How New Zealand Software Companies Are Adapting Work Settings with Changing Times

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Abstract—Before the COVID-19 pandemic, most software companies operated in office settings. Lockdowns imposed during the pandemic forced them to work from home. There are speculations around what a post-pandemic work setting may look like. In this study, we investigated how software companies in New Zealand are currently operating, as they are one of the few countries that have managed to lift nearly all restrictions. Based on data collected from software professionals from 13 different companies, we compared their work settings before, during, and after the lockdown. We found that most companies adopted a hybrid work setting combining work from home and office. We present challenges they faced in this way of working as well as practical recommendations to overcome these challenges, while ensuring productivity and employee satisfaction. The rest of the world can learn from their journey to make a hybrid setting work as their own COVID-19 restrictions are eased.

■ **Since the beginning of 2020,** the entire world entered into unprecedented times with the spread of the COVID-19 pandemic. Many governments around the world implemented lockdowns, forcing people to largely stay at home. The outbreak has affected software professionals in different ways. It impacted their well-being and productivity [3], [5], their onboarding process [9], and their working styles and activities [4], [10], [8]. Lockdowns also impacted work settings, which shifted people from working in the office (WFO) to working from home (WFH) [2]. This New Zealand-based study is unique and gives a glimpse into the hybrid work future for the rest of the world.

Who expected that reporting to an office physically every day of the week would not be a norm. Work from home was embraced as the new normal by the office workers when the New Zealand (NZ) government enforced mandatory WFH in March 2020. Companies who were reluctant to WFH prior to the pandemic had to adapt. These adaptations suited some and challenged others. For example, some found sharing working space with family members a challenge, while others enjoyed being close to family members [11], [12]. Overall, during COVID-19, employees enjoyed the flexible work conditions over the more conventional working ways [2]. A recent study found that if given an option of operating in

Box 1. Participants' Recruitment, Data Collection & Analysis
We contacted multiple software professionals through advertisements on social networking sites and personal contacts. We interviewed 14 participants representing 13 different software companies. The participants and their company's details are presented below.

C#	Size (NZ)	Product Domain	P#	Age	Gender	Role
C1	M	Retail	P1	50+	W	Tester
C2	L	Banking	P2	35-40	M	Developer
C3	L	Accounting	P3	25-30	W	Developer
C4	M	Insurance	P4	35-40	W	Tester
C5	S	Cloud Services	P5	30-35	W	Tester
C6	S	Insurance	P6	35-40	M	Product Owner
C7	S	Health Care	P7	35-40	M	Developer
C8	S	Embedded Systems	P8	35-40	M	Software Engineer
C9	M	POS & Inventory	P9	25-30	W	Senior Software Engineer
C10	S	Health Care	P10	35-40	M	Integration Engineer
C11	L	Finance	P11	30-35	M	Senior Technical Analyst
C12	L	Banking	P12	30-35	M	Product Owner
C13	S	Productivity	P13	30-40	W	CEO
"	"	"	P14	25-30	W	Data Scientist

Figure 1. Companies and Participants Demographics; C# Company #; P# Participant #; Company Size (# of employees in NZ): Small (employees < 100), Medium (between 100 and 499), Large (employees > 500)

We conducted semi-structured interviews both in-person and on Zoom, depending on the location of the participant. We asked questions about their/team's work setting before/during/after the pandemic restrictions. Some sample interview questions are:
Q: What was your/ team's work setting before the pandemic?
Q: How did it change during the pandemic?
Q: What is your/ team's work setting after the pandemic restrictions? Have you moved back to your previous work setting? Why not?
Q: How has your organization adjusted the workplace after the pandemic restrictions to continue flexibility while maintaining productivity?
We transcribed the audio-recorded interviews and performed Thematic Analysis [1] using NVivo, a data analysis tool. The 'work setting' theme emerged across different periods, i.e., before, during, and after the lockdown. Within that, we identified sub-themes around 'challenges' and 'responses to challenges'. We consolidated a list of recommendations that participants learned after experimenting with different options. Some of these are formulated through detailed discussions amongst the co-authors. The first author collected and analysed the data. The co-authors reviewed the themes generated and the application of the analysis process in multiple rounds during the fortnightly meetings throughout the study.

a hybrid model, the majority of respondents stated they could fulfil 80% of their work effectively from home [2].

This article presents the journey of NZ software teams' work settings before and during the pandemic and highlights transformations companies went through under the *new normal*. Specifically, we report from an empirical study that explores how software teams in NZ companies adapted their work settings during and after COVID-19 restrictions. We recruited participants from NZ software companies because NZ prevented the spread of COVID-19 well. Details about these companies, the roles we interviewed, and the data analysis process are provided in "Box 1".

We found that before the pandemic, most of the software professionals were WFO with occasional WFH in exceptional circumstances. There were few companies who did not allow WFH at all. The pandemic forced companies to WFH on a larger scale. Many participants enjoyed WFH and reported being more productive. The time they would have spent on long commutes could be utilized working or spending more time with family. Others reported being fatigued, working long hours, and missing real physical contact, conversations, and team activities. We looked at how companies/employees continued working amid the pandemic. We found that companies experimented to determine an ideal, potentially more beneficial and sustainable, work setting for themselves. Building a more flexible, yet productive work setting is not straightforward. We discuss these in detail and provide concrete recommendations for companies who are struggling to find a balance between WFH and WFO.

FROM WFO TO A HYBRID WORK SETTING

Figure 1. presents the work-settings before, during, and after the lockdown. This figure illustrates that before the pandemic WFO was common at most of the companies, WFH was employed during the pandemic, and a hybrid work setting has been adopted by most of the companies post-lockdown.

Before the pandemic

The work-setting was most often only WFO, occasionally WFH was allowed. There were a few companies who offered exceptions for some employees, such as outsourced developers or permanent employees, who were allowed to WFH once a week. Special work arrangements were agreed upon at the time of hiring, e.g., WFH for one or two fixed days of the week due to personal issues. Employees were also allowed to WFH occasionally with approval from the manager to accommodate personal commitments, e.g., apartment viewing or taking care of an unwell child. In a rare case, a long serving employee was allowed to WFH after being relocated to a different city. Other flexible working arrangements were common in most companies, such as the ability for employees to come into the office a bit late and, thus, finish for the day a bit later.

During the pandemic

NZ software companies started to WFH in March 2020 when the government announced a countrywide lockdown. Some companies started preparing earlier, learning from the experiences of other teams or stakeholders from overseas whose countries had already imposed lockdowns. Companies defined different levels, e.g., red, yellow, and green, for workplace operations under different COVID-19 alert levels. In level 'red' nobody could work from the office, while in level 'yellow' companies were carrying out work operations in the office while maintaining a distance of at least 2 metres between employees. Companies monitored how many employees could come to the office at the same time following clear policies for physical distancing in the workplace. Companies coordinated staff accordingly, for example, a portion of team members were allowed to come on alternate days or different teams came in on different days of the week, or teams alternated weeks. At the green level, anybody could come to the office at any time. How companies enforced these policies varied, but most of the companies let their employees decide to work from the office or not, allowing employees to WFH if they felt unsafe to commute or be in the office during these times.
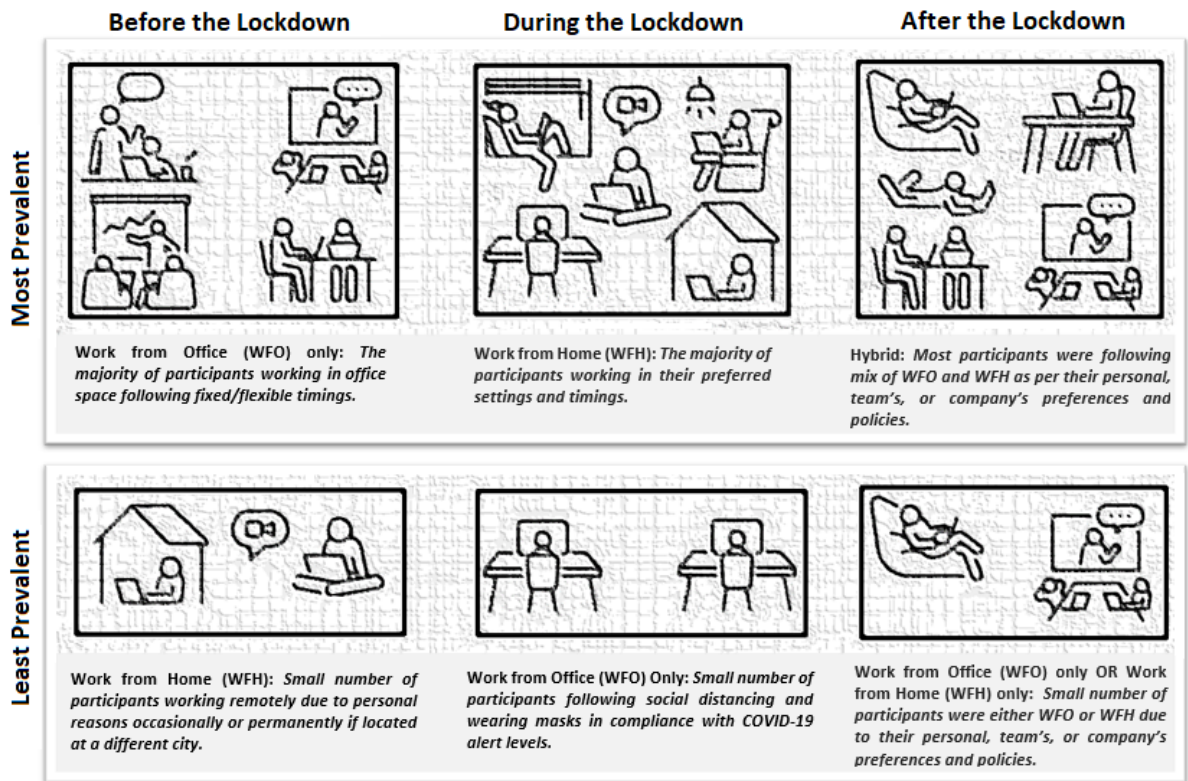
Figure 2. presents examples of participants' work settings before, during, and after the lockdown through icons (within boxes). It highlights that most companies were WFO before the lockdown and switched to WFH during and to hybrid after the lockdown.

After the lockdown

WFH stayed a norm in the beginning of the post-lockdown time. In most of the companies, if employees did not feel comfortable, they were allowed to WFH. Over a period of time, companies started introducing work setting related policies, some allowed their employees and teams to decide the preferred work setting. Interestingly, very few companies moved back to their initial work setting, i.e., completely WFO.

Most of the companies adopted a hybrid setting, an amalgamation of WFH and WFO. We identified multiple options within hybrid settings amongst and within different companies, i.e., one or more standard company or tribe WFO days, one or more standard team WFO days, one or more individually selected WFO days. These options varied across companies or teams based on the number of days they chose to WFH or WFO and who decided on these days. Different companies and teams have combined and experimented with these options to decide on one that best suited their needs. Some examples are:

- Anyone can WFH or WFO at any time. This is the most flexible, yet least followed hybrid setting.
- Teams decide two standard days to WFO for everyone in the team, and WFH for the remaining days of the week.
- Company decides two standard days for everyone to WFO. Employees can WFH for the remaining days of the week.
- Company declares one standard day as the company day to WFO. Teams mutually selected another WFO day and everyone selected one additional WFO day of their choice. Employees can WFH for the remaining days of the week.
- Employees can choose one day of their choice to WFH and WFO for the other days

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of the week.

Comparing WFO and WFH

Our findings suggest that the working needs vary across *business domains* and *job roles*. Business domains such as banking or embedded systems demand interaction with sensitive information and working with/on specific hardware. Workers of other domains may only require a laptop, desk, and an internet connection to accomplish their tasks. Similarly, roles supporting clients and customers have to consider their preferences. Some clients may prefer in-person over remote communication or prefer a specific tool for a safe remote communication. Similarly, working needs vary with *employees' tenure* or *experience level*. When an employee joins a new company, starts a new role, or switches their team, being in the office is beneficial for building relationships with co-workers.

We also noticed variations of preferences across different employees. Some employees prefer the 9am to 6pm standard way of working from the office, talking to people, fostering camaraderie, and enjoying being in a professional space. While others prefer to WFH to avoid commute time and interruptions from social chats. Those who prefer to WFH feel more productive and focused in their personal space without external distractions and noises. They are more creative and comfortable while working in a casual wear. These preferences also vary with their personal situations. Participants reported preference to WFO for multiple reasons, e.g., issues with VPN connectivity, difficulty working with kids at home, wanting a separate space away from household chores, or finding it difficult to adjust to WFH after working many years in an office setting. Some participants reported WFO is easier as the office environment is good. Participants shared having frequent headaches while WFH as the home environment wasn't ideal w.r.t. lighting or air conditioning.

Both WFO and WFH have pros and cons. WFH benefits organizations in saving costs on infrastructure, electricity, phone, internet, cleaning, and security [2]. Employees are happy as they spend more time with family and save traveling costs [6]. They are more focused and productive with less distractions. They enjoy the flexibility and autonomy to manage their time. On the other side, WFH reduces brainstorming opportunities with colleagues, makes it harder to communicate with colleagues, and reduces awareness of what colleagues are working on, which impacts team productivity when WFH [10]. Interestingly, we observed that many companies provided employees the freedom to choose to WFH or WFO in the beginning. But over time, most of them adopted a hybrid setting or encouraged workers to WFO.

Hybrid settings can compensate for elements lacking in a WFH only setting, such as no physical contact and enabling in-person meetings. It provides opportunities to meet other team members and other teams and even interact with senior management while walking around the workplace. It accommodates the needs of new hires as they can meet their co-workers [9]. A hybrid setting meets the needs of specific groups such as single parents, parents with young children or children with special needs, elderly workers, and workers with elderly care responsibilities. A hybrid work setting provides flexibility to such workers. For example, some participants feared being a virus carrier for their elderly family members and preferred to WFH to avoid public transport to work until being vaccinated.

Participants shared how a hybrid setting is becoming a necessity nowadays. Job seekers inquire about flexible work arrangements as stated by a product owner (P12). *Questions weren't asked before the pandemic, around flexibility of work, now, everyone that I interviewed would ask about the arrangements.* Another participant (P1) noted how work flexibility was a key consideration while applying for a future job. Another participant (P9) expressed *…my company was not in favour of having a remote employee and now even looking for remote employee as long as they are in New Zealand. And also we all coming twice or thrice a week, and I think it's working well.* On the other hand, it enables companies

to access a larger pool of talent since they do not need to be restricted to a geographic zone as indicated by P6. *'The whole IT job market has changed. Now, it doesn't matter if someone is sitting in NZ or anywhere else in the world.*

Before companies decide to opt for a hybrid working setting, they need to ensure they have the right culture. To make a hybrid setting work, companies need to empower and trust their teams and individuals, and even within teams, they need to trust their co-workers. In the words of a participant (P2) *'My feeling is if a company trusts people to do the right thing and give them the tools to do so they will definitely perform. You don't need to assume that they're going to go home and be on social media all day. Like I enjoy coding. So if you give me that opportunity, I'll do it over Facebook, whatever'.* They need to take into account certain factors while deciding the right work setting for their employees. Most importantly, the nature of the work and responsibilities software professionals perform.

CHALLENGES OF WORKING IN A HYBRID SETTING

We observed a set of challenges in a hybrid setting which are listed below.

- *Missing key information:-* Participants feared missing key information while WFH. Their teammates might have talked about something important in the office while they WFH. When everyone was WFH, team members would regularly update each other on different mediums (e.g., the slack channel), and anyone could join the conversation when needed. However, in the office, unplanned discussions can occur that those who WFH would miss. A participant P3 expressed *'The biggest one was when working from home and having people working in office, because you kind of sometimes feel left out, like, people might talk about something ... and they're not really reflected back in channel or somewhere like that'.*

- *Difficulty managing interactive sessions:-* Managing planning and refinement sessions effectively in a hybrid setting is challeng-

ing. Employees who WFH cannot see the physical board and miss who's moving the ticket to what status (e.g., during stand-ups discussing what's done and what's not). Similarly, walking through wireframes and work items and switching to physical boards breaks the flow of communication. A participant P7 shared an example as *'Where we needed engagement like working on tasks requiring discussion or white boarding, drawing or making others understand through diagrams, it was definitely difficult'.*

- *Waste of effort:-* When the speaker is talking very low, especially if connected through a landline, their voice may not reach the WFH person properly, and they miss the discussion happening in the room. After the session, the speaker may need to explain the same things to different co-workers multiple times as shared by P6. *'If someone is not near the bridge (network connection) or speaker, then his voice is not gonna reach to the remote people properly. And then they are asking the same question again. And you need to repeat the whole story again and that's waste of time.'*

- *Lack of participation from teammates WFH:-* Participants reported that teammates WFH are less vocal. Their involvement in the refinement or estimation process is not up to the mark. They don't ask questions about user stories and features unless assigned to them as indicated by a participant. *'I have seen that gap, they (WFH) are not as much embedded as they should be as part of the team. They're not asking enough questions. They are just silent on the call. Until there is a big ask from them.'* Another participant reported being hesitant to say something or talk further on any point while WFH as they might be interrupting and breaking the speaker's flow. Similarly, participants expressed their concerns of interrupting others during focused work when WFH.

- *Different working slots:-* Employees who WFH also often work outside regular working hours. This can reduce communication access across the team, potentially leading

to delays in case of dependent tasks. P6 indicated different working slots *'One of our team member used to start at 11 and worked late night and I used to start at 7:30 just to finish timely so that I could give time to my son for his homework.'*

RECOMMENDATIONS FOR EMPLOYERS AND MANAGERS

Based on our analysis and from the experiences shared by the participants, we identified a set of actionable recommendations for companies to deal with these challenges as they move to hybrid settings. We also provide a list of general recommendations for employers and managers to make a hybrid setting work.

Challenge: Missing key information
Recommendation:

- *a synchronised mode of communication* for everyone in the team. For instance, even team members who WFO use their laptops to attend calls to facilitate team members who WFH.

Challenge: Managing interactive sessions
Recommendations:

- *scheduling physical sessions* for interactive or information-seeking events. For instance, conducting agile ceremonies in the office on a team day where everyone is WFO.
- *selecting, training, and leveraging the right tools* and supporting features to facilitate synchronous and asynchronous communication and collaboration, e.g., team communication using Microsoft Teams, Google Meet, Slack channels, Miro for whiteboarding, or Scrumpy Planning Poker for estimation.

Challenge: Wastage of effort
Recommendation:

- *recording meetings or minutes of meetings* to facilitate team members who WFH, as they can access them if they miss anything due to any interruptions.

Challenge: Lack of participation from teammates WFH
Recommendations:

- *accommodating teammates who WFH*, ensuring they are given time to talk or share

their thoughts or by setting up some rules, e.g., the unmuted mic is an indication of saying something.
- *accessibility of employee's calendar* to everyone in the team if not the entire company. This way, they can approach others without any concerns of interrupting them.
- *sharing their preferred mode of communication* with co-workers when WFH, e.g., when members are working on virtual machines, they prefer co-workers sending emails over slack messages.
- *sharing working schedules with co-workers* so they know of their availability to collaborate, such as through email signature or communication platform status (e.g., away for 2 hours, available for 3 hours, do not disturb).

Challenge: Different working slots
Recommendations:

- *setting up team rules* e.g., no obligation to respond to emails outside working hours unless marked as urgent or high in priority, setting status to 'do not disturb' to minimise interruptions.
- *setting up a common working slot* with half-day (at least 4 hours) when everyone in the team is available. This also enables team members to have uninterrupted time outside of these standard overlapping hours for focused work.

General recommendations:

- *having a fortnightly company day* where everyone in the company WFO for providing opportunities for external communications and collaborations. Bigger companies can have fortnightly tribe days to accommodate space related issues. This will resolve dependency-related issues outside teams and departments.
- *declaring one team or squad day* when all team/squad members WFO. They can do team bonding activities such as team lunches, games, celebrating birthdays to maintain team camaraderie, in addition to conducting interactive sessions such as agile ceremonies.
- *allowing teams and employees to WFO* if

they prefer due to personal reasons and preferences.

- *conducting quarterly/biannual company-wide surveys and retrospectives* to collect reflections on work settings and reassess the satisfaction of the employees and management in their work setting. Companies and teams should continuously refine the work settings until they find the setting that works best for them.
- *introducing ways where teams* can communicate informally, e.g., chat, share jokes, and have casual discussions as part of their day-to-day activities through slack channels or other similar channels.
- *including work setting as part of the team retrospective agenda* to have ongoing team discussions and reflections on what's working well and not.
- *flexibility to accommodate specific groups*, e.g., single parents, working parents, workers with elderly care to meet these personal responsibilities.
- *facilitating regular brief synchronous sessions* for quick updates at a time suiting everyone in the team.
- *providing an inclusive working environment* for new hires by providing online resources and designing an exclusive onboarding plan to cater to their needs in a hybrid work setting.
- *covering costs associated with WFH*, e.g., in setting up an optimal office environment at home, supplying ergonomic furniture, equipment, gadgets, and stable home broadband. These costs can be covered from the company's real estate savings to enable productivity during WFH days.
- *investing in employees mental health and wellness* e.g., by covering the costs of gym memberships and giving away massages vouchers.

CONCLUSION

The COVID-19 pandemic was an eye opener for many companies to see that workers can still work from home and be efficient. In this study, we looked at how companies maintained both productivity and flexibility while combining the best of both working from home and the office in a hybrid setting. We present some key learnings and a set of recommendations for the employers and managers that can help to work around the challenges employees face while working in a hybrid setting. Future studies can compare our findings to their unique settings and study the relevance and effectiveness of these recommendations in other countries.

ACKNOWLEDGMENT

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