**Information Technology Issues in New Zealand**

Jocelyn Cranefield, Jocelyn.cranefield@vuw.ac.nz

Victoria University of Wellington, New Zealand

Mary Ellen Gordon, Maryellen.gordon@vuw.ac.nz

Victoria University of Wellington, New Zealand

Zlatko Kovacic, Zlatko@mystatisticalconsultant.com

Independent Researcher, New Zealand

Gillian Oliver, gillian.oliver@monash.edu.au

Monash University, Australia

Alexander Serenko, a.serenko@utoronto.ca

University of Toronto, Canada

Aykut Hamit Turan, ahturan@sakarya.edu

Sakarya University, Sakarya, Turkey

**SUMMARY**

Our results suggest that New Zealand’s IT workforce is aging and evolving to become more gender-balanced (28% of survey responses were from women) and more diverse (45% of survey respondents were born in another country). It is generally a happy workforce: on average, survey respondents reported that they were satisfied with their jobs and that they felt a sense of accomplishment, without expressing excessive concern about work pressure, workload, work/life balance, or losing their jobs. Respondents of this survey were concentrated in financial services, the public sector, and educational organizations. Those in financial services tended to be particularly focussed on outward-looking organizational issues and mobile app development, and those working for public sector organizations tended to be more particularly focussed on inward-looking organizational issues and enterprise-level technologies. The only issues where those working for educational institutions attributed greater importance than other respondents were BYOD and globalization.

**INTRODUCTION**

New Zealand has a multi-faceted IT workforce. It includes many people who have moved to the country relatively recently as well as many New Zealanders who have been working in IT for decades. The IT workforce includes many people working in large, government organizations, as well as others working in entrepreneurial start-ups or doing the technical work required to create some of the world’s best-known films, such as the Lord of the Rings Trilogy. The country is relatively small, and many organizations employing IT workers in the cities are near one another, so there are ample opportunities for professionals to interact with one another. That combination of diversity and proximity has allowed information technology to evolve in New Zealand from a support function to a major and growing part of the economy.

**COUNTRY BACKGROUND AND HISTORY**

New Zealand is an island country of 4.8 million that is geographically distant from most of its main trading partners, which include Australia, the European Union, USA, China, South Korea, Japan and Canada. New Zealand has a mixed economy based on free-market principles (following massive economic reforms in the 1980s and 1990s), and it is very reliant on global trade. Hence, the country has worked hard to gain a reputation for being a good place to do business. In 2017, it was ranked first in the world for ease of doing business, tied for first place for being non-corrupt, fourth for transparency, and thirteenth for competitiveness (MBIE, 2017). Since the 1970s, there has been a shift away from a traditional agricultural and manufacturing economy towards a services-oriented economy (Statistics NZ, 2018c). As of 2016, the services sector made up about two-thirds of GDP (The Treasury, 2016).

One in seven of New Zealanders identify as indigenous Māori, 74% have European ancestry, 12% are of Asian descent, and 7% identify as Pacific Islanders. Over 86% of the population live in urban areas, and over 53% live in the four largest cities. New Zealand has a beautiful natural environment, which makes it attractive to tourists, and the quality of life makes it attractive to immigrants. According to the 2013 census, 25% of the population were born overseas. Recent years have seen high immigration, with incoming net migration reaching 73,000 in the year to June 2017 (The Guardian, 2017). IT workers are well-represented among those gaining visas through a skilled migrant category (MBIE, 2018).

Compared with many other countries, New Zealand has a high percentage of small and medium-sized enterprises. In 2017, only 1% of enterprises had 50 or more employees, however, those organizations employed around 45% of the country’s workforce (Statistics NZ, 2017).

In this study, we had enough survey respondents working in educational, financial, and government / public organizations to compare those types of organizations to one another. To help to interpret the results, we briefly introduce these three sector contexts:

*Public tertiary education institutions* employed over 36,000 people in 2013 (Ministry of Education, 2018). The sector is well-regarded, but it faces rising costs while centralized rules and requirements make it hard to innovate and adapt (NZ Productivity Commission, 2017).

*Banking* contributes $7.2 billion to the economy, and banks employ over 25,000 people. New Zealand ranked first in financial market development and third for soundness in the World Economic Forum’s Global Competitive Report (NZ Bankers Association, 2018).

NZ’s *government/public sector* employs around 348,000 people across 2,900 agencies; 14% of the country's workforce (State Services Commission, 2018). The sector is undergoing a major transformation aimed to deliver citizen-centric services across all of government.

**INFORMATION TECHNOLOGY IN NEW ZEALAND**

The technology sector is a major and growing area of the New Zealand economy. It had exports of $960 million in 2016 and employed an estimated 29,700 workers (NZ Immigration, 2018). Some of New Zealand’s best-known IT exports come from the cloud accounting company, Xero (founded in Wellington), and digital and special effect work produced by Weta Digital, Park Road, and other Wellington-based companies related to film director Peter Jackson and his collaborators.

New Zealand also has an active IT-related start-up ecosystem. Organizations that participated in the country’s largest incubator/accelerator have a collective valuation of over NZ $55 million on annual revenue of over NZ $25 million and employ over 250 staff (CreativeHQ, 2018).

The country’s public sector has embraced digital government, with many services delivered online. It has also created an integrated data infrastructure, which enables joint analysis of data from many public-sector organizations while protecting the privacy of individuals and organizations (Statistics New Zealand, 2018d). New Zealand is a leader in open government data, ranking in the top 5 countries for data readiness and impact (Open Data Barometer, 2018).

New Zealand’s traditional exports (e.g., food and beverages, wool, tourism) are also increasingly enabled by IT (MBIE, 2013). Overall, in the country’s wider economy, nearly 75,000 people work in IT related roles (NZ Immigration, 2018), representing just under 4% of the total New Zealand workforce (Statistics New Zealand, 2018e). Increasing use of ICT and digitization across sectors is generating growth in roles such as software engineering and development, project management, business analysis and analytics (NZ Immigration, 2018). The areas of computer system design and interactive gaming are rapidly growing subsectors of the IT economy, while at the level of occupations, growth in IT jobs has been driven by roles such as ‘Software and Applications Programmers’ and ‘ICT Business and Systems Analysts.’

The growth in demand for IT is matched by a significant skills shortage: in 2014, more firms in the IT sector reported having vacancies, and that these vacancies were harder to fill, than in any other sector in the economy (NZ Immigration, 2018). New Zealand had an innovative approach to addressing that issue. In 2017, the capital city of Wellington offered 100 free trips to the city for applicants for 265 available technology-related jobs and was able to select those people from 48,000 applicants from around the world, including people in senior roles with well-known technology companies (Stuff, 2017).

**METHODOLOGY**

We gathered survey data between September and December 2016. In keeping with the global World IT Project’s requirements, our survey population was drawn from a cross-section of New Zealand’s larger organizations (those with a minimum of 10 IT employees). Our sampling strategy was designed to optimize coverage of New Zealand’s main industries and geographic regions.

We identified suitably large IT employers using a list of New Zealand’s largest IT employers (The CIO 100 [www.cio.co.nz](http://www.cio.co.nz)) mapped onto target industry areas (identified using government GDP statistics). We selected around 46 target organizations to approach, based in major cities in the North and South Islands of New Zealand. For the targeted companies, we made personal contact (generally by phone) with senior IT Executives (the CIO, CDO, Group Manager IT, or IT Manager), outlining the scope and goals of the World IT Project and invited them to participate by sharing the survey with their IT staff and championing its importance. The CIO-as-survey-intermediary approach was chosen as a way of mitigating the burden of a 160-item questionnaire on individual workers.

We gave each organization a survey deadline of approximately one week, so as to create a sense of urgency to participate, and sent a link to a media article about the study. We sent a follow-up email a few days later, and again a day before the deadline, asking the CIOs themselves to follow up with their staff. The level of engagement with the survey from within each organsiation was therefore dependent on CIO advocacy as well as individual time and interest.

For the analysis that follows, we checked for relevant individual- or organization-based demographic differences in the information presented in the tables. Patterns of statistically significant differences are discussed in the text. Those that were not statistically significant, were not part of a larger pattern (e.g., only one statistically significant difference among a set of related variables), or were self-evident (e.g., contractors, consultants, and employees of vendors agree less strongly than regular employees of an organization that they will be with the organization in one or five years) are not discussed.

As shown in Table 1, we ended up with 516 usable responses. Most respondents had at least a bachelor’s degree or more (64%), twenty or more years of overall work experience (61%), and ten or more years of IT experience (75%). Most worked full-time (92%), as IT department employees (86%), are not part of management (62%), and had never been laid off from an IT job (77%).

**TABLE 1. Descriptive Statistics**

| **Characteristics** | **N** | **%** | **Characteristics** | **N** | **%** |
| --- | --- | --- | --- | --- | --- |
| Education: |  |  | Years of Work Experience: |  |  |
| High School or less | 95 | 18.4 | 0 – 4 Years | 20 | 3.9 |
| Associate Degree | 90 | 17.4 | 5 – 9 Years | 51 | 9.9 |
| Bachelor’s Degree | 254 | 49.2 | 10 – 19 Years | 128 | 24.8 |
| Master’s Degree | 72 | 14.0 | 20 – 29 Years  | 157 | 30.4 |
| PhD | 5 | 1.0 | 30 + Years | 160 | 31.0 |
| Years of IT Experience:  |  |  | Organizational location:  |  |  |
| 0 – 4 Years | 52 | 10.1 | IT Department Employee | 441 | 85.5 |
| 5 – 9 Years | 75 | 14.5 | IT worker in non-IT Dep.  | 7 | 1.4 |
| 10 – 19 Years | 183 | 35.5 | Contract Employee | 42 | 8.1 |
| 20 – 29 Years  | 130 | 25.2 | Consultant | 18 | 3.5 |
| 30 + Years | 76 | 14.7 | Vendor Employee | 8 | 1.6 |
| Work as:  |  |  | Position: |  |  |
| Mostly Full Time | 477 | 92.4 | Not part of Management | 319 | 61.8 |
| Mostly Part Time | 23 | 4.5 | In Lower Management | 72 | 14.0 |
| Mostly Over Time | 16 | 3.1 | In Middle Management | 68 | 13.2 |
| Been Laid Off from IT job: |  |  | In Senior Management | 57 | 11.0 |
| Yes | 121 | 23.4 |  |  |  |
| No | 395 | 76.6 |  |  |  |

Overall, 28% of the responses came from women. Compared to the male respondents, they had significantly less IT experience, with 29% of them having twenty or more years of IT experience, compared to 44% of the men. There were no other statistically significant gender differences in any of the variables shown in Table 1 (based on chi-square tests, *p*<.05).

As mentioned in the preceding sections, New Zealand has a fairly large migrant population, which is reflected in the IT workforce. As a consequence, only 55% of respondents were born in New Zealand with the other 45% coming from 45 different countries. There were 15 or more respondents who were born in the UK (61), India (36), South Africa (18) and the Philippines (16), so those countries of origin are broken out and compared in some of the subsequent analysis.

Compared to respondents who were born in New Zealand, those from India and the Philippines had more education and fewer years of work experience. Ninety-seven percent of respondents who were born in India had at least a Bachelor’s degree, as did 93% of those born in the Philippines. That compares to 55% of respondents from New Zealand. In contrast, only 14% of respondents from India and 25% of those from the Philippines had at least twenty years of work experience, compared to 66% of respondents who were born in New Zealand. Similar patterns held for IT work experience. These differences reflect an age difference. Three quarters (75%) of respondents who were born in India and nearly two-thirds (63%) of those who were born in the Philippines were younger than 40, compared to less than a third (31%) of New Zealand born respondents. Compared to respondents born in other countries, those born in the UK were disproportionately likely to have been laid off from IT jobs (39%) and those from the Philippines were disproportionately unlikely to have been (6%). There were no other statistically significant differences in the variables in Table 1 (based on chi-square tests, *p*<.05).

**ORGANIZATIONAL IT ISSUES**

As shown in Table 2, the organizational IT issues rated as most important by New Zealand respondents were, on average, IT reliability and efficiency, security and privacy, and alignment between IT and business.

**TABLE 2. Organizational IT Issues in New Zealand**

| **Organizational IT Issues** | **Rank** | **Mean Rating\*** | **Std. Deviation** |
| --- | --- | --- | --- |
| IT reliability and efficiency | 1 | 1.60 | 0.64 |
| Security and privacy | 2 | 1.71 | 0.78 |
| Alignment between IT and business | 3 | 1.73 | 0.70 |
| IT strategic planning | 4 | 1.92 | 0.77 |
| Attracting and retaining IT professionals | 5 | 1.94 | 0.74 |
| Continuity planning and disaster recovery | 6 | 2.00 | 0.84 |
| Knowledge management | 7 | 2.04 | 0.75 |
| Project management | 8 | 2.21 | 0.80 |
| Business agility & speed to market | 9 | 2.23 | 0.86 |
| Enterprise architecture | 10 | 2.30 | 0.88 |
| Business productivity & cost reduction | 11 | 2.35 | 0.76 |
| Business process reengineering | 12 | 2.40 | 0.82 |
| IT service management (e.g. ITIL) | 13 | 2.50 | 0.93 |
| IT cost reduction | 14 | 2.60 | 0.86 |
| Revenue-generating IT innovations | 15 | 2.66 | 1.06 |
| Globalization | 16 | 3.21 | 0.99 |
| BYOD (Bring Your Own Computing Device) | 17 | 3.30 | 1.13 |
| Outsourcing | 18 | 3.60 | 0.99 |

*\* Rating scale ranges from 1 to 5: 1 as most important and 5 as no importance*

Perceptions regarding the importance of organizational IT issues varied based on the type of organization a respondent worked for. The overall patterns were for those working in financial organizations to focus on more outward-looking issues and those in public-sector organizations to focus on more inward-looking issues. Specifically, respondents who work for financial institutions rated the following organizational issues as having greater average importance than those who work for other types of organizations (based on ANOVA *F* statistics, *p*<.05):

* Security and privacy (mean = 1.52)
* Alignment between IT and business (mean = 1.58)
* Business agility and speed to market (mean = 1.82)
* Revenue-generating IT innovations (mean = 2.29)

Those working in public-sector organizations rated the following as significantly more important, on average (based on ANOVA *F* statistics, *p*<.05):

* Project management (mean = 2.13)
* Business productivity & cost reduction (mean = 2.19)
* Business process reengineering (mean = 2.26)
* IT service management (mean = 2.34)
* IT cost reduction (mean = 2.47)

On average, the only organizational IT issues those working in education organizations rated as significantly more important than those in other sectors (based on ANOVA *F* statistics, *p*<.05) were BYOD (mean = 2.94) and globalization (mean = 3.15).

The average importance attributed to different IT issues varied based on whether or not respondents were managers, and if so, at what level (based on ANOVA *F* statistics, *p*<.05). The higher in management a respondent was, the more importance (on average) he or she attributed to alignment between IT and business, business agility and speed to market, and BYOD. A similar pattern held up through middle management for IT strategic planning, attracting and retaining IT professionals, enterprise architecture, business productivity/cost reduction, and outsourcing.

This overall pattern of results suggests a possible need to provide more information about the importance of different organizational issues to individual contributors and lower level managers.

Individual perceptions of the importance of organizational issues varied by country of origin. Compared to those born in other countries, respondents born in India attributed greater average importance (based on ANOVA *F* statistics, *p*<.05) to: business productivity & cost reduction, business agility and speed to market, revenue-generating IT activities, IT cost reduction, globalization, and outsourcing. Those born in the Philippines attributed the greatest importance to IT service management and those born in India or the Philippines rated project management as more important, on average, than did those from other countries.

That pattern of results suggests that people from countries that have become recipients of significant IT outsourcing may be particular attuned to profitability-related organizational issues.

Comparing these New Zealand results with the results of the 2017 SIM IT Issues and Trends study (Kappelman et al., 2017),  the top three issues in both studies included security and privacy and alignment between IT and business. Business agility also ranked as the ninth most important organisational issue in both studies.

The SIM study focused on the perspective of top IT executives, whereas the New Zealand study is based on opinions from a range of IT professionals, so we also compared results using only senior IT executives in New Zealand, but the only difference between that and the overall comparison was that, on average, the New Zealand senior executives rated business agility as even more important than either the SIM sample or the full New Zealand sample.

Beyond that, the ten top-rated issues identified by New Zealand respondents to the World IT study included more protective concerns (e.g., IT reliability & efficiency, continuity planning & disaster recovery, and attracting and retaining IT professionals); whereas (95% US-based) respondents to the SIM IT Issues and Trends study included more pro-active concerns (innovation and digital transformation) and more concerns related to cost reduction. These differences may reflect differences in the types of organizations respondents were drawn from. One quarter of New Zealand respondents worked in government organizations, compared to only 6% of participating organizations in the SIM study, and as noted above we found that at least in New Zealand, those who work for such organizations tend to have more inward-looking concerns.

**TECHNOLOGY AND INFRASTRUCTURE ISSUES**

As shown in Table 3, the three technology issues rated as most important were, on average, networks / telecommunications, enterprise application integration, and mobile and wireless applications.

**TABLE 3. Technology and Infrastructure Issues in New Zealand**

| **Information Technology Related Issues** | **Rank** | **Mean Rating\*** | **Std. Deviation** |
| --- | --- | --- | --- |
| Networks/telecommunications | 1 | 2.25 | 0.96 |
| Enterprise application integration | 2 | 2.26 | 0.88 |
| Mobile and wireless applications | 3 | 2.29 | 0.93 |
| Collaborative and workflow tools | 4 | 2.30 | 0.79 |
| Business intelligence/Analytics | 5 | 2.34 | 0.92 |
| Virtualization (desktop or server) | 6 | 2.46 | 1.00 |
| Software as a Service | 7 | 2.46 | 0.94 |
| Cloud computing | 8 | 2.55 | 0.96 |
| Business process management systems | 9 | 2.56 | 0.94 |
| Customer relationship management (CRM) | 10 | 2.64 | 1.00 |
| Service-oriented architecture (SOA) | 11 | 2.66 | 0.94 |
| Big Data systems | 12 | 2.69 | 1.03 |
| Mobile apps development | 13 | 2.74 | 1.04 |
| Data mining | 14 | 2.77 | 1.05 |
| Enterprise resource planning (ERP) | 15 | 2.84 | 1.01 |
| Social networking/media | 16 | 3.17 | 1.08 |

*\* Rating scale ranges from 1 to 5: 1 as most important and 5 as no importance*

Compared to those who work for other types of organizations, respondents who work for government institutions rated the following technical issues as having greater average importance (based on ANOVA *F* statistics, *p*<.05):

* Enterprise application integration (mean = 2.07)
* Business intelligence and analytics (mean = 2.17)
* Business process management systems (mean = 2.34)
* Enterprise resource planning systems (mean = 2.63)

Respondents working for financial institutions attributed greater average importance (based on ANOVA *F* statistics, *p*<.05) to mobile app development (mean = 2.42) and service-oriented architecture (mean = 2.42).

The more senior respondents were in their organization, the greater average importance they attributed to cloud computing. Among managers, the more senior respondents were, the greater importance (on average) they attributed to business intelligence / analytics, data mining, social networking / media, software as a service, and service-oriented architecture (based on ANOVA *F* statistics, *p*<.05).

As with organizational issues, average importance placed on technology issues varied (based on ANOVA *F* statistics, *p*<.05) based on where respondents were born. Those born in India attributed greater average importance to cloud computing, ERP systems, mobile app development, networks / telecommunications, social, media, virtualisation, software as a service, and service-oriented architecture. Those born in the Philippines attributed greater average importance to CRM systems and those born in South Africa attributed greater importance to data mining.

Some of these differences appear to be confounded with age since some of the technologies are relatively new and, as discussed previously, respondents born in India and the Philippines were disproportionately young compared to other respondents; however the association between country of origin and the importance placed on the technology-related issues described is stronger than for age (i.e., there are only 6 statistically significant differences in mean technology importance ratings for age compared to 11 for country of origin).

**INDIVIDUAL IT EMPLOYEE ISSUES**

As shown in Table 4, on average, respondents agreed that they liked working for their organization and were satisfied with their current jobs.

Female respondents recorded greater average job satisfaction than male respondents on all three measures shown in Table 4 (based on ANOVA *F* statistics, *p*<.05). A similar pattern held for senior managers, who also reported greater job satisfaction on all three measures compared to those lower in their organizational structures.

On average, respondents felt only moderate work pressure; however compared to those from other countries, respondents who were born in South Africa more strongly agreed that they felt busy / rushed or pressured at work and those who were born in India disagreed more strongly with those last two work pressure statements (based on ANOVA *F* statistics, *p*<.05).

**TABLE 4. Individual IT Employee Issues in New Zealand**

| **Individual Issues** | **Mean Rating\*** | **Std. Deviation** |
| --- | --- | --- |
| **Job Satisfaction** |  |
| In general, I like working here | 1.83 | 0.73 |
| All in all, I am satisfied with my current job | 2.05 | 0.82 |
| In general, I don’t like my current job | 4.08 | 0.89 |
| **Work Pressure** |  |
| I feel that the number of requests, problems or complaints that I deal with at work is more than expected | 3.33 | 1.07 |
| I feel that the amount of work I do interferes with how well it is done | 3.05 | 1.12 |
| I feel busy or rushed at work | 2.96 | 1.07 |
| I feel pressured at work | 3.04 | 1.04 |
| **Work-Life Balance** |  |
| There is a blurring of boundaries between my job and my home life | 3.50 | 1.20 |
| My work-related responsibilities create conflicts with my home responsibilities | 3.73 | 1.09 |
| I do not get everything done at home because I find myself completing job-related work | 3.84 | 1.07 |
| **Work Load and Burn-out** |  |
| I feel drained from activities at work | 3.12 | 1.14 |
| I feel tired from my work activities | 3.03 | 1.15 |
| Working all day is a strain for me | 3.56 | 1.05 |
| I feel burned out from my work activities | 3.60 | 1.09 |
| **Sense of Accomplishment** |  |
| I feel I’m making an effective contribution to what this organization does | 1.87 | 0.65 |
| In my opinion, I do a good job | 1.76 | 0.59 |
| I have accomplished many worthwhile things in this job | 1.84 | 0.65 |
| At my work, I feel confident that I am effective at getting things done | 1.92 | 0.67 |
| **Threats to One’s job** |  |
| I am worried that future technology advancements may pose a threat to my job | 3.62 | 1.06 |
| I believe that other people may be able to perform my work activities  | 2.53 | 1.02 |
| I am concerned that my job may be eliminated soon | 3.81 | 1.02 |
| I am concerned that my job may be outsourced soon | 3.93 | 0.97 |
| **Career Plans** |  |
| I will be with this organization one year from now | 2.32 | 1.06 |
| I will take steps during the next year to secure a job at a different organization | 3.53 | 1.04 |
| I will be with this organization five years from now | 3.10 | 1.04 |
| I will be working in the IT field one year from now  | 1.79 | 0.87 |
| I will take steps during the next year to secure a job outside the IT field | 4.09 | 0.91 |
| I will be working in the IT field five years from now | 2.18 | 1.03 |

*\* Rating scale ranges from 1 to 5: 1 strongly agree and 5 strongly disagree*

Perhaps counter-intuitively, female respondents disagreed more strongly than male respondents with the statements that: “There is a blurring of boundaries between my job and my home life.” and “My work-related responsibilities create conflicts with my home responsibilities.”

Compared to respondents who were born in other countries, those who were born in India or the Philippines disagreed more strongly (on average, based on an ANOVA *F* statistic, *p*<.05) that: “I feel drained from activities at work” and “I feel tired from my work activities.”

There were also country of origin differences in the sense of accomplishment respondents felt. Those who were born in the Philippines (followed by those born in South Africa) agreed most strongly with the last three statements about accomplishment, while those born in New Zealand and the UK agreed least strongly.

Country of origin was also related to perceived threats. Respondents who were born in the UK (followed by New Zealand) were least concerned about their jobs being eliminated or outsourced.

Compared to other respondents, those working in public-sector organizations agreed less strongly that they would be with their current organization in one year and five years (based on ANOVA *F* statistics, *p*<.05).

**CONCLUSION**

According to survey respondents, the top organizational IT issues in New Zealand were IT reliability and efficiency, security and privacy, and alignment between IT and business, although the second and third of these issues were perceived as more important by those working in financial services organizations than other types of organizations. The top technology issues identified by survey respondents were networks / telecommunications, enterprise application integration, and mobile and wireless applications, though enterprise application integration was a particular concern for those working in public-sector organizations.

New Zealand’s IT workforce is already being heavily influenced by migrants, who made up 45% of survey respondents. Those from India, in particular, appear to be bringing with them a greater sense of urgency, perhaps developed through exposure to India’s much larger, more competitive, IT industry. They are also disproportionately young and well-educated: suggesting that their influence will only grow as more of them are promoted into managerial positions.

For now, New Zealand IT workers appear to be fairly well satisfied with their roles, without feeling overly pressured or fearful about losing their jobs.

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