leads to women underestimating themselves and having lower expectations of success than men (Herbst, 2020).

Their attitude and identification towards technology would positively change if women saw role models of the same gender. And it is also found that women underestimate their potential and shy away from mentoring others (Gomez & Alvarez, 2020).

Men tend to encounter role models more pertinent to career-related efficacy, thus providing them with greater exposure to vicarious learning experiences that could aid in developing expectations of efficacy for nontraditional (male-dominated) careers. Consequently, women are less likely to benefit from such vicarious learning opportunities (Zeldin, Britner & Pajares, 2006).

Advocating personal solutions for self-confidence will not provide a long-term solution, instead the focus should be on cultural forces and structural inequalities which have been created (Gill & Orgad, 2017).

### **Impact on the level of influence they can have on their Organisation**

Adopting masculine behaviour does not guarantee success for women in Technology sector. Research by Herbst (2020) suggests that powerful and assertive behaviour displayed by women is often perceived as overly aggressive, unlike similar behaviour in men.

Exceptional job performance did not consistently result in gaining influence within an organisation for women in traditionally male-dominated positions. Both men and women who demonstrate successful job performance are perceived as self-confident by their supervisors. However, this self-confident image is not equally rewarded for men and women. Women could only leverage their perceived self-confidence into organisational influence when they also exhibited a high prosocial orientation, demonstrating a willingness to benefit others, which aligns with stereotypical behaviours expected from women. In contrast, for men, high job performance alone was sufficient to translate into organisational influence (Guillen, Mayo & Karelaia, 2018).

### **Impact on the career opportunities**

The above-mentioned disparities hinder women from engaging in networking activities due to concerns about being perceived as overly ambitious or self-promoting (Herbst, 2020). This reluctance is reflected in the types of jobs they apply for and the salary negotiations they undertake. An internal analysis conducted by the technology company Hewlett-Packard revealed that women typically apply for internal promotions only when they believe they meet 100% of the listed job requirements, whereas men often apply even if they meet just 60% of the criteria. Similarly, another research found that men are four times more likely to negotiate salaries than women, and when negotiations do occur, men tend to request 30% less than women (Gomez & Alvarez 2020).

Those who exude confidence are more likely to be seen as trustworthy, reliable, and influential (Guillen, Mayo & Karelaia, 2018). And the structural inequalities work against women.

According to research conducted by Zeldin, Britner & Pajares (2006), men tend to develop robust self-efficacy perceptions derived from their previous performance, fostering a strong belief in their ability to accomplish similar tasks in the future. Conversely, for women, vicarious experiences gained through observing others perform tasks and receiving social or verbal persuasions (messages from others about their ability to succeed in a task) play a crucial role in

their decision to pursue and persist in careers in science, technology, engineering, or mathematics. This becomes more challenging when women are unable to also find mentors for technical roles.

## **Practical Implications**

### **Promoting Balance in Job Descriptions**

- Instead of solely prioritising technical skills in job descriptions, there should be a balanced emphasis on soft skills. The soft skills often associated with women play a significant role in shaping the workplace culture within the organisation. As evidenced in the results section, women demonstrate a readiness to enhance their technical skills and utilise various self-directed learning methods. Training employees for technical skills is generally more straightforward than for soft skills. Therefore, it is crucial to recognise and integrate these attributes into the job description, underscoring the importance of their personal traits in this industry.
- Women frequently apply for positions only when they satisfy all the job criteria. Rather than detailing the specific requirements for the position in JD, it might be more advantageous to delineate the responsibilities inherent in their current role. This approach could involve indicating that if they are proficiently managing certain responsibilities in their current position, they would be considered eligible for the advertised role.

### **Understanding Gender Dynamics in Interview Processes**

- It's important to acknowledge that the interview processes in the technology sector have typically adhered to a standard procedure that has been established over many years. This approach likely worked well when predominantly men were involved in the process. However, with an increasing number of women entering the workforce, expecting them to feel completely at ease with a path designed primarily by men is unfair. Recognising the influence of cultural norms and structural inequalities within a male-dominated sector is crucial in understanding their impact on women's behaviour during the interview process.

### **Recognising Gender Differences in Self-Efficacy and Confidence Levels**

- The current process of shortlisting candidates for roles tends to be more "gender blind" than "gender conscious." It's important to recognise that self-efficacy levels differ between men and women, as does the display of confidence. For instance, when faced with a topic where they don't fully understand the content, women are more likely to admit to not knowing, whereas male candidates may respond differently. This discrepancy in responses can inadvertently disadvantage women. It's essential to interpret these responses accurately, and interviews should strive to maintain a balance by not placing excessive emphasis on technical skills alone but also giving due consideration to prosocial skills.

- It's important to acknowledge the challenges women face in finding mentors in senior technical roles and the limitations they encounter in networking within male-dominated fields. These constraints can significantly impact their levels of self-confidence. This situation is unlikely to change until we witness a shift towards greater representation of women in technical positions such as Lead Engineers and Principal Engineers, particularly in areas like Infrastructure, Security, and Networking.

### **How to avoid a leaky pipe?**

- After successfully achieving gender balance in graduate recruitment for technical roles, organisations should maintain ongoing engagement with women throughout their tenure. This involves establishing and communicating transparent career pathways for both technical and non-technical roles. Women should be presented with clear options rather than relying solely on social cues for career progression.
- Career advancement opportunities into positions within Network, Security, or Infrastructure are relatively restricted for women. Organisations should introduce career progression pathways where women, for instance, can transition from a Service Desk Support role to an intermediate security position, and subsequently advance to higher-level technical roles if they desire.
- Recognise the various manifestations of microaggressions, as outlined in the "Workplace Environment" section. Develop sensitivity training sessions for staff to comprehend the repercussions of such behaviour on individuals.
- Organisations must demonstrate sensitivity and recognise the family commitments women may have at various stages of their lives. Women should not feel excluded from technical roles solely because they are unable to commit to after-hours support.
- Organisations should proactively facilitate women's participation in technical conferences and actively seek opportunities for them to represent the organisation and deliver presentations at these events. Additionally, they should support and encourage women to serve as mentors for graduates and other women in the technology sector. Having role models in specialised technical roles can inspire more women to pursue similar career pathways. Having the flexibility to have dedicated training hours for upskilling during work will help with work-life balance.

### **Future Enhancements of this Study**

- The sample size utilised in this study remains relatively modest. Given the potential disparities in opportunities and workplace environments across various cities, such as Napier compared to Auckland, it would be beneficial to expand this study nationwide.
- Most survey respondents originate from the Banking and Finance Industry. To enhance the comprehensiveness of findings, replicating this study with broader representation across diverse industries and conducting cross-examinations would be advantageous.

- This research does not explore the roots of this issue and how a shift in perception and approach should begin from schools.
- Further investigation is warranted into the influence of ethnicity on the self-efficacy levels of women.
- Expanding this study to encompass other gender minorities would shed light on the impact of inequalities on their career advancement.
- This study was conducted solely by the author. Encouraging organisational support for such studies would significantly contribute to the tech industry, particularly amidst the current acute shortage of skilled resources within the country. Failing to equip half of the workforce with the necessary tools and support hampers their entry into the tech sector.

## Conclusion

Gender roles which are deeply ingrained in our society significantly influence our behaviour. Just as we feel disoriented when attempting to mimic someone else's behaviour, women may struggle to assimilate into environments still largely dominated by men. Recognising the inherent differences in how men and women operate and the unique traits they bring can be transformative. Biases suggesting women are unsuitable for technical roles due to personal traits must be actively avoided. This shift in mindset will evolve gradually, and organisations can enhance female retention in the technology sector by grasping the cultural and social dynamics at play.

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