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The "Other" Workplace Design Factors: An Insight into What New Zealand Workers Want

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Abstract: The recent COVID-19 pandemic has led to a reassessment of workplace necessities. It has resulted in the current shift from traditional workplace design to creating work experiences—a new paradigm in workplace management. Hence, while some conventional workplace factors remain important to the experiences of workers and, thus, to their well-being, comfort and productivity, recent studies suggest other factors, not widely known, as important in creating the appropriate work experience. Our study explores these other factors in the workplace that contribute to, or may be very important to, workers' comfort, well-being and productivity. These include working mode, facilities, sustainability practices and Diversity, Equity, and Inclusion (DEI)—cultural connection. A sample of 149 occupants across offices in New Zealand was conveniently collected for the study and analysed using descriptive and content analysis in SPSS vs 24. The results show that the occupants prefer to have private offices in the workplace and separate meeting rooms for better concentration on work. In terms of working mode, a combined model of remote working and in-office working is preferred. Furthermore, occupants prefer to have access control and fire safety systems essentially in the workplace and for their offices to be cleaned daily. For sustainable measures in the workplace, the respondents choose the following as practical and convenient: turning off computers outside work hours, using more LED light bulbs in the office, opening windows and doors when required and using a motion sensor lighting system. Interestingly, most of the respondents did not think having a cultural connection in their workplace was important. The study findings represent significant progress in identifying the needs of contemporary office workers. These findings assist facility managers and workplace designers in developing more proactive approaches to anticipated user issues in buildings.

Keywords: diversity and inclusion; facilities; office design; performance; productivity; sustainability

1. Introduction

Buildings are designed and built to meet the needs of their potential users, and the way buildings perform affects users' comfort and well-being [1]. With the recent COVID-19 pandemic, the importance of improving the well-being and comfort of building users is now recognised as a means of transforming decades of underperforming buildings into better-performing buildings [1].

Contemporary research has studied the indoor environment of office buildings to identify its broad effects on the health and well-being, comfort satisfaction, productivity, and performance of building occupants [2]. These studies suggest that parameters/factors, namely thermal comfort, indoor air quality (IAQ), visual comfort, and acoustic quality, together (collectively known as the indoor environmental quality (IEQ)) are the major factors responsible for workers' comfort, productivity, and wellbeing [3,4].

That said, there is growing evidence that the relationship between IEQ and workers' productivity is exaggerated. Byrd and Rasheed [5] argued that the expectation of an optimal IEQ, which increases worker productivity, is non-existent. The authors pointed out that despite a building's compliance with IEQ criteria, workers will still resort to exceptional measures to alter their

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working environment in a bid to achieve comfort. They noted the existence of "other" factors prevalent in the office environment that may have a greater influence on worker productivity than IEQ, such as "loss of sleep", "workload", being "undervalued at work", and "poor management". Rasheed et al. [1] supported this notion when they found that IEQ factors were better predictors of comfort than productivity, suggesting that other factors not captured in their study may have a more significant effect on workers' productivity. These "other factors" influence the design of the work environment as opposed to the architectural outer shell and technical installations of the building.

Some of these "other factors" in the work environment that affect worker comfort and productivity have been acknowledged by research. For example, past works have noted that the building occupants' satisfaction is affected by factors like layout, control over the indoor environment, size, and aesthetics [6,7]. Another set of studies highlighted the effect of office layout, availability of amenities, and cultural diversity on worker comfort satisfaction and building performance [7–12,81,82] and identified safety and security, layout, storage, and privacy as common problems associated with building performance.

Despite the opposing views, there is a collective understanding that an appropriate work environment is necessary for workers' comfort and productivity. However, what constitutes a proper work environment remains debatable because it is multi-faceted, with various interrelated and interdependent factors at play. Therefore, this current study focuses on the "other factors" by investigating their impact on worker comfort, satisfaction, and productivity in the workplace. Thus, we intend to gain insights into the aspects of the workplace where workers' preferences lie. In the subsequent section, pertinent literature is reviewed, culminating in a clear demonstration of the rationale for the current study. After the review, the methods section describes the study approach, sampling, data collection and analysis methods. The results and discussion sections follow, and finally, the paper concludes with the study's insights, limitations, and future research.

2. Workplace Design and Productivity

There is a current shift from traditional workplace design to creating workplace experiences. As more than 90% of human activity occurs indoors [13,14], workplace design must focus on supporting workers' work experiences [15,16].

Designing the appropriate workplace that supports workplace experiences considers the various interrelated and interdependent factors. These include physical, environmental, social, and personal factors that create the complex relationships between worker comfort and productivity and work environments [17,71]. For example, Danielsson et al. [17] depicted that the workplace environment could substantially influence female employees more than male employees due to differences in their sensitivities towards the work environment and noise disturbances.

While environmental factors are recognised as the central focus of workplace research and are significant players in this relationship, the part played by other factors is often generalised. Most times, anthropometrics and ergonomics preeminently oversimplify the multi-faceted influence of these other factors on worker comfort and productivity in workplace designs. However, recent research has highlighted the need for evolving design theories and ideas in the physical structure of work environments.

2.1. Other Factors in Workplace Design

Recent research indicated that the workplace comprises various factors in constant complex relationships impacting workers' comfort, well-being, satisfaction and even productivity. Byrd and Rasheed [5] highlighted this when they proved that social factors such as loss of sleep, individual health/wellbeing, workload, poor management, and being undervalued at work outweighed environmental factors (temperature, lighting, air quality and noise) for their impact on workers' productivity. They maintained that these "other" factors should be given due attention in research and the design of future workplaces.

For example, the emergence of more efficient open-plan offices and flexible working spaces from conventional cellular and traditional "static" offices results from the increasing awareness that

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workers require more social connections and interactions. By definition, conventional cellular or enclosed workplaces are designed to provide a private room for one or two individuals. At the same time, open-plan offices lack interior walls, leading to a high capacity of individual workers in distinct workspaces [18].

The benefits and limitations of both cases are prominent. Cellular offices are known to increase solitude, lessen undesirable interference [72], and surpass open-plan office designs for indoor environmental quality (IEQ) performance [18]. However, open-plan offices are aesthetically charming and easier to redesign when a different population fits in. Due to this reason, open-plan offices have become a well-liked workplace design precisely for offices desiring to lower stable overheads and expand the worker population [19]. Some studies have attributed the greater worker satisfaction in open-plan offices to enabling teamwork and coordination [20]. De Paoli et al. [21] observed that most workers in a new building prefer open and flexible workplaces as it helps them enhance knowledge sharing, coordination, and innovation. Common limitations of open-place offices include loss of privacy, prevalent noise and being unsuitable for technical and concentrated tasks [20].

The recent COVID-19 outbreak has seen an unprecedented change in working style—introducing a new normal of Working From Home (WFH) [22]. Vyas and Butakhieo [23] noted that the COVID-19 restrictions offered a unique perspective on how well WFH works. The authors pointed out that WFH may be essential to reshaping the current working style structure and allowing for more flexibility in the work environment. Although the benefits are laudable, especially considering the financial burden on workers for transportation and lack of work-life balance, it may be too soon to "call it". Research evidencing how the layout and other aspects of a home affect workers' health, comfort, and productivity deserves focus. Although some studies have covered some aspects [76–78], some more investigations about how WFH (fully or partially) affects workers' physiological and psychological reactions to stress and presenteeism are required [24].

The role furniture and office layout play in creating a workplace experience is established. The comfort and health implications of a particular type of furniture in the style of office layout ensure that these considerations are at the heart of every furniture design and layout plan. For example, past studies have shown the relationship between the type of furniture workers use and musculoskeletal or visual comfort [25,26] and stimulating physical activity or reduced sitting time [27,28].

Notably, the performance of furniture or the effectiveness of an office layout in supporting workers and providing required comfort is mediated by how they are used. Improper use of furniture can reduce their performance and have a negative effect on workers' comfort, satisfaction, and productivity. For instance, Anjum et al. [29] observed that 24% of workers were least satisfied by the appearance of furniture and office layouts. Lueder and Allie [30] pointed out that designers need to consider providing training in the correct use of furniture, as many users need to be made aware of how their furniture can be adjusted to alleviate physical discomfort and potential musculoskeletal disorders.

Creating a workplace experience also means that anthropometrics and ergonomic considerations are not the only determinants of how a work environment is designed, arranged, and even furnished. For instance, greening the indoor work environment has been established to benefit health and comfort. The air-cleaning ability of plants [31–33] and exposure to views and scenery [34,35] are evidenced as an advantage to creating a biophilic workplace design. Lee et al. [36] noted that workers in buildings with the Green Mark (GM) Standard have superior IEQ performance than those in Non-Green Mark (NGM) buildings. Singh et al. [37] observed that green office buildings decrease perceived absenteeism, respiratory allergies, depression, and stress.

In worker-centric office designs, other considerations like Diversity, Equity, and Inclusion (DEI) are also significant in ensuring that the work environment supports all workers. However, a limited number of studies have investigated the significance of these aspects on workers' comfort and productivity.

DEI in the work environment entails recognising and accepting differences of employees, such as gender, age, ethnicity, religion, culture, and disability [22,38] and designing a work environment

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that accommodates and values the differences in their workplace experiences. The commonly investigated DEI aspects involve utilising the gender and age of the workforce to overcome discrimination and isolation while enabling equality [39–41]. Other limited works on the importance of DEI have been directed to harnessing the differences towards creating a productive work environment [42–44]. For instance, Nyagadza et al. [45] studied the Zimbabwean labour market and noted that teamwork, participation, and cohesiveness are integral to enhancing workplace DEI.

Theofanos et al. [41] pointed out that most studies solely focused on gender differences in promoting diversity in the work environment while ignoring other essential aspects such as race and ethnicity. For instance, Cherian et al. [46] evaluated the impact of multicultural work team performance at Abu Dhabi University, identifying the impact cultural diversity played in the university's productivity levels. Mensah [47] reported on the influence of sociocultural values on job satisfaction within Ghanaian society. Salama [48] explored the relationship between leadership and cultural diversity challenges in the construction sector of Dubai.

Similar research has been conducted in New Zealand, exploring the significance of cultural diversity in the workplace. For example, Vine [49] examined the influence of an ethnicised Maori workplace on interaction patterns in workplace meetings for a Maori male manager—Caleb. The author identified Maori norms and values underlying the manager's adoption of his interaction patterns. Schurr et al. [50] investigated how leaders in ethnically diverse (Pakeha and Maori workplaces) construct themselves as influential leaders interacting with subordinates. They noted that by behaving in ways per the norms developed in their 'ethnicised' communities of practice, leaders and other organisational members reinforce, maintain, and shape these politeness norms. Haar and Brougham [51] found that Māori employees who felt their cultural values were understood in the workplace reported better job outcomes and satisfaction.

An overlooked aspect of DEI is cultural connection's role in the workplace, especially in supporting worker comfort, well-being, and productivity. Cultural connection in the workplace denotes an environment where cultural differences are represented in the design and management of work experiences. Workplace designs that acknowledge the cultural connection of their workers provide the opportunity to remain connected to one's culture, enabling self-reflection and foundational beliefs that guide work ethics and commitments. Cultural connection is integral to creating a cohesive and conducive work environment by promoting inclusive work experiences and influencing the design of the physical workplace. As such, it is plausible to question whether a workplace that has been designed to highlight the cultural connection of workers is important to their comfort and productivity.

Our hypothesis is that an inclusive workplace design comprises all multi-faceted aspects that create a familiar yet unique work experience for each worker. An appropriate work experience will ensure a pool of talented workforce and make the organisation attractive to other stakeholders.

2.2. Problem Statement

Anjum et al. [29] noted that research needs to be conducted into how users (workers) feel about these places to establish the required improvements and facilities. Many past studies that have attempted to identify the factors influencing an appropriate work environment and understand the relationships between workers and the work environment employ objective and subjective measures. Objectively, experiments and tests are conducted to establish a link between varying indoor work environments and workers' ability to perform assigned tasks. Subjectively, self-evaluated comfort/satisfaction/productivity indicators are captured through post-occupancy evaluation (POE) surveys [16,52,74]. POE is valuable in evaluating occupant satisfaction with the indoor environment, thereby determining whether the building performs to ensure occupants' health and comfort and to which degree [1,21,53].

As expected, previous POE studies show that the work environment significantly affects occupants' health, well-being, and productivity [54,55]. However, most of these studies have been dominated by specific IEQ factors in the workplace. Limited work has explored the part played by "other" factors in the workplace [56,57]. Our study focuses on these other factors, namely facilities,

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DEI, and sustainability, and investigates workers' preference for their factors with respect to their comfort, satisfaction, and productivity.

Also, past studies have been limited to case studies of specific office buildings and spaces with unique work expectations and configurations. The findings and conclusions are reactive (after the fact) and not generalisable. These results in workplace designs that do not provide inclusive work experiences. Our study takes a proactive- rather than the prevalent reactive approach by investigating New Zealand office workers' preferences in their workplaces.

Our study is not limited to case study office buildings; however, we aimed to identify non-IEQ-related factors prevalent in the workplace that can affect worker comfort, satisfaction, and productivity. These factors are integral to the design of new workspaces and the retrofit of existing ones. No previous work has obtained generalisable workers' workplace preferences that are not limited to specific case study office buildings. The findings of this study provide a more robust account of contributing factors that enable more user-centred designs for worker comfort, satisfaction, and productivity.

Also, as limited research has investigated workers' perceptions of DEI and the possible impacts on their work experience [58]), we explore the extension of DEI studies beyond cultural diversity and awareness of cultural connection. While awareness and diversity require the sentience and representation of different cultures, cultural connection ensures that workers' traditional values and beliefs influence workplace design.

We investigate the importance of cultural connection to the design of the physical workplace. For instance, Houkamau and Sibley [59] found that Māori who are more strongly oriented towards a traditional Māori belief system are less likely to be individualistic– opting for relationships (whanaungatanga) relationships, mainly based on whakapapa, i.e., genealogy at work. Other core cultural values include generosity, caring for others, compassion (mannakitanga) and reciprocity (utu) [60,61]. Such belief systems influence workers' preference for more inclusive and collaborative shared spaces that promote interaction in the workplace, amongst other features.

Cultural connection has not received as much attention as diversity and awareness, and most studies remain within the boundaries of establishing a relationship between these aspects and workers' productivity. In this study, we explored the perception of workers on the importance of a workplace designed to provide a cultural connection for workers as a part of "other" factors significant to workers' comfort, satisfaction, and productivity.

3. Methods

Our study aimed to identify non-IEQ-related (other) workplace factors influencing worker comfort, satisfaction, and productivity. To achieve this, we explore three non-IEQ aspects of the workplace, using mixed methods, namely:

1. Facilities: such as furniture, office type, meeting rooms, working remotely/WFH, cleaning, safety, and security
2. Diversity, Equity, and Inclusion (DEI): These include cultural connection, gender equality, and sexual orientation. These factors were analysed with regard to cultural connection, gender equality, age, ethnicity/race, disability, and religion.
3. Sustainability: These include sustainable practices and policies. We delved into the aspects of sustainable practices that support workers' work experience, exploring their practicality and viability to their comfort and productivity.

The research approach undertaken in the study is essentially exploratory as it aims to gain insights into the experience and interpretation of events by office occupants who have widely differing stakes and roles [83]. To address the three aspects highlighted, we conducted a perception-based study using self-evaluated questionnaires that required workers to evaluate their preferences for workplace facilities. Self-evaluation is commonly used in social science studies to retrieve participants' opinions and perceptions in the workplace [62–64].

We followed a sequential approach to the development of the questionnaire by firstly extracting the parameters tested from existing literature on various physical and social factors influencing

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workers' comfort, satisfaction, and productivity. The questions were mostly quantitative (Q1–10), while Q11 on Diversity and Inclusion required a qualitative (open-ended) question. Secondly, we validated the questions (Q1- 11) asked through a pilot study, and finally, we administered the questionnaire to office workers through the Qualtrics online survey platform.

The questions examined in this paper are categorised as follows (Table 1):

- Socio-demographic information: gender, age, ethnicity, duration of residence in NZ and work, and time spent in workspace type and location.
- Workplace parameters tested: furniture, office type, meeting rooms, working remotely/WFH, cleaning, safety & security, cultural connection, and sustainable practices.

Table 1. Questions to evaluate office occupants' perceptions and preferences.

Parameter	Questions (1–11)	Response Options
Furniture [57]	Q1: Is the furniture in your workspace sufficient and appropriate for the work you do?	Want more; No change—OK; Want less
Office type	Q2: What type of office layout do you prefer as your workspace?	Private; Cubical/Open-floor plan; Duo (shared with 1 other); Shared (shared with 2-4 others); Shared (shared with 5-8 others)
Meeting Rooms	Q3: How do you prefer the availability of meeting rooms for use?	With an adjoining conference room; Within the office with a comfortable seating area; At workspace with chairs opposite my desk
Working Remotely	Q4: Would you rather work remotely or in-office?	Remotely (anywhere else); Remotely (from home); Half remotely/half in-office; In-office
Safety & Security	Q5: What type of safety and security systems do you prefer in your workspace?	Lockable storage; CCTV cameras; Access control; Fire safety; Cybersecurity; Other—Yes or No
Cleaning	Q6: How frequent would you prefer your workspace to be cleaned?	Daily; Weekly; Monthly
Facilities	Q7: Which facility(s) do you prefer in your office building?	More storage, more private toilets, lifts, lounges/cafeterias, more parking lots, staircases, others (please specify)—Yes or No
Sustainable Measures	Q8: Which of these sustainable measures do you think is practical in your workspace?	Less use of artificial lighting; Less use of air conditioners (HVAC); Adjusting clothing when cold or too warm; Turning off computers outside work hours; Turning off printers outside work hours; Turning off kitchen equipment outside work hours; Reusing kitchen utensils (cups, cutlery and plates); More use of LED light bulbs; Use of motion sensor lighting; Less use of hot water; More indoor plants; Have more recycling bins in the workspace; Have a compost bin in the workspace; Opening windows and doors as required; Less use of dishwashers; Less use of microwaves; Other (please specify)—Yes or No
Mandatory sustainable practice	Q9: Would you like a mandatory sustainable practice standard in your office building?	Yes; No; I do not mind
Cultural Connection	Q10: How important is a cultural connection in your workspace to your ability to work?	Not at all; Slightly important; Moderately important, Very important
Diversity & inclusion	Q11: Please state what you will like to have in your office that makes it more inclusive of workers' diversity?	Open-ended question

The target population was office workers across New Zealand. At the time of conducting this study, there is no information on the number of office workers (employees who occupy office spaces) in the country. Also, simple regression analysis was deemed sufficient to achieve the aim of our

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study—to identify non-IEQ-related workplace factors influencing worker comfort, satisfaction, and productivity. According to Hair et al. [65], simple regression analysis needs at least 50 samples and generally 100 samples for most research situations. As such, we aimed for a minimum of 100 samples of office workers in New Zealand.

The questionnaire was distributed across the country via online platforms between November 2020 and February 2021, during the summer season in New Zealand. A total of 204 responses were collected, and 149 (38.8%) were deemed viable for analysis using IBM SPSS 24 [66,67].

The respondents' demographic is mostly female (61%) and younger people aged between 30-49 and below 30 years (71.9%). The workers have different ethnicities; however, most are Europeans (38.3%) and Asians (37.6%). Furthermore, nearly all workers have lived in New Zealand for more than 1 year (98%), with a majority having lived between 1—10 years (43%).

The study participants are well familiar with their workspace and indoor environment, as most of the workers spend 8 hours or more at the buildings (69.8%), have worked in the current building (76.5%), and the workspace for a year or more than a year (65.1%). Also, most workers share the workspace with more than eight other co-workers in cubicles or open-plan offices (38.3%). Table 2 shows the demographic variables of concern in the study. We believe these variables capture much of the variation that might influence office worker preferences of non-IEQ factors at their workplace. We acknowledge other demographic, professional, and personal factors that could potentially influence an individual's preferences for their work environments. We have held certain control variables constant to prevent their interference with the study findings, such as: workers' cadre/position—which may determine their workplace configuration; previous work environment—where past experiences may shape current preferences; physical ability/disability—that may influence workplace features; and personality traits (introversion/extroversion)—that may affect preferences for layouts.

Table 2. Participants' background information.

Demography	N	Percentages				
Gender	149	61.1 (female)	36.2 (male)	2.7 (prefer not to say)		
Age	149	43.0 (30 -49 years)	28.9 (below 30 years)	26.8 (50 -65 years)	1.3 (above 65 years)	
Ethnicity	149	38.3 (European)	37.6 (Asian)	15.4 (Other)	6.7 (Black, Middle Eastern)	2 (Māori, Pasifika)
Time spent in NZ	149	43 (1–10 years)	40.9 (More than 20 years)	14.1 (11–20 years)	2 (Less than a year)	
Normal work base	149	90.6 (Yes)	9.4 (No)			
Time spent in the office building	149	76.5 (A year or more)	23.5 (Less than a year)			
Time spent in present workspace	149	65.1 (A year or more)	34.9 (Less than a year)			
Time spent in office building each day	149	69.8 (8 hours or more)	30.2 (Less than 8 hours)			
Type of office building	148	61.7 (Commercial)	27.5 (Educational)	10.1(Home Office)		
Time spent working at the computer each day	149	54.4 (Less than 8 hours)	45.6 (8 hours or more)			
Private or shared workspace	149	38.3 (Cubical or Open plan)	20.8 (Private office)	18.1 (Shared with 2-4 others)	12.8 (Shared with 1 other)	10.1 (Shared with 5-8 others)
Workspace location	149	60.4 (Close to a window within 1.5m	20.1 (Close to an exterior wall within 1.5m	19.5 (At the centre of the office)		

As the study aims to identify non-IEQ-related workplace issues that affect worker comfort, satisfaction and productivity, the data scales were ordinal, and data were analysed using descriptive and content analysis.

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The results for each parameter investigated are presented based on the following categories, namely gender, age, the time spent in NZ, type of workspace, type of building and proximity. Each parameter is critically analysed based on its mean, standard deviation, frequency of responses and opinion differences.

The mean shows the value that appears most frequently in a data set, while the standard deviation measures how dispersed the responses are with the mean. As the data is categorical, the cross-tabulation Chi-square test of goodness of test with a confidence level of 95% was used to determine if there is a statistically significant correlation between the demographic variables and workers' preferences [68]. Chi-square has been used in past works to test for correlations, associations, and differences [69,70].

4. Presentation of the Results

The chi-square goodness-of-fit test showed a significant association between preference for all the variables tested and all the demographic groups ($p > 0.05$). This means that their responses for each variable were influenced by their demographics. The results for each variable are presented in the following subsections.

4.1. Opinions on Facilities in Workplaces

4.1.1. Sufficient and Appropriate Furniture

The occupants were asked whether sufficient and appropriate furniture was available to carry out the routine work in the workspace. Table 3 presents the occupants' preference rating on the availability of furniture. Generally, the majority (79.51%) preferred no change in the current availability of furniture in the office space (M=1.86; Std Dev = 0.43). This was followed by some workers who felt the furniture was insufficient and wanted more furniture (17.21%), while very few indicated they wanted less furniture in their workspace (3.28%). The chi-square goodness-of-fit test showed a significant association between preference for furniture and all the demographic groups ($p > 0.05$). This means that their demographics influenced their responses on the sufficiency and appropriateness of the furniture in their workplaces.

Table 3. Office Workers' Preference Rating on Furniture.

	Demography	Mean	SD	Want more (%)	No Change (%)	Want less (%)	Chi-Square test
Gender	Male	1.851	0.408	16.7	81.5	1.9	$X^2 = 1.194$
	Female	1.846	0.469	19.8	75.8	4.4	$p = 0.879$
	Prefer not to answer	1.750	0.500	25.0	75.0	0.0	
Age	Below 30	1.744	0.441	25.6	74.4	0.0	
	30–49	1.844	0.479	20.3	75.0	4.7	$X^2 = 5.846$
	50–65	1.950	0.389	10.0	85.0	5.0	$p = 0.441$
	Above 65	2.000	0.000	0.0	100.0	0.0	
Time Spent in present workspace	Less than a year	1.750	0.519	28.8	67.3	3.8	$X^2 = 5.495$
	More than a year	1.897	0.395	13.4	83.5	3.1	$p = 0.064$
Time spent in office each day	More than 8 hrs.	1.733	0.495	28.9	68.9	2.2	$X^2 = 4.410$
	Less than 8 hrs.	1.894	0.416	14.4	81.7	3.8	$p = 0.110$
Type of Workspace	Private office	1.742	0.445	25.8	74.2	0.0	
	Shared with 1 other	1.947	0.524	15.8	73.7	10.5	
	Shared with 2–4 others	1.778	0.424	22.2	77.8	0.0	$X^2 = 8.837$
	Shared with 5–8 others	1.800	0.561	26.7	66.7	6.7	$p = 0.356$
	Cubicle/open plan office	1.912	0.391	12.3	84.2	3.5	
Proximity	1.5m close to a window/door	1.878	0.392	14.4	83.3	2.2	$X^2 = 8.632$ $p = 0.71$
	1.5m close to an exterior wall	1.867	0.571	23.3	66.7	10.0	

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	At the centre of the office	1.724	0.455	27.6	72.4	0.0	
Type of Building	Commercial	1.850	0.488	20.4	74.2	5.4	$X^2 = 7.822$ $p = 0.098$
	Education	1.902	0.300	9.8	90.2	0.0	
	Home Office	1.667	0.488	33.3	66.7	0.0	

4.1.2. Office Layout

Office layout is another factor that must be considered when designing the workspace. Table 4 includes the occupants' response towards current office layouts of their offices. Possible suggestions given to the occupants are private rooms, cubical/open-plan office, duo office, shared offices with 2-4 others and shared with 5-8 others.

Table 4. Preference rating on office layout.

	Demography	**Mean**	**SD**	**Alone (%)**	**Cubicle/ Open-floor (%)**	**Shared with 1 other (%)**	**Shared with 2-4 others (%)**	**Shared with 5-8 others (%)**	**Chi-Square test**
Gender	Male	2.796	1.698	38.9	9.3	13.0	11.1	27.8	$X^2 = 5.839$ $p = 0.665$
	Female	2.604	1.570	40.7	9.9	15.4	16.5	17.6	
	Prefer not to answer	1.500	1.000	75.0	0.0	25.0	0.0	0.0	
Age	Below 30	2.349	1.602	53.5	4.7	9.3	28.6	14.0	$X^2 = 17.713$ $p = 0.125$
	30–49	2.813	1.632	35.9	10.9	12.5	17.2	23.4	
	50–65	2.700	1.620	37.5	10.0	22.5	5.0	25.0	
	Above 65	2.500	0.707	0.0	50.0	50.0	0.0	0.0	
Time Spent in present workspace	Less than a year	2.423	1.601	48.1	11.5	5.8	19.2	15.4	$X^2 = 8.386$ $p = 0.078$
	More than a year	2.763	1.612	37.1	8.2	19.6	11.3	23.7	
Time spent in office each day	More than 8 hrs.	2.171	1.485	54.3	11.4	5.7	20.0	8.6	$X^2 = 5.841$ $p = 0.211$
	Less than 8 hrs.	2.790	1.627	36.8	8.8	17.5	12.3	24.6	
Workspace	Private office	1.936	1.181	54.8	12.9	16.1	16.1	0.0	$X^2 = 27.091$ $p = 0.04$
	Shared with 1 other	3.316	1.600	26.3	21.1	21.1	31.6	0.0	
	Shared with 2–4 others	2.926	1.859	40.7	11.1	11.1	37.0	0.0	
	Shared with 5–8 others	3.467	1.598	20.0	6.7	20.0	13.3	40.0	
	Cubicle/open plan office	2.457	1.536	43.9	10.5	17.5	12.3	15.8	
Proximity	1.5m close to a window/door	2.956	1.628	33.3	7.8	14.4	18.9	25.6	$X^2 = 11.571$ $p = 0.171$
	1.5m close to an exterior wall	2.067	1.484	56.7	13.3	10.0	6.7	13.3	
	At the centre of the office	2.276	1.486	48.3	10.3	20.7	6.9	13.8	
Type of Building	Commercial	2.656	1.638	41.9	8.6	12.9	15.1	21.5	$X^2 = 9.285$ $p = 0.319$
	Education	2.854	1.636	36.6	4.9	19.5	14.6	24.4	
	Home Office	2.000	1.254	46.7	26.7	13.3	6.7	6.7	

The chi-square test of goodness-of-fit showed that there was a significant association between preference for office layout and all the demographic groups ($p > 0.05$), except for the type of workspace. This means there was a significant difference in workers' opinions based on their current type of workspace, i.e., whether they share their workspace with another worker(s) or not ($p = 0.04$).

Generally, more (38.52%) preferred private offices (M=2.48; Std Dev = 1.52). This was followed by cubical/open-plan offices (22.13%). The next preferred office space was the Shared office with 5–8 other workers (16.39%) and Shared with 2–4 others (14.75%). Duo office spaces were the least preferred workspaces (8.20%).

The majority preferred private rooms, showing how occupants value their privacy and upkeep concentration on their work.

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4.1.3. Meeting Rooms

Table 5 summarises the workers' responses to their preferred meeting room choice. As shown in the table, most of the workers prefer a conference room away from their workspace, followed by those who prefer a meeting room within the office with a comfortable seating area. Very few prefer a workspace with chairs opposite their desk.

Table 5. Preference rating on meeting rooms.

	Demography	Mean SD	Away from workspace (%)	Within the workspace (%)	Opposite my desk (%)	Chi-Square test
Gender	Male	1.537 0.605	51.9	42.6	5.6	X2 = 1.058
	Female	1.517 0.619	54.9	38.5	6.6	p = 0.901
	Prefer not to answer	1.250 0.452	75.0	25.0	0.0	
Age	Below 30	1.449 0.697	66.7	21.7	11.6	
	30–49	1.518 0.617	54.5	39.1	6.4	X2 = 00.717
	50–65	1.554 0.501	44.6	55.4	0.0	p = <0.069
	Above 65	1.500 0.577	50.0	50.0	0.0	
Time Spent in present workspace	Less than a year	1.547 0.645	53.5	38.4	8.1	X2 = 0.789
	More than a year	1.488 0.592	56.2	38.9	4.9	p = 0.674
Time spent in office each day	More than 8 hrs.	1.613 0.634	46.7	45.3	8.0	X2 = 2.846
	Less than 8 hrs.	1.462 0.596	59.0	35.8	5.2	p = 0.241
Workspace	Private office	1.585 0.692	52.8	35.8	11.3	
	Shared with 1 other	1.226 0.425	77.4	22.6	0.0	
	Shared with 2–4 others	1.548 0.772	61.9	21.4	16.7	X2 = 12.834
	Shared with 5–8 others	1.444 0.577	59.3	37.0	3.7	p = 0.118
	Cubicle/open plan office	1.558 0.520	45.3	52.7	1.1	
Proximity	1.5m close to a window/door	1.472 0.591	57.6	37.5	4.9	X^2 = 1.616
	1.5m close to an exterior wall	1.539 0.641	53.8	38.5	7.7	p = 0.806
	At the centre of the office	1.577 0.637	50.0	42.3	7.7	
Type of Building	Commercial	1.447 0.559	58.5	38.4	3.1	X^2 = 5.748
	Education	1.631 0.651	46.2	44.6	9.2	p = 0.219
	Home Office	1.583 0.776	58.3	25.0	16.7	

Interestingly, the perception of workers was generally consistent on having meeting spaces away from their workspaces or within the workspace who spend more time in the office (46.7%; 45.3%.) and those who work in educational buildings (for example, lecturers and administrators) (46.2%; 44.6%) respectively. In both cases, having chairs opposite their desks for meetings was least preferred.

The chi-square test of goodness-of-fit performed showed that there was a significant association between preference for meeting rooms and all the demographic groups (p >0.05).

4.1.4. Working Mode (Home or In-Office)

The respondents were asked to identify their preferred working mode. These included in the office, a combination of working from home and in the office, and remotely (working from home or anywhere else). The responses are summarised in Table 6.

Table 6. Preference rating on working mode.

	Demography	Mean SD	Anywhere else (%)	From home (%)	Remotely in office (%)	In-office	Chi-Square test
Gender	Male	2.600 1.143	28.7	6.3	41.3	23.8	X2 = 11.319
	Female	2.905 0.968	13.6	10.9	46.9	28.6	p = 0.079
	Prefer not to answer	3.800 0.422	0.0	0.0	20.0	80.0	

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Age	Below 30	2.191	1.105	38.1	19.0	28.6	14.3	X2 = 30.952 *p* = <0.001
	30–49	2.889	1.009	16.2	8.1	46.5	29.3	
	50–65	3.315	0.705	4.1	1.4	53.4	41.1	
	Above 65	3.500	0.707	0.0	0.0	50	50	
Time Spent in present workspace	Less than a year	2.718	1.087	22.4	9.4	42.4	25.9	X2 = 2.891 *p* = 0.409
	More than a year	2.908	1.012	15.8	8.6	44.7	30.9	
Time spent in office each day	More than 8 hrs.	2.861	1.031	16.8	10.4	42.8	30.1	X2 = 1.789
	Less than 8 hrs.	2.781	1.076	21.9	4.7	46.9	26.6	*p* = 0.617
Workspace	Private office	2.535	1.032	23.3	16.3	44.2	16.3	X2 = 16.213 *p* = 0.182
	Shared with 1 other	3.286	1.049	10.7	10.7	17.9	60.7	
	Shared with 2–4 others	3.044	1.010	13.0	8.7	39.1	39.1	
	Shared with 5–8 others	2.955	1.046	18.2	0.0	50.0	31.8	
	Cubicle/open plan office	2.725	1.013	20.4	7.1	52.0	20.4	
Proximity	1.5m close to a window/door	2.544	1.018	24.4	11.1	50.0	14.4	X^2 = 19.830 *p* = 0.003
	1.5m close to an exterior wall	2.500	1.157	30.0	113.3	33.3	23.3	
	At the centre of the office	3.379	0.719	3.4	3.4	44.8	48.3	
Type of Building	Commercial	2.762	1.074	21.9	6.6	45.0	26.5	X^2 = 10.706 *p* = 0.098
	Education	3.069	0.835	6.9	10.3	51.7	31.0	
	Home Office	2.786	1.197	21.4	17.9	21.4	39.3	

The chi-square test showed that there was a significant association between preference for the working mode and all the demographic groups (p >0.05); except for Age and Proximity. This means that their responses differed significantly for both demographics (p = <0.000; 0.003, respectively).

As seen from Table 6, most workers surveyed indicated they like to work remotely for a few days and in the office on other days. Another considerable number of occupants indicated they prefer to work in-office only. The next preferred working mode was anywhere else (not from home or the office), and the least was working from home.

Unlike other variables tested, the responses to this question varied amongst some demographics of the respondents. Workers under 30 years old preferred to work in any way else that is not at home or in the office (38.1%), while those above 30 years old preferred a combination of home and office work modes (46.5%; 53.4%).

Workers who shared office space with one other person (60.7%), whose desk spaces are located at the centre of the workspace (48.3%), and those who work in "other" building types (39.3%) preferred to work mostly in the office. In contrast, the rest of the groups preferred a combination of home and office work modes.

4.1.5. Cleaning

The workers were asked about their preference for the frequency of cleaning at their workplace, and the results are summarised in Table 7.

Table 7. Preference rating on cleaning pattern.

	Demography	Mean	SD	Daily	Weekly	Monthly	Chi-Square test
Gender	Male	1.459	0.589	58.8	36.5	4.7	X^2 = 12.022 *p* = 0.017
	Female	1.354	0.480	64.6	35.4	0.0	
	Prefer not to answer	2.000	0.000	0.0	100.0	0.0	
Age	Below 30	1.267	0.446	73.3	26.7	0.0	X^2 = 15.060 *p* = 0.020
	30–49	1.433	0.498	56.7	43.3	0.0	
	50–65	1..552	0.626	51.7	41.4	6.9	
	Above 65	1.000	0.000	100.0	0.0	0.0	
Time Spent in NZ	Less than a year	1.500	0.577	50	50	0.0	X^2 = 6.605 *p* = 0.359
	1-10 years	1.312	0.491	69.1	29.8	1.1	
	11-20 years	1.393	0.629	63.3	23.3	6.7	

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	More than 30 years	1.511	0.524	50.0	48.9	1.1	
Workspace	Private office	1.479	0.583	56.3	39.6	4.2	$X^2 = 9.471$ $p = 0.304$
	Shared with 1 other	1.552	0.506	44.8	55.2	0.0	
	Shared with 2–4 others	1.382	0.490	61.8	38.2	0.0	
	Shared with 5–8 others	1.474	0.513	52.6	47.4	0.0	
	Cubicle/open plan office	1.313	0.528	71.6	25.4	3.0	
Proximity	1.5m close to a window/door	1.377	0.517	63.8	34.6	1.5	$X^2 = 1.134$ $p = 0.889$
	1.5m close to an exterior wall	1.532	0.584	51.1	44.7	4.3	
	At the centre of the office	1.390	0.494	61.0	39.0	0.0	
Type of Building	Commercial	1.4505	0.543	57.1	40.7	2.2	$X^2 = 2.340$ $p = 0.674$
	Education	1.3415	0.526	68.3	29.3	2.4	
	Home Office	1.4667	0.505	53.3	46.7	0.0	

As expected, the respondents' preferences for cleaning showed that the majority preferred to have their workspaces cleaned daily. This is followed by weekly cleaning. Only very few respondents prefer their workplaces to be cleaned every month. Therefore, facilities managers can schedule the cleaning parties according to the type of cleaning. For example, emptying the garbage bins and cleaning the bathrooms can be scheduled daily, while vacuuming can be done weekly. The cleaning jobs that need monthly attention are cleaning and disinfecting office furniture and equipment.

The chi-square test of goodness-of-fit performed showed that there was a significant association between preference for cleaning patterns and all the demographic groups ($p > 0.05$), except for gender ($p = 0.017$) and age ($p = 0.02$).

4.1.6. Safety and Security Systems

In workplace design, safety, and security systems play a considerable role in assuring a peaceful environment for people to carry out their work. For this variable, the respondents were asked to choose the safety and security systems they preferred to have in their workspaces. They could choose more than one system. The results are presented in Table 8.

Table 8. Preference rating on safety and security.

Facilities	Overall	Gender (%)			Age (%)				Building Type (%)		
		Male	Female	Prefer not to answer	Below 30 years	30–49 years	50–65 years	Above 65 years	Commercial	Educational	Home office
Lockable Storage	49.7	51.9	50.5	100	55.8	45.3	52.5	100	48.4	56.1	40
CCTV Camera	39.6	42.6	38.5	25	39.5	34.4	45	100	43	29.3	46.7
Access control	65.8	64.8	67	50	74.4	60.9	65	50	67.7	56.1	80
Fire safety	62.4	59.3	65.9	25	79.1	56.3	55	50	63.4	63.4	53.3
Cybersecurity	43.6	46.3	44	100	41.9	43.8	47.5	100	45.2	46.3	36.7
Other	3.4	3.7	3.3	100	7	3.1	100	100	3.2	4.9	100

Regarding building type, more workers in commercial buildings voted for Access control (67. 7%) and Fire Safety (63.4%) as preferred systems in the workplace. In educational buildings, more workers voted for Fire Safety (63.4%), lockable storage and access control (56.1% each) as preferred systems. Workers in home offices voted most for Access control (80%) and Other (100%) as the preferred security and safety systems in their workplace.

In their opinion, by age, most of the workers below 30 years old voted for Fire Safety (79.1%) and Access control (74.4%) as preferred systems in their workplace. More workers between 30–49 years old preferred to have Access Control (60.9%) and Fire Safety (56.3) in their workplaces. Workers between 50–65 years old voted mostly for 'Other' systems (100%) and Access control (65%) as preferred systems. The respondents who are aged 65 years and above all voted for Lockage storage, CCTV cameras, Cybersecurity and Other systems as preferred systems (1000%).

Regarding gender, Access control received the most votes amongst male (64.8%) and female workers (67%), although more female workers voted in favour of Access control. For male workers, Fire Safety (59.3%) and Lockable storage (51.9%) followed suit. For female workers, Fire safety was the second most voted system (65.9%), followed by lockable storage (50.5%). Workers with no

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identified gender voted for lockage storage, cybersecurity, and other systems, which preferred security and safety systems in the workplace.

Generally, all the safety and security systems given in the list were selected by the respondents. However, many prefer Access control (65.8%) and fire safety (62.4%) as must-have security and safety systems in the workplace. This was followed by Lockage storage (49.7%), Cybersecurity (43.6%) and CCTV cameras (39.6%). Other systems received the least number of votes (3.4%), including earthquake resilience of the office buildings.

4.1.7. Preferred Facilities

The respondents were asked to select the facility they prefer to have in their workplace to support their tasks. These included more storage, private toilets, lifts, lounge/cafeteria, parking lot, staircases, and others.

As shown in Table 9, more workers in commercial buildings prefer having lounges/cafeterias (58.1%) in their workplaces. This is followed by private toilets (46.2%) and parking lots (44.1%), staircases (29%), lifts (28%) and more storage (21.5%). Twenty-five per cent (25.8%) of the workers noted a preference for other facilities. More workers in educational buildings also prefer having lounges/cafeterias (53.7%), followed by parking lots (43.9%) and private toilets (34.1%). Those in home offices prefer having more parking spaces and lounges/cafeterias (40% each).

Table 9. Preference rating on facilities.

Facilities	Overall	Gender (%)			Age (%)				Building Type (%)		
		Male	Female	Prefer not to answer	Below 30 years	30–49 years	50–65 years	Above 65 years	Commercial	Educational	Home office
More storage	21.5	22.2	22	0	16.3	25	20	50	21.5	19.5	26.7
Private toilets	40.9	31.5	45.1	75	44.2	39.1	40	50	46.2	34.1	26.7
Lifts	25.5	22.2	28.6	0	18.6	28.1	30	0	28	24.4	13.3
Lounge/Cafeteria	55	48.1	57.1	100	62.8	51.6	55	0	58.1	53.7	40
Parking lot	43.6	46.3	42.9	25	48.8	35.9	50	50	44.1	43.9	40
Staircases	22.1	9.3	30.8	0	25.6	20.3	22.5	0	29	14.6	0
Other	18.8	13	22	25	16.3	20.3	20	0	25.8	7.3	6.7

Half of the workers aged 65 years old and above voted for more storage, private toilets and parking spaces. Those between 50–65 years old voted most for lounge/cafeterias (55%) and parking spaces (50%) in their workplace. This was followed by private toilets (40%) and lifts (30%). Fifty-one per cent (51.6%) of workers within the age range of 30–49 years old voted for lounge/cafeterias, 39.1% voted for private toilets, 35.9% voted for parking spaces, and 28.1% voted for lifts. More storage received 25% of the votes, while 20.3% voted for staircases and other facilities. For workers below 30 years old, more workers voted for lounge/cafeteria as a preferred facility in the workplace (62.8%). This was followed by parking spaces (48.8%), private toilets (44.2%), staircases (25.6%) and lifts (18.6%). The systems that received the least votes were more storage and other systems (16.3% each).

In their opinion by gender, most of the male and female workers preferred having lounges/cafeterias (48.1% & 57.1%, respectively). For the male workers, parking spaces were the second most voted facility (46.3%), followed by private toilets (31.5%) and lifts (22.2%). Private toilets received the second-highest votes from female workers (45.1%). Parking lots followed this with 42.9% of their votes. Staircases and lifts received 30.8% and 28.6%, respectively. More storage and other facilities received 5.88% each of the votes from female workers.

Generally, most of the workers preferred having a lounge/cafeteria in their workplace (55%). This was followed by parking lots (43.6%) and private toilets (40.9%). Lifts and staircases received 25.5% and 22.1% of all the votes, respectively. More storage received 21.5% of the votes, while other facilities received 18.8% of the votes as preferred facilities in the workplace. The other facilities identified by workers included having a convenience shop near the office, a decent kitchen or kitchenette to cook lunch, bike storage, more showering facilities and meeting rooms, a gaming area, a gym, quiet rooms, and end-of-trip facilities.

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4.2. Sustainable Practices

The workers were required to choose the most practical among 17 sustainable measures in the workplace. They were allowed to choose more than one option. The results are depicted in the figures below and discussed based on the age, gender and building type of the workers surveyed.

From Table 10, reusing kitchen utensils was voted the most as a practical (64.5%) sustainable measure in commercial buildings. This is followed closely by turning off computers outside work hours (63.4%) and using motion sensor lighting (54.8%) and LED light bulbs (53.8%). Opening windows and doors (52.7%), adjusting clothing when cold or too warm and having more recycling bins received 51.6% of the votes. Having more indoor plants also received votes from most workers in commercial buildings (50.5%). In educational buildings, only using more LED light bulbs (53.7%) and turning off computers outside work hours (51.2%) were voted by most workers as practical, sustainable measures. For workers in home offices, two measures were voted by most workers—using motion sensor lighting and opening windows and doors when required (53.3% each).

Table 10. Practical sustainable measures in offices.

	Overall	Gender (%)			Age (%)				Building Type (%)		
		Male	Female	Prefer not to answer	Below 30 years	30–49 years	50–65 years	Above 65 years	Commercial	Educational	Home office
Less use of artificial lighting	39.6	42.6	37.4	50	48.8	35.9	37.5	0	45.2	29.3	33.3
Less use of air conditioners (HVAC)	28.9	35.2	23.1	75	30.2	25	35	0	34.4	22	13.3
Adjusting clothing when cold or too warm	47.7	51.9	44	75	46.5	43.8	55	50	51.6	41.5	40
Turning off computers outside work hours	58.4	61.1	57.1	50	62.8	56.3	57.5	50	63.4	51.2	46.7
Turning off printers outside work hours	41.6	37	42.9	75	51.2	37.5	40	0	47.3	34.1	26.7
Turning off kitchen equipment outside work hours	38.3	50	30.8	50	44.2	35.9	37.5	0	35.5	41.5	46.7
Reusing kitchen utensils (cups, cutlery, and plates)	47.7	44.4	48.4	75	51.2	40.6	55	50	64.5	9.8	46.7
More use of LED light bulbs	52.3	51.9	52.7	50	53.5	53.1	50	50	53.8	53.7	40
Use of motion sensor lighting	50.3	50	49.5	75	55.8	50	47.5	0	54.8	39	53.3
Less use of hot water	20.8	29.6	15.4	25	27.9	15.6	22.5	0	19.4	22	26.7
More indoor plants	46.3	44.4	47.3	50	32.6	53.1	50	50	50.5	41.5	33.3
Have more recycling bins in the workspace	49.7	53.7	47.3	50	46.5	48.4	57.5	0	51.6	46.3	46.7
Have a compost bin in the workspace	38.3	35.2	39.6	50	32.6	42.2	35	0	47.3	24.4	20
Opening windows and doors as required	51	57.4	46.2	75	34.9	57.8	57.5	50	52.7	46.3	53.3
Less use of dishwashers	25.5	29.6	23.1	25	30.2	21.9	27.5	0	29	19.5	20
Less use of microwaves	12.1	13	11	25	14	12.5	10	0	14	9.8	6.7
Other measures	7.4	1.9	11	0	4.7	9.4	7.5	0	9.7	4.9	0

Regarding age, the measures voted by most workers under 30 years old include turning off computers outside work hours (62.8%), using motion sensor lighting (55.8%), using LED light bulbs (53.5%), turning off printers outside work hours and reusing kitchen utensils (51.2% each). For workers aged between 30–49 years old, the sustainable measures voted as practical include opening doors and windows when required (57.8%), turning off computers outside work hours (56.3%), using more LED light bulbs and having more indoor plants (53.1% each). Workers between 50 and 65 years old voted mostly for turning off computers outside work hours, having more recycling bins in the workplace, and opening windows and doors as required (57.5% each). These measures were followed by adjusting clothing when cold or too warm and reusing kitchen utensils (55% each). The next most voted measures were using more LED light bulbs and having more indoor plants (50% each). Fifty percent (50%) of workers above 65 years old voted for adjusting clothing when cold or too warm, turning off computers outside work hours, reusing kitchen utensils, using more LED light bulbs and more indoor plants and opening windows and doors as required.

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The sustainable measures voted as most practical by most of the male workers voted mostly turning off computers outside work hours (61.1%), opening windows and doors as required (57.4%), having more recycling bins in the workplace (53.7%), using more LED light bulbs ad adjusting clothing when cold or too warm (51.9%). Other measures, namely turning off kitchen equipment outside work hours and using motion sensor lighting, were voted by 50% of the male workers as practical. For female workers, turning off computers outside work hours (57.1%) and using more LED light bulbs (52.7%), were voted the most practical, sustainable measures.

Overall results show that turning off computers when not in use was the most practical sustainable measure for workers in the workplace (58%). This is followed by using more LED light bulbs (52.3%), opening windows and doors when required (51%), using motion sensor lights (50.3%) and having more recycling bins in the workspace (49.7%). Adjusting clothing when cold or too warm and reusing kitchen utensils received 4.7% votes each. Forty-six per cent (46.3%) voted for having more indoor plants, and 41.6% voted for turning off printers outside work hours. The rest of the votes are provided in the figures above.

In addition, we questioned whether workers would want mandatory sustainable practices in their workplaces (Figure 1). Most of the respondents answered Yes (57%) and I do not mind (35%) to this question. Only 8% of the workers would not appreciate making sustainable practices mandatory in the workplace.

4.3. Cultural Connection

Workers were asked to rate the importance of integrating cultural connection in the design and creation of their workplace. The responses range from very important (4) to not at all (1). The mean score and Standard Deviation (SD) were calculated, which indicates how close the responses are to the mean value.

Regarding their opinions by building type, 26.9% of workers in commercial buildings did not find cultural connection as an important feature of their workplace, while 22.6% each found it as moderately or very important. Fourteen percent (14%) perceive it as slightly important. Cultural connection was found to be slightly important and not important (29.3 each) by workers in educational buildings. The rest found it to be moderately or very important (19.5% each). For home offices, cultural connection was mostly regarded as not important (46.7%) and slightly important (13.3%). Only 20% of the workers felt it was moderately and very important in their work environments.

For age, cultural connection was regarded as not important by workers who are below 30 years old (32. 6%). Workers between 30–49 years old perceived it as very important (37.5%). Most of the workers between 50–65 years old voted it as not important (27.5%), followed by those who voted it as very important (25%).

Based on gender, most male workers did not think cultural connection was an important aspect of their workplace (37%). Others saw it as slightly and moderately important (20.4% each), while 22.2% felt it was very important. For female workers, more of them voted cultural connection as very important (28.6%) and not important (25.3%). The rest felt it was moderately important (22%) or slightly important (16.5%).

Overall, our results showed that workers perceived that cultural connection in the workplace design is a slightly important feature with a mean value (m) of 2.45 (SD = 1.19; min value = 1; max value = 4). Interestingly, 31.2% of the workers surveyed do not perceive cultural connection as important in their workspaces. The rest of the workers surveyed regarded cultural connection as slightly important (19.1%), moderately important (22.7%) and very important (27%) in their workplaces.

Table 11. Importance of cultural connections in the workplace.

	Mean	SD	Min	Max	Not at all	Slightly important	Moderately important	Very important
Overall	2.450	1.190	1	4	31.2	19.1	22.7	27.0

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Building Type								
Commercial	2.581	1.212	1	4	26.9	14.0	22.6	29.0
Educational	2.300	1.114	1	4	29.3	29.3	19.5	19.5
Home office	2.133	1.246	1	4	46.7	13.3	20.0	20.0
Age								
Below 30	2.154	1.040	1	4	32.6	20.9	27.9	9.3
30–49	2.661	1.267	1	4	28.1	14.1	17.2	37.5
50–65	2.447	1.179	1	4	27.5	22.5	20.0	25.0
Above 65	1.000	1.414	1	4	50.0	0.0	50.0	0.0
Gender								
Male	2.278	1.188	1	4	37.0	20.4	20.4	22.2
Female	2.583	1.195	1	4	25.3	16.5	22.0	28.6
Prefer No	2.000	1.000	1	4	25.0	25.0	25.0	0.0

5. Discussion

Today's organisations are largely focused on creating workplace experiences that are conducive to workers and enable productivity. Creating appropriate workplace experience—a situation where the workplace supports the required deliverables expected of the worker—remains essential to aligning workplace activities to the strategic goal of organisations. Poor working conditions contribute to workers' low performance and well-being. In this study, we investigated NZ workers' preferences for an ideal office, exploring various factors in the workplace that research has proved to impact workers' comfort, well-being, and productivity. We analysed the vote counts for each factor tested based on the respondent's demography.

For most of the factors, workers' preferences did not differ based on their demographics except for a few factors ($p > 0.05$). For example, workers' preferences for office layout differed based on whether they shared offices or not ($p = 0.04$). Those in private offices shared offices with 2–4 others, and those in open-plan offices preferred private offices. Workers who shared offices with one other person preferred sharing with 2–4 people, while those who shared with 5–8 people were happy to continue sharing with 5 -8 people in their workspace. Also, workers' age and desk proximity influenced their preferences for their working mode ($p < 0.001$; 0.003, respectively). For instance, workers below 30 years old prefer to work anywhere else that is not an office or at home, while those between 30–65 years old prefer a combination of working from home and in the office. Likewise, workers with desks close to a window or external wall prefer a combination of working from home and in the office, whereas those with desks at the centre of the office space prefer working in the office. Supporting our findings. Bae et al. [71] found that in medium age groups (35-54 years old), women may be more affected by the type of workplace. Khoshbakht et al. [72] showed that women and older people were more easily distracted and that unwelcome interruptions had a significantly higher negative impact on their productivity. This supports past works that refute the generalisation of findings without acknowledging the effect of the diverse characteristics of individuals on their perceptions and opinions [5,73].

Generally, workers noted that no change is required to the furniture in their workspaces. They prefer being in private offices and having conference/meeting rooms away from their desks. Workers favour a combination of working from home and in the office and having their workspaces cleaned daily. For safety and security systems, the workers surveyed voted access control and fire safety as the preferred systems in their workplaces. The other important system identified is the earthquake-proofing of their office buildings. Past works support these findings. For example, Rahanjam and Ilbeigi [74] note that office user satisfaction was influenced by the quality, cleanliness, and safety of offices. Vischer & Wifi [18] noted that private rooms provide more solitude and have less interference. Rasheed et al. [73] observed the preference for private offices in their study, while Haapakangas et al. [75] showed that workers become distracted in larger workgroup settings in the workplace.

Research on the impact of working from home on worker comfort, wellbeing and productivity is still evolving. In support of our findings, past works have shown the benefits of working from

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home and in the office. The benefits of working from home include flexible schedule, cost-saving for transportation, better work-life balance, and less work-based distractions [76–79]). On the other hand, working full-time from home can have adverse effects on presenteeism and lead to a decline in social support and worker productivity [24]. Similarly, previous studies noted that workers prefer to work in the same spot after a while, indicating that remote work should be introduced cautiously [22,80].

Regarding workplace facilities, the workers wished for more lounges and cafeterias, parking spaces and private toilets. Interestingly, more workers voted for having lifts rather than staircases as a must-have facility in the workplace. Worthy of note is the high percentage of other factors voted by workers. The most prominent other factor was showering facilities. Mulyapradana et al. [81] pointed out that a well-set-up office layout and equipment(facilities) are required to support work activities. As emphasised by Chandrasekar et al. [82], a poorly designed work environment negatively impacts the degree of creativity and cooperation of workers.

For sustainable measures that are practical for workers, they voted for turning off computers outside work hours, using more LED light bulbs in the office, opening windows and doors when required and using a motion sensor lighting system. Workers in commercial buildings favour reusing kitchen utensils as the most practical, while those in educational buildings opt for using more LED light bulbs. Those in home offices voted for opening windows and doors when required and more LED light bulbs. There wasn't a notable difference in opinions based on workers' age and gender. As expected, most workers would welcome mandatory sustainable practices in their workplaces.

Despite efforts by research to show the significance of cultural connection in the workplace, our respondents felt it was not an important aspect of workplace design. Most workers in our sample population felt it was only slightly important to their comfort, well-being, and productivity ($m = 2.45$). Specifically, more male workers found it to be unimportant in the workplace than female workers. Only workers aged 30–49 years old found it to be important, while more workers in commercial buildings voted it as important than those in educational buildings.

Tables 12 and 13 deductively summarise the findings of this study. Table 12 shows the facilities that respondents prefer to have in their workplaces. These facilities fall into the category of "other" factors in the workplace and are noted to have an impactful influence on workers' work experience and impact their comfort, well-being, and productivity. Table 13 depicts the sustainable measures in the workplace regarded as practical for workers.

Table 12. Most preferred facilities in workplaces.

Most preferred facilities/factors in the workplace
Private Offices
Meeting rooms away from desk spaces
Work from home and in office—combined
Daily workplace Cleaning
Access to controls
Fire Safety
Lounge/Cafeteria
Parking spaces
Private Toilets

Table 13. More practical sustainable measures in workplaces.

Practical Sustainable Measures in the Workplaces
Turning off computers outside work hours
Using more LED light bulbs
Opening windows and doors when required
Using motion sensor lighting system
Reusing kitchen utensils

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6. Conclusions

Office workers' preferences regarding New Zealand office design, facilities, and diversity inclusion were investigated in the current study. These aspects are important to promote the design and creation of appropriate work experiences for worker comfort, well-being and productivity. A survey was conducted on workers in office buildings in New Zealand. The subjective responses collected from workers were analysed and discussed based on their demographics to identify the occupants' preferences.

Considering most of the responses given by occupants, several insights are worth noting. Office occupants prefer to have private rooms and separate meeting rooms away from the seating area so that they will not be distracted from work. In terms of facilities, remote working for a few days is preferred due to concerns about employee productivity and performance and working parents. The preferred safety and security systems are access control and fire safety systems, and there were expectations for the workplaces to be cleaned daily. Practical, sustainable measures noted were turning off computers outside work hours and using more LED light bulbs.

Our study findings highlight some significant scientific contributions. Firstly, our study is one of the few studies that have focused on the significance of non-IEQ-related (Other) factors to worker comfort and productivity, especially in New Zealand. Also, our study offers further support for the need to highlight the importance of considering these other factors in the design of future workplaces. Specifically, our study opens the opportunity for more studies in this area of research and highlights significant findings worthy of critical investigations.

That said, we acknowledge the limited data collected. Further studies are required with a larger sample for results to be generalised (or not) across New Zealand. Similarly, there are potential limitations of generalizing the study findings to countries with significantly different building types, environmental conditions and levels of technological developments. Thus, future studies may undertake a comparative analysis of different contextual backgrounds, which may yield more nuanced interpretation of our result and their broader implications. Also, our study was limited to non-IEQ related factors, meaning future studies will be needed into other factors that are related to IEQ in the workplace. In the same vein, the study acknowledges other variables such as: workers' cadre/position, previous work environment, physical ability/disability, and personality traits that may influence office worker preferences. These are treated as control variables in this study, and we suggest future studies consider them. Finally, it would be interesting to compare non-IEQ and IEQ-related factors regarding their relevance to worker comfort and productivity.

In summary, the results of this current study make a valuable contribution to the establishment of a standardised POE protocol for office buildings in New Zealand. This includes essential insights into user preferences for office design, facilities, and diversity and inclusion. This research programme highlights the significance of users' opinions and their interactions with buildings, supporting a shift to a more holistic and user-centric approach to the management of facilities. This approach prioritises the needs, preferences, and experiences of building occupants in the design, management, and evaluation of office buildings. These have ramifications for the achievement of broader sustainability targets through resource efficiency, sustainable design practices and occupants' sustainable behaviours.

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