Future Collaboration Hub

Technology-driven well-being workspace
design strategies

POLITECNICO
MILANO 1863

SCUOLA DEL DESIGN

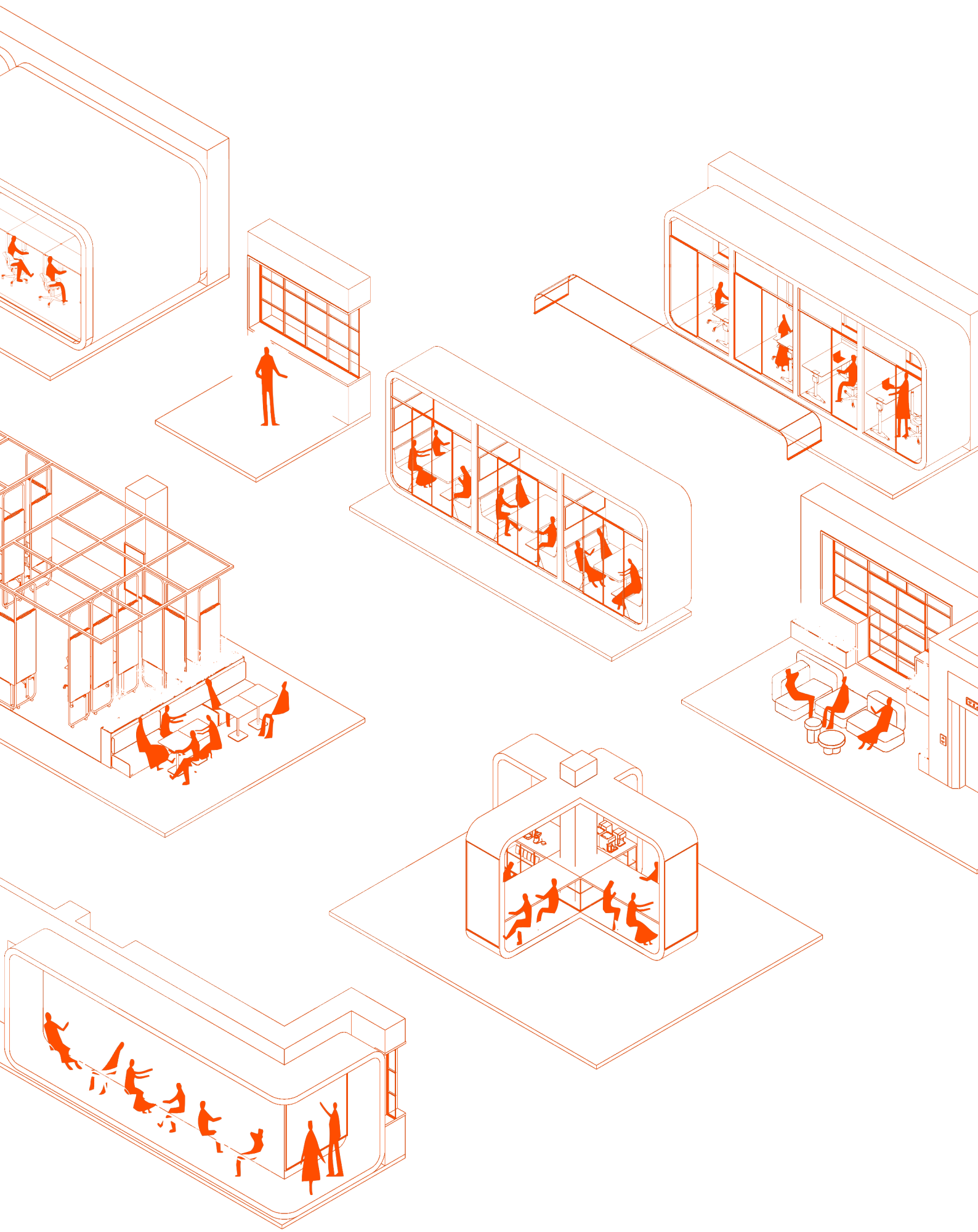
Future Collaboration Hub

Technology-driven well-being workspace design strategies

Nan Jiang
990717

Supervisor: Barbara Camocini

Politecnico di Milano | School of Design
Master of science
Interior and Spatial Design
a.a. 2022-2023



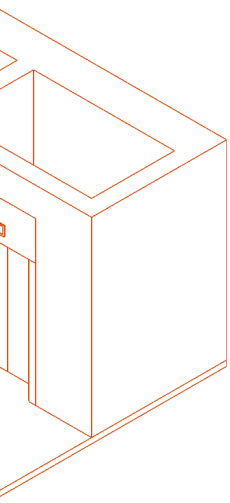
Abstract

In the post-pandemic era, the hybrid work model has become normalized thanks to the influx of new generations and technology support in the workplace. Due to changes in the way of work, people have new expectations and demands for future workplaces. 'Well-being' has become the most crucial factor people consider when entering a workspace, and 'Collaboration' tends to become the primary modality of physical workspaces.

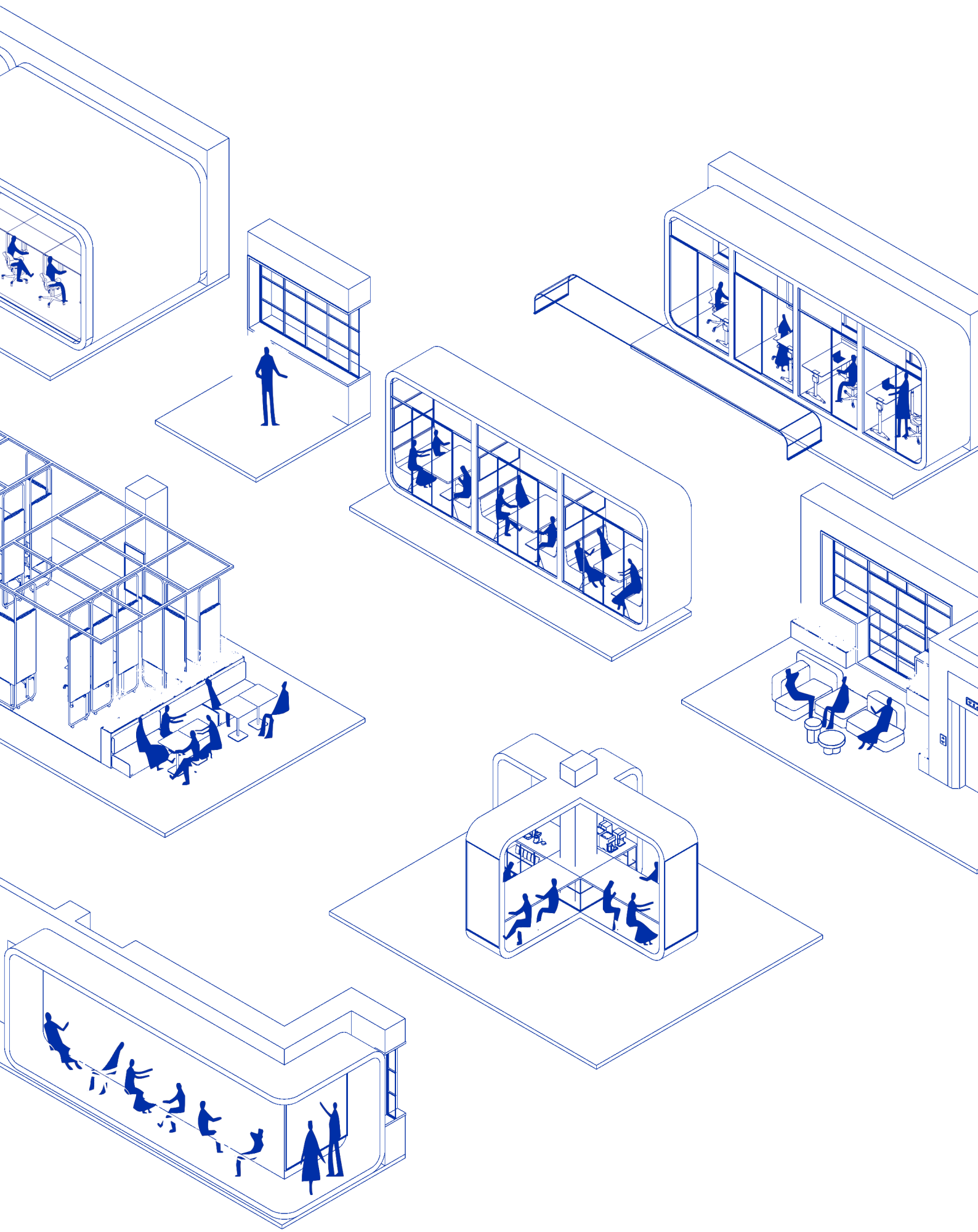
According to the user's behavior and needs, the thesis reports in-depth research to obtain the design strategies for future collaboration space. Based on the design strategies acquired from the research, the Collaboration Hub, which is the core area of the WORK LIVING HUB project of Contest Design Studio (within the master's degree in Spatial Design), was redesigned.

The design exploration primarily focuses on people, space, and technology, combining the physical and virtual spaces to create a comprehensive immersive experience, embedding well-being into the details of spatial design.

The combination of technology and space will bring people a better sense of experience aimed at truly realizing the well-being of the workspace that people expect.



Keywords:
Hybrid work, Collaboration space, Well-being, Activity-based work (ABW), Flexible space, Experience design, Inclusive design, Smart technology, Metaverse



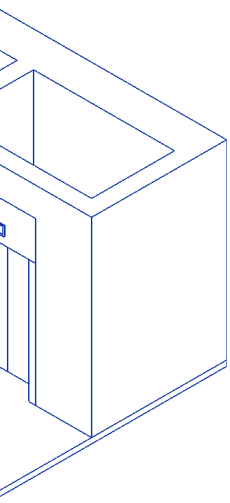
Abstract

Nell'era post-pandemia, con l'ingresso delle nuove generazioni nel mondo del lavoro e il supporto della tecnologia, il modello di lavoro ibrido si è normalizzato. A causa dei cambiamenti nel modo di lavorare, le persone hanno nuove aspettative e richieste per lo spazio di lavoro futuro. Il 'Benessere' è diventato il fattore più rilevante che le persone considerano quando entrano in uno spazio di lavoro e la 'Collaborazione' tende a diventare la modalità principale degli spazi di lavoro fisici.

In base al comportamento e alle esigenze degli utenti, la tesi riporta una ricerca approfondita per ottenere le strategie di progettazione dello spazio futuro di collaborazione. Sulla base delle strategie di progettazione acquisite dalla ricerca, è stata riprogettata la Collaboration Hub, che è l'area centrale del progetto WORK LIVING HUB dello studio di progettazione Contest Design (all'interno del Corso Magistrale di Spatial Design).

L'esplorazione del design si concentra principalmente su persone, spazio e tecnologia, e combina gli spazi fisici e virtuali per creare un'esperienza immersiva completa, incorporando il benessere nei dettagli del design degli spazi.

Obiettivo della combinazione di tecnologia e spazio è di offrire alle persone a una migliore esperienza per raggiungere la condizione di benessere nello spazio di lavoro che le persone si aspettano.



Parole chiave:
Lavoro ibrido, Spazio di collaborazione, Benessere, Lavoro basato sull'attività (ABW), Spazio flessibile, Progettazione dell'esperienza, Progettazione inclusiva, Tecnologia intelligente, Metaverso

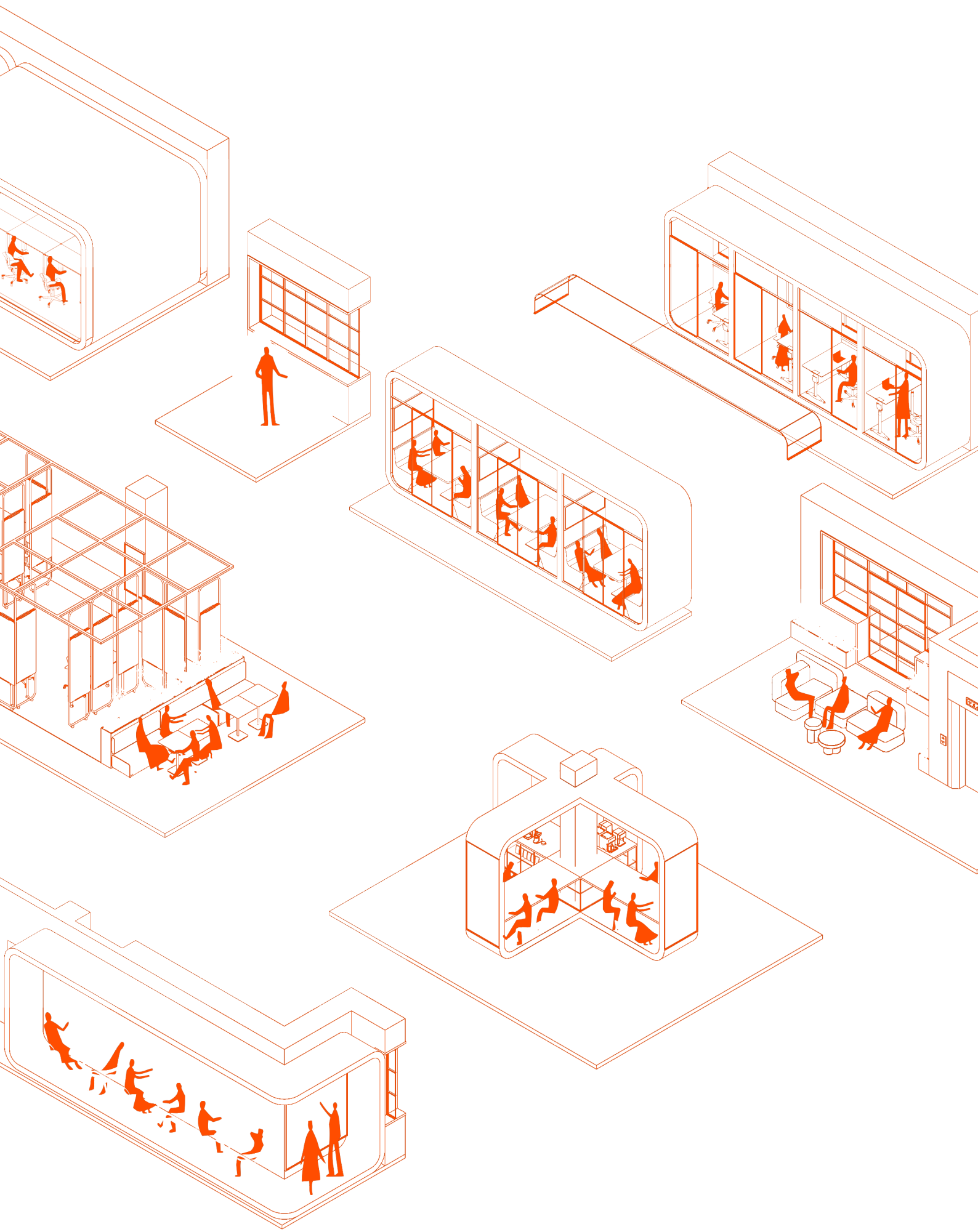
Index

1 Introduction

1.1 Statement of the problem

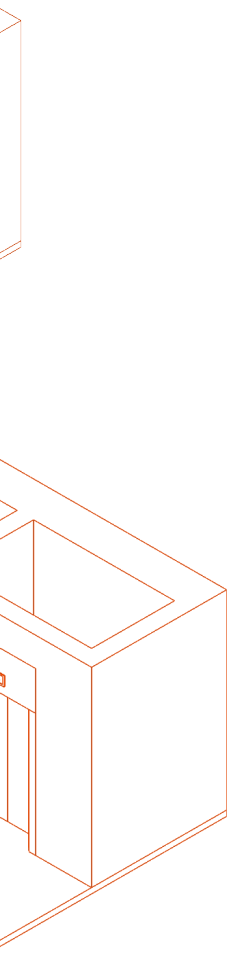
1.2 Objectives of the work

1.3 Methodology



1.1 Statement of the problem

The global landscape of work and lifestyle has undergone a substantial change in the wake of the Covid-19 pandemic, reshaping traditional paradigms and paving the way for a new normal — the era of hybrid working. This transformation has been propelled by a confluence of factors, including the imperative for flexibility, advancements in technology, and a heightened focus on individual well-being.



As we navigate the post-pandemic landscape, it is evident that the hybrid work model is not merely a transient phenomenon but a lasting evolution in how we approach work. The fusion of remote and in-person work will define the future of work environment. The key to the realization and generalization of the hybrid work model is the support of technology. Smart technology and the burgeoning metaverse will revolutionize traditional physical workspaces, challenging conventional notions of work and spatial arrangements.These technological innovations will redefine the contours of traditional physical workspaces, transcending conventional boundaries and presenting new possibilities for collaboration and productivity. The experiences garnered from the pandemic-induced era of remote work have also engendered a profound shift in priorities for employees. Work-life balance has emerged as a paramount consideration, and as individuals contemplate a return to physical workspaces, their expectations have evolved. Chief among these expectations is the aspiration for well-being, compelling organizations to reimagine work environments that prioritize the holistic health of their workforce. In the context of the hybrid work model, the functions of physical workplaces have undergone a metamorphosis. No longer the exclusive locus of daily tasks, these spaces have become hubs for collaboration, innovation, and shared experiences. The surge in demand for collaborative spaces underscores a fundamental change in the way people perceive and utilize their work environments.

Amidst these transformative dynamics, the urgent need arises for the design of new workplaces that seamlessly align with the requirements of hybrid work. The infusion of technology into collaborative spaces emerges as a key facet, not only enhancing productivity but also nurturing employee well-being. This exploration into the symbiosis of technology-enabled collaborative spaces and employee well-being stands at the forefront of the evolving narrative of the contemporary workplace.

1.2 Objectives of the work

The primary objective of this work is to investigate and propose innovative design strategies for future collaborative spaces that prioritize and enhance employee well-being through the integration of technology. The exploration of physical space design mainly focuses on the following three aspects:

1.**Activity-Based Work Design:** It explores and recommends design strategies that facilitate activity-based work within physical workspaces. This involves creating environments that cater to various work activities and tasks, promoting flexibility and adaptability to different work styles.

2.**Sensory Design for Physical Needs:** It investigates how sensory design can be leveraged to address employees' physical needs within the workplace. This includes considerations for lighting, acoustics, ergonomics, and other environmental factors to create a conducive and supportive atmosphere for employee well-being.

3.**Inclusive Design for Psychological Needs:** It examines the impact of inclusive design on employees' psychological well-being. This involves creating workspaces that foster a sense of belonging, support diverse workstyles, and consider psychological factors to promote a positive and inclusive work environment.

The thesis explores innovative ways to use technology to support hybrid working and promote employee well-being:

1.**Integration of Smart Technology:** It researches and evaluates the application of intelligent technology within physical workspaces. It focuses on exploring how technologies such as Internet of Things (IoT) devices and smart infrastructure can enhance the overall employee experience, streamline workflows, and contribute to well-being.

2.**Metaverse Technology Integration:** It investigates the potential of metaverse technology in connecting physical and virtual workspaces to better support hybrid work models. It explores how virtual collaboration platforms and immersive technologies can bridge the gap between physical and virtual environments, facilitating seamless communication and collaboration.

In summary, the work aims to provide practical insights and recommendations for creating future collaborative spaces that prioritize employee well-being and leverage technology to optimize the work environment for the evolving demands of hybrid work settings.

1.3 Methodology

(1) **Literature collection**
This study conducts a literature review to gather and review global academic journals, books, online articles, and relevant materials related to the subject. It identifies the latest and most comprehensive research outcomes, organizing them to serve as the theoretical foundation and analytical framework for the design of collaborative spaces.

(2) **On-site inspection**
In this work, the author conducted field research on two co-working spaces in Milan and the project site that needed to be designed. Through observation, photography, interviews, recording, research, design analysis and other methods, the author comprehensively and in-depth explored and discussed user needs and work experience.

(3) **Case analysis**
At each exploratory stage of the research, application cases of related concepts are searched on the Internet based on the corresponding themes and analyzed to provide a strong basis for project design.

(4) **Interdisciplinary research**
Future workplace design requires comprehensive knowledge of various disciplines, including architecture, psychology, aesthetics, technology, information communication, service design, interaction design and other disciplines. After a multi-faceted understanding and seeking inspiration for re-creation, this study integrates the relevant research strategies and results of major disciplines such as space construction and sensory experience, and reasonably applies them to the design process of this project.

(5) **Service design method**
During the project development stage, use service design research methods including service design process, service design tools, service blueprints, user portraits, user journey map to guide the design direction from the perspective of user experience.

2 Precondition

2.1 Hybrid work has become the new normal

2.2 Hybrid work will continue to exist in the future

2.3 The third space has become a new choice for hybrid work

2.1 Hybrid work has become the new normal

At the end of 2019, a sudden pandemic disrupted the pace of life and changed the way everyone works. The pandemic has sparked the world's largest "remote work experiment": a massive randomized trial testing the notion that whether many jobs can be done from couches and dining tables. In the "experiment", employees usually enjoyed a greater flexibility. For instance, as one of the online meeting leaders, Zoom has grown its daily active customers more than 30 times – from ten million to 300 million – during the Covid-19 pandemic (Draper, 2021). When the pandemic was brought under control, the tendency to telework continued to persist. Twitter announced that employees will be able to telework permanently even after the pandemic is over (Rose, 2020). The catalyst effect of the pandemic has accelerated the development of the telework ecosystem, which in turn has driven the digital transformation of enterprises (Chen,2022).

In this global "experiment" about how people work, the global workforce's demand for flexibility and autonomy has skyrocketed, and for them, how they work is more important than where they work. Employees tend to have more freedom and self-discretion to choose when and where to work, including choosing a hybrid model combining in-office and home working. There are indications that hybrid work model have become the norm for many organizations.

According to a 2020 research report by JLL, Reimagining Human Experience, hybrid work is the new normal and now the preferred way of working. 66% of employees surveyed are expecting to be able to work from different locations post-pandemic. 50% want to work both in the office and remotely, and 26% do not want to head to the office anymore.

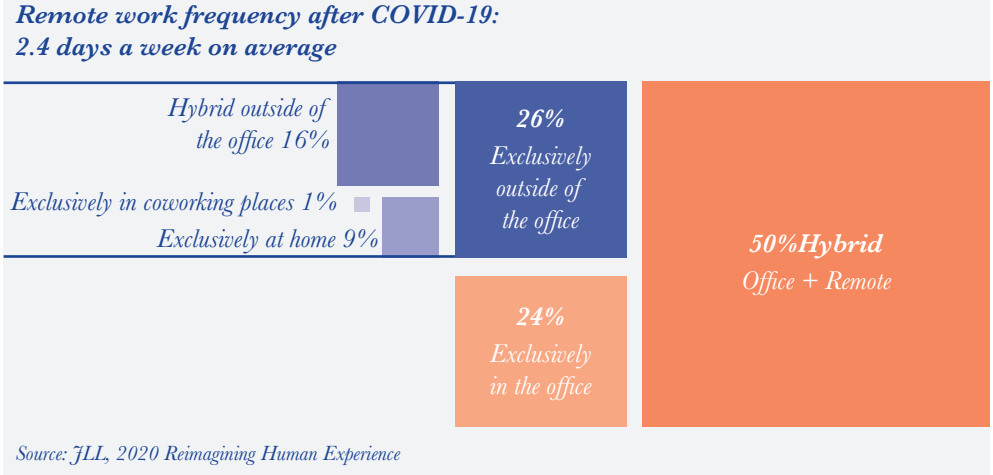


Chart 1: Remote work frequency after COVID-19

2.2 Hybrid work will continue to exist in the future

According to the report, The Future of Work Survey 2022 released by JLL in November 2022, for most enterprises the hybrid work trend will continue to exist. A quarter of enterprises said they had offered permanent telecommuting options to employees who needed them. Another 30% expect to implement such policies by 2025. Companies with more than 5,000 employees are more willing to provide employees with such choices.

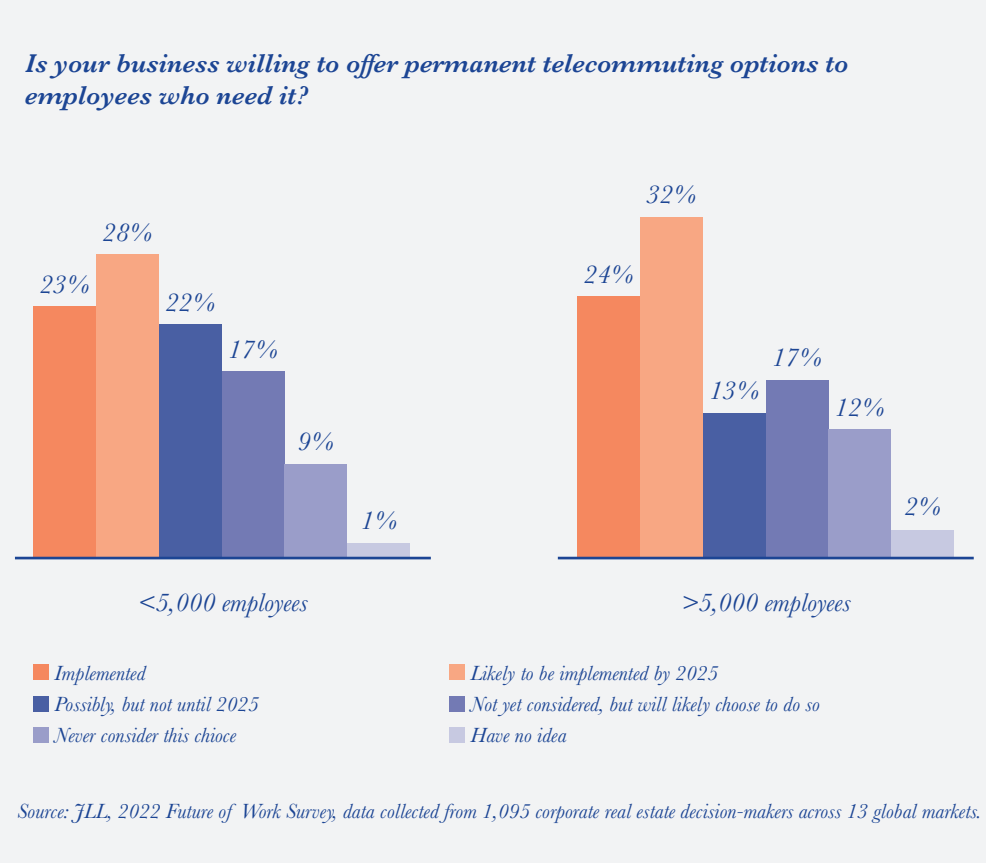


Chart 2: Companies offer permanent telecommuting options to employees who need it

The benefits brought by the transformation from onsite work model to hybrid work are obvious: in the future, employees will be given more discretion to make better use of work space, including more autonomous arrangements for their own way and time of work. Chart 2 shows that by 2025, more than half of enterprises will switch to a work model which focuses on employee choices, i.e., employees have the right to independently decide their own way of work. Before the Covid-19 pandemic, only 8% of enterprises were willing to provide employees with such work options.

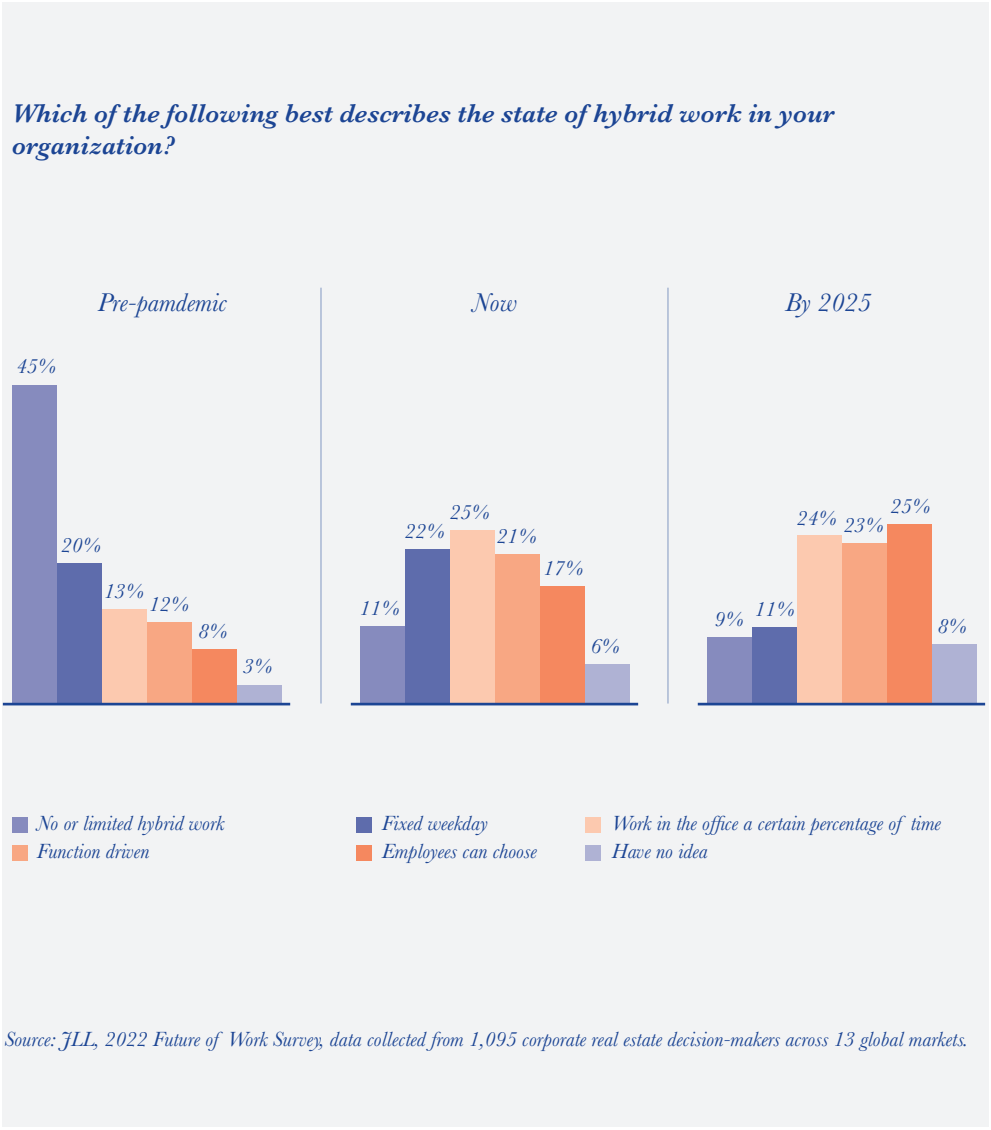


Chart 3: Description of hybrid work status in organizations

The interviewed companies said that in order to maintain competitiveness and attract the best talents, they need to plan their future work model, and a dynamic work strategy will be the key of the team building. More than three-quarters (77%) of businesses surveyed believed that offering remote or hybrid work options is critical to attracting and retaining the talents.

In the post-pandemic world, work is not only about where you are, but more about what you do. Employees have more freedom to decide when and where they work. Hybrid work has become the most popular way of work at present.

2.3 The third space has become a new choice for hybrid work

The global research report released by JLL in June 2022, Workforce Preferences Barometer, shows that the proportion of hybrid work model continues to grow. 55% of employees switch between locations on a weekly basis (a rise of 5% compared to March 2021). The gradual return to the office is a general trend: 73% of employees go to the office at least once a week (compared to March 2021, this proportion increased by 5%). The concept of hybrid work is further expanded and extended, as more and more employees not only work from home and in office, but also work in third places such as co-working space facilities. 36% of employees will work in a third places on a weekly basis (up 8% compared to March 2021). 33% of employees prefer to work from a co-working space or satellite office near home.

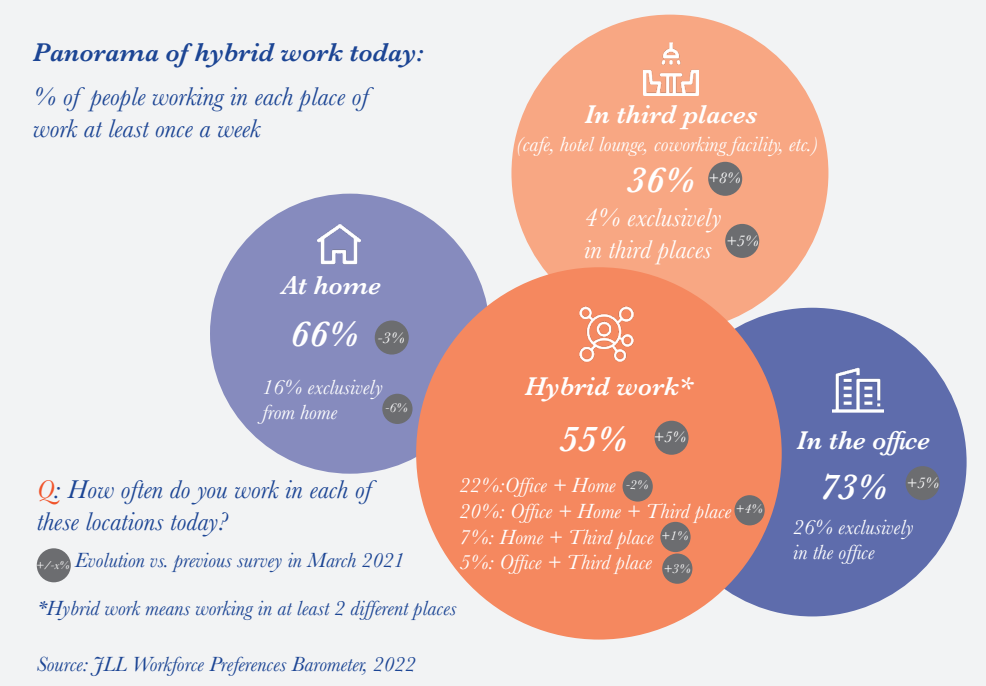


Chart 4: Panorama of hybrid work today

The Covid-19 pandemic has fundamentally promoted changes of traditional work habits and long work hours. Hybrid work enables employees to switch among different environments, depending on which one suits them best. For some, moving away from traditional work arrangements is an easy transition. For others, such rebalancing leads to a disconnect from colleagues and blurs lines between work and private life, which has been and will continue to be a challenging experience. At the same time, it also provides company managements an opportunity to reshape the future work of the organization. The flexibility of when and how people return to the office creates interesting challenges for workspaces redesign.

3 Technology Influences Workplace

The normalization of hybrid working models has made the choice of work arrangements more flexible. Today, knowledge workers have more opportunities to choose where they work: in the office, at home or in a third space. The realization of such flexibility is inseparable from the development of science and technology. In the more than 100 years since the advent of the modern office in the early 20th century, with the continuous evolution of technology the work carrier of knowledge workers has moved from paper to typewriters, telephones, computers, projectors, and to the mixed-reality headset – the depth of spatial experience has been expanded from physical to virtual. Technologies such as the Internet of Things, artificial intelligence, big data, and cloud computing make physical space more intelligent and provide a more specific and comfortable experience, thereby expanding the breadth of physical space experience. What will the work space of the future look like? To answer this question, we need to first grasp the laws of historical development, learn ideas from excellent cases and draw lessons from failed cases, so as to better grasp the trends of design development and explore the future.

3.1 Technology influences work behavior

The Information Technology Revolution, a book edited by Tom Forester in 1985, defines an office as a place where people read, think, write, and communicate; where proposals are considered and plans are made; where money is collected and spent; where business and other organizations are managed. If technology is changing the way we perform such activities, the office needs to change in the nature and organization of office work. (Chevez, 2009)

3.1.1 The Technological Revolution: Typewriter and Telephone

The first modern office was born during the Technological Revolution. The widespread use of electric light eliminated the need for costly gas lighting and allowed employees to work efficiently. The impact of subsequent breakthrough of office technologies, such as typewriters and electronic calculators, vastly improved information processing and amplified productivity. Communication technology facilitated by the telegraph and telephone gestated the birth of dedicated office blocks, enabling seamless long-distance administration where companies first began to expand and decentralize their footprint.

3.1.2 The Digital Revolution: PC and Internet

The Third Revolution, also known as the Digital Revolution, is the shift from mechanical and analogue electronic technologies of the Industrial Revolution towards digital electronics which began in the latter half of the 20th century, with the adoption and proliferation of digital computers and digital record-keeping, which continues to the present day (Steven, 2004). This revolution brought about the automation of factory production, telecommunications, the Internet, the use of personal computers and mobile phones. With the popularization of the Internet and mobile office equipment, remote working emerged as the times required. In 1973, Jack Niles, an American rocket expert, introduced the concept of telework (Lovelace, 2000). Due to the outbreak of the first global oil crisis at that time, Jack Niles proposed to build network equipment on the periphery of big cities so that everyone could work remotely by using electronic devices. In 1975, the first personal computers launched (Campbell-Kelly, 2001). Since then, portable personal laptops have been continuously updated, their costs have gradually decreased, and resource sharing has been promoted through the network. Network and equipment conditions have gradually matured, allowing people to carry laptops when traveling or working at home.

3.1.3 Industry 4.0: Smart Technology and the Metaverse

With the arrival of the Fourth Industrial Revolution (Industry 4.0), fundamental shifts are taking place in how the global production and supply network operates through ongoing automation of traditional manufacturing and industrial practices, using modern smart technology, large-scale machine-to-machine communication (M2M), and the Internet of Things (IoT) (Moore,2019). In recent years, the development of automation and digital technologies such as cloud computing and big data has further reduced the market's demand for basic manual labor, while the demand for knowledge-based mental labor has continued to increase. Occupations in office-administrative and production lines are predicted to constitute the basic categories that will be excluded from employment until 2026. (Wilks et al., 2018).

The core of Industry 4.0, which is currently being actively advanced by different countries, lies in the system of combining virtual and reality, arguably the foundation of the industrial metaverse (Suzuki et al., 2020). Relying on a powerful communication environment, processing platform and

sensing equipment, the industrial metaverse can achieve better risk prediction, capacity management and renewable energy consumption. Technological innovations from Industry 4.0, such as artificial intelligence (AI), blockchain, 5G and VR, also bring opportunities to change the traditional working style (Javaid et al., 2022). With the continuous development of metaverse technology, remote office platforms are constantly being optimized from flat to three-dimensional, from voice, video, to immersive sensory experience.

Industry 4.0 is bringing people's work into a new and broader world. With the development of machine learning and artificial intelligence, more and more repetitive tasks have been automated, allowing workers to focus on more complex and creative work. We are witnessing a shift towards a more connected, digital and flexible work environment.

Case Study (Virtual collaboration platform)

Nvidia Omniverse: Virtual Collaboration and Simulation Platform

Location: Global Access
Time: Launched in 2020, ongoing
Designer: Nvidia Corporation

Introduction:
In late 2020, Nvidia launched a simulation and collaboration platform called Omniverse for creating and experiencing virtual worlds and simulations in a cross-platform, multi-user environment. It combines the power of real-time rendering, simulation and machine learning to enable users to interact in shared virtual environments in real time. Omniverse is designed to enable collaboration across multiple industries, including architecture, engineering, construction, film and gaming. From concept to final deployment, Nvidia Omniverse not only accelerates complex 3D workflows but also enables breakthrough new possibilities for visualization, simulation and code on the next frontier of creativity and innovation. For creators, Omniverse acts as a central hub for seamlessly connecting and enhancing 3D creative applications, unifying assets, libraries and tools, ensuring a truly uninterrupted workflow and enabling artists to reach new heights of creative freedom.

Reason for Selection:
The Nvidia Omniverse platform is a virtual collaboration solution that is used in some large creative companies. BMW is using Omniverse to make a digital twin of a factory. Volvo uses it to design vehicles prior to making the actual car, and Ericsson uses it to optimize its 5G network deployments. Omniverse provides an example for our research into the future of virtual collaboration.

Highlights:
Real-time collaboration in virtual environments.

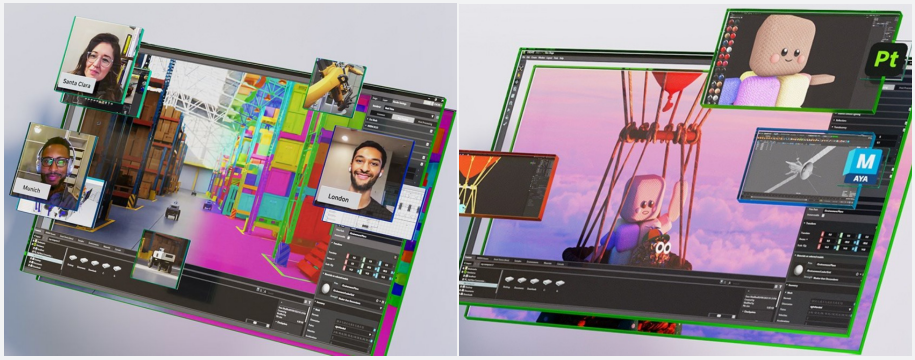


Fig. 1: Omniverse, a simulation and collaboration platform. Source: https://www.nvidia.com/en-us/omniverse/

3.2 Technology influences work space layout and experience

Today, the way we work has evolved beyond what people could have imagined 100 years ago. The office is no longer the building where everyone gathers, but our homes, local cafe and many other "third places" where people gather for virtual meetings. From the seriousness and restraint of the world's first office to today's free and flexible integration of reality and virtuality, how we got here - the introduction of new technologies and tools, changes in employee needs and work patterns, and the transformation from an industrial economy to a knowledge economy - is rooted in the offices of the past.

3.2.1 Early 1900s: Taylorism and the rise of the open plan office

At the beginning of the 20th century, technology revolutionized the form and function of the workplace. With the invention of steel frames and elevators, buildings exceeded 10 stories for the first time in history. The invention and application of electric lighting and air-conditioning systems meant that new high-rise buildings did not require much natural light or ventilation. The buildings became sealed and workers were more isolated from the outside world. With the use of telephones and typewriters, offices turned to be very crowded and noisy.

Workspace design in the early 20th century was guided by Taylorism, where space was organized in a way to maximize efficiency. The most prominent feature of an office under the guidance of Taylorism is all-round openness and surveillance: a vast large room with neatly arranged seats inside, and no obstructions on the desktop. Managers could monitor the working conditions of employees at any time in the high-rise glass office. In terms of work routines, office staff became more similar to factory workers (Galloway, 1919). The office was divided into departments responsible for various specific tasks, and employees in the same department handle similar tasks in the same session. From the perspective of work space planning, the planning and design of interior space was efficiency-oriented and workflow-based with the specific goal of reducing unnecessary time expenditure or space movement. More desks were placed in the room, allowing for more employees and allowing managers and supervisors to monitor employees more easily. From the perspective of household equipment, space planning, light environment, interior decoration and other aspects, there was no essential difference between the work space and the working environment of the factory workshop at that time.

Fig. 2: The Larkin Administrative Building , designed by Frank Lloyd Wright in 1904, contained 1,800 workers processing 5,000 orders per day working in a central open space at the centre of the building. Source: https://www.morganlovell.co.uk/the-evolution-of-office-design

Summary

1. Typical layout: Primitive office layouts were straight, linear and heavily influenced by the manufacturing industry.

2. Work models: Standardized, repetitive work activities with heavy monitoring from management (such as counting the number of letters opened per hour or counting the typists' strokes).

3. Furniture: Steel swivel chairs and carpentered wooden desks, comfortable furniture (such as armchairs) and roll-top desks reserved for senior staff.

4. Technology: Electric lamps, telegraph, static phones, dictation machines.

3.2.2 1950s:
Bürolandschaft and the dawn of office collaboration

In the 1950s, technological advances led to further evolution of work space. Over the decades, modern materials such as steel and glass were more widely used, and innovative air conditioning systems and gas boilers replaced coal, greatly improving indoor air quality. This encouraged floor areas to increase and ceilings to lower. Wider, more open floors allowed employees to be placed almost anywhere. As the office environment became the primary environment for city dwellers, workplace furniture gradually became the focus. Bespoke workstations, seating and textiles developed by renowned architects and designers emerged.

After World War II, business theorists began to move away from Taylorism's "employee-based" concept and instead sought flat hierarchical structures that encouraged communication and interaction. In the 1950s, the German management consulting group Quickborner developed a new office layout called the Bürolandschaft. Bürolandschaft stemmed from organizational theory, which was based on more complex "human relations" principles than Taylorism. For the first time, the Quickborner team realized that office work types were diverse and designed different office layouts for different types of business. Unlike previous open-plan or streamlined work spaces guided by the strict and methodical Taylorism, the office landscape consisted of free and open furniture dispersed in large, loose and non-structurally divided spaces in different contexts. Through the creative use of partitions and planting, these different environments were less rigidly demarcated, and their nature was often determined by the type and function of the staff engaged within them. For example, workers in creative fields (such as advertising or media) could be grouped loosely so that they interacted more easily and frequently, while managements were in tighter, more segmented areas. Although the office layout was open plan, partitions and plants did create different areas and a degree of privacy. Cabinets and curved partitions were used to offset the noise and distractions of typewriters and telephone conversations. Informal spaces such as break rooms were first introduced to provide employees with an "escape" away from their desks. The workplace became more democratic and social, with employees at different levels encouraged to sit and work together to improve the collaboration and communication environment in the office. Therefore, Bürolandschaft is often cited as a principle of modern office design.

Fig. 3: The Bürolandschaft, a new office layout in 1950s. Source: https://hubblehq.com/blog/the-history-of-the-office

Summary

1. Typical layout: Prominent open-plan spaces with partitioned breakrooms.

2. Work models: Single function tasks completed in isolated departmental groups.

3. Furniture: Steel-tube swivel chairs, ergonomic executive chairs, office plants, G-Plan and mid-century modern desks, Rolodexes.

4. Technology: Typewriters, filing cabinets, rotary telephones, air conditioning, fluorescent lighting.

3.2.3 1960s:
Herman Miller and the action office

From the 1950s to the 1960s, humanistic care gradually emerged, and the concept of architectural design progressively shifted from being based on process to being based on the needs of employees. Although the Bürolandschaft was briefly popular in Europe, its casual and open layout wasn't for everyone. Some employees wanted more privacy. Herman Miller Research Corporation evaluated the evolution of the "office" during the 20th century, specifically the way it functioned in the 1960s. Their research includes understanding how people work in offices, how information travels and how office layout affects their performance. They concluded that office staff require both privacy and interaction, depending on which of their many duties they were performing. (Leslie, 1998)

In 1964, the Herman Miller Research Corporation launched the Action Office I series of office furniture to solve the problems that plagued office staff at the time. Action Office I featured desks and workspaces of varying height that allowed the staff the freedom of movement and the flexibility to assume the work position best suited for the task. However, Action Office I was expensive and difficult to assemble, resulting in poor sales. By 1968, the company launched the Action Office II series. It was based around the mobile wall unit that defines space. The unit also supported multiple workstation furnishings that benefited from the vertically oriented work space. The components were interchangeable, standardized, and simple to assemble and install. More importantly, they were highly flexible, allowing the company to modify the work environment as needs changed (Leslie, 1998). The Action Office II lineup was an unprecedented success, often referred to as the birth of the modern cubicle, and was quickly copied by other manufacturers (Brooke,2015).

Herman Miller's first modular furniture series, the Action Office series, was the first iteration of the modern cubicle. The series was designed to provide employees a variety of work environments, increased freedom of movement and greater privacy while working, as well as allowing employees to personalize their space. However, there were two sides of its impact on office design. The space required for rows of modular furniture increased, and individual workstations became larger and more enclosed. While it did provide ample workspace, people became less visible to each other, reducing interaction between colleagues. Over time, the form of cubicles gradually evolved, deviating from the original design intention of the Action Office series and later evolved into the cubicles of the 1980s.

At the same time, this decade also witnessed the rise of design-led office furniture, with seats designed to be more ergonomic and comfortable. Due to the popularity of plastics, office chairs came in a wider variety of colors and shapes.

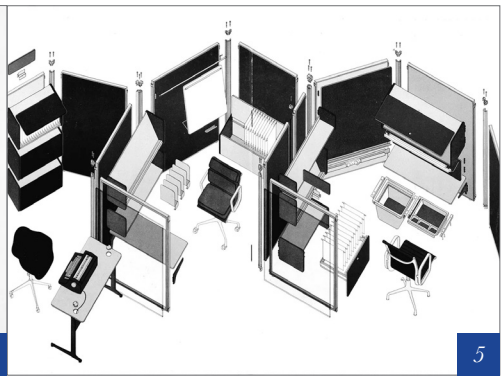


Fig. 4: Action Office I, 1964, with roll-top high desk, Perch stool, a separate telephone table, and freestanding shelves. Source: https://www.wired.com/2014/04/how-offices-accidentally-became-hellish-cubicle-farms/
Fig. 5: Action Office II: It consists of three walls that can change the angle. The whole is open and dynamic, and employees can freely arrange the space. Source: https://www.wired.com/2014/04/how-offices-accidentally-became-hellish-cubicle-farms/

Summary

1. Typical layout: Central bullpen workspace with formal boardrooms and break rooms lining the perimeter of the office.

2. Work models: Labour and time-based approaches, fixed desk policies.

3. Furniture: Modular furniture, wooden desks, sofas, plastic and steel chairs, moveable partitioning and walls.

4. Technology: Handheld calculators, pocket dictation machines, fax machines, laser printers, photocopiers.

3.2.4 1970s:
Rise of the word processor

A typical computer at the time had only a basic word processor, as well as the first-ever spreadsheet. But early office automation tools, heavy and cumbersome, initiated a return to centralized clerical work, forcing offices to house the bulky machines in designated areas to minimize the noise they produced and allow room for tables and workstations to place them.(Shaban, 2023)

The concept of cubicles dominated throughout the 1970s. The health and ergonomics of employees received increasing attention: The design of office furniture fully considered the health and comfort of users, and the design of work space paid more attention to providing employees with the freedom to display their creativity and work independently.

Fig. 6: The IBM 360 mainframe computing system with printing terminal. Source: https://aeon.co/essays/the-1970s-librarians-who-revolutionised-the-challenge-of-search

Summary

1. Typical layout: Open-plan spaces blended with adjacent cubicles of lounge areas, boardrooms and collaborative workrooms.

2. Work models: Ergonomics and employee health, collaborative working.

3. Furniture: Modular furniture, MDF desks, sofas, height-adjustable seating, personal pedestals.

4. Technology: Air conditioning, handheld calculators, floppy disks, fax machines, laser printers, photocopiers, local network (ethernet)

3.2.5 1980s: Cube Farm

In the 1980s, computers began to become commonplace in the workplace as they shrank from bulky objects in designated rooms to boxes on every employee's desk. This marked the beginning of an era of new technologies that would forever change the workplace.

Many companies began to take advantage of spatial density by building linear cubicles, aiming to increase productivity of employees. The focus of office layouts shifted from a focus on healthy working conditions to the pursuit of greater productivity and profitability. Action Office series evolved into cheap modular cubicles, which completely deviated from the original design intention of Action Office series, causing the history of office design to completely diverge from the original humane development trajectory during this period. Desks were designed as bulky and complex units to accommodate the rise of word processors and fax machines. As the cubicles became smaller and more standardized, their "Taylorism" color became more and more intense, and like single-person cells, they became "management units" where profits came first. The method of communication between employees became a phone call from one cubicle to another, rather than the original in-person meeting.

This kind of working environment is not conducive to the physical and mental health of white-collar workers. There were a large number of patients with "high-rise syndrome" and even led to a shortage of skilled office staff.

Fig. 7: The Office Cubicle.
Source: https://www.wsj.com/articles/a-brief-history-of-the-dreaded-office-cubicle-1399681972

Summary

1. Office layout: Cubicle farms and interior design dictated by technology and space densities.

2. Work models: Decentralized workspaces with flatter organizational structures.

3. Furniture: Ergonomic chairs with lumbar supports, whiteboards, steel workstations.

4. Technology: Car phones, CDs, Email, bulky desktop computers, pagers.

3.2.6 1990s:

New open plan office space and hot desking

The cubicles of the 1980s continued into the 1990s. In 1991 the World Wide Web was opened to the public. The creation of the internet and improvements in connectivity made the workplace more dynamic and a place where information technology flowed freely, thus starting to open up more communications over a larger area. Free email was launched in 1996. Email provided companies with instant communication, allowing people to share messages and files like never before. It also changed the way employees interact with customers and colleagues. Widespread new technologies - the internet, laptops and mobile phones - could move offices, workers and work out of offices and into public transport, homes and cafes.

Mobile computers subverted the traditional model of a single employee fixed at a desk. Employees became more mobile and require more flexible working methods. The company sought to foster flexibility and collaboration in the booming information age and knowledge economy. Open-plan office design was becoming more popular, and concepts such as "hot desking" were beginning to emerge, allowing employees to choose available space rather than specific workstations, and requiring the entire office design concept to be supportive and inspiring.

Fig. 8: UK - London - 90s National Westminster Bank currency trading floor.
Source: https://www.gettyimages.at/detail/nachrichtenfoto/an-interior-of-office-desks-and-90s-computers-in-the-nachrichtenfoto/527477862?adppopup=true

Summary

1. Office layout: Expanded cubicles to house departments and teams moving towards non-assigned workstations in the latter half of the decade.

2. Work models: Hot-desking, telecommuting, heightened focus on collaboration and cooperation and the rise of "company culture".

3. Furniture: Personal lockers, U-shaped workstations, integrated personal storage, built-in filing cabinets, monitor arms, keyboard trays, cradle-to-cradle furniture lifecycles.

4. Technology: Email, laptops, personal digital assistants, dial-up internet, mobile phone, document scanners.

3.2.7 2000s: The emergence of casual offices and co-working spaces

By the turn of the century, mobile technology products such as thinner, lighter and more convenient laptops provided companies and employees with greater flexibility. Smartphones entered the mass market in the late 2000s, redefining the way people interact with each other. Remote and home office became feasible and work could be done from a laptop as long as there was a stable internet connection.

The rise of dot-coms and startups changed many practices and perceptions of behavior in the workplace. Work-life balance started to be integrated into workplace design, with many open-plan office spaces including break areas for employees to relax or collaborate, and more "fun" elements entering the office. Casual office environments were more common in industries such as technology, startups, and creative fields, where employees were allowed and even encouraged to wear casual clothing. Casual offices often promote creativity, innovation, and collaboration. A less formal atmosphere encourages

employees to share ideas more freely and engage in open discussions. Casual offices were becoming a trend, spearheaded by creative industry companies born in the information age. From large Internet giants such as Apple, Microsoft, and Google to small digital marketing startups, all these technology companies adopted a more casual office style, aiming to encourage highly personalized work spaces to relieve employee fatigue caused by long hours programming, data analyzing, links building or graphics designing.

As more and more people worked from home or in flexible remote environments, the concept of coworking spaces started to gain traction, providing an alternative to traditional offices. These spaces encourage collaboration, networking and knowledge sharing among freelancers, remote workers and entrepreneurs. The idea of working in a shared environment with other professionals became more popular.

Fig. 9: In 2000s coworking spaces have started to arise.
Source: https://www.freeofficefinder.com/article/the-history-of-coworking

Summary

1. Office layout: Communal areas, quiet zones and interactive environments, touchdown spaces with extraneous coworking spaces.

2. Work models: Neighborhood work environments, flexible working.

3. Furniture: Meeting pods, shared sofas, modular seating, pool and ping pong tables, environmentally friendly furniture.

4. Technology: 3G, WiFi, laptops, smartphones, Google, social media, teleconferencing software, acoustic planning.

3.2.8 2010s:
Agile working and Activity-based working

The rise of smartphones and tablets in the 2010s, along with the bring-your-own-device (BYOD) trend, resulted in more mobile workforces. Collaboration tools such as Microsoft Teams and Miro have proliferated, enabling real-time communication, file sharing and remote collaboration. High-definition video conferencing solutions such as Zoom and Cisco Webex improved the quality and accessibility of virtual meetings and further support remote work. These tools enable teams to work together no matter where they are. Smart office technologies, including IoT sensors, advanced building automation systems and energy-saving solutions, make work space more efficient and sustainable. Smart buildings optimize lighting, climate control and resource management. Virtual reality technology has developed rapidly in the decade, with VR and AR technology being used in office design, employee training and product development. These immersive technologies enhance project visualization and improve training and communication. Technology becomes ubiquitous and more subtly integrated into the fabric of space. From video conferencing equipment to interactive screens and to VR headsets, people expect technology to support workplace experiences.

Powered by personal communications technologies, workplace design in the 2010s drew from the exploration of different work space models that had come before. During this time, agile working practices gained traction in the software development industry, with many organizations adopting agile methods to improve project outcomes, enhance collaboration, and respond to changing customer needs. "Agile working" is an approach of work and work management which emphasizes flexibility, adaptability and collaboration, promoting flexibility in how, when and where work is done. It allows employees to choose the most appropriate method and location for their tasks. This flexibility includes remote working, flexible hours, and the ability to adapt to changing priorities. In addition, agile working places great emphasis on collaboration among team members. Cross-functional teams often work together to achieve common goals. Agile working has evolved in recent years and is no longer restricted to any particular industry, but is instead a set of principles and practices that can be applied to a wide range of work settings. It emphasizes flexibility, adaptability, collaboration and customer focus, and continues to evolve to meet the changing needs of organizations and industries. Agile practices have also influenced the design and management of workplaces, resulting in agile work spaces that prioritize flexibility and collaboration.

In the early 2000s, the concept of Activity-based working (ABW) started to take shape as a more structured and strategic approach to flexible office design. ABW focused on the idea that different tasks and activities require different work settings. It sought to create a variety of workspaces within an office to match specific activities and personal preferences. ABW is arguably the most significant shift in office space use since the creation of the Taylorist 'pool' system in the early 20th century (Leyland, 2021). ABW has developed as a response to the changing nature of work, technology, and the need for more flexible, adaptable, and employee-centric office environments (Veldhoen + Company,2023). Its principles have been refined over the years to create spaces that support diverse work activities and promote employee well-being and productivity.

ABW and Agile are both people-centered change systems to help organize a company more flexibly, but some key differences exist. The key difference between Activity Based Working and Agile working is the focus on the individual (ABW) versus the emphasis on the team (Agile) (Veldhoen + Company,2023).

"There's no conflict between ABW and Agile working. If ABW is a pie, Agile can certainly be a piece of that pie." (Jonas Thelandersson Veldhoen + Company | Senior Consultant).

Both Agile and Activity-based workplaces are all about being flexible, but they do it in different ways. The engine of ABW is a flexibly designed working environment (both in and out of the traditional office); in Agile, its power comes from visualizing the work process. Agile workplaces encourage teams to work together and iterate which for some types of teams is a perfect fit, while ABW setups can work well in any industry because it adapts easily to many flexible ways of working (Veldhoen + Company,2023).

Summary

1. Office layout: Variety of workspace environments, focused around formal/informal, collaborative/concentration, virtual/physical spaces.

2. Work models: Coworking, virtual collaboration, delegated management, activity-based working.

3. Furniture: Standing desks, private booths, bookable meeting rooms.

4. Technology: 4G, artificial intelligence, cloud storage, software as service, occupancy sensors, digital signage.

Case Study (Activity-based working)

ASB North Wharf office design

Location: Auckland, New Zealand.
Time: 2013
Design Collaborators: BVN Donovan Hill in association with Jasmax

Introduction:
ASB is a major bank in New Zealand. The office design provides a wide range of work settings, including open workstations,informal lounge areas, formal meeting rooms, quiet zones for focused work, and collaborative spaces for team projects. Employees at ASB's North Wharf building have the autonomy to choose where and how they work. The flexible and agile working environment allows them to select the workspace that best aligns with their current tasks.

The office is equipped with advanced technology solutions, including video conferencing facilities, interactive digital displays, and seamless connectivity. This technology supports digital collaboration and remote work. Employee well-being is prioritized, with ergonomic furniture, access to natural light, and wellness amenities incorporated into the design. The building includes a wellness center and rooftop gardens to enhance employees' comfort and health. The office layout can be easily reconfigured to adapt to changing project requirements and accommodate dynamic teams. Mobile furniture and modular spaces allow for quick rearrangements.

Reason for selection:
ABS North Wharf building is a flagship example of an ABW workspace. The flexibility and choice of work settings contribute to high job satisfaction and well-being among employees. The open and diverse workspaces encourage collaboration and knowledge sharing among teams and individuals. The office layout allows employees to select work settings that best suit their specific tasks, leading to improved productivity and job performance. The design of ASB North Wharf's office supports the company's culture of innovation and experimentation.

Highlights:
Diverse work settings, Employee choice, Technology integration, Ergonomics and well-being, Flexibility and adaptability.

Discussion booth

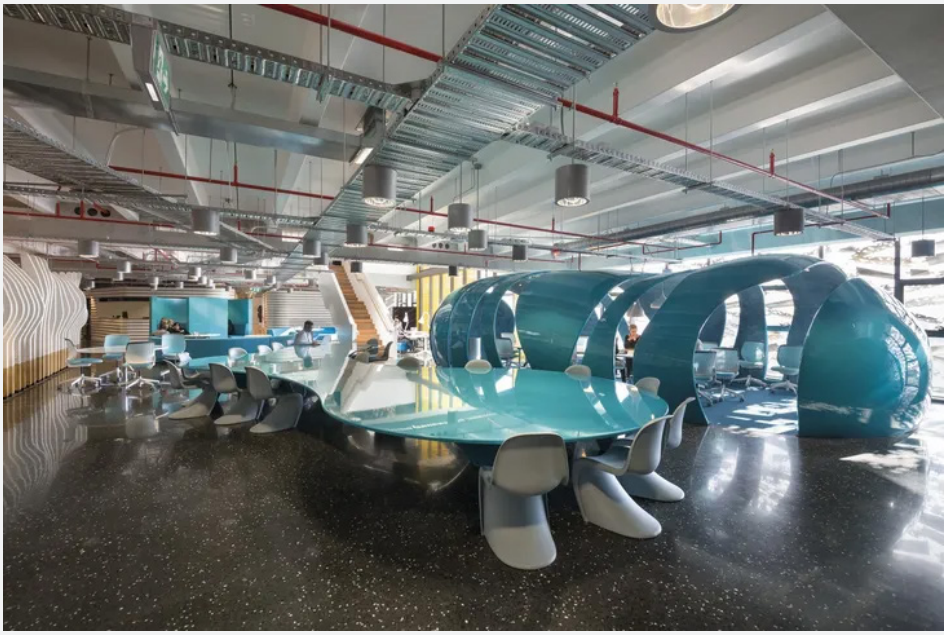
Meeting booth

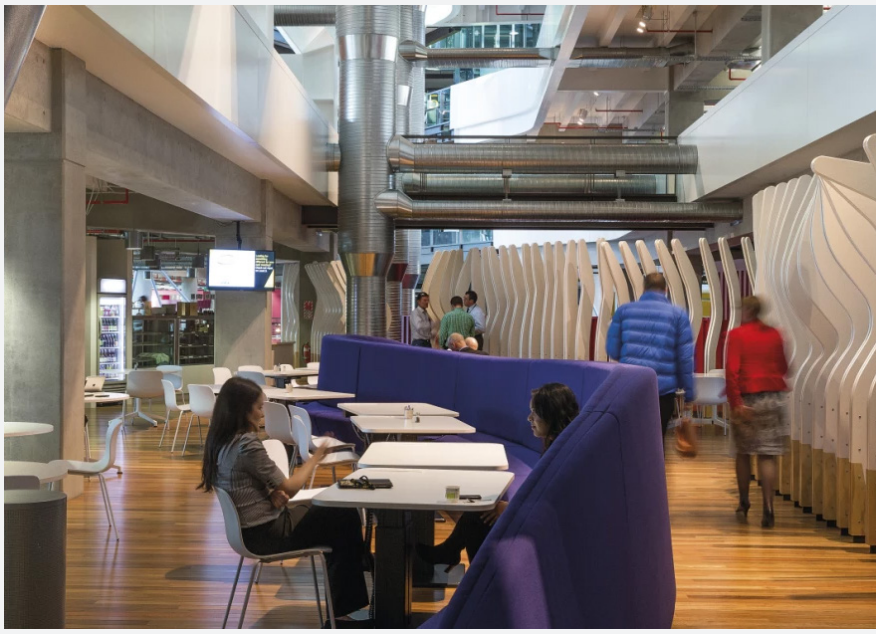
Open workstations

Informal lounge area

Fig. 10: ASB North Wharf - Auckland, New Zealand. Source: https://www.bvn.com.au/project/asb-north-wharf

Flexible workspaces employees to 'dock' anywhere depending on their tasks at hand.





Informal lounge area

Case Study (Agile working)

While "Agile working" is often associated with methodologies and practices rather than specific office designs, many organizations have adopted agile principles in their office environments to promote collaboration, flexibility, and innovation.

Autodesk's MaRS Solutions Studio office design

Location: Toronto, Canada
Time: 2018
Designer: The Living design agency

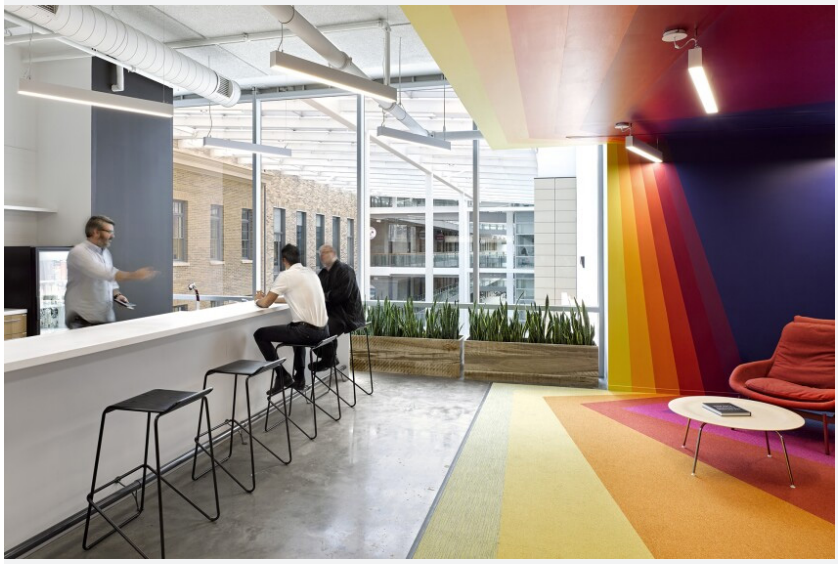
Introduction:
The office layout is open and fosters collaboration. It features flexible workspaces, open seating, and shared workstations to encourage teamwork and creative interactions. The office includes a variety of project rooms equipped with digital whiteboards and collaboration tools. These spaces are dedicated to specific projects and encourage cross-functional teams to work together closely. Employees are not assigned fixed desks. Instead, they can choose from a variety of work settings based on their needs for the day. This flexibility supports agile methodologies and allows employees to adapt to changing project requirements. The office is equipped with advanced technology, including video conferencing facilities, digital project boards, and interactive screens. This technology enables remote collaboration and seamless communication with Autodesk's global teams. The office design incorporates elements that promote creativity and innovation, such as writable walls, brainstorming zones, and spaces for ideation and design thinking. The office includes comfortable lounge areas, a café, and recreational spaces to provide employees with areas for relaxation and informal meetings.

Reason for selection:
This case illustrates how an organization like Autodesk has applied agile principles to its office design to create a workspace that promotes collaboration, innovation, and flexibility. The open and collaborative layout of the office encourages cross-functional teams to work together and share ideas, aligning with agile principles. The flexible workstations and project rooms allow employees to adapt to the needs of their projects, fostering agility and responsiveness. The design elements that promote creativity support Autodesk's culture of innovation, leading to

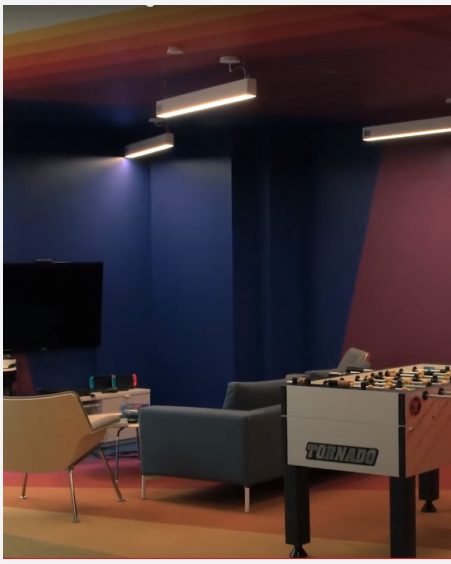
creative solutions and products. Technology integration enables seamless communication and collaboration among employees, including those working remotely or from other global locations.

Highlights:
Open and collaborative, Flexible workstations, Technology integration, Design for creativity.

Café



Recreational space

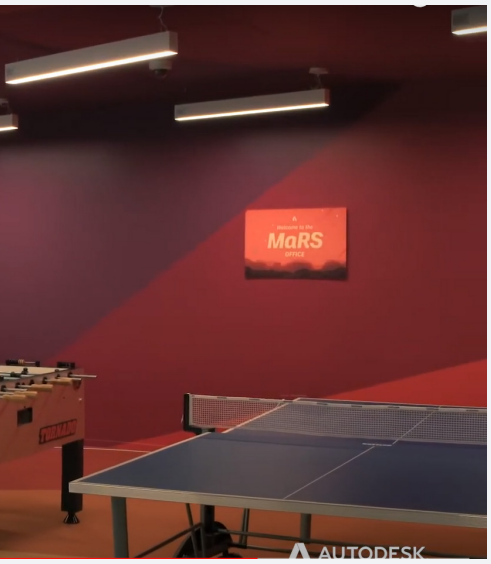


Training area

Shared workstations and Boo

Fig. 11: Autodesk's MaRS Solutions Studio - Agile Office Design.
Source: https://www.architectmagazine.com/project-gallery/autodesk-mars-office_o

Workshop area



th

Meeting room

3.2.9 2020s and beyond:
Smart office and Infinite office

In 2020, the sudden Covid-19 pandemic pressed the pause button on the development of physical work spaces, with millions of organizations forced to close their workplaces and shift to a full-time remote work model. After decades of development and accumulation, network technology has connected families around the world into a virtual work network. Hardware technology facilities such as personal computers and smartphones and various virtual collaboration and conferencing software provide smooth remote working support for people working from home.

Post-pandemic hybrid working models respond to the rethinking of work-life balance as people work from home during the pandemic. People choose work hours and locations based on their work needs. The support of virtual collaboration technology is particularly important for work spaces when members of the same team may not be in the same space at the same time. When people can choose their work location at will, the experience in the work space becomes a reason to attract people. The application of smart technology in work space will bring a new work experience to the physical space.

(1) Smart technology enables smart office

From smart building management systems to portable smart mobile devices that are connected in real time, people today are increasingly working in new types of workplaces, where technology optimizes the physical workspace to improve productivity, health and well-being. Behind the scenes is a growing number of technological tools enabling companies to measure the impact of improvements on various workplace functions through the data collection, data analytics, spatial intelligence and measurement techniques, which provide insight into workplace performance and behavior to Create the right environment for employees.

The development of IoT technology is increasingly moving from the home environment to smart enterprise buildings, while focusing on enriching the employee experience. A growing number of workplaces demonstrate a commitment to employee well-being through the WELL certification, which formally recognizes the ways in which every aspect of a building positively contributes to the well-being of occupants, including air, water and light to comfort, fitness and sleep quality. Sensors, for example, in addition to managing light and air quality, track how people use work spaces, introducing a data-driven dimension into design decisions.

Case Study (Smart office)

Deloitte's "The Edge" office design

Location: Amsterdam, Netherlands
Time: 2014
Designer: the Dutch architectural firm PLP Architecture

Introduction:
Deloitte's "The Edge" is a prime example of a smart office design located in Amsterdam, Netherlands. Completed in 2015, this building serves as Deloitte's Dutch headquarters and is renowned for its innovative use of technology to create an efficient, sustainable, and employee-friendly workplace. "The Edge" features over 28,000 sensors connected via IoT. These sensors monitor occupancy, temperature, humidity, lighting, and even the availability of parking spaces. The data collected is used to optimize various building functions, such as heating, cooling, and lighting, to create an ideal working environment while minimizing energy consumption. Employees have the flexibility to choose their workspaces through a mobile app. Desks are equipped with sensors to detect occupancy, and the app allows employees to find and reserve available workstations, meeting rooms, or quiet spaces. The building boasts a range of energy-efficient features, including solar panels, a rainwater harvesting system, and a thermal energy storage system. This results in "The Edge" being energy-neutral, producing as much energy as it consumes. The office design incorporates features like circadian lighting, adjustable sit-stand desks, and a gym to promote employee health and well-being. Employees can also track their activity levels using a mobile app. Meeting rooms are equipped with advanced audio-visual systems and scheduling tools. Employees can book rooms, control lighting, and set up presentations with ease.

Reason for selection:
Deloitte's "The Edge" in Amsterdam exemplifies how a smart office design, driven by cutting-edge technology and sustainability principles, can positively impact energy efficiency, employee well-being, and overall productivity. It serves as a model for the future of work spaces that are both environmentally responsible and employee-centric.

Highlights:
IoT and building automation, Personalized workspaces, Energy efficiency, Health and well-being, Smart meeting rooms.

Overview of building interior

Cafe

Leisure area

Fig. 12: Deloitte's "The Edge" - Amsterdam, Netherlands. Source: https://edge.tech/de/developments/the-edge

Leisure area

Discussion Booth

(2) Metaverse as Infinite Office

Connecting remotely using video calls and shared desktops has become critical during the Covid-19 pandemic, and as hybrid working becomes the new normal, people would like to have the flexibility to choose where they work based on their needs. Despite the many advantages of working remotely, having only a computer screen in teamwork, social interaction and other scenarios, which usually require a greater degree of immersion and participation, might lead to experiencing video call fatigue and being unable to read the body language or and other nonverbal cues of colleagues. In other words, the sense of engagement with remote work is often limited.

Advances in virtual reality (VR) and augmented reality (AR) technologies will mean that online and offline collaboration will be more immersive and efficient. New augmented reality and holographic technologies will seamlessly blend the digital and physical worlds around us. Even if participants are not in the same work space, VR can closely mirror the physical office setting thus allowing them to use avatars to occupy shared areas. Participants can use body language, gestures and facial movements to communicate with colleagues just as they would in a physical space. This is the Metaverse. From HR teams hosting more engaging onboarding meetings, to creatives working together on design concepts in different locations, people who use VR and AR will be able to create and share collaborative online worlds. No matter where they are, they can socialize, discuss or work together on projects, which can improve workplace productivity and enhance the hybrid work experience.

As organizations around the world come together to explore new ways of working remotely without losing the collaborative capabilities of the physical environment, VR can really make a difference. An article published by Meta company on its workplace website, The future of VR – top trends for 2023, shows that employees are already enthusiastic about the technology, with 60% saying they want to see VR headsets available to employees by 2024. 62% also want to experience VR spaces with digital avatars for collaboration.

The evolution of the Metaverse has made hybrid work easier and more inclusive for employees around the world. The limitations in physical space are extended in virtual space. Traditional office hardware, such as desktop computers and laptops, may one day be replaced by VR headsets and glasses, just as typewriters were replaced by personal computers. Metaverse would bring a surreal work experience to remote employees in future hybrid work and provide an infinite workplace for collaboration and innovation.

Case Study (VR)

Meta Platforms - Virtual Collaboration in the Metaverse

Location: Global Access
Time: Launched in 2021, ongoing
Designer: Meta Platforms, Inc.

Introduction:
On the official website of Meta Platforms, Inc., we know that there are currently three main ways to access the Metaverse: Virtual reality, Augmented reality and Smart glasses.

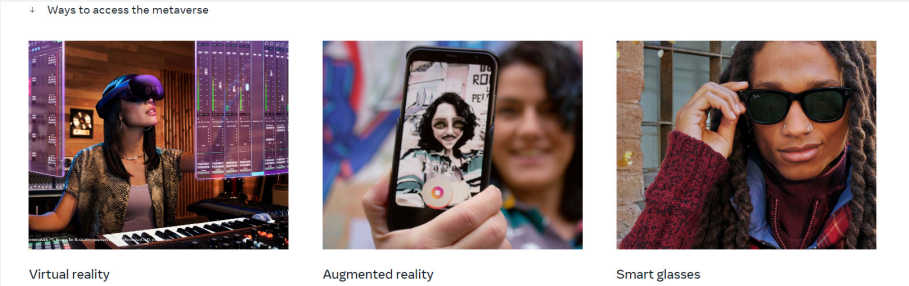


Fig. 13: The official website of Meta Platforms. Source: https://about.meta.com/uk/metaverse/

Virtual reality
Users can enter the Metaverse platform by wearing a VR headset and explore the shared experience of a new world. Meta Platform provides a multi-functional virtual reality space which basically covers all aspects of daily real life scenarios, including fitness, games, social interaction, entertainment, work, etc.

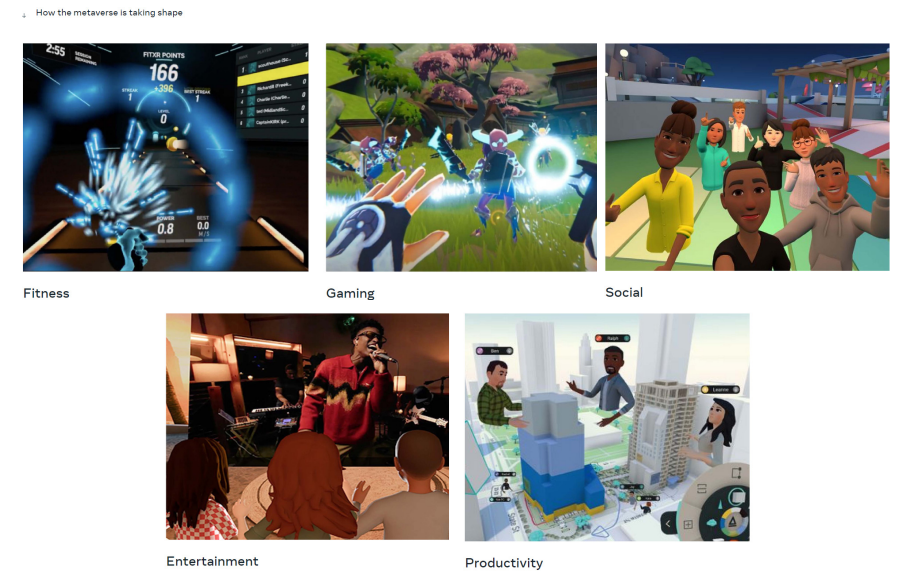


Fig. 14: Virtual reality on Meta Platforms. Source: https://about.meta.com/uk/metaverse/

In this world, all participants appear as 3D characters. Participants create their own avatar, which allows them to "pinch" their face to create a cartoon 3D character avatars which look like themselves. Gestures and expressions are well represented in the virtual space of meetings. People in the virtual world can also move around, participate in various activities, and interact with remote colleagues or friends in a virtual "face-to-face" manner.

In the Metaverse platform, the virtual space of work functions is mainly used in three fields: collaboration, prototyping and training. The corresponding applications are: Meta Horizon Workrooms, Gravity Sketch and Shape XR.

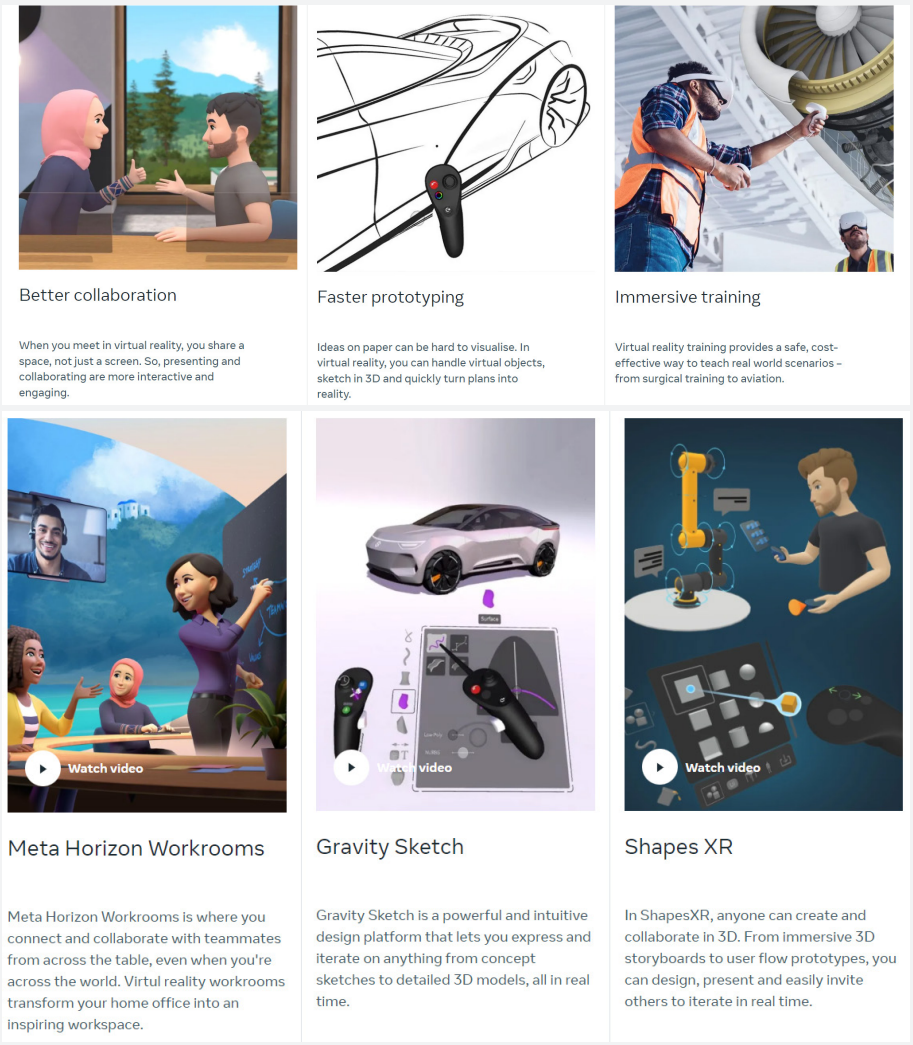


Fig. 15: The virtual space of work functions in the Metaverse platform. Source: https://about.meta.com/uk/metaverse/

We take Meta Horizon Workrooms as an example. Horizon Workrooms is an immersive virtual office where users can meet teammates, brainstorm ideas, share presentations and get things done, whether they're wearing a Meta Quest headset or joining from a 2D screen (Meta, 2023).

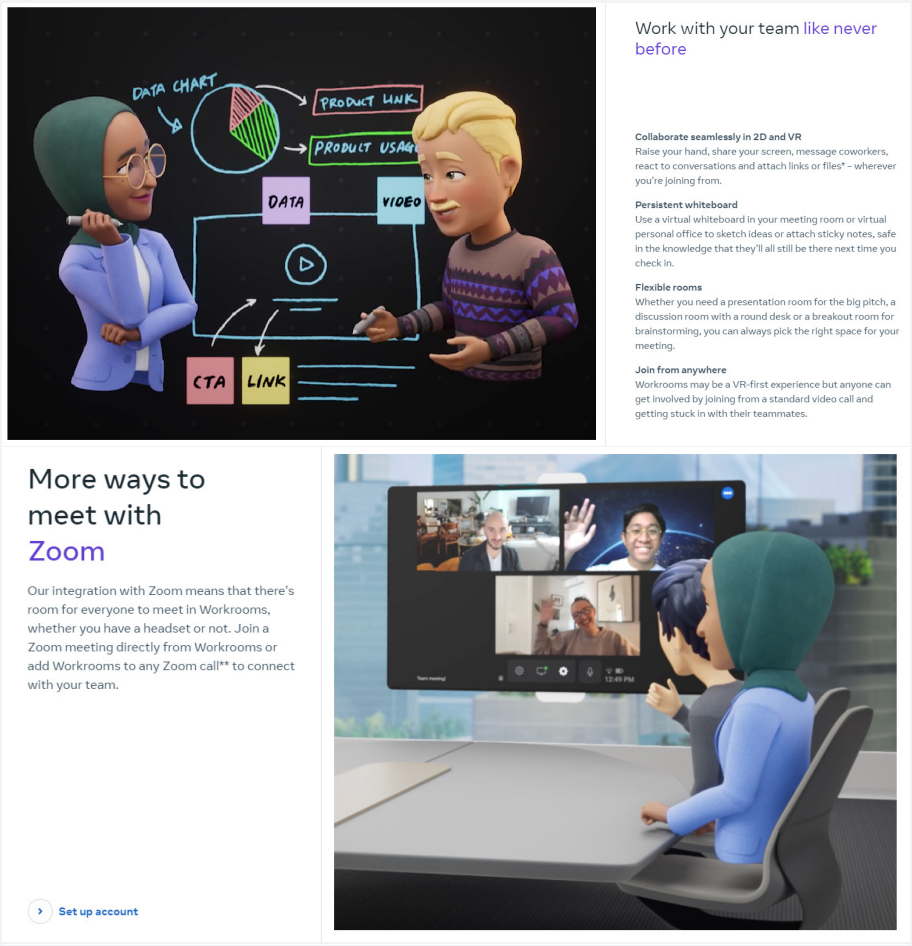


Fig. 16: Meta Horizon Workrooms. Source: https://about.meta.com/uk/metaverse/

Users can create and enter virtual meeting rooms and customize avatars to represent themselves. These avatars mimic the user's head movements and facial expressions for more natural interactions. Equipped with tables, chairs and whiteboards, these rooms are designed to simulate real-world meeting spaces. Horizon Workrooms supports voice chat, spatial audio, and hand tracking, allowing users to communicate with colleagues as if they were in the same physical space. Users can access virtual whiteboards to draw and share ideas, as well as desktop sharing and screen casting for presentation and collaboration on documents

and applications. The platform supports integration with productivity tools like Zoom and Slack, allowing users to link Workrooms meetings with existing workflows. Users are also able to access their computer desktop in VR, which is useful for multitasking and accessing files and applications.

Reason for selection:
The design of future work spaces must consider various hybrid work scenarios, including interaction in physical space and collaboration with remote colleagues in virtual space. Horizon Workrooms demonstrates a new direction in virtual work space collaboration. Users can work, meet and socialize in immersive digital spaces, enhancing the experience of remote working and collaboration, and taking virtual meetings and teamwork to new levels of interactivity and engagement. It makes us convinced that remote collaboration in future office will be supported by powerful technologies.

Highlight:
Virtual space collaboration for remote work

Case Study (AR)

Dobe E-Manor of Baihang--Metaverse creative office park

Location: No. 1200, Zhongshan North 1st Road, Hongkou District, Shanghai, China
Time: 2022
Designer: DoBe Group

Introduction
The project was originally a creative office park transformed from an old aerospace factory in Shanghai. In 2022, Dobe used AR technology to implant virtual space into the original physical space, thereby bringing an immersive space experience that combines virtuality and reality. Visitors can explore virtual scenes using their mobile phones and VR glasses through the "wehome" app. After logging in to the application, users will enter a world where virtuality and reality merge. There are virtual signboards to guide users to various places in the park, and along the way they can enjoy virtual scenes such as cartoon characters, fireworks and ribbons against the real background. As users walk through the narrow alleys of the office campus, a virtual runway pops up, and the wall on one side turned into a huge billboard, and a bunch of cartoon characters appeared on the forward arrow, just like entering a VR parkour game. Compared with online games, this virtual universe community is based on a real community. All players are people working in the same office park. It's fun to meet new people through a virtual scavenger hunt in a real location.

Reason for selection:
In this case, the AR technology of Metaverse is used to integrate physical space and virtual space to provide users with an immersive interactive experience between people and space. The design which combines virtuality and reality makes communication and sharing no longer limited to entities, allowing creative inspiration to further burst out in the three-dimensional world where virtuality and reality blend. This case provides new ideas for virtual interaction for future physical work space design.

Highlights:
AR technology realizes the integration of virtual and physical space, immersive interactive experience.

Fig. 17: Use AR technology to implant virtual space into the original physical space.
Source: https://www.dobechina.com/news/detail.aspx?id=1656

Case Study (Metaverse in Space Design)

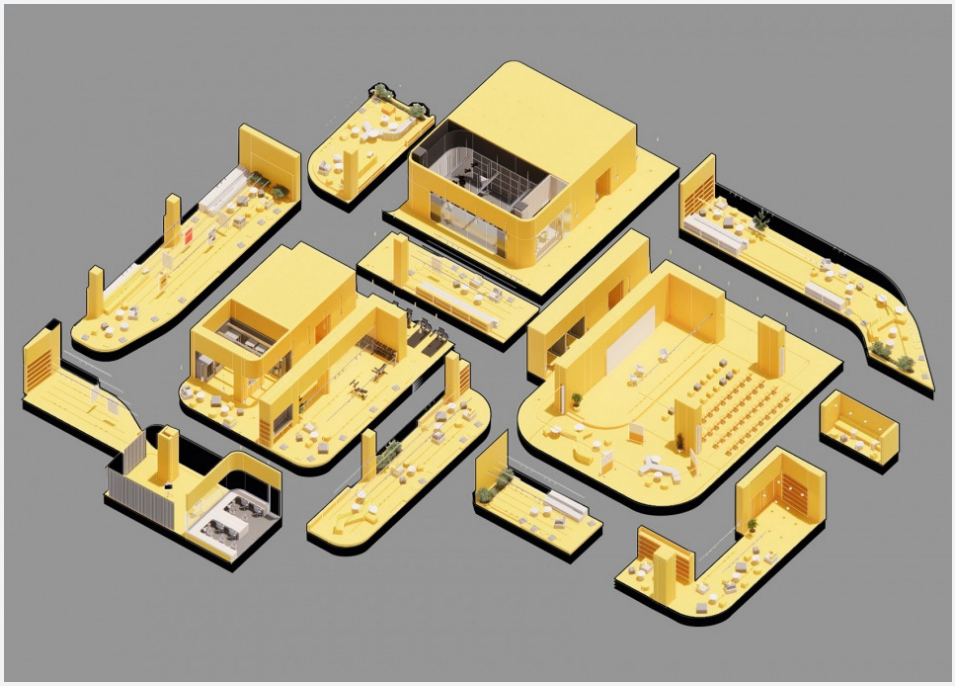
Red Bird Maker Space – Hong Kong University of Science and Technology (HKUST), Guangzhou Campus

Location: Guangzhou China
Time: 2022
Designer: reMIX studio

Introduction:
The Red Bird Maker Space studio is the core carrier of the cross-integration and shared creative education concept of different engineering disciplines on the Guangzhou campus of HKUST. The studio is equipped with a variety of furniture and space modules to carry out different types of group activities. The retractable socket hanging from the ceiling could "disappear" when not in use. Relatively independent glass partitions provide a quiet place for presentations and discussions. Private booths create conditions for one-to-one communication and solitary study scenes. On each floor, a series of different public nodes create a unique spatial experience. Lounges, restaurants, exhibition halls, gyms, cafes, lecture halls, recording studios, etc. provide a rich space for daily activities. In addition, in the Metaverse classroom, the motion camera system is combined with virtual reality technology, allowing students in the Guangzhou campus to seamlessly connect with the teaching activities on the main campus in Hong Kong.

Reason for selection:
In the design of the studio, the designer proposed a distinct design strategy: minimize fixed partitions to create a more flexible open plane; design richer space partitions to create conditions for activities with different levels of openness. This case shows how to combine various small spaces based on different activities in a modular form in an open space. In addition, this studio contains a space which uses the Metaverse - the Metaverse Classroom. Integrating virtual technology into real space provides some reference for the design of combining virtual and real spaces in future work spaces.

Highlights:
Activity-based collaboration space, Metaverse classroom



Atlas of the new inserted programmatic nodes

F4 studio: visual connections across different functional clusters

F4 studio: the central node with a large platform for exhibitions / resting and the gym

F5 studio: the central auditorium in open and closed configuration

F6 studio: four types of interactions: informal (resting area), group work (movable tables), 1-to-1 (niches), individual (booth)

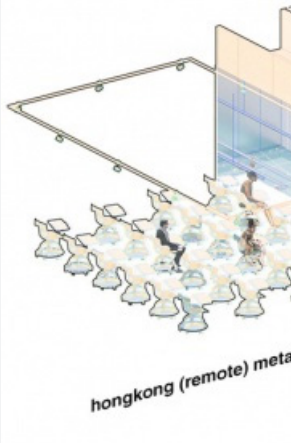
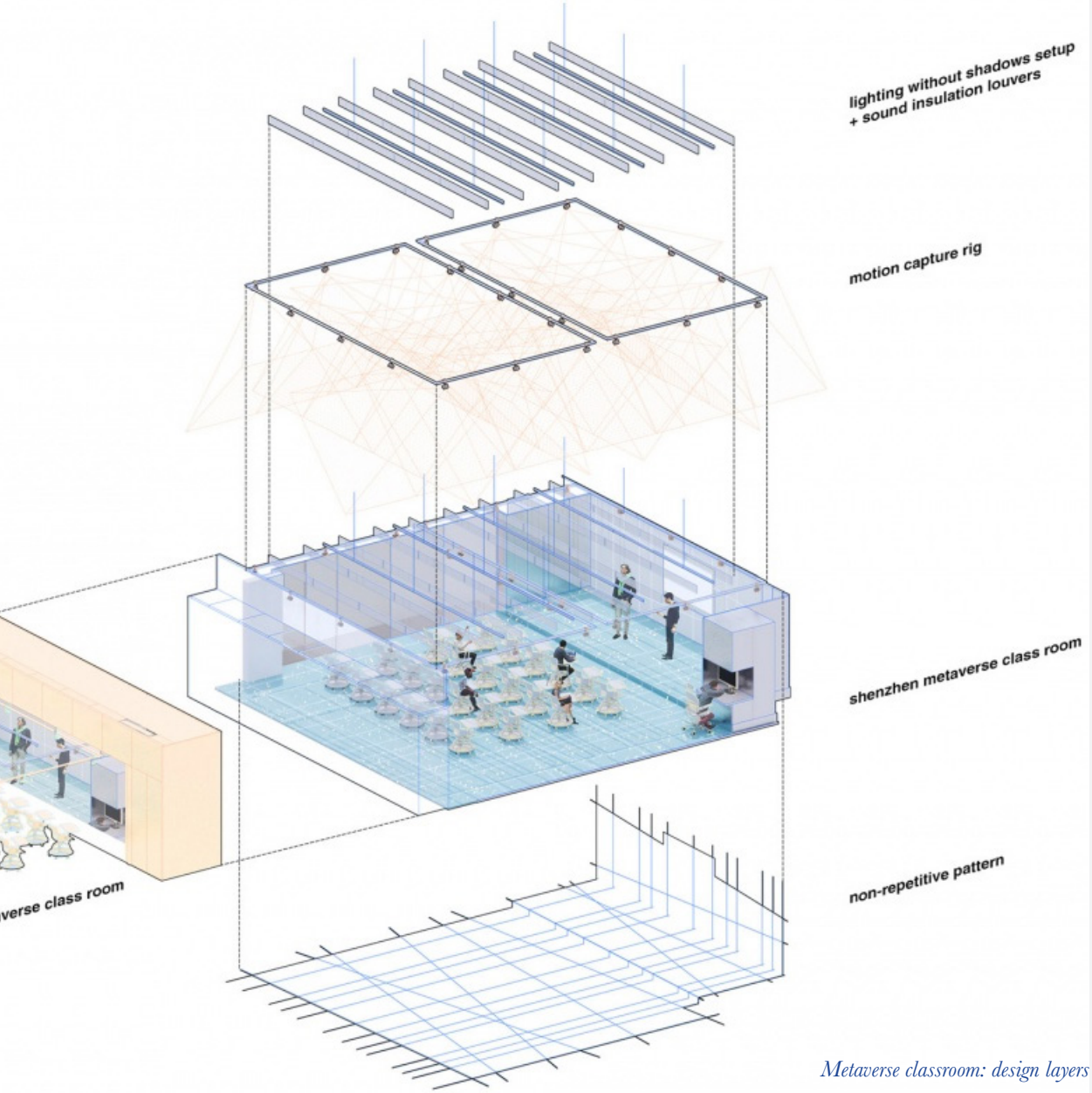


Fig. 18: Red Bird Maker Space – Hong Kong University of Science and Technology (HKUST), Guangzhou Campus. Source: https://www.gooood.cn/red-b

Metaverse classroom: motion-capture zone seen from the workshop

Metaverse classroom: workshop and discussion area



Metaverse classroom: design layers

ird-maker-space-by-remixstudio.htm

3.3 Summary

In the history of office development over the past 100 years, we have seen that technological progress has been a continuous driving force for office design changes. From typewriters to the Internet, technology continues to simplify work processes and improve communication patterns. From strict hierarchies and fixed workstations to flexible, remote and hybrid work models, workspaces are constantly adapting to work dynamics and employee needs.

In addition to the impact of technology, the changing needs of employees are another driver of office change. For example, in order to get rid of the oppression caused by Taylorist open spaces to employees and solve problems such as inequality and lack of communication, the Bürolandschaft, which pursues freedom and equality, emerged. It used green plants to create a partial privacy space, and promoted equal communication among employees through more democratic and social elements. For the first time, the needs of employees were fully taken into account. On this basis, the Action Office series has developed modular office furniture which adapted to various work activities while maintaining a flexible layout. It not only ensured the flexibility and convenience of work space use, but also increased the sense of privacy and personalization. At the same time, ergonomic office furniture design has also received increasing attention. They were all developing in compliance with the law of "fully considering the needs and well-beings of employees". The subsequent casual offices and co-working spaces were also born with the development of new technologies and the emergence of new needs of employees. Activity-based working, which emerged later, also inherited the flexibility and the idea of determining interactivity and privacy based on the needs of work activities that were followed when the Active Office series was originally designed. It has been continuously developed and improved based on employee needs and is still used today. Of course, there were also Taylorist negative cases like Cube Farm. Such negative cases were caused by excessive pursuit of profits and ignoring the needs of employees.

Following the above development venation of work space, we can summarize the following points:
1. In work space design, the development of technology and the needs of employees are indeed indispensable. The development of technology affects employees' needs by affecting the nature of work and behavior, employees' needs determine the form of space, and technology shapes space experience. The three complement each other.
2. Flexibility is the development trend of work space that has always been in line with the needs of employees. Flexibly movable modular office furniture, office plant landscapes, considerations of openness and privacy in work spaces,

design of activity-based work spaces, etc., are all experiences worth learning from. These experiences can be specifically applied or improved in the future based on changes in employee needs in different periods.

4 People's

s Expectations and Needs for Workplace

in force in future work

rom the future of work?

on well-being"

place well-being

n the workplace?

orkplace well-being

he main activity

time collaborating

llaboration spaces

ployees agree that: The primary purpose
orate'

ecision makers: The future office is a
s collaborate and create

of experiences

me an important part of the new

4.1 Young people are the main force in future work

In a time of major change in the way people work, and the composition of the workers entering the workforce is changing, a key part of it shouldn't be overlooked: the youth.

According to the U.S. Bureau of Labor Statistics, more than half of the professional workforce is now under the age of 45. Younger people, especially millennials and Generation Z (Gen Z), now make up more than 59% of the knowledge workforce. The World Economic Forum released a report in May 2022, Gen Z and the end of work as we know it, showing that by 2025, 27% of the workforce in OECD countries will be Gen Z. As Gen Z enters the workforce, the baby boomer generation is retiring and the labor market is undergoing a fundamental shift. Gen Z preferences and work styles will increasingly define the future of the workplace.

4.1.1 Who is Generation Z?

The Pew Research Center has defined 1997 as the starting birth year for Generation Z, based on "different formative experiences", such as new technological and socioeconomic developments. Pew has not specified an endpoint for Generation Z, but used 2012 as a tentative endpoint for their 2019 report. Numerous news outlets use a starting birth year of 1997, often citing Pew Research Center.

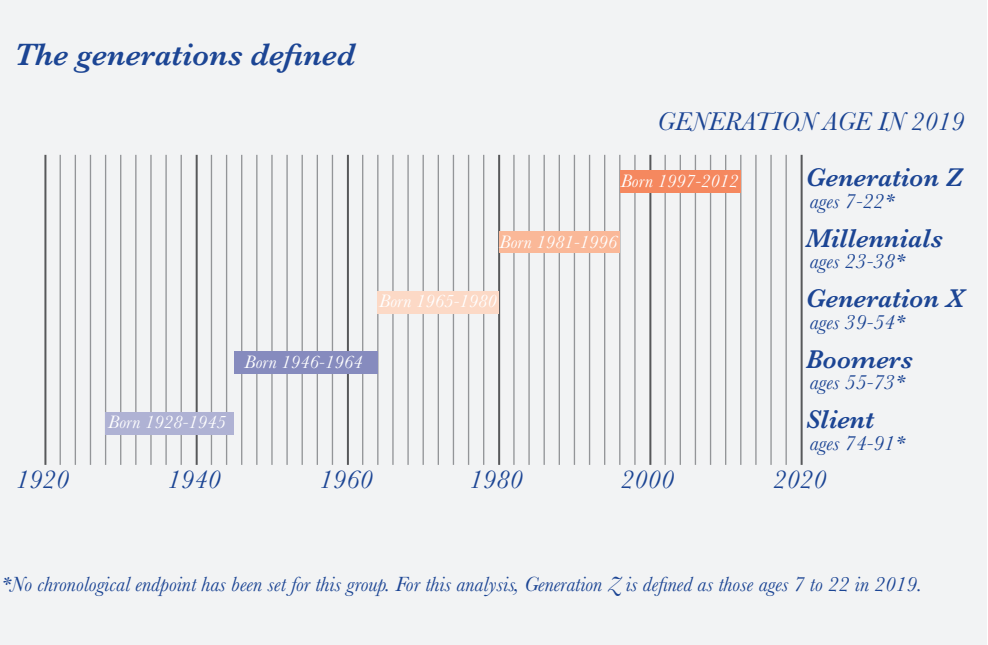


Chart 5: The generations defined. Source: Pew Research Center

Although many countries have aging populations and declining birth rates, Generation Z is currently the largest generation on Earth. Bloomberg's analysis of United Nations data predicted that, in 2019, members of Generation Z accounted for 2.47 billion (32%) of the 7.7 billion inhabitants of Earth, surpassing the Millennial population of 2.43 billion.

"They see the world so differently than those who came before them." (Meghan Grace,2018)

Generation Z is the first group to have access to the internet and portable digital technology from the day they came to know the world. They were born around the time of the Web 2.0 revolution that took place in the mid to late 2000s and 2010s. They grew up with access to an unprecedented number of technologies, and the use of mobile devices has been growing exponentially over time. Their social world is full of instant messages, online likes and shares, and they access information via smartphone, tablet or computer and connect to online stores, payment and banking services. Gen Z has not lived a pre-digital life, hence a connection to technology is inherent in the way they think and behave.

On the other hand, they start their careers amid rising inflation, rising student loan debt, a housing crisis, a worldwide public health crisis and a looming recession. Even before the Covid-19 pandemic, Gen Z were growing up under a cloud of uncertainty. Gen Z has yet to experience a career decline, but many have grown up watching their parents and older siblings struggle with unemployment and financial dilemma. Early exposure to economic uncertainty made this generation pragmatic and skeptical about their careers.

Most worryingly, Gen Z is more likely than other generations to suffer from mental health problems. According to a survey of 3,409 adults conducted by the American Psychological Association in August 2020, Generation Z adults (ages 18 to 23) had an average stress level of 6.1 out of 10, the highest of any generation, and all adults The average stress level is 5. Shockingly, 75% of Gen Z adults say they have experienced one or more symptoms of depression. The study cites uncertainty about the Covid-19 pandemic, as well as an ongoing sense of crisis and social unrest, as potential causes. It is clear that Gen Z is bearing the psychological impact of these uncertain times. The Economist has described Generation Z as a more educated, well-behaved, stressed and depressed generation in comparison to previous generations. (Economist,2019)

Overall, Gen Z is having a hard time and it is affecting the way they work.

4.1.2 What does Gen Z want from the future of work?

In an article by Forbes in May 2023, How Gen Z's Impact On The Workplace Continues To Grow, Mark Beal from Rutgers University stated, "Gen Z will transform and disrupt the workplace more than any generation. Gen Z will inspire leaders to focus on mental health, including offering mental health days as an employee benefit."

Greater flexibility

Many of the anxieties that Gen Z feel impact their experience at work. According to a 2021 Adobe survey, 59% of Gen Z respondents said they were dissatisfied with their jobs. Difficulty with work-life balance, long hours, time pressure and lack of flexibility were other major reasons for dissatisfaction, with 57% saying they felt pressured by the need to be connected at any time of the day. They feel that flexible work hours that they can control can relieve a lot of this pressure. Additionally, Gen Z tends to return to the office, but not full-time. This may be because 72% of Gen Z workforces lack a dedicated home work space, and 86% of Gen Z staff share a house with at least one other adult. They want to reap the social benefits of working face-to-face, and 41% feel they miss out on mentoring from seniors when working remotely. 70% prefer a hybrid work environment.

In this hybrid work model they expect, for Gen Z who have just stepped out of school, remote work means not only working from home, but also working from anywhere. According to Gensler's workplace research report released in 2021, only 66% of Generation Z employees prefer to work from home, 24% prefer alternative office locations, 16% prefer co-working locations, and 13% prefer spaces like coffee shops, libraries, or other third places. Two-thirds of Gen Z workers would trade their assigned desk for more opportunities to work outside of their desk or office walls. This also provides an important direction for the physical workplace in the future of hybrid work: flexible work space, which enables various work experiences.

If unhappy, will leave

What distinguishes Gen Z workforces from other generations is that they are more willing to leave jobs that are not suitable for them. A Deloitte survey of 14,808 Gen Z employees and 8,412 Millennial employees in 2022 revealed that 40% of Gen Z respondents plan to leave their jobs within the next two years, compared to just 24% of Millennials.

High levels of dissatisfaction with work make this generation a major departure risk. According to Adobe's 2021 survey results, 74% of people said they would change jobs to achieve a better work-life balance, and 66% said they would change jobs to gain more control over their work schedules ,63% would change jobs to choose remote work.

Greater Diversity, Equity, and Inclusion (DEI)

Generation Z is the most diverse generation in the European Union in regards to national origin (European Parliament, 2020). When it comes to diversity and inclusion, many of Gen Z people feel that minorities are underrepresented in the workplace. This concern is very important when considering employment opportunities. In a September 2020 Tallo survey of more than 5,000 Gen Z youth, 69% of respondents said they are more likely to apply to companies that emphasize diversity and inclusion in their hiring process. One third said they would avoid opportunities to be treated unfairly because of their gender, ethnicity or racial identity. Diversity is important to them in many ways, not just in isolation of race and gender, but also in relation to identity and orientation.

As the most emerging force in today's labor market, the preferences of the Gen Z will greatly affect the future of work and the development trend of the workplace. There are various signs that hybrid work will continue and develop further in the future. The design of physical work space will take more into account their expectations about well-being, among which not only the physical and mental health of employees should be paid attention to, but also flexible space, diversity and inclusive experience are also particularly important.

4.2 "It is important to focus on well-being"

The lingering health risks of the pandemic and employee's reflections on their experiences with the autonomous aspects of remote work during the pandemic have created new expectations for the future of work as people return to the office. According to a 2021 research report jointly conducted by Workplace Intelligence and WeWork, The future of work is hybrid, 95% of the respondents want to control their working hours, places and methods, and 62% of the respondents want to control their work and make life balance their first priority. 80% of respondents said it is important to focus on well-being.

4.2.1 Employees expect workplace well-being

A research report released by JLL in July 2022, Workforce Preferences Barometer, compared the priorities of employees before and after the pandemic, and found that work-life balance has always been the ideal state pursued by employees. In addition, the ranking of well-being factors in the minds of employees has increased to a pivotal position year by year.

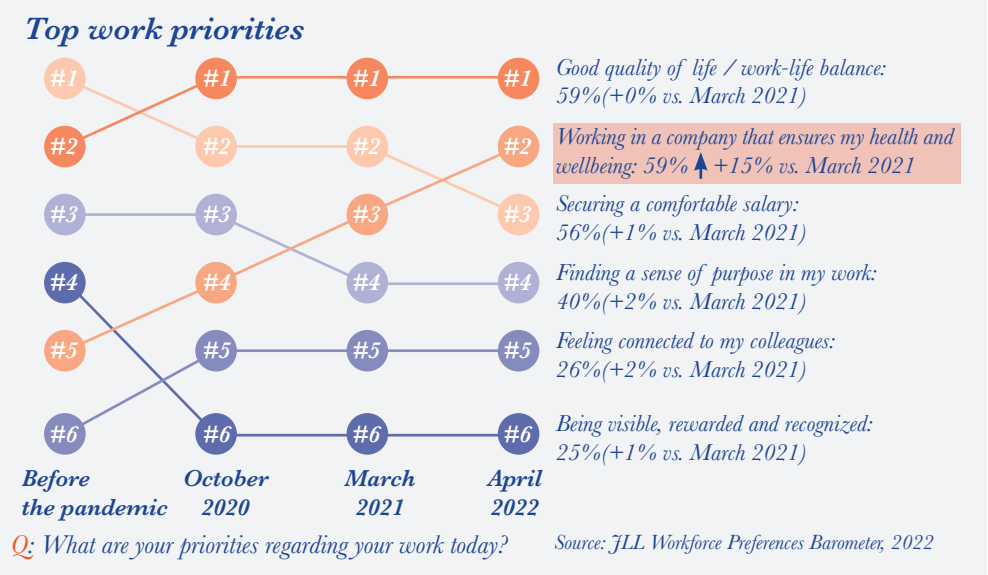


Chart 6: Top work priorities.

Part of creating a truly successful hybrid workplace is building offices that reflect the current and future needs of employees. After a difficult period of burnout and disconnection during the pandemic, a hybrid work environment allows people the flexibility to work when, where, and find the sweet spot for work-life balance. In line with the principle of people-oriented design, the design of work space should take the "well-being" that employees care about most as the starting point, create a unique experience for employees that can only be realized in the office, and make the office a uniquely connected medium that helps them do their jobs more efficiently.

4.2.2 What is the well-being in the workplace?

Since 1948, the World Health Organization (WHO) has consistently defined health as a "state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" (World Health Organisation 1948). In a broader context, wellbeing term is used to describe not only person's state and affective evaluation of it but also a relationship with its workplace (organizational wellbeing) and quality of life in the community (social wellbeing). (Danivska et al., 2020)

According to JLL's research report on restoring employee well-being, Regenerative Workplace, released in September 2021, the Workplace wellbeing model lies on three health pillars and nine resilience traits.

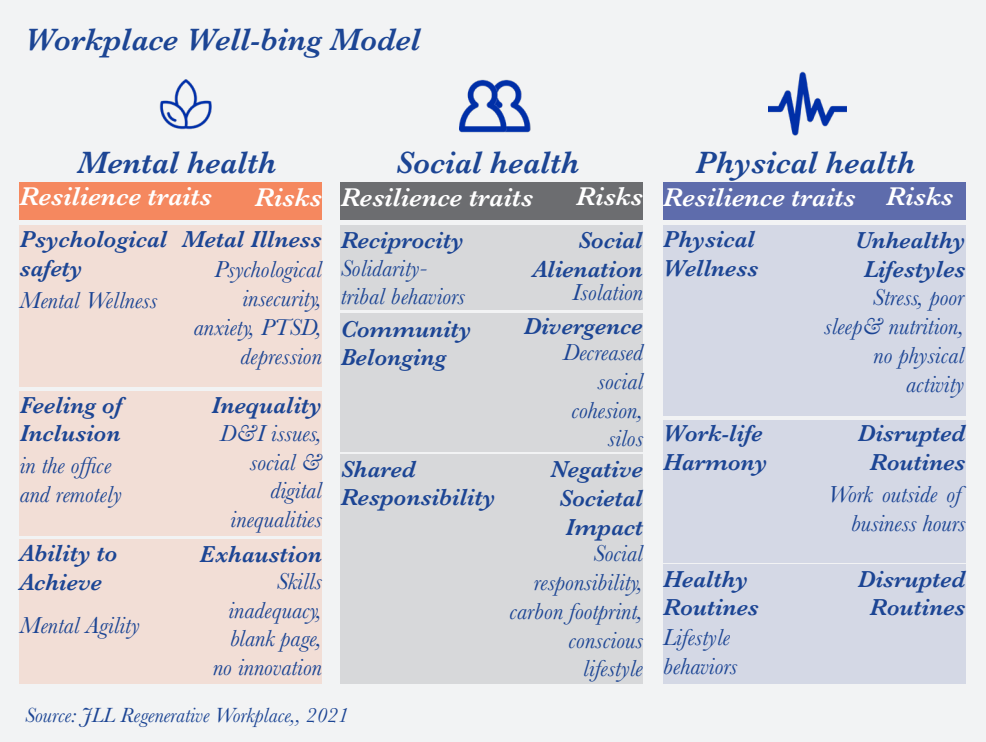


Chart 7: Workplace Well-bing Model.

According to the above model, when designing future workplaces, we should mainly consider employee well-being from three aspects: physical, psychological and social.

1. Physical

Support employees' physical health and work-life balance. For example, in work spaces, we can protect employee well-being and care for their health by providing a high-quality physical environment — with ergonomic office furniture, healthy meals, fitness equipment, etc.

2. Psychology
Focus on employees' mental health and personal growth. For example, integrating design aesthetics into the office environment to create a relaxed working atmosphere; adopting activity-based workspace design methods to help employees improve work efficiency; creating leisure spaces to relieve work stress and increase job satisfaction and happiness; providing psychological support resources and space, etc.

3. Social
Create common areas where employees can gather, collaborate, and socialize to enhance a sense of community and belonging. Examples of workplace social affordances include coffee bars and food spaces, and opportunities for playful engagement such as games, comics on the wall, and kitchen facilities, as well as workspace personalization and physical assimilation or segregation of teams (Spreitzer et al., 2020).

4.2.3 Technology improves workplace well-being

Smart technology supports employee well-being

Regarding functional wellbeing, smart services are based on knowledge of the individual and his/ her environment. Services support a healthy and safe work environment and working conditions within the organization and office areas with workstations (Danivska et al., 2020). For example, IoT sensors are used to monitor various environmental factors in work spaces, including temperature, humidity, lighting, occupancy and air quality, provide real-time data, and make timely adjustments to improve comfort and efficiency.

With respect to mental health, smart wellbeing services are based on learning and they enhance behavioral change. With the help of collected data and machine learning, one can provide and get feedback about the behavior (Danivska et al., 2020). For example, employees can use mental health apps to access resources such as stress management, meditation and emotional support for mental health healing.

In terms of social wellbeing, smart services are based on networking and strengthened community support. Services allow users to join and operate in different communities and they connect multiple tools or service providers in the network (Danivska et al., 2020). For example, apps that facilitate mentoring and communication can help employees connect with colleagues who share common interests or career goals.

Metaverse technology supports employee well-being

Metaverse technology has the potential to improve workplace well-being in various ways by creating immersive, collaborative, and flexible environments.

Regarding functional wellbeing, metaverse technology would enable employees to work from anywhere, promoting work-life balance and reducing commute-related stress. Employees can customize their virtual workspaces, choosing layouts, decorations, and even the ambient environment. Personalization enhances comfort and satisfaction. Metaverse technology can provide accessible workspaces for employees with disabilities, ensuring that everyone can fully and comfortably participate in work.

With respect to mental wellbeing, virtual spaces within the metaverse can be dedicated to relaxation, meditation, or mental health resources. Employees can access these areas to de-stress and seek support when needed.

In terms of social wellbeing, immersive virtual meetings, gatherings, and team-building activities can help employees who work remotely eliminate feelings of isolation and enhance emotional well-being.

Case Study (Well-being)

National Australia Bank Headquarters office design

Location: Melbourne, Australia
Time: 2022
Design: Hassell

Introduction:
In this project, highly flexible and welcoming hybrid work spaces promote more interaction between people. NAB's employees and customers prefer more than one way to communicate at work. Especially in the post-epidemic era, the design provides them with a variety of flexible options to welcome them back to the office. The new office building supports a variety of work modes, such as team collaboration, hybrid work and focused work needs. The design also takes advantage of the differences in floors to create a series of small meeting spaces. In this way, some private space can still be retained in the open space. Diversifying employee well-being is NAB's top priority when creating work spaces. By introducing abundant natural light and outdoor views, the indoor space also flows. Recognizing that stress and anxiety are among the top factors limiting innovation and productivity, an entire floor of the building was dedicated to wellness, learning and training spaces. Employees can enjoy some solitude spaces, such as couches, meditation spaces, mother and baby rooms, prayer rooms for people of different faiths, and gyms. Hassell and NAB share common sustainable values, from locally sourced recycled building materials to abundant natural light and to green spaces everywhere, they help NAB realize its sustainable vision through various design initiatives.

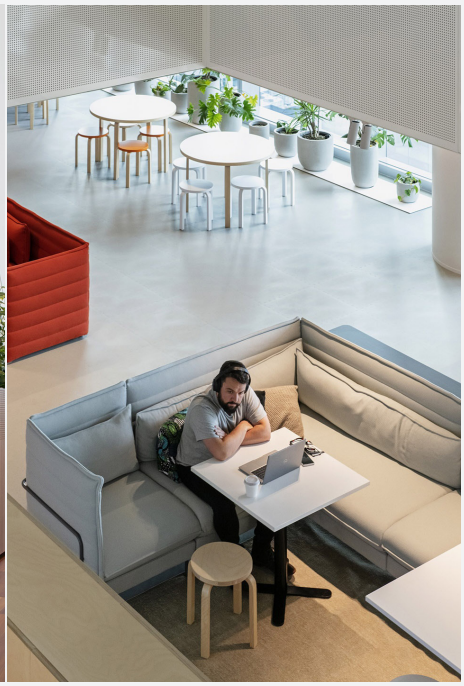
Reason for selection:
Employee welfare office design in the hybrid work model during the post-epidemic era. Flexible space planning allows open and private spaces to coexist. The main focus of the space design is employee well-being. This case explains employee well-being in the work space from three aspects: physical, psychological and social, which is completely consistent with the three aspects of well-being mentioned before.

Highlights:
Interpreting the well-being of office employees through space design from three aspects: physical, psychological and social aspects. Flexible and diverse work space. Biophilic elements and sustainable development.

A highly flexible and welcoming hybrid workspace

The lounge

A place for concentration and relaxation with greenery



A shared agile space

Spaces designed for physical and mental health and communication

The workplace brings employees together

Fig. 19: National Australia Bank Headquarters.
Source: https://www.gooood.cn/nab-places-new-melbourne-hq-by-hassell.htm

4.3 Collaboration becomes the main activity

The rise of hybrid work model has brought a new understanding of how to work best, what types of spaces are needed, and the experience of hybrid work. People engage in a series of work activities and fundamentally need different workspaces to support them. Understanding employee's behavior is critical as workplaces are designed to meet the changing needs of them.

4.3.1 Employees spend more time collaborating

According to Gensler's latest research report on workplaces, Global Workplace Survey Comparison 2023, Employees across the world are spending the majority of their time working with others. Specifically, employees spend the majority of their workweek (42%) working with others, both virtually (14%) and in-person (28%). However, there is a potential overlap between face-to-face and virtual working modes, as more than half of hybrid meetings (which require both face-to-face and virtual participants) take place in offices. Working alone, whether or not it involves independent tasks such as deep concentration, reading or answering emails, accounted for the second most time (35%).

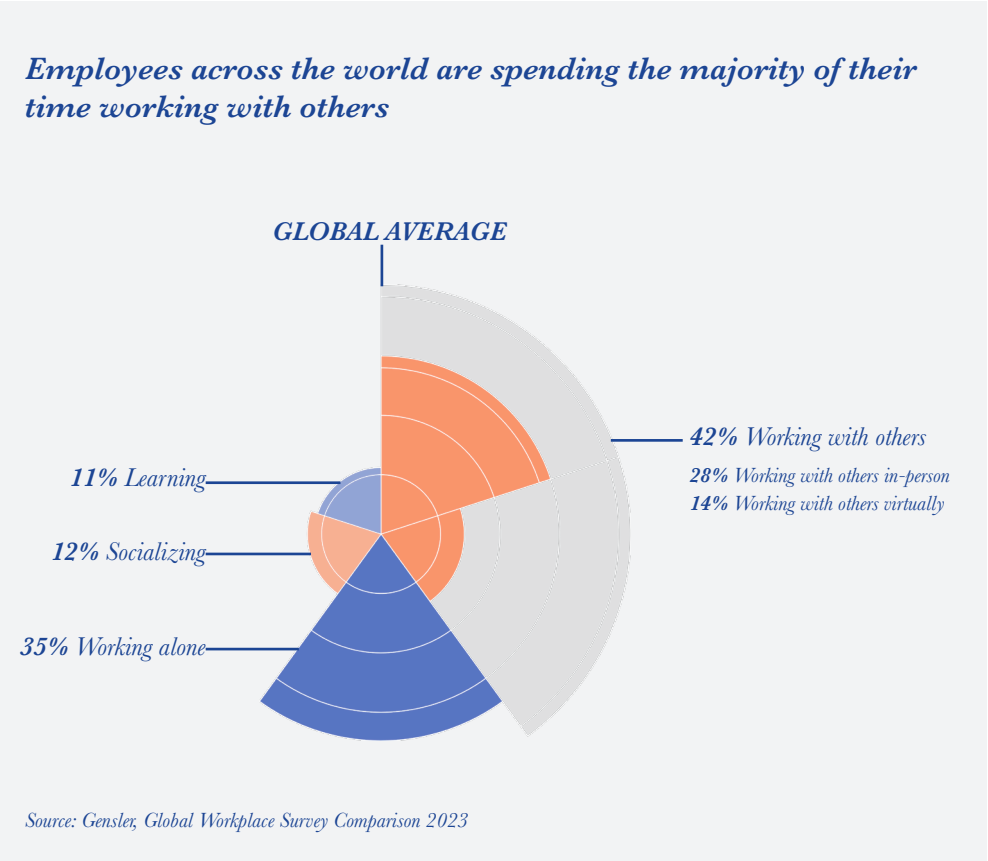


Chart 8: Employees across the world are spending the majority of their time working with others.

4.3.2 Increased number of collaboration spaces

VergeSense's May 2022 State of the Workplace data report analyzed space utilization in 550 buildings around the world, including more than 100,000 spaces. According to the report, from the first quarter of 2021 to the first quarter of 2022, we saw a 45% increase in the average number of collaboration spaces per floor (Chart 9). Collaboration space utilization has increased by 88% in a short period between Q1 and Q2 2021. Additionally, utilization of these spaces has remained stable over the past four quarters (Chart 10). Combining these two sets of data, we can see that as the number of coworking spaces increases, utilization remains stable. This shows that employees come into the office more for "we" work than "me" work.

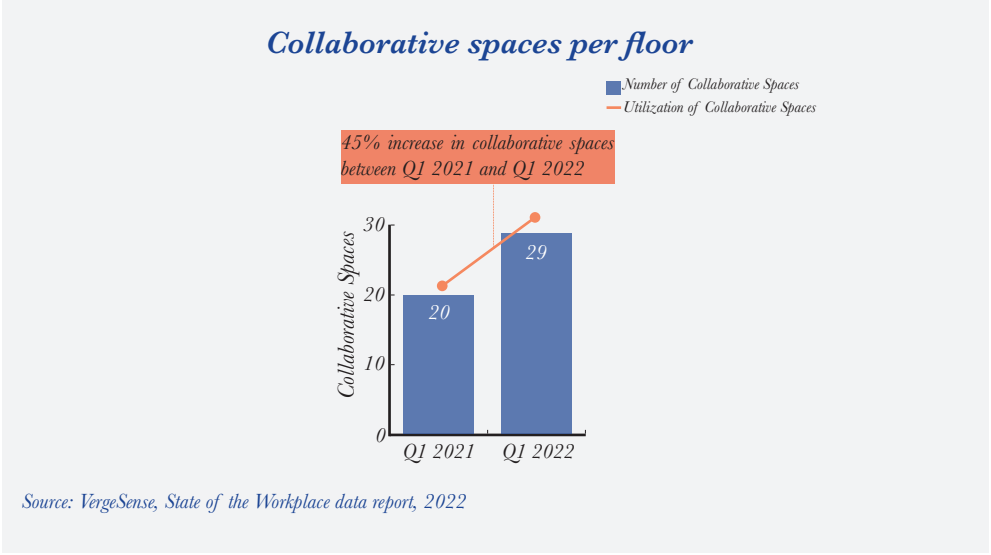


Chart 9: Collaborative spaces per floor.

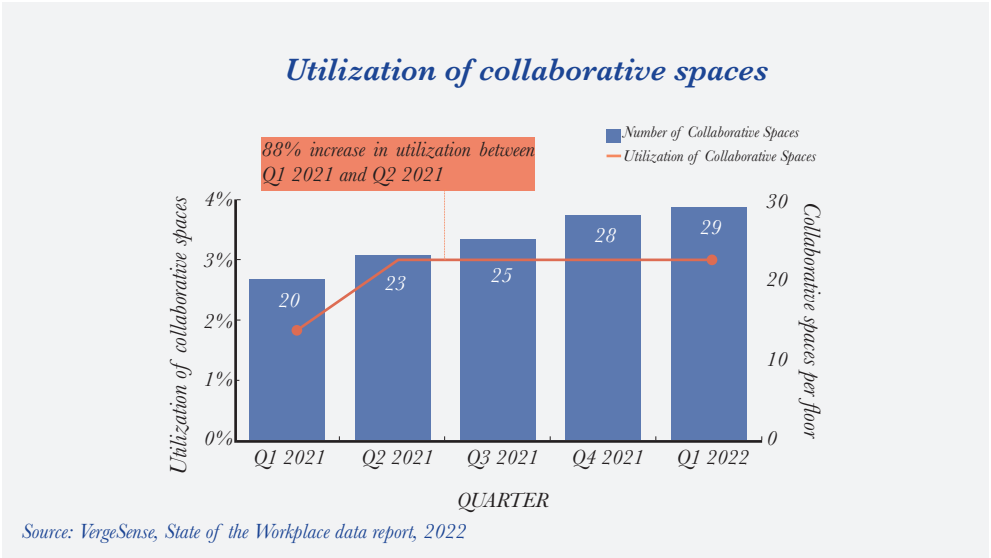


Chart 10: Utilization of collaborative spaces.

4.3.3 Four generations of employees agree that: The primary purpose of the office is to 'collaborate'

In Gensler's 2021 study on the workplace survey, four generations of people of different working ages, all of the more than 2,000 survey respondents were asked to choose from a long list of options their top ten reasons for using the office. In general, four generations agree that the primary purpose of the office is to "work with the team". They say Zoom and other virtual collaboration tools used by home workers are not a good substitute for face-to-face work with teams and colleagues.

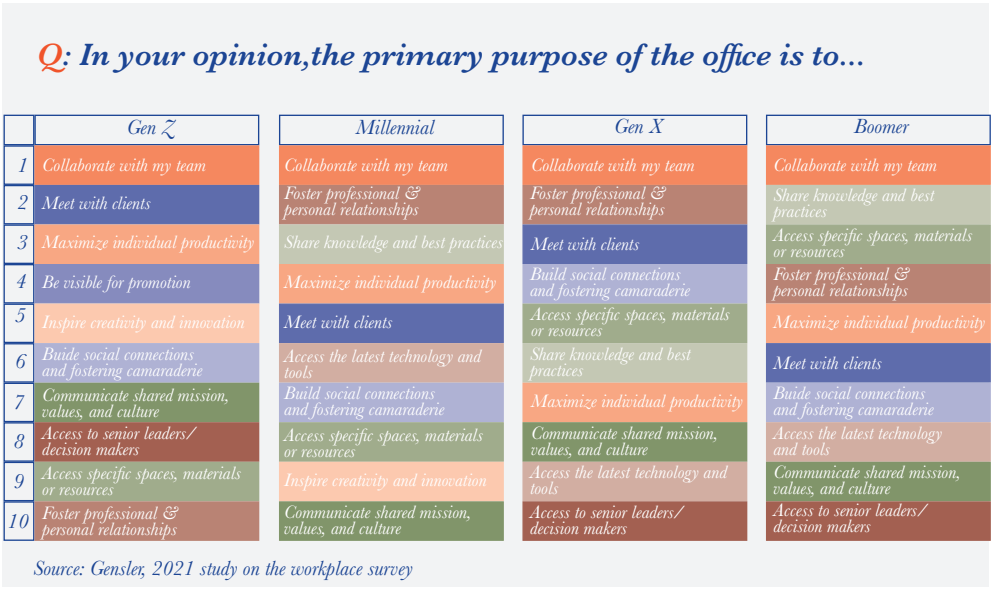


Chart 11: The primary purpose of the office.

4.3.4 Corporate real estate decision makers: The future office is a space where employees collaborate and create

JLL's research, The Future of Work Survey 2022, shows that employees now see collaboration as the primary purpose of the office. 45% of respondents listed fostering collaboration as one of their top three workplace goals, rising to 55% for organizations with more than 10,000 employees (Chart 12). This reflects the growing challenge for enterprises to facilitate effective collaboration among large and geographically dispersed teams of employees. In addition, 40% of the respondents mentioned that the office of the future will also become a place to stimulate innovation and creativity. If employees are not working in the office, it is difficult for them to spontaneously share their thoughts on work, and they cannot enjoy a good professional learning

experience. Corporate real estate decision makers believe that the office will always be the most effective place to achieve the goals of employee collaboration, co-creation, professional learning experience and so on.

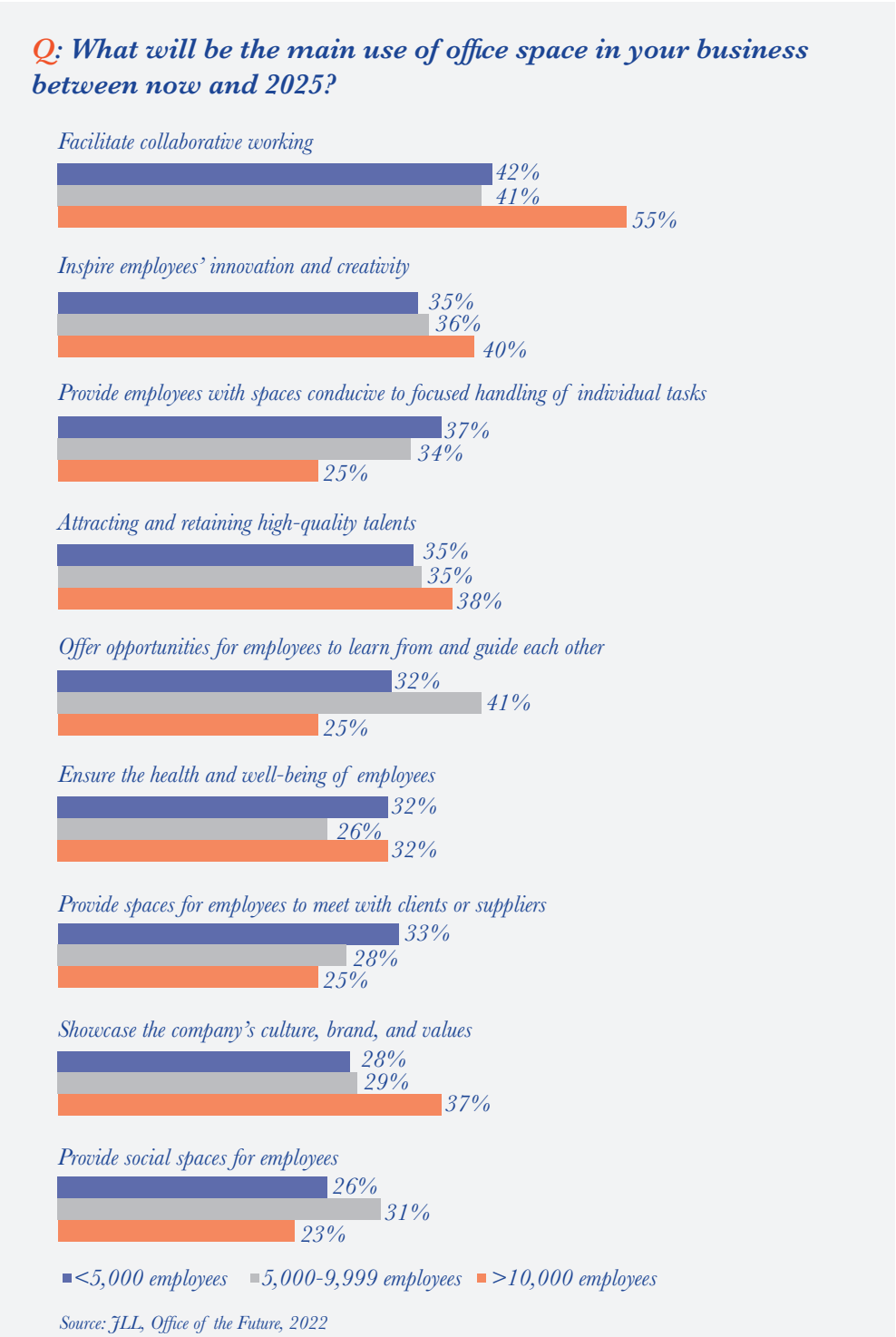


Chart 12: The main use of office space between now and 2025.

4.4 Workers want a new mix of experiences

In the post-pandemic era, workplaces are moving towards diverse work environments and experiences to accommodate the dynamics of work. When employees return to the office, it's clear they expect a different set of experiences. According to the workplace survey released by Gensler in 2022, Returning to the Office, if the workplace provides employees with a creative experience, 83% of people say they will return to the office at least one more day per month. In addition, research shows that different generations prefer different combinations of experiences. The younger generation clearly prefers a combination of coffee shop and boutique hotel-centric experience, but older employees prefer a combination of coffee shop and enterprise-centric experience. Analyzing the characteristics of representative experience spaces chosen by employees, workplaces which are welcoming, aesthetically pleasing, easy to navigate, have controlled noise levels and equipped with the latest technology were identified as delivering the best experiences.

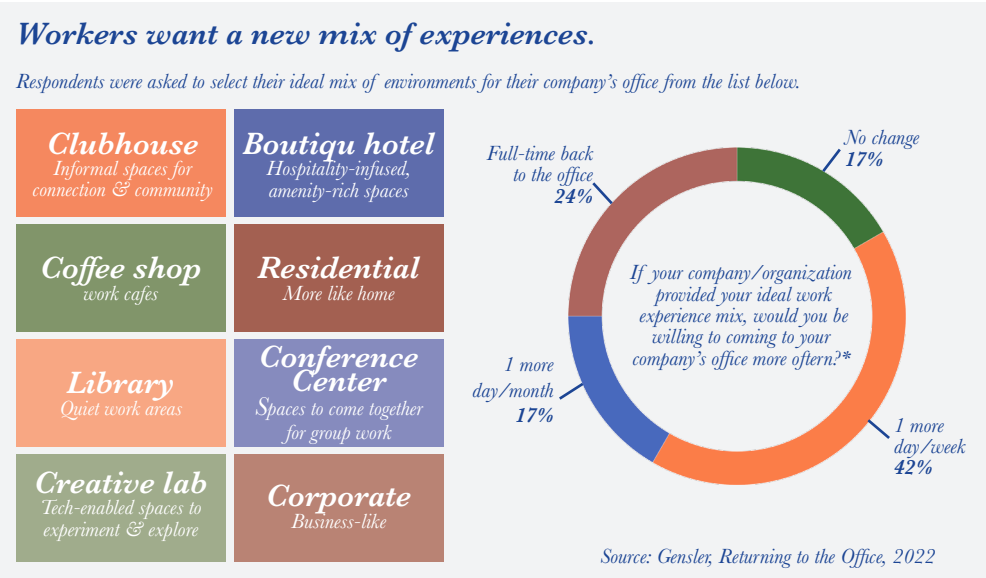


Chart 13: Workers want a new mix of experiences.

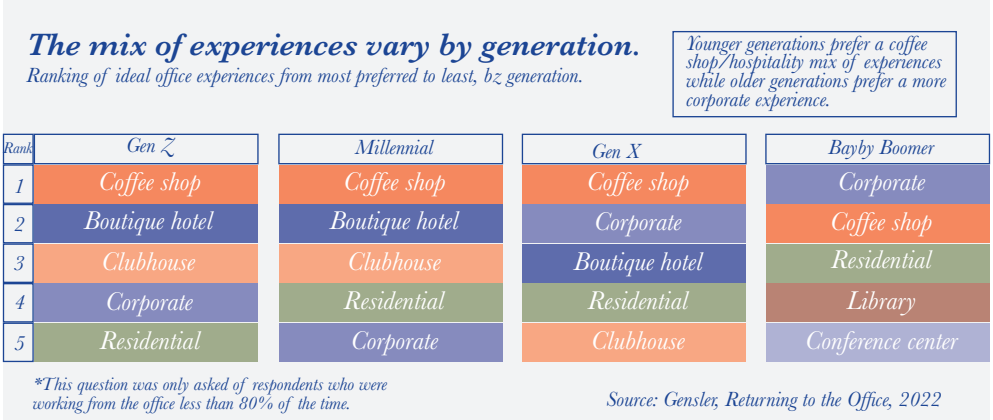


Chart 14: The mix of experiences vary by generation.

4.5 The third place has become an important part of the new workplace ecosystem

With the normalization of hybrid work, employees can independently choose when and where to work every day according to their own preferences and needs. In addition to working at home and in the office, many public spaces and facilities in the city have also become people's choice of working places. These are the third places where places are collectively referred to, in addition to homes and business offices.

According to the workplace survey released by Gensler in 2022, Returning to the Office, Generation Z and millennial employees view third places such as cafes, libraries and parks as an important part of the workday and a place to get work done. While older generations tend to think of workplaces as binary - home or office, younger generations have fully embraced the concept of "work from anywhere". Third places and co-working spaces are increasingly popular for a variety of work activities. For example, younger generations prefer to think/ideate on their own in the office compared to baby boomers who prefer to think/ideate at home. Younger generations are three times more likely to prefer a third place to reflect or conceptualize than baby boomers, who overwhelmingly prefer working from home. Gen Z also prefer third places for in-person feedback, connecting/networking with colleagues, and unplanned meetings. Elder employees have lower preference for the third place when carrying out these activities. It can be seen that the third place, which is popular among more and more young employees, will be an important part of the future workplace ecosystem.

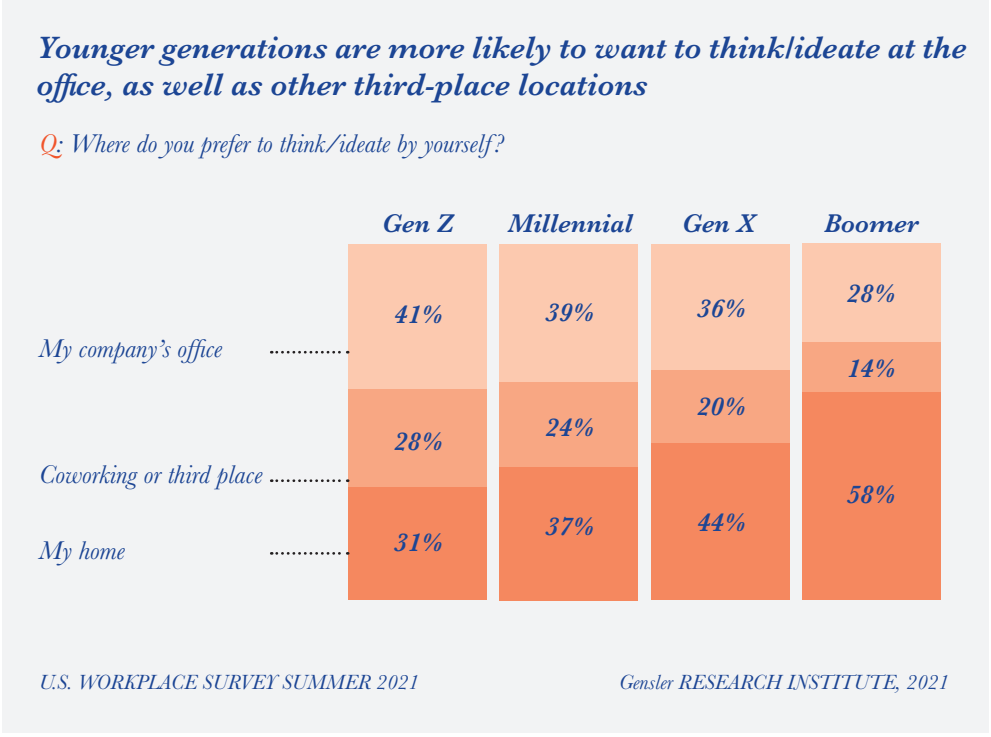


Chart 15: Younger generations are more likely to want to think/ideate at the office, as well as other third-place locations

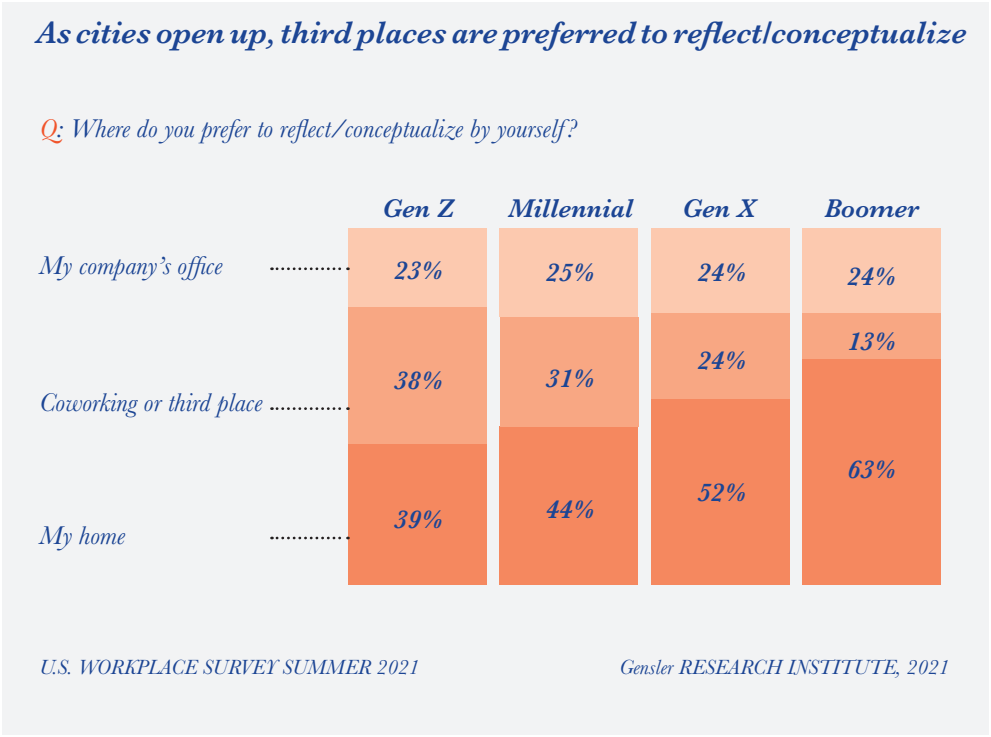


Chart 16: As cities open up, third places are preferred to reflect/conceptualize

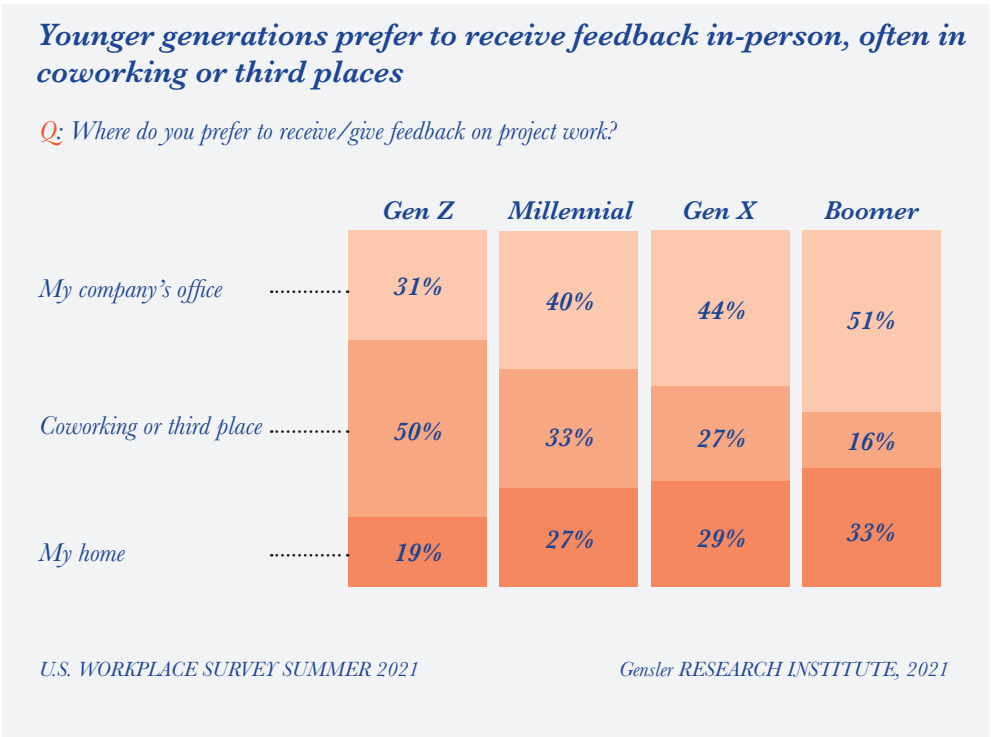


Chart 17: Younger generations prefer to receive feedback in-person, often in coworking or third places

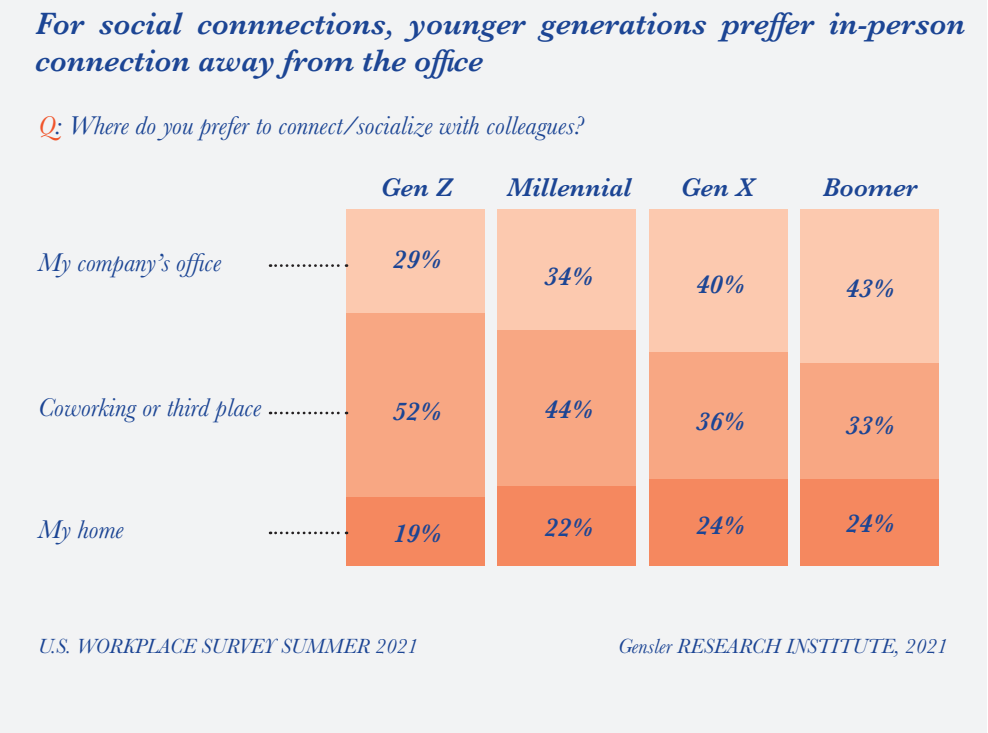


Chart 18: For social connnections, younger generations preffer in-person connection away from the office

Different work contents are suitable to be completed in different workspaces. Not only do different generations work differently, but they also value the workplace in and out of the office differently. Future workplace design will need to win over employees by creating a work experience based on inclusivity and flexibility, according to how each person works, what they want and need from the workplace.

5 Co-working Space in Hybrid Work

5.1 Co-working space has become a new choice to promote collaboration

In the previous section, we knew that the way people work is undergoing tremendous changes driven by the impact of the Covid-19 pandemic, the rise of the new generation and the development of technology. Hybrid work has become the development trend of future work. We explore employees' new expectations and needs for future work space. The workspace that attracts employees must be a flexible choice which is fully in line with the work, and the well-being of employees can be achieved by creating a good sense of space experience. The co-working space reconciles the contradiction between people's longing for face-to-face collaboration and socializing and their desire for the flexibility and freedom of telecommuting. With the convenient geographical location, complete office equipment and comfortable experience, co-working space has become an important option for people to work in the hybrid work environment.

5.1.1 More employers opt for co-working spaces

With the rise of hybrid work model, employers have learned lessons from the past three years to develop new workplace strategies and take the right stance for their businesses. Many companies – large or small, local or global – are experimenting with flexible workspaces to facilitate hybrid work model. The co-working space is a kind of area where employees, who are hesitate about returning to office, could find a solution. The co-working spaces not only are safe havens for tech start-ups and individual entrepreneurs, but have already attracted significant interest from large and established corporate players. Now that people are less constrained by physical work spaces than before, corporate use of co-working is booming.

According to statistics released by hybrid work brand WeWork in January 2023, bookings for monthly membership services have doubled in the year ending December 2022, as employers want to provide employees with more flexible options.

5.1.2 Advantages of co-working space in hybrid work environment

The professionalism, flexibility and experience of the co-working space adapt to people's needs in the hybrid work era. Co-working spaces provide an efficient, creative and satisfying working atmosphere: everyone can find a quiet corner to bury themselves in work, or a bright and open area to mingle with other professionals. Many people choose co-working spaces precisely for their social dimension – they are more focused when other people around them are doing the same, and they enjoy taking breaks to strike up conversations with others, which gives them the opportunity to seek out collaborations and expand business.

For employees, the advantages of co-working spaces include:

Easy to reach. Busy, long and congested commutes are one of the biggest barriers to returning to the office, so a well-located and easily accessible workspace is an important aspect of a successful collaboration space.

Tools for working efficiently. Coworking spaces are equipped with the latest and greatest technology. From high-speed internet to state-of-the-art computers to collaboration tools, these spaces are designed with efficiency and productivity in mind. Hybrid teams can be equipped with the tools and software they need to get work done no matter where they are, hence coworking spaces are able to provide employees with different type of tools which they don't have at home.

Enable collaboration. Coworking environments make it easier for teams to work together by freeing up more space for group work and discussions. In addition, coworking spaces can also bring people of different professions together and encourage spontaneous interactions, which allow people to build their networks and professional skills.

Provide flexibility. Coworking spaces offer companies the flexibility to expand without incurring long-term space costs, as well as opportunities for individuals to change the way they work day-to-day. Co-working spaces usually have different work environments, such as individual work spaces, conference rooms, cafes, etc. This enables individuals and teams to tailor their work environment to their specific needs.

Inspire innovation. Many people choose to work in co-working spaces because they have more contact with people outside the traditional network. Co-working spaces often attract entrepreneurs, freelancers, and start-ups who bring an innovative spirit into an environment that encourages innovation,

risk-taking, and creative problem-solving. Great ideas often come from the fringes who haven't yet been deeply embedded in a function's traditional expertise. Moreover, new innovations arise from bringing disparate ideas together in new ways to spark in-person creativity without the constraints of slow Internet connections or the (seemingly) ever-present technical issues.

Community drives connection. Many people choose coworking because of the community experience it offers. The desire to connect with others is part of being human. Much of the stress and anxiety caused by the pandemic is due to separation from others. Work is inherently social, therefore community, connection and friendship are the most effective parts of providing a sense of employee experience.

Enhanced well-being. Another advantage of the co-working experience is its contribution to well-being. It provides strong support for the work-life balance that people value. Co-working space can provide more activities throughout the day, which is associated with not only better physical fitness, but also better memory and learning abilities. Well-being can permeate all aspects of space design, from air temperature lighting to diversity and inclusive space design.

Overall, against a backdrop of dramatic changes in work styles and workplace models, coworking space offers a flexible, cost-effective and socially engaging alternative to traditional office environments. These advantages make them a popular choice for many professionals and businesses looking for a flexible, adaptable workspace.

5.1.3 How does co-working space promote collaboration?

The concept of co-working was originally born with "collaboration". The history of coworking began in 1995, when a group of computer engineers created a "hackerspace" for them to collaborate in Berlin, Germany (Nicorici, 2018). While technically a coworking space, at the time it was not recognized as one. The term coworking was first introduced in 1999, referring to the way of working collaboratively, and not as a space to work in (Nicorici, 2018). The current understanding of the term "coworking" as a physical space was first introduced in 2005 by entrepreneur Brad Neuberg, who opened the first coworking space in San Francisco, California (Franzén,2020).

Spinuzzi et al. (2018) articulates the claim that "coworking is about community, specifically, the collaboration that takes place within communities". A variety

of social interactions and collaborative activities help create a sense of community in coworking spaces (Spinuzzi et al., 2018). It follows that collaboration is the key concept of community created at coworking spaces.

Castilho and Quandt's study (2017) looked at factors that influence intra-organizational collaboration in the context of the 14 coworking spaces. The pair found that coworking spaces can be divided into two simplified types of coworking spaces: convenience sharing and community building. Convenience sharing spaces are based more on sharing resources and reducing cost, while community building spaces rely more on collaboration and a collective view (Castilho et al., 2017). The two approaches provide four collaboration factors that are interconnected and can be summarized as below (Castilho et al., 2017):
(1) enable knowledge sharing,
(2) support collective action to an effective solution, while community building coworking spaces,
(3) enhance individual action for the collective, and
(4) enhance creativity.

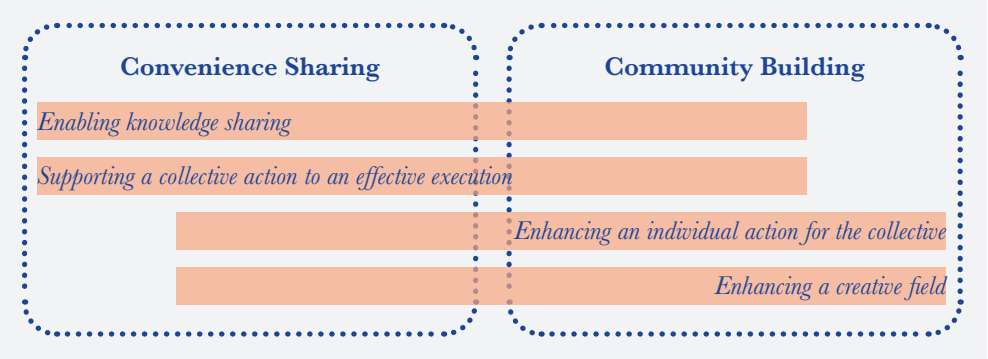


Chart 19: Recreation of prevalence of collaboration factors considering the convenience sharing and community building approaches (Castilho et al., 2017)

In a co-working space, the above four elements work together to create a favorable collaborative environment. The specific manifestations are as follows:

Shared Resources: Coworking spaces offer shared amenities and resources, such as meeting rooms, whiteboards, and projectors, making it easier for teams to work together and hold productive meetings.

Flexibility: Coworking spaces allow teams to scale up or down based on their project needs. This adaptability makes it convenient for startups, small businesses, and project-based teams to collaborate without the constraints of long-term leases.

Collaboration Software: Some coworking spaces provide access to collaboration tools and software that enable members to work together virtually, whether they're in the same space or different locations.

Knowledge Exchange: Professionals in coworking spaces often share their skills and knowledge with others. This knowledge exchange can lead to mentoring, learning, and collaborative efforts.

Diverse Community: Coworking spaces attract professionals from various backgrounds, industries, and disciplines. This diversity encourages the exchange of diverse ideas and expertise, leading to innovative solutions and collaborative opportunities.

Networking Events: Many coworking spaces host networking events, workshops, and seminars to facilitate interactions among members. These events provide a platform for individuals to meet, share and collaborate on projects.

Informal Gatherings: Common areas and lounges in coworking spaces provide informal meeting spaces for impromptu discussions and sharing of ideas. This fosters organic collaboration.

Community Building: Coworking space operators place a strong emphasis on community building. They create an environment where members feel a sense of belonging and are more likely to collaborate with others.

Inclusivity: Coworking spaces often embrace inclusivity and encourage individuals from various backgrounds to work together. This diversity can lead to broader perspectives and innovative solutions.

Professional Development: Coworking spaces frequently host events and workshops focused on skill development and industry-specific knowledge, providing opportunities for members to collaboratively learn and grow.

In the last chapter we learned that collaboration will be the primary purpose of the physical workplace of the future. The way co-working spaces promote collaboration has implications for future work space design. Next, we examine in detail the specific design elements of coworking spaces that promote collaboration through case studies.

5.2 Case study of co-working space

5.2.1 WeWork

WeWork co-working space

Location: Global Presence, Headquarters in New York City
Time: Founded in 2010, ongoing
Designer: WeWork Inc.

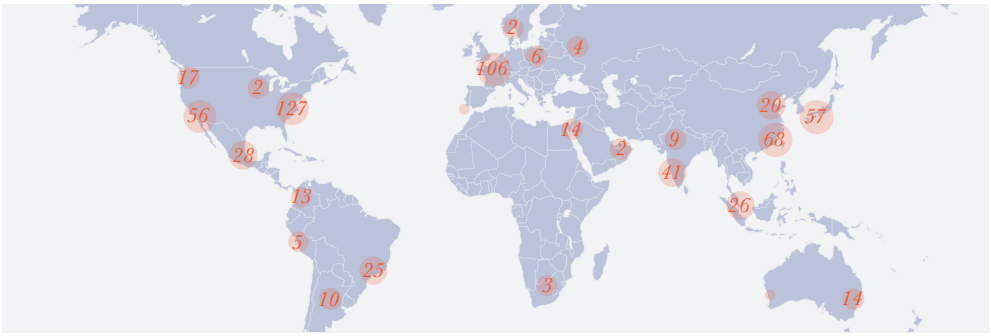


Fig. 20: WeWork offices around the world. Source: https://www.wework.com/

Introduction:
WeWork Inc. is a provider of coworking spaces, including physical and virtual shared spaces, headquartered in New York City. As of December 31, 2022, the company operated 43.9 million square feet (4,080,000 m2) of space in 779 locations in 39 countries, and had 547,000 members, with a weighted average commitment term of 19 months (U.S. Securities and Exchange Commission, 2023). WeWork provides flexible workspace solutions and co-working environments for individuals, startups, small businesses, and large enterprises.
WeWork offers a range of workspace solutions designed to meet the diverse needs of its members:
1. Hot Desks: Hot desks are shared workspaces where members can choose any available desk on a first-come, first-served basis. This option is ideal for individuals who prefer flexibility in their work locations.
2. Dedicated Desks: Dedicated desks provide members with their own personal workspace within a larger co-working area. These desks are reserved exclusively for the individual, providing a semi-private working environment.
3. Private Offices: WeWork offers private work spaces for individuals, startups, and larger companies. These offices come in various sizes and can be customized to meet specific requirements.
4. Enterprise Solutions: WeWork's enterprise solutions are tailored for larger organizations. They provide custom work spaces, design, and services to meet the unique needs of corporate clients.

WeWork spaces typically offer the following features and amenities:
1. High-speed internet access.
2. Meeting rooms and conference facilities.
3. Phone booths for private calls.
4. Kitchen areas with coffee and refreshments.
5. Community and networking events.
6. Access to a global network of WeWork locations.
7. Professional on-site staff.
8. Printing and administrative support.

One of WeWork's distinguishing features is its focus on fostering a sense of community and collaboration among its members. They host events, workshops, and social gatherings to encourage networking and interaction. This community-building approach aims to create an environment where professionals from various backgrounds can connect, collaborate, and share ideas.

Reason for selection:
WeWork is one of the most recognizable and expansive co-working brands globally, with locations in major cities around the world. It offers a wide range of flexible workspace solutions, amenities, and community events, and is representative of the widespread perception of coworking spaces. Although WeWork is widely distributed around the world, its space facilities and services all follow the same standards, and its space solutions, community activities and virtual office products can be booked online.

Highlights:
Diverse workspace solutions, Complete facilities, Community and collaboration

One of WeWork office in Milan

Location: 4 Via Filippo Turati, Milan

The coworking space combines the best of both worlds—modern amenities and down-to-earth community. The entire nine-story building is dedicated to WeWork, featuring light-filled lounges, unique conference rooms, and sleek private offices.

Available workspace:

Private Office

Full-Floor Office

Coworking space: monthly member

Coworking space:
Monthly member can work from hot desks, lounges, phone booths and more.
They can book meeting rooms and private offices with credits, and enjoy fast Wi-Fi, printing, unlimited coffee, and on-site support.

Shared amenities:
Meeting rooms
On-site staff
Lounges
Professional & social events
Cleaning services

Business essentials:
High-speed Wi-Fi, IT support and guest log-in functionality
Business class printing, office supplies and paper shredder
Unlimited coffee and tea

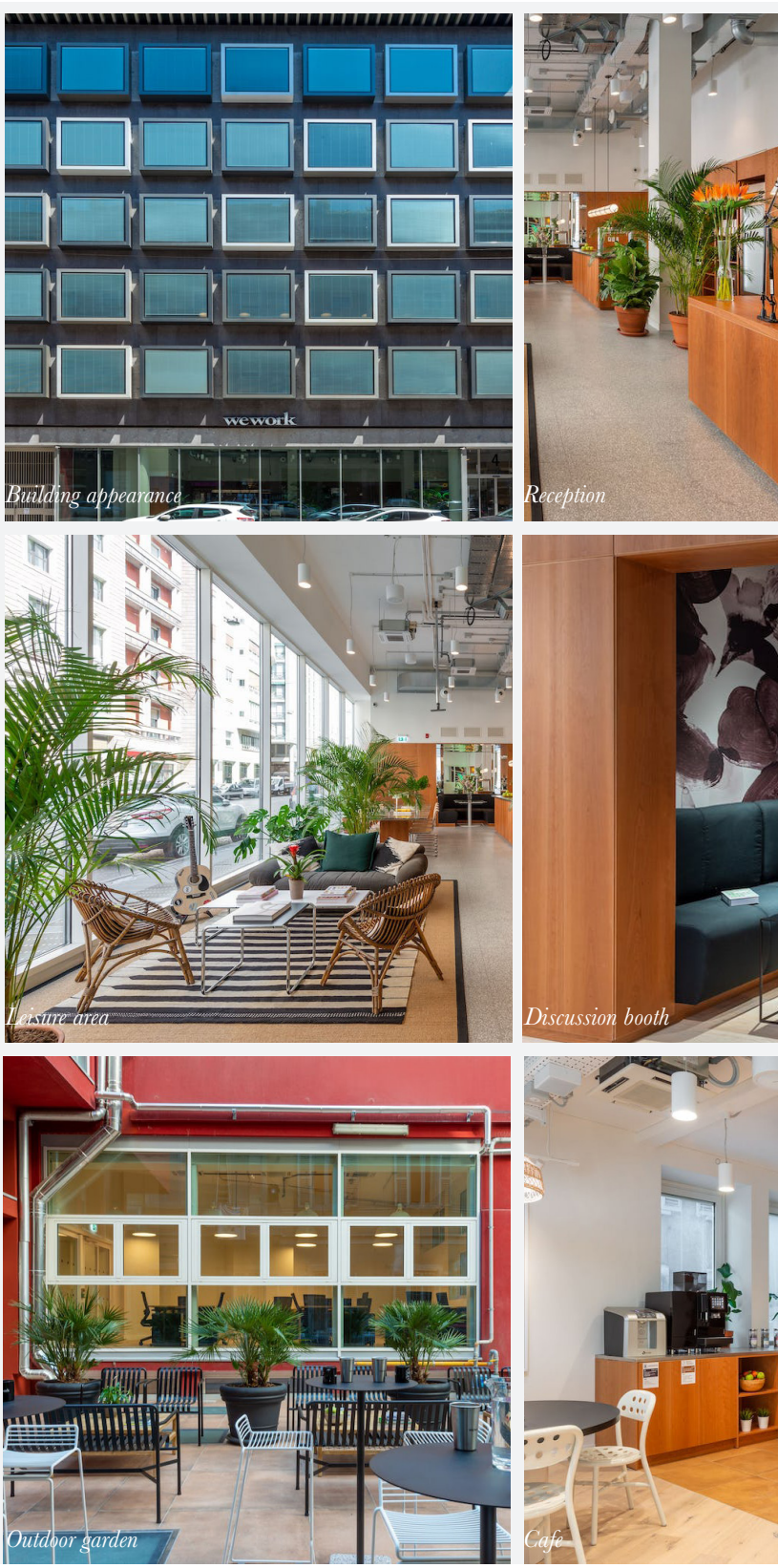
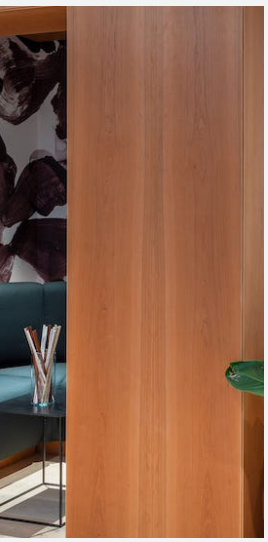


Fig. 21: One of WeWork office in Milan

Hot desks



Focus room

Lounge

5.2.2 Talent Garden

Talent Garden co-working space

Location: Multiple Countries in Europe, Founded in Italy
Time: Established in 2011, ongoing expansion
Designer: Talent Garden

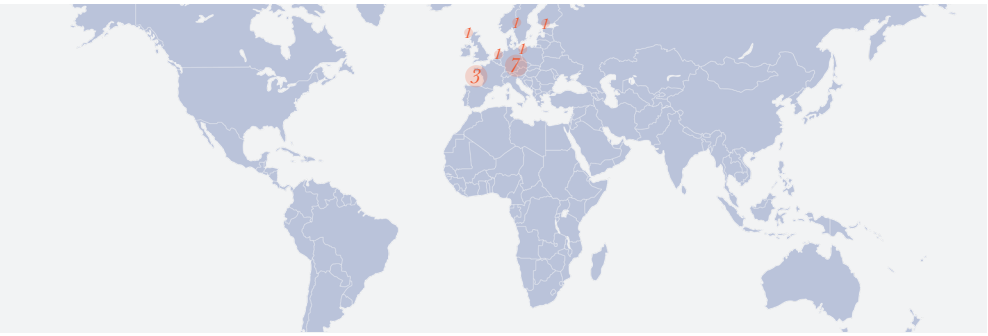


Fig. 22: Talent Garden offices. Source: https://talentgarden.org/en/

Introduction:
Talent Garden is a European co-working and innovation platform that provides flexible workspace solutions and a thriving community for entrepreneurs, freelancers, startups, and larger organizations.
Talent Garden offers a range of workspace options designed to meet the diverse needs of its members:
1. Coworking Spaces: Talent Garden provides open co-working areas with flexible seating options, including hot desks and dedicated desks. These spaces are designed to encourage collaboration and networking among members.
2. Private Offices: For businesses and teams that require more privacy, Talent Garden offers private work spaces that can be customized to suit specific needs.
3. Innovation Campus: Talent Garden operates Innovation Campuses that bring together co-working, learning, and innovation in a single location. These spaces often feature event areas, meeting rooms, and learning facilities.
4. Innovation School: In addition to workspace solutions, Talent Garden runs an Innovation School offering a wide range of courses and programs focused on digital skills, innovation, and technology.
Talent Garden co-working spaces typically offer the following features and amenities:
1. High-speed internet access.
2. Meeting rooms and event spaces.
3. Networking events and community-building activities.
4. Cafes and relaxation areas.

5. Access to a global network of Talent Garden locations.
6. On-site staff to support members.
Talent Garden places a strong emphasis on building a vibrant and innovative community among its members. The co-working spaces often host events, workshops, and networking opportunities to encourage collaboration and knowledge sharing.
Talent Garden positions itself as a hub for innovation, digital skills development, and entrepreneurship. The Innovation School offers a variety of programs and courses to help members enhance their knowledge and skills in these areas.
Talent Garden's focus on fostering innovation and entrepreneurship sets it apart from traditional co-working spaces. The platform aims to provide an environment where tech and innovation-focused professionals can connect, collaborate, and develop their skills. It caters to a diverse range of individuals and organizations seeking a dynamic and innovative workspace solution in Europe.

Reason for selection:
Talent Garden is a European co-working brand with locations in multiple countries. It focuses on fostering innovation and collaboration, particularly within the tech and digital sectors. This is a representative co-working space in the innovative collaboration category, which is consistent with the technical elements in this study and helps to explore the key points of collaborative space design supported by technology.

Highlights:
Flexible space options, Focus on digital skills, innovation, and technology

One of Talent Garden office in Milan

Location: Piazza Città di Lombardia, Milano

Located inside the Lombardy Region building, in one of the most vital and sought-after areas of milan, with a surface area of 2,000 square meters it offers workstations for 180 professionals and inside there are 2 classrooms for the courses of the Innovation School, Talent Garden's training school dedicated to the world of innovation and digital, common areas and an Innovative Food Lab. Talent Garden is an innovation space that hosts a community of talents operating in the food-tech sector, with numerous important partners in the sector present within it.

Available workspace:

Offices of all sizes

Event spaces (10m2-1,000m2)

Meeting rooms

Dedicated desk within a shared space

Coworking space:
A vibrant coworking community for digital or technology professionals. Members also receive exclusive access to the Talent Garden Innovation School, which provides industry-leading training for every level of experience, from recent graduates to seasoned professionals.

Shared amenities:
24/7 Access
Dedicated community
Community & relaxation areas
Free workshops & upskilling activities
Meeting rooms & event spaces
TAG Cafe & Restaurant

Business essentials:
High-speed Wi-Fi
Mail and package handing
Unlimited coffee and tea

Talent Garden is committed to building a vibrant knowledge-sharing community, attracting more professional talents, and providing them with courses to improve their skills.

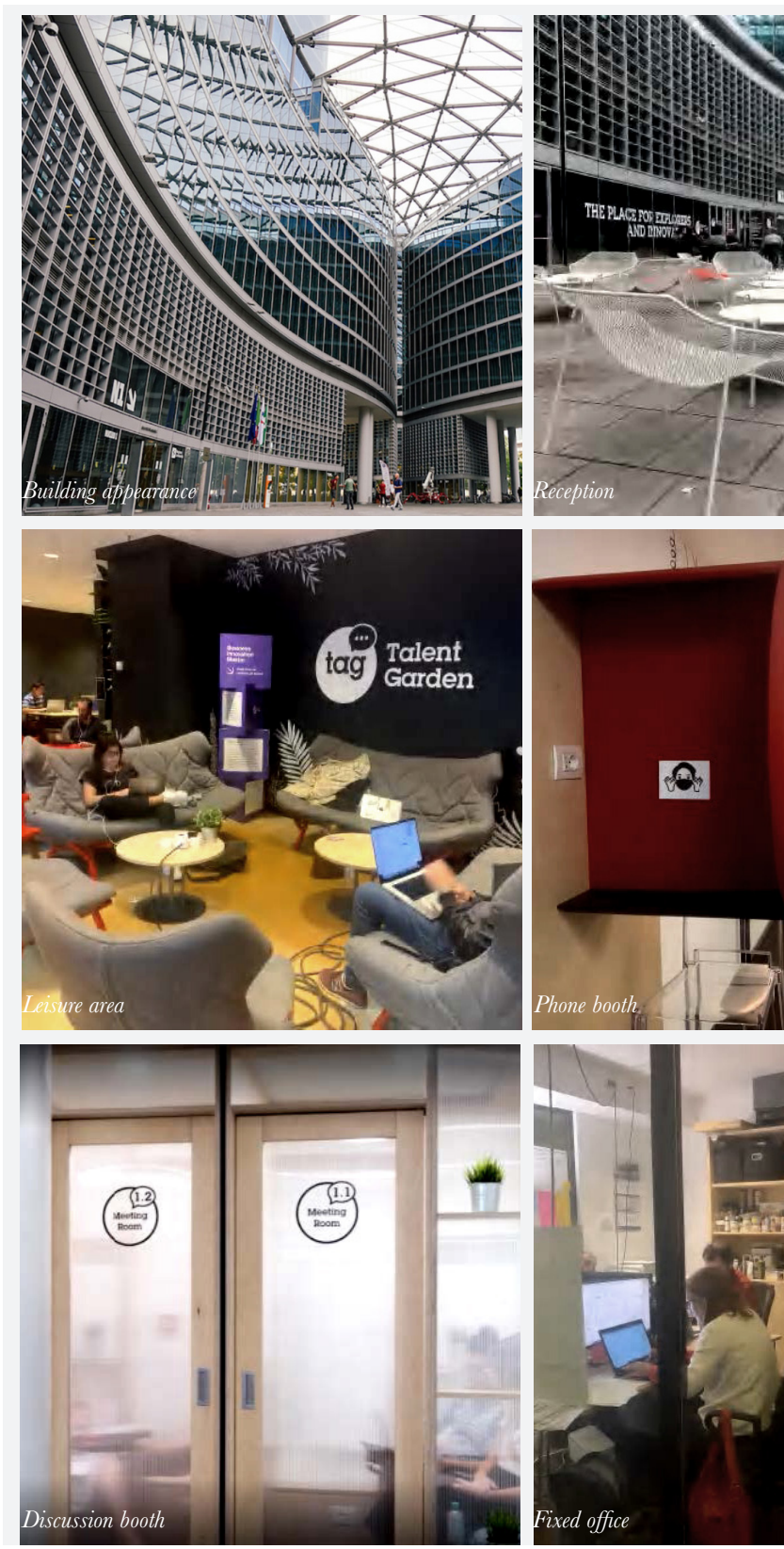
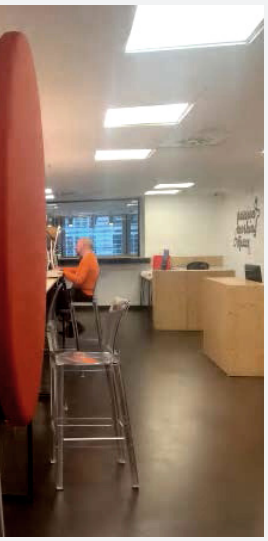
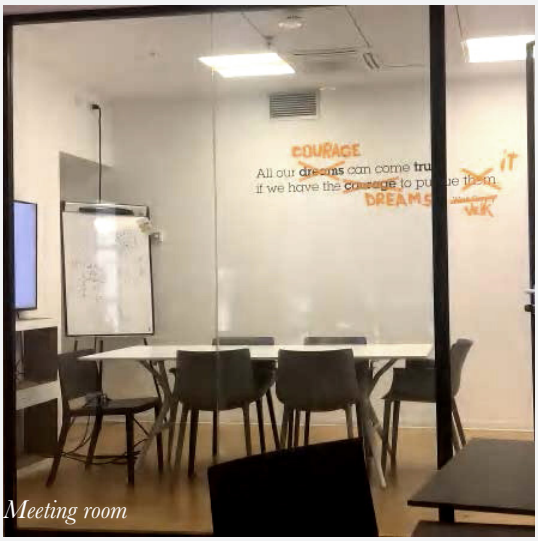


Fig. 23: One of Talent Garden office in Milan

Cafe





Meeting room

Food Lab

6 Design Strategies

In the research in the previous chapters, we first clarify a major pre-condition: hybrid working models would continue to exist now and even in the future. Next, following the historical development of work space, we see that the development of technology has driven changes in work space. We realize that meeting the changing needs of employees is the right direction for the development of work space and recognize that many design methods and elements worth learning and applying. By collecting a large amount of data and analyzing it, we research the characteristics, needs, work behaviors and preferences of "people" in the future workplace, and learned that well-being is the main expectation of employees for the future workplace, and collaboration is the main purpose to the future workplace. Then, with respect to the coworking space – the kind of work space increasingly chosen by people to facilitate collaboration – we study its benefits, features and how it facilitates collaboration. Finally, based on the above researches, we explore design strategies for future work spaces.

6.1 Three elements of workplace: people, technology and space

If we want to predict the future, we must first discover some persistent laws from the changes in historical development. In the above study on the development process of work space, we found that: the needs of employees are constantly changing, technology is constantly developing, and work space is constantly evolving. These three are eternally changing, while at the same time they maintain a relatively synchronized and stable dynamic balance. Therefore, we treat people (corresponding to employee needs), technology, and space as the three elements of work space, and use them as a starting point to implement strategic analysis of future work space.

(1) **The dimension of people**
The human dimension (employee needs) requires us to adhere to the people-oriented principle. In the design of future work spaces, attention should be paid to the behavioral, sensory and psychological factors of space users.

(2) **The dimension of technology**
From the dimension of technology, on the pre-condition of a hybrid work model, intelligent technology and metaverse technology would be used to upgrade traditional physical work spaces.

(3) **The dimension of space**
From the dimension of space, future work space can be divided into physical space and virtual space with the support of technology. In the hybrid work model, employees would be able to feel the new experience brought by the integration of reality and virtuality all the time.

6.2 Design focus: Collaboration and innovation in technology-driven well-being spaces

In the above researches, we learned that in the hybrid work model post pandemic, 1) employees' greatest expectation for returning to the work space is well-being; 2) people can complete personal and focused work at home, and the main purpose of coming to the office is to collaborate and socialize. Therefore, when exploring future work space design strategies, we must first clarify the following points:

1. The design of future work spaces must put employee well-being first;

2. Carry out space design based on users' behavioral activity needs, sensory experience and psychological needs at work to create a well-being work space that promotes collaboration and innovation;

3. Apply the most cutting-edge technology to the design of work space to bring a better work experience to users, thereby achieving employee well-being.

6.3 Design strategies for technology-driven well-being work space

According to the technology-driven space form, this study divides the space into two parts, physical space and virtual space, for exploration.

6.3.1 Design strategies for physical work space

Physical work space is a real space that employees can actually touch and feel while working. Employees' work behavior activities, employees' sensory experience and psychological needs are the starting point of space design.

1. Behavior

Compared with the past, today's daily work has more fluctuations and a higher degree of digitalization, and needs to be more flexible and agile in response to changes. Not only does the work content often change, but the working methods even change multiple times a day - from cross-team brainstorming to intra-group problem solving, from in-depth phone calls with customers to concentrating on the work at hand… Daily work involves both movement and stillness, groups and individuals. In conclusion, a productive day is dependent on communication, collaboration, concentration, and thinking. Therefore, designers need to design corresponding spaces based on employees' work behavior activities to create a good work experience.

Regarding designing space based on activities, we have to mention the concept of "Activity-based working". For every organization, the pandemic has accelerated the global shift from fixed to flexible, predictable to emergent, simple to complex. Given the changing nature of the world of work, an activity-based approach enables the adaptivity required to understand the evolving functional requirements of organizations (Veldhoen + Company, 2020).

Activity-based working (**ABW**) is a way of working in which employees make shared use of a diversity of work settings that have been designed to support different kinds of activities (Meel, 2020). There are three crucial elements in this concept:

Diversity
The office provides a diversity of work settings to support different kinds of activities and work styles. The essence of ABW office is to provide users with choices. Further than open or closed spaces, this option offers employees a variety of environments in terms of openness, furniture, scale, technology and atmosphere. For example, a combination of regular workstations, phone booths, quiet areas, break areas, break rooms and project spaces. People can always choose the settings that suit their tasks, mood, and personal preferences.

Sharing
In ABW office, all work settings are available to everyone, regardless of their levels in the organization or functions they hold. The logic behind the "free seating" approach is well known: Traditional workstations tend to be underutilized because people spend most of their working time in meetings away from their desks, chatting at the water cooler, on the road, and working from home. By sharing workspaces, a more diverse set-up can be provided while saving square meters.

A way of working
ABW is a way of working and not just a design concept. The core idea is that employees work in a mobile and flexible fashion, making their own decisions as to where and when to work (Meel, 2020).

As the word "activity-based" indicates, ABW office should provide a work environment that matches the types of activities people perform. Diversity and flexibility have become two major themes in work space design.

(1) Diversity of space types

Different space types are divided according to different activities:

- **Workspaces**: spaces for desk-bound/computer-related activities (In a hybrid work model, this space may be at home, office, or a third space);
- **Collaboration spaces**: spaces for meetings and other types of interaction;
- **Support spaces**: spaces for practical activities like printing and getting coffee.

The following are the possible space forms that may appear in these three types of space, which would be increased, decreased, or adjusted according to the needs of specific work space design projects.

Workspaces

Workspaces are defined here as those spaces that are specifically designed for desk-related activities such as reading, re

Open workstation

Workstation placed in an open area, typically in groups of 4, 6 or 8 units. Suitable for collaborative work and general office tasks that require a medium level of concentration. This type will usually make up the majority of work settings. Make sure that they are all of equal (good) quality so there is no inclination to compete for a particular workstation

Size: 4 to 6 sqm
Ratio: 4 to 6 per 10 employees
Position: Away from busy circulation areas and social functions

Semi-open workstation

Workstation with semi-high enclosure (a modern version of the classic cubicle), providing a sense of visual and acoustic privacy in the absence of floor-to-ceiling partitions. Suitable for activities which demand medium concentration and medium interaction.

Size: 4 to 6 sqm
Ratio: 1 to 2 per 20 employees
Position: Close to open workstations

Focus room

Fully enclosed, soundinsulated room that allows people to escape the buzz of the open work area. Suitable for activities that require concentration and/ or privacy. Ideally, the room should be designed in such a way that it can also be used for small meetings and phone/video calls.

Size: 4 to 8 sqm
Ratio: 1 to 2 per 20 employees
Position: Close to open workstations

Note that the above dimensions and proportions come from ACTIVITY_BASED WORKING: The Purnet Practice
and even from department to department. Therefore, in order to determine what is needed, it is important to analyze
Does the activity involve the use of specific equipment? How do the activities relate to each other? All these kind of c

searching, writing, phoning. The main difference between the different kinds of workspaces is the degree of enclosure.

Study

Enclosed room with multiple workstations, intended for 'heads-down' work in a group setting. A getaway from the chat and interruptions of open work areas. Similar to a library reading room (phone-free, muted conversations only).

Size: Dependent on number of workstations
Ratio: 1 per 50 or 100 employees
Position: Close to open workstations or centralized

Phone booth

Enclosed or semi-enclosed area where people can go when they have to make or take a phone call or video call that requires a degree of focus and privacy. Can be used as a way of removing noisy activities from open work areas.

Size: 2 to 4 sqm
Ratio: 1 per 20 to 30 employees
Position: Close to open workstations

Project room

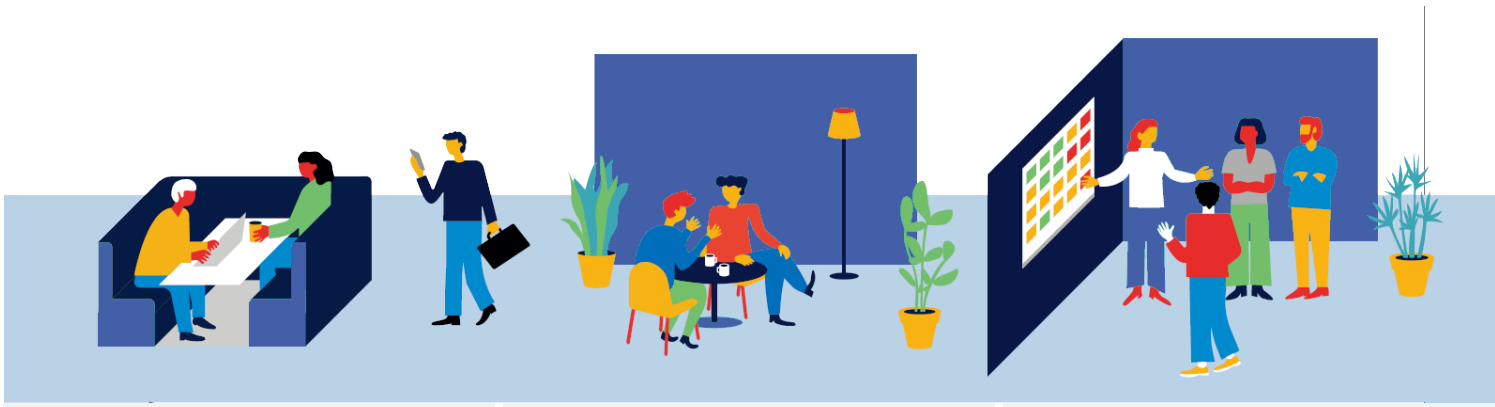
Enclosed room with several workstations, combined with collaborative features such as meeting tables and whiteboards. Suitable for project work or teamwork that is confidential and/ or demands frequent consultation.

Size: Dependent on number of workstations
Ratio: Dependent on degree of project work
Position: Close to open workstations or deliberately away from them

e Guide (Meel,2020), which are general guidelines. The exact need for space varies from organization to organization
e what people do in the office. What are the characteristics and nature of their tasks? How many people are involved?
questions need to be determined according to the specific space design project.

Collaboration Spaces

As the name implies, collaboration spaces are spaces that are explicitly designed for collaboration, such as formal me



Booth

Semi-enclosed space for small meetings, collaboration and individual work. Typically has highbacked seating, as in a classic diner booth, that provides a sense of visual privacy while still being part of the open space around it. In some cases, booths are ceilinged.

Size: 5 to 8 sqm
Ratio: 1 to 2 per 50 workstations
Position: Close to work and meeting areas. Can be part of kitchenette/ restaurant.

Huddle

An open meeting space with an informal, comfortable feel. It can function as a congregating point for teams or departments. Suitable for informal discussions, relaxation or work, should people so wish.

Size: 20 to 32 sqm
Ratio: 1 per 100 workstations, or 1 per floor
Position: Close to kitchenette or other shared facilities that attract people.

Stand-up space

Open or semi-enclosed space for 'stand-ups' (a specific kind of meeting associated with scrum/ agile working). Suitable for informal discussions and meetings that do not require seating. Typically features a large video screen and/ or a writeable 'scrum board'.

Size: Dependent on team size
Ratio: Dependent on number of scrum/agile teams
Position: Close to/inside the work areas of the people making use of this space

Note that the above dimensions and proportions come from ACTIVITY_BASED WORKING: The Purnet Practice
and even from department to department. Therefore, in order to determine what is needed, it is important to analyze
Does the activity involve the use of specific equipment? How do the activities relate to each other? All these kind of c

etings, informal chats, brainstorming sessions, one-on-one conversations, 'stand-ups' and other kinds of interactions.

Small meeting room

An enclosed meeting room for two to four persons. Suitable for small meetings and confidential discussions. Typically available on a first-comefirst-served basis. Can overlap/be combined with focus rooms to create flexibility in use.

Size: 6 to 10 sqm
Ratio: 1 per 10-20 workstations
Position: Close to open workstations

Medium meeting room

Conference room for planned group meetings with larger groups (8-12 persons). Should provide wall space for writing, brainstorming or presentations. It can be a good idea to create meeting rooms with different ambiences for different kinds of meetings.

Size: 24-30 sqm
Ratio: 1 or 2 per 50 workstations, or 1 per floor/security zone
Position: Close to office floor entrance and main circulation areas

Large meeting room

Conference room for planned group meetings with larger groups (≥ 14 persons), typically providing some formality and privacy. Should provide wall space for writing, brainstorming or presentations.

Size: 48 sqm or more
Ratio: Dependent on frequency of large meetings
Position: Centralized, usually grouped with other facilities in a conference zone

e Guide (Meel,2020), which are general guidelines. The exact need for space varies from organization to organization
e what people do in the office. What are the characteristics and nature of their tasks? How many people are involved?
questions need to be determined according to the specific space design project.

Support Spaces

Support spaces concern the practical facilities that provide employees with water, food, storage, stationery and other
social interaction within an organization.

Kitchenette

Facility that gives employees easy access to water, coffee and tea. Sometimes it is a full kitchen with refrigerator and microwave. Ideally designed as a place that encourages socialization as it is a destination where people run in to each other.

Size: 6 to 15 sqm, depending on the available facilities
Ratio: 1 per 50 employees, or 1 per floor/security zone
Position: Close to work areas, but beware of noise issues (people chatting, coffee grinding)

Locker space

Area with lockers for the storage of personal items. It is often decided to give everyone their own personal locker, even though shared lockers are more efficient.

Size: 0.5 sqm per locker
Ratio: 1 locker per person or shared lockers (e.g. for 60% of employees)
Position: Close to entrance of office floor/building, or close to team zones/anchors

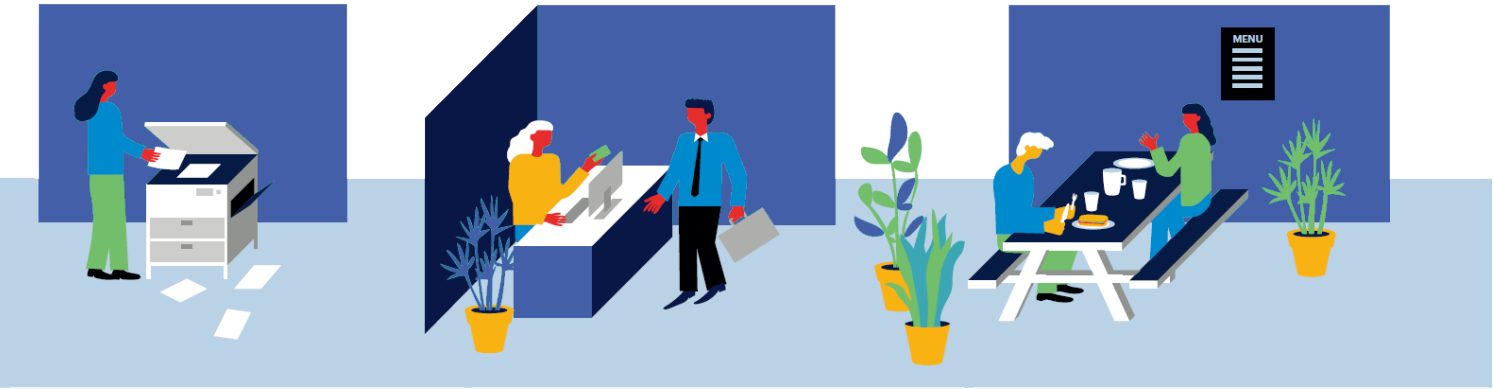
Storage (group/individual)

Space for the storage of documents or other 'stuff'. Can be either individual or group storage. The need for storage is very much dependent on the nature of people's work processes and the degree of digitalization.

Size: 1 sqm per person (preferably less)
Ratio: 1 storage point per team/group
Position: Close to workstations

Note that the above dimensions and proportions come from ACTIVITY_BASED WORKING: The Purnet Practice
and even from department to department. Therefore, in order to determine what is needed, it is important to analyze
Does the activity involve the use of specific equipment? How do the activities relate to each other? All these kind of q

essentials. Because of their practical purpose, support spaces tend to attract people, so they can be used to influence



Print/copy space

Enclosed space containing a multifunctional machine for copying, scanning and printing. May also accommodate a shredder and office supplies.

Size: 5 sqm
Ratio: 1 per floor/security zone
Position: Close to main circulation, away from open work areas

Lobby

Entrance area with seating for visitors and reception desk and/or reception screen. Provides visitors with their first impression of the organization. Large lobbies can double as informal meeting areas when combined with a coffee facility.

Size: site dependent
Ratio: 1 per building/office unit
Position: Close to elevators, stairs and meeting rooms

Restaurant

Facility where employees can go for lunch and in some cases breakfast and dinner as well. Can be designed and serviced in such a way that the areas can be used as informal meeting or workspace outside mealtimes.

Size 2.5 sqm per seat
Ratio: 1 per building/office unit
Position: Central, close to entrance

e Guide (Meel,2020), which are general guidelines. The exact need for space varies from organization to organization
e what people do in the office. What are the characteristics and nature of their tasks? How many people are involved?
questions need to be determined according to the specific space design project.

(2) Flexibility of space functions

Flexible and moveable space fixtures or office furniture can quickly adapt to the needs of various work activities.

Faced with changes in where and how people work, the workplace of the future will need to have multi-purpose spaces that can support various types of activities. Creating an agile, flexible work environment could ensure that elements of the workplace meet the needs of different employees for different tasks. Choose flexible, modular and adjustable furniture, reduce fixed or built-in furniture, and create different space experiences through the recombination of furniture.

Flexible furniture and technology allow employees to experiment with inclusive configurations that can fit their teams needs as they evolve over time (Linton, 2023).

Fig. 24: The Flex series of movable office furniture developed by Steelcase. Source: https://www.steelcase.com/

For example, the Flex series of movable office furniture developed by office furniture brand Steelcase provides flexibility for team collaboration (Steelcase). It enables teams to easily move and reposition furniture in the same space based on the needs of their work activities, making it easy to transition from brainstorming to workshops, or from daily stand-ups to sprint reviews.

Mobile and smart technologies

Mobile and smart technologies upgrade physical work space experience

Mobile devices: light, powerful tools with long battery lives that can be quickly launched from any location.

Top-notch infrastructure: all the practicalities: docking stations, power sockets, a robust Wi-Fi network and high-quality screens.

Collaboration apps: applications that allow employees to stay in touch in an easy and intuitive way. Whether employees are in the office or working remotely, video conferencing and collaboration tools can enhance communication and collaboration. These technologies increase productivity and connectivity.

Space occupancy and utilization sensors: these sensors monitor work space usage, helping organizations optimize layout and allocate resources more efficiently.

Automated task management: use task management applications and automation tools to help employees organize their work, streamline workflows, and manage projects to create a more efficient work environment.

Workspace booking app: smart room booking system is used to book workspaces, meeting rooms and amenities within offices to enhance workspace flexibility.

Mobile and wayfinding app: Mobile apps can provide employees with wayfinding assistance within the office, helping them locate specific workspaces or amenities. This simplifies navigation and saves time, contributing to a more stress-free work experience.

Artificial intelligence helps employees: use an AI chatbot or virtual assistant to answer common employee questions and provide instant support.

Cafeteria and catering services: implement a smart ordering system or cafeteria service app that allows employees to reserve meals or customize food selections.

Community building apps: create apps that help with community building, employee networking, and shared interest groups within the office.

Cloud solutions: Internet-based applications and filing systems that allow employees to work from anywhere.

Blockchain security: Implement blockchain technology to enhance the security of sensitive data and transactions within the office.

Well-being

In activity-based work space design, employee well-being is mainly reflected in the following aspects:

- More autonomy in choosing where to work
- More choice and variety in work settings
- Advanced technologies that facilitate mobile working
- More contact with colleagues
- Fewer hierarchical differences
- A less sedentary, healthier workstyle
- Fewer but better workplaces

2. Senses

We experience the world around us through our senses: sight, smell, touch, taste and sound, plus balance and body awareness. Sensory design is the purposeful design of spaces to engage the full range of human experiences. Engaging our senses in a 'sensory experience' impacts our thoughts, emotions, behavior, performance, memory and overall wellbeing (Foster,2023).

Vision:

Vision is considered the most important sense when understanding office design, conveying the information presented by the composition of the work space, since it provides an environment that can be summarized at first glance.

1. **Natural Light**: Maximize natural light by incorporating large windows, skylights, and glass partitions. Exposure to daylight has been linked to improved mood, reduced stress, and increased productivity. Consider adjustable blinds or curtains to control glare.

2. **LED technology**: LED technology also plays a role in the overall employee experience. In addition to providing dimmable lighting, giving employees the option to change the colors within a work setting can help benefit employee productivity and mood (Stueve, 2023). For example, warm lighting, including red and orange tones, can help create a feeling of comfort and relaxation, while cool tones of blue and purple can help increase alertness and reduce fatigue. Realizing multiple purposes in a single space requires various lighting solutions. The selection is based on function and design, creating a balance between decorative lighting, task lighting, and accent lighting (Ruelas, 2023).

3. **Color Palette**: Studies have shown that color has the potential to affect mood, emotions, concentration, and even physical health (Stueve, 2023). By incorporating principles of color psychology into the workspace, employee mindsets are subconsciously enhanced (Stueve, 2023). Choose a color palette which aligns with the desired atmosphere. For instance, use calming colors like blues and greens in relaxation areas and energizing colors like yellows and oranges in creative spaces.

4. **Biophilic Design**: Viewing greenery and natural landscapes reduces symptoms of ADHD (inattention and impulsivity) (Kuo et al., 2004). Incorporate nature-inspired elements in workspaces, such as indoor plants, green walls, or nature-themed artwork. These visual cues from nature can promote a sense of well-being.

Hearing:

Sound is probably the most concerned sensory experience in the workplace after sight. With the rise of collaborative and open work spaces, it is critical to consider acoustic privacy and comfort when creating a balanced layout of focus and collaborative zones, quiet spaces, and third spaces.

1. **Acoustic design**: The radius of distraction in most modern space is about 60 feet. By adding sound masking and good acoustical absorptive materials the radius can shrink down to 10-15 feet (Johnson, 2023). Implement acoustic panels, ceiling treatments, and sound-absorbing materials to reduce noise levels. The more sound that is captured in proximity to the conversation, the less will transfer to neighboring areas. Hard ceilings, glass and sheetrock surfaces should be covered or simply left unused (Johnson, 2023). Designated quiet zones provide employees with a peaceful retreat when needed.

2. **Soundscape**: Consider using ambient sounds, like flowing water or gentle nature sounds, to create a calming auditory environment. Some employees may benefit from music zones where they can personalize their listening experience.

Smell:

One of the most powerful senses when designing for an office – yet it is often one of the most neglected. As with our auditory senses, our sense of smell can strongly connect us with memories and emotions. Using scent is a wonderful way for space to create a more immersive experience that is positive and memorable (Shah,2023).

1.**Air circulation**: Keep indoor air fresh with an air purification system.

2.**Natural Scents**: Plants in the office naturally give off a fresh smell. If possible, use materials and finishes with natural scents, such as wooden furniture or stone surfaces. They can provide a subtle and pleasing aroma to the workspace.

3.**Aromatherapy**: Introduce subtle scents using essential oil diffusers, scented candles, or air purification systems. Scents like lavender or citrus can have calming and mood-boosting effects.

Touch:

A 2016 study from Harvard University showed that touch can release serotonin and dopamine, brain chemicals that can enhance our mood (Kuehn,2016). The joy we can feel with positive experiences of touch are some of the simple yet most meaningful pleasures of life (Shah,2023).

1. **Texture and Materials**: The integration of unique materiality and textured fabrics create an added level of comfort for employees (Stueve, 2023). Incorporate various textures and materials in the design, such as soft fabrics, warm woods, and tactile elements that employees can interact with.

2. **Ergonomic Furniture**: Provide ergonomic office furniture, including adjustable desks and chairs, to support good posture and reduce physical strain.

Taste:

Food experiences can also provoke strong feelings. This is evident in the way many cultures associate food with community and social connections – things that also bring us feelings of happiness (Shah,2023). Café areas and lunch spaces will invite employees to come together and boost collaboration, work and relaxation over a cuppa.

1. **Wellness Nutrition**: Offer access to nutritious snacks and beverages in the office, encouraging healthy eating habits. Consider providing spaces for employees to prepare and enjoy their meals.

2. **Community Dining**: Design communal eating areas that promote social interaction during breaks and foster a sense of belonging and camaraderie among employees.

Smart technology

Use smart technology to control and adapt to sensory elements.

1. **Smart Lighting Systems**:
1) **Circadian Lighting**: Install smart lighting systems that adjust the color temperature and intensity of lighting throughout the day to mimic natural daylight patterns. This regulates employees' circadian rhythms, improves mood, and enhances well-being.
2) **Personalization**: Allow employees to adjust the lighting in their workspaces to their preferred brightness and color temperature. Personalized lighting can create a comfortable and productive environment.

2. **Climate Control**:
1) **Smart HVAC**: Implement smart heating, ventilation, and air conditioning (HVAC) systems that use sensors to detect occupancy and adjust temperature and ventilation settings accordingly. This ensures a comfortable and healthy indoor environment.
2) **User-Controlled Zones**: Enable employees to control the temperature and air flow in their individual workspaces using mobile apps or control panels. This level of personal control can enhance well-being.

3. **Aromatherapy Systems**:
1) **Scent Dispensers**: Install scent-dispensing devices that release various fragrances based on user preferences or time of day. For example, calming scents could be diffused during relaxation periods.
2) **Customizable Aromas**: Allow employees to customize the scent profile in their workspaces, providing a personalized sensory experience.

4. **Acoustic Control**:
1) **Sound-Masking Systems**: Utilize sound-masking technology to create a consistent background sound that helps mask speech and reduce noise distractions.
2) **Adaptive Noise-Canceling**: Implement adaptive noise-cancelling systems that adjust based on real-time noise levels to provide employees with a quieter environment when needed.

5. **Touch and Ergonomics**:
1) **Adjustable Furniture**: Use smart, ergonomic furniture that automatically adapts to employees' preferences. For instance, desks could be adjusted to the desired height, and chairs could provide real-time feedback on posture.

6. **Digital Art and Creative Displays**:
1) **Digital Art Walls**: Incorporate digital art displays that can be controlled and customized by employees. They can change the artwork, colors, and patterns based on their preferences.
2) **Interactive Art**: Implement interactive art installations that respond to employee gestures or facial expressions, creating a visually engaging and dynamic experience.

7. **Food and Beverage Services**:
1) **Smart Vending Machines**: Install smart vending machines that offer a variety of healthy snacks and beverages, which employees can access using mobile apps or touchless payment methods.
2) **Automated Coffee Stations**: Provide automated coffee and beverage stations that allow employees to customize their drinks and control the preparation process.

8. **Feedback and Adaptation**:
1) **Sensory Feedback Collection**: Use smart sensors and IoT devices to collect data on employees' sensory preferences and well-being. This feedback can provide reference for adjustments to the office environment.
2) **Machine Learning and AI**: Implement machine learning and AI algorithms to analyze sensory data and continuously adapt the office environment to optimize well-being.

9. **User-Friendly Interfaces**:
1) **Mobile Apps and Control Panels**: Offer user-friendly mobile apps or control panels that enable employees to adjust sensory elements with ease. The technology should be intuitive and accessible to everyone.

10. **Privacy and Data Security**:
1) Ensure that the use of smart technology respects employee privacy and data security. Clearly communicate how sensory data is used and protected.

By integrating smart technology in these ways, future work spaces would be able create a sensory-rich environment that adapts to individual preferences and needs, ultimately improving employee well-being, comfort, and productivity.

Well-being

In work space design based on sensory experience, employee well-being is mainly reflected in the following aspects:

- Multi-sensory experience to gain mental and emotional health
- Biophilic design improves air quality and promotes physical and mental health
- Ergonomic office furnitures to improve physical comfort.
- Intelligent technology integration allows for personalized adjustments to the environment, improving overall comfort and happiness.
- Social interaction and community belonging

3. Psychology

We define space through our activities and perceive space through our senses, but when we truly want to connect with space on a deeper level, we need to turn our gaze toward the heart. Only when our psychological needs can be met in a space do we truly belong there.

(1) Spatial translation of "Maslow's hierarchy of needs"

80 years ago, American psychologist Abraham Maslow proposed "Maslow's hierarchy of needs", which provided a prescient perspective for us to study psychological needs.

Fig. 25: Maslow's hierarchy of needs. Source: https://www.thoughtco.com/maslows-hierarchy-of-needs-4582571

- According to Maslow, human beings have five categories of needs: physiological, safety, love, esteem, and self-actualization.
- In this theory, Maslow believed that higher needs in the hierarchy begin to emerge when people feel that they have adequately satisfied previous needs.

From the perspective of space design, we can translate this "needs pyramid":

1. **Physiological needs** are the design content analyzed from a sensory perspective mentioned in the previous section, i.e., a comfortable physical work space environment and good office infrastructure. Employees would not come to work space if their basic needs could not be met, such as it's too hot or cold, too noisy, or the glare of the sun makes it difficult to read a computer screen.

2. **Safety needs** can be understood as a healthy and safe office environment when applied to work space design. For example, during the Covid-19 pandemic, when the health and safety environment in the office cannot be guaranteed, people prefer to stay at home and work where the physical conditions and safety are met. In the future work space design, it corresponds to the health and safety protection of the physical space and the data security protection facilities of the virtual space.

3. **Love and belonging needs** correspond to space design that promotes interpersonal relationships such as collaboration and social interaction in workplace design. From this stage, people's needs would shift from Me to We, and people need to connect with others in the workplace. For example, after people are quarantined at home during the pandemic, their desire for face-to-face communication, collaboration and community interaction is particularly strong. In the future, collaboration and social interaction would become the main functions of work spaces.

4. **Esteem needs** map to inclusivity and accessibility in workspace design. People who work together in this work space should not be treated differently because of differences in race, age, gender, culture, sexual orientation, etc., nor would they encounter obstacles in using the office because of physical disabilities. Everyone in the office is respected and understood, and has equal opportunities for professional development. Correspondingly, the design process of work space also considers inclusivity and accessibility more.

5. **Self-actualization** needs can be space design that encourages innovation, creativity and personal growth, when applied to the design of work spaces. This could include spaces such as brainstorming area, creative lab or flexible work environment, or any other design element that inspires creativity.

In short, future work space design must fully consider the psychological needs of the above five stages, and carefully design offices to promote the realization of employees' self-worth.

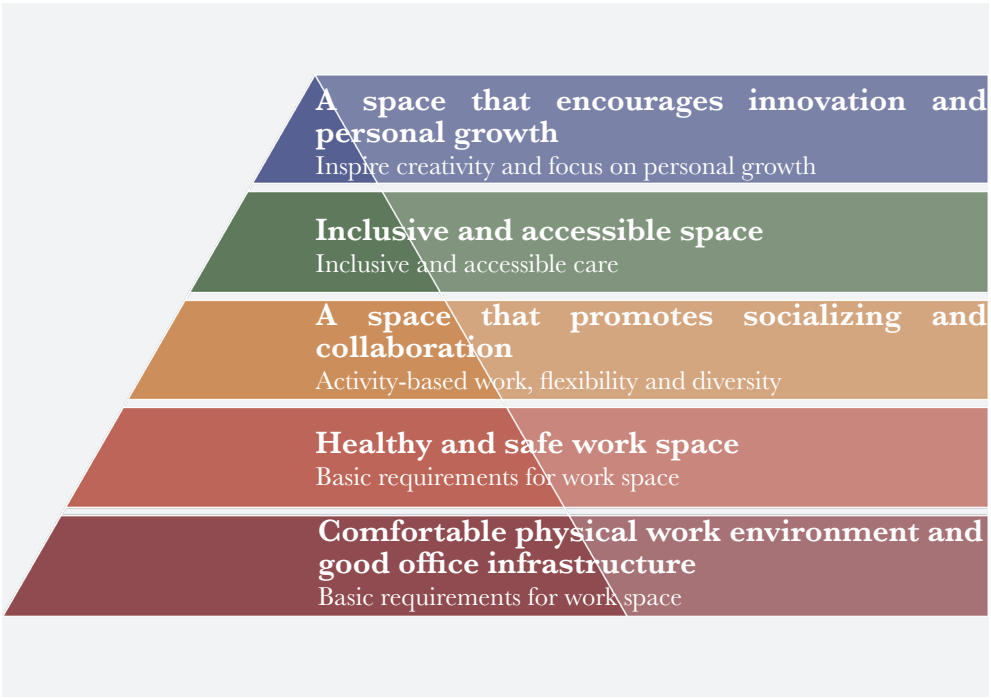


Fig. 26: Spatial translation model (drawn by the author)

The picture above is a spatial model translated from "Maslow's hierarchy of needs" theory. The first three stages in the model correspond to the analysis in previous sections. Next we continue our exploration of inclusive and accessible design strategies for stage four of the model, as well as design strategies for creating spaces that encourage innovation and personal growth.

(2) Inclusive and accessible space design

The world is diverse, and people working in the same work space are also different in one way or another (as shown in Figure 27). An inclusive and accessible workplace design ensures that all employees, regardless of their abilities, backgrounds, preferences, or needs, can perform their tasks effectively, comfortably, and safely. It also fosters a culture of diversity, equity, and inclusion, which can boost innovation, productivity, and engagement (LinkedIn,2023).

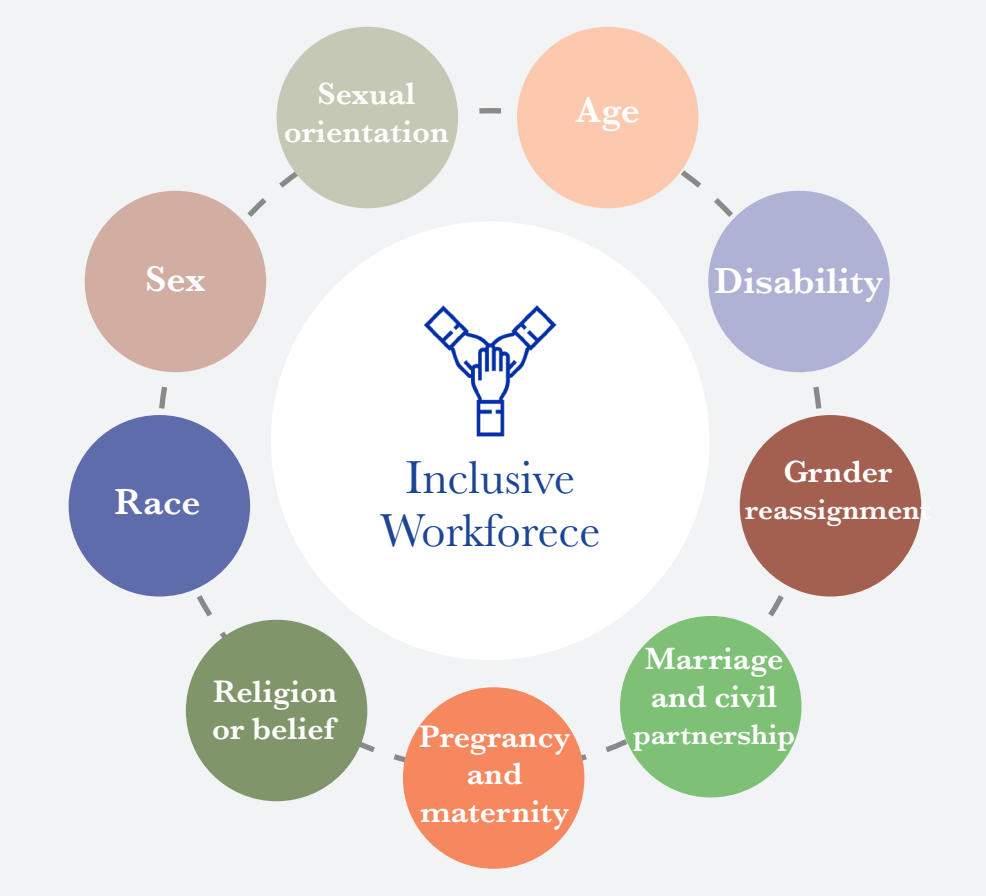


Fig. 27: Inclusive Workforece.

In the design of future workplace, inclusive and accessible spaces can be designed through **universal design principles** and **assistive technology**.

Universal design is an approach that aims to create products and environments that are usable by all people, regardless of their abilities, age, or background (Linkedin, 2023). By considering the diverse needs and abilities of all throughout the design process, universal design creates products, services and environments that meet people's needs (Australian Human Rights Commission, 2021). Seven principles to guide universal design were developed in 1997 by a working group of architects, product designers, engineers, and environmental design researchers led by Ronald Mace at the Center for Universal Design at the North Carolina State University (NCSU). They developed these principles to guide a wide range of design disciplines including environments, products and communications.

The **seven principles** are as follows:

Principle one: Equitable Use
The design is useful and marketable to people with diverse abilities.

Principle two: Flexibility in Use
The design accommodates a wide range of individual preferences and abilities.

Principle three: Simple and Intuitive Use
Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

Principle four: Perceptible Information
The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Principle five: Tolerance for Error
The design minimizes hazards and the adverse consequences of accidental or unintended actions.

Principle six: Low Physical Effort
The design can be used efficiently and comfortably and with a minimum of fatigue.

Principle seven: Size and Space for Approach and Use
Appropriate size and space are provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Applying these principles to work space design, we need to consider the accessibility of physical locations. If workplace accessibility is considered, automatic door openings can help people carrying heavy boxes or recovering from injuries, as well as people with permanent mobility impairments. Consider accessibility within the workspace, with adjustable tables, spread out spaces and movable seating ensuring that people using wheelchairs can easily move through the workspace. Provide various barrier-free facilities, and set up clear and easy-to-read signage and identification symbols, etc.

Accessibility considerations, in addition to physical disabilities, also need to take into account factors such as mental health, neurodiversity and personal work styles.

About 15%-20% of the world's population is neurodiverse – and across the spectrum of neurological differences, individuals can react to certain elements or situations within a space that leads to the loss of productivity (Stueve, 2023). As we design the workplace of the future, we must be aware of these differences. Some employees may need to work in an environment where music is playing and the chatter of distant colleagues can be heard. And for some, however, working in an open environment can be distracting and stressful. Therefore, designers must provide employees with diverse workspace options. There are slightly noisy open seating spaces and cafe spaces to promote communication and collaboration, as well as quiet, softly lit library-like spaces to support focused work, or increasing the number of relaxation rooms or wellness rooms to help ease employees' work stress and care for their mental health.

Fig. 28: Audiences for inclusive design. Source: https://www.gensler.com/blog/why-embedding-inclusive-design-is-critical

Technology support

Various technologies can support the inclusive design of future workplaces, ensuring that all employees, regardless of their abilities or diverse needs, can access and engage with the workspace effectively.

1. **Digital office equipment, applications and services website**:
Allow employees to work online without any barriers.

2. **Smart Assistive Devices and technologies**:
Help people with disability use access and use online resources. For example, people with low vision may use screen-reader software which reads out what is on the computer screen. People who do not have access to a keyboard or mouse can use voice-activated dictation software to enter information into a computer.

3. **Sensory Enhancement Technologies**:
Sensory enhancement devices can amplify and clarify audio for employees with hearing impairments, as well as enhance visual content for those with visual impairments.

4. **Real-Time Captioning and Sign Language Interpretation**:
Provide real-time captioning services and sign language interpretation through video conferencing and live events to support employees with hearing impairments.

5. **Touchscreen and Gesture Control Devices**:
These technologies can assist employees with mobility issues by allowing them to control devices and interact with digital content through touch or gestures.

6. **Wayfinding Apps and Beacons**:
Wayfinding apps and Bluetooth beacons can provide navigation assistance within the workspace for employees with visual or mobility impairments.

7. **Smart Building Systems**:
Implement IoT solutions for building control, which can include voice-activated controls, automated doors, and adjustable lighting and temperature settings to cater to individual needs.

8. **Adaptive Furniture and Ergonomics Tools**:
Implement adaptive furniture and ergonomic tools that can be customized to meet the specific physical needs of employees, such as sit-stand desks and ergonomic chairs.

9. **Physical and Mental Health Apps**:
Provide access to physical and mental health apps that support employees in managing stress, improving mental health, and promoting well-being.

10. **Machine Learning and AI**:
AI-driven chatbots and virtual assistants can provide personalized support for employees with diverse needs, including answering questions, providing information, and assisting with daily tasks.

(3) Space design that encourages innovation and personal growth

Self-actualization needs is the last level in "Maslow's hierarchy of needs" theory and is also the ultimate goal of future work space design. We can meet the need for self-actualization by designing office environments that inspire employees' creativity for personal growth.

How does space design inspire employees' creativity? We begin by exploring what creativity is.

Creativity is much broader than what we think of traditionally. Beyond an ability to draw or sculpt or paint, it's the capacity to generate ideas, solve difficult problems and exploit new opportunities (Brower et al., 2017).
Dr. Tracy Brower offers a four-point description of how people get things done through creativity (Brower et al., 2017):

- Creativity isn't only about group collaboration. It also requires individual focus. Exposure to diverse perspectives and the thinking of the group is important, but so is the time for quiet reflection and the incubation of ideas.
- Creativity doesn't just encompass the realm of ideas. It also involves action. Creativity requires divergence, and plenty of new ideas that move in multiple directions. But it also entails convergent thinking in which we cull, select, prioritize and take action.

- Creativity isn't just about immersing ourselves in the problem, it also benefits from distance and the opportunity to get away, rejuvenate and seek inspiration outside the boundaries of the problem.
- Creativity doesn't just solve known problems, it also anticipates problems, proactively seeks out problems and solves them in new ways.

We can adopt corresponding design strategies in space design.

Me+We

Support both personal focus space and team collaboration space. In addition to formal and informal collaboration spaces that are conducive to teamwork, personal focus spaces such as focus rooms, phone rooms, etc. not only respect personal privacy, but are also conducive to the burst of inspiration during focused thinking.

Fixed to Flexible

From fixed space to flexible space. The practicality of flexible and movable space devices and office furniture has once again been affirmed in stimulating creativity. Creativity and innovation sometimes happen spontaneously rather than planned, and having flexible spaces can help us facilitate these moments.

Work+Others

In addition to providing work space, there are other spaces besides work. Whether it's a five-minute diversion that boosts focus, or a 17-minute coffee break that improves performance, mental downtime can increase productivity and replenish energy during demanding workdays. Disengaging from work gives people the ability to think more inventively (Symes, 2016).

Physical + Virtual

Combining physical and virtual workspaces (supported by technologies). In addition to interacting with a comfortable physical environment, virtual digital technology also provides strong support for employees to expand their thinking. For example, advanced digital collaboration platforms, virtual whiteboards, and interactive displays will facilitate real-time brainstorming and idea sharing among remote and in-house teams. VR and AR technology will be integrated into the workspace to create immersive environments for design thinking, prototyping, and data visualization, fostering creativity. Interactive touchscreen displays and digital whiteboards will encourage creative problem-solving and idea generation by enabling employees to draw, write, and manipulate digital content. AI algorithms and machine learning models will assist employees in generating creative ideas by analyzing data and suggesting innovative solutions.

6.3.2 Vision of virtual work space: Metaverse technology contributes to hybrid work

The need for remote social interaction in hybrid work models are accelerating the development of Metaverse technology. In future work space design, the metaverse is another trend to be considered as part of the new workplace experience (Mejia, 2023).

The metaverse is the realm of computer-generated, networked extended reality, or XR, an acronym that embraces all aspects of augmented reality, mixed reality and virtual reality (AR, MR and VR) (Anderson et al.,2022). Among them, Virtual reality (VR) experience requires people to enter an immersive virtual environment through head-mounted devices and tactile controllers. These virtual scenes can be entirely computer-generated content, simulations of the real world, or a hybrid of the two (Anderson et al.,2022). Augmented reality (AR) is an interactive experience that combines real-world and computer-generated content. People can see digital information superimposed on the real world through smartphones, tablets, and head-mounted displays, thus enhancing their perception of reality. Mixed reality (MR) allows people to interact and manipulate computer-generated images in the real world in real time. Accordingly, AR and VR could be understood as technologies that create certain degrees of MR and enable users to experience a sense of immersion in a synthetic environment where physical and virtual objects co-exist (Serio et al., 2013).

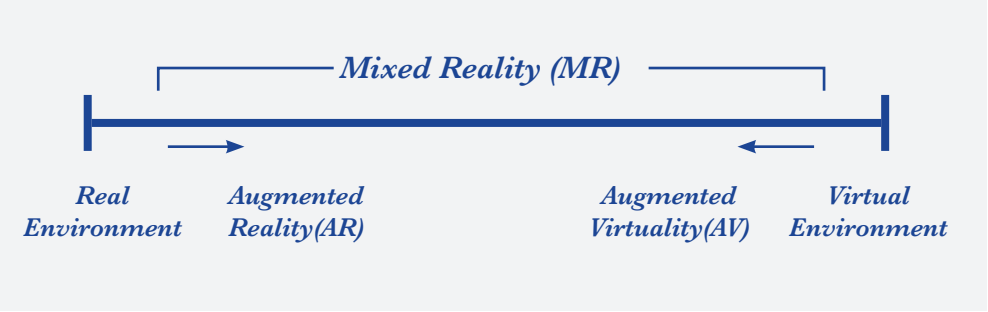


Fig. 29: Reality-Virtuality continuum (Milgram & Kishino, 1994).

Metaverse provides a new way of interaction for future hybrid work. Just as the web used to consist of text and images before videos and other media were added, the metaverse is intended to represent the next level and place the user at the center of interaction (Blazek,2022). It is conceivable that in future work spaces, people can connect with colleagues or partners around the world through the Metaverse and work together in an immersive way. How will future work spaces provide employees with Metaverse technology support and empower hybrid work? Starting from of Activity-based work, an effective way for employees to work in the work space, we continue to explore.

According to the Activity-based working method, the workspace in the metaverse can also be divided into personal workspace, collaboration space and support space.

Personal workspace

Individuals can focus on their work and communicate with colleagues working remotely or clients in remote locations.

1. Mixed Reality Workstations:
Incorporate mixed reality workstations within the physical work environment, which allow employees to access their personalized metaverse workspace. These workstations might consist of headsets or smart glasses that seamlessly blend the physical and virtual worlds.

2. Personalized Avatars:
Enable employees to use personalized avatars when they enter their metaverse workspace. These avatars can be customized to reflect individual identities and preferences.

3. Virtual Desk Setup:
Each employee's metaverse workspace includes a virtual desk with customizable features. This virtual desk can mimic a real-world workspace, offering a digital representation of a physical desk and equipment.

4. Digital Twins:
Create digital twins of the physical work spaces within the metaverse. This allows employees to virtually enter the office, interact with colleagues, and work in a familiar, physical-like setting even when working remotely.

5. Ergonomic Integration:
Integrate ergonomic customization options within the metaverse workspace. Employees can adjust the height, angle, and layout of their virtual workspace for optimal comfort and productivity.

6. Virtual Office Privacy Settings:
Offer privacy settings that allow employees to control who can enter their virtual work space, creating a focused work environment with minimal distractions.

7. Seamless Digital Collaboration:
Enable real-time digital collaboration within the metaverse workspace. Employees can work together on projects, share ideas, and conduct meetings with the same level of interactivity as in a physical office.

8. Advanced Communication Tools:
Provide advanced communication tools, including voice, text, and video chat, to facilitate interactions within the metaverse workspace. These tools should feel natural and intuitive.

9. Personalized Sensory Environment:
Allow employees to customize their sensory environment in the metaverse, including lighting, sounds, and even scents, to create an atmosphere that enhances focus and comfort.

10. Data Integration and Storage:
Integrate data storage and access to digital resources within the metaverse workspace. This enables employees to access documents and data seamlessly.

11. AI-Powered Assistance:
Utilize AI-driven virtual assistants within the metaverse workspace to provide support, reminders, and recommendations to enhance productivity.

12. Physical and Mental Health Resources:
Provide access to wellness and mental health resources, such as relaxation activities, mindfulness sessions, and stress management tools within the metaverse.

13. Regularly Updated and Improved Design:
Continuously update and improve the design of the metaverse workspace based on feedback and evolving needs, ensuring that it remains a productive and personalized environment.

Collaboration space

Formal meetings, informal meetings, group discussions, brainstorming, etc.

1. Metaverse Integration Hub:
Designate a central integration hub within the physical work space, equipped with mixed reality workstations, headsets, and other Metaverse technology. This hub serves as the entry point to the collaborative Metaverse environment,

and could also serve as the entrance to leisure and social spaces.

2. Virtual Collaboration Rooms:
Create virtual collaboration rooms within the Metaverse that mirror the layout and design of physical meeting spaces in the office. These rooms can be customized to cater to different types of collaborative activities, such as brainstorming sessions, project meetings, or virtual conferences.

3. Virtual Whiteboards and Interactive Displays:
Equip Metaverse collaboration rooms with virtual whiteboards and interactive displays. Employees can sketch, write, and draw on these digital surfaces, making it easy to share ideas and concepts in real-time.

4. Cross-Platform Compatibility:
Ensure that Metaverse technology used for collaboration is compatible with various devices, operating systems, and platforms, allowing for seamless communication between remote and in-house teams.

5. Digital Prototyping and Visualization:
Use Metaverse technology to facilitate digital prototyping and 3D visualization of projects and designs. Employees can collaborate on virtual 3D models and prototypes to enhance creative and technical discussions.

6. Persistent Collaboration Spaces:
Create persistent collaborative spaces within the Metaverse, where teams can store project-related content, ideas, and discussions. These spaces remain accessible and organized for ongoing work.

7. Dynamic Virtual Environments:
Customize virtual environments to support specific collaboration needs. For example, a virtual beach environment could be used for casual team meetings, while a virtual boardroom setting could be chosen for more formal discussions.

8. Personalized Workstations:
Offer personalized virtual workstations within the Metaverse collaboration environment. Employees can customize their virtual desks and digital tools to suit their collaboration requirements.

9. Secure and Private Interactions:
Ensure secure and private interactions within the Metaverse collaboration rooms. Sensitive discussions and intellectual property protection should be top priorities.

10. Project Management Tools:
Integrate project management tools into the Metaverse to allow teams to track progress, set goals, and assign tasks, enhancing project collaboration and productivity.

11. AI-Enhanced Collaboration:
Implement AI-driven features that enhance collaboration, such as real-time language translation, sentiment analysis, and suggestion engines that help with decision-making and idea generation.

12. Community Building:
Use the Metaverse for community building and team-building activities. Host virtual events, social gatherings, and team challenges to foster a sense of togetherness among employees.

13. User Training and Support:
Provide training and support to employees on using Metaverse technology for collaborative workspaces, ensuring they are comfortable and proficient with the tools.

Leisure and social space

Rest, socialize, have fun.

1. Virtual Lounge Areas:
Create virtual lounge areas within the Metaverse that mimic real-world relaxation spaces. These spaces can be used to host casual interactions, coffee breaks, and informal discussions.

2. Interactive Events and Gatherings:
Host interactive virtual events and gatherings within the Metaverse. These can include team-building activities, social hours, and celebrations that promote social connections.

3. Art Galleries and Exhibitions:
Create virtual art galleries and exhibitions within the Metaverse, presenting employee artwork, digital art, or cultural displays that enhance the visual and social experience.

4. Personalized Social Spaces:
Allow employees to customize their virtual social spaces based on their interests and preferences, creating areas for hobbies, passions, and socializing with like-minded colleagues.

5. Virtual Travel and Exploration:
Design virtual travel and exploration spaces within the Metaverse, where employees can visit digital replicas of famous destinations, explore new worlds, and share experiences with others.

6. AI-Enhanced Virtual Social Hosts:
Implement AI-driven virtual social hosts and entertainers within the Metaverse who can engage with employees, lead activities, and provide entertainment.

7. Themed Social Spaces:
Create themed virtual social spaces within the Metaverse, changing the environment and activities based on various themes and occasions.

In the future, Metaverse technology will, like the Internet today, completely change the way we work and become a powerful tool in our hands. The Metaverse will not replace the office, but will be an addition to both the home office and the office (Blazek, 2002). Just like we carry our laptop from one workstation to another today, in the future we will take the XR headset for a walk (Blazek, 2002). Janna Anderson and Lee Rainie noted in their 2022 book, The Metaverse in 2040, that a notable share of experts argued that the embrace of extended reality in people's daily lives by 2040 will be centered around augmented-reality and mixed-reality tools, not in the more-fully-immersive virtual reality worlds many people define today as being "the metaverse." (Anderson et al.,2022) The augmented metaverse will fundamentally change society, altering our world into a merged reality of real and virtual (Anderson et al.,2022).

7 Project Development

7.1 Project brief

This project is a **continuation** of Contest Design Studio project. Contest Design Studio project WORK LIVING HUB mainly focused on the theme of Workplace ecosystem for behaviors of the future. The aim of the Studio was to design an ecosystem made of different types of spaces, a hub of functions to support new working behaviors, open to other services to support the daily life of the individual and the community. This project is an in-depth study and redesign of the **Collaboration Hub** part of the original group project.

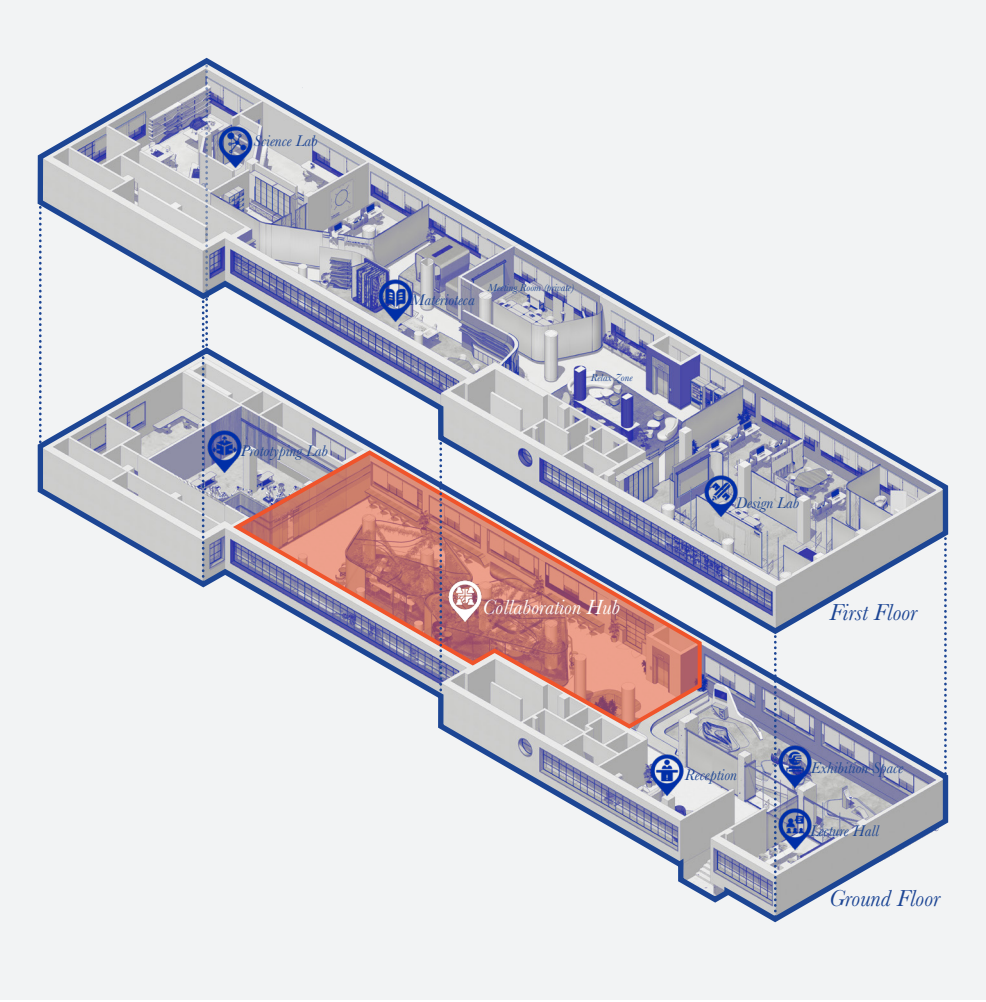


Fig. 30: Original project design plan, in which the orange area is the new renovation design scope

As shown in Figure 30, the design area of the original project was divided into two floors: the ground floor and the first floor. The central part of the ground floor (the area **marked in orange**) is the **Collaboration Hub**, which is the **design area** for in-depth research and renovate this time.

7.1.1 Site analysis

Dergano

The work site is located in **Dergano**, a neighborhood in **northern Milan**. This area was once a rural village, which was then united with Milan in 1923. Today, Dergano maintains that same small town atmosphere with a central square and a rich platform of cultural and commercial activities. Situated just a stone's throw from Bovisa and the Politecnico di Milano, the area has slowly been imbued with design culture, lending its industrial spaces to young creatives as showrooms and sets for years (Marelli, 2019).

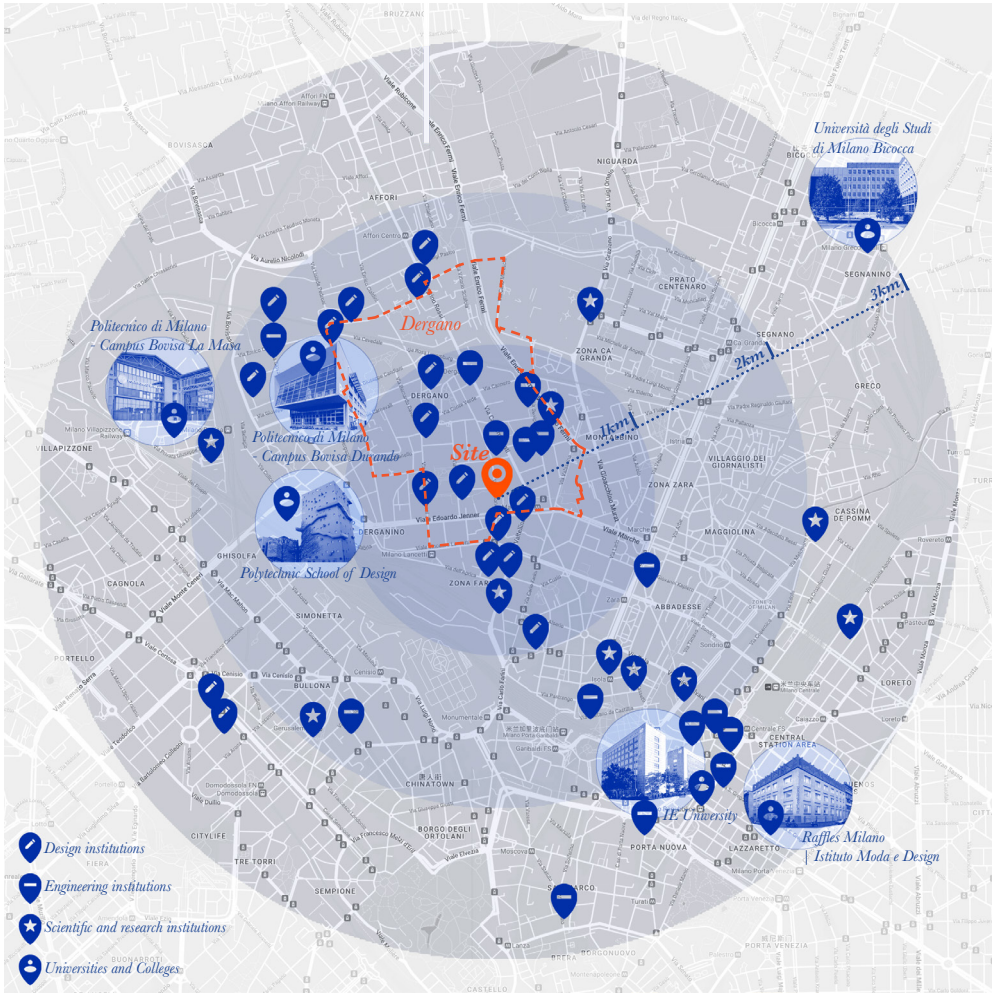


Fig. 31: The location of the project and the distribution of innovative institutions within the surrounding 3km area, including design institutions, engineering institutions, scientific research institutions and universities.

In 2019, the area participated in Milan Design Week for the first time as the newest design district.This area will be relaunched the periphery as a territory with innovative, inclusive, and collaborative activities in locations experimenting with new and diverse focuses (Andonini, 2019). In Figure 31, we can clearly see that there are rich innovation resources gathered around the project location.

Site surroundings

The specific location of this project is at the intersection of Via Legnone and Viale Jenner, was the Italcima chocolate factory designed by Gio Ponti and Luciano Baldessari in 1935, when northern Milan was still an industrial area.

Three long buildings, parallel to one another, are divided according to a rigorous and Rationalist compartmentalization. Spaces accommodate for offices and a private home for the owner, along with a doorman and factory floor. The factory itself was set back from the street, featuring long ribboned windows that accentuate the composition's sweeping width.

The building has since been converted as a residential and corporate complex, remaining one of the most important examples of Milanese Rationalism (Marelli, 2019).

Fig. 32: Environment within 200 meters around the project site, public transportation, life facilities, greening and sunlight conditions

Surrounding environment: There are subway stations and bus stations within a 200-meter walk, and transportation is convenient. There are restaurants, gyms, cafes, pharmacies, supermarkets and other living facilities. There are also two parks where many people take a walk and rest.

Surrounding the building: The building where the design project is located faces a garden and has a beautiful environment. There is a small sports ground next to the building.

7.1.2 Original design plan

This interior design project is the design of a co-working space, covering the ground floor and first floor of the building. The main **target users** are designers, engineers, and scientific researchers. It is also open to other innovative workers and university students in related majors. The main purpose of this project is to provide an experimental co-working space for innovative workers, provide a good working environment for their research, collaboration and socialization, and stimulate creativity.

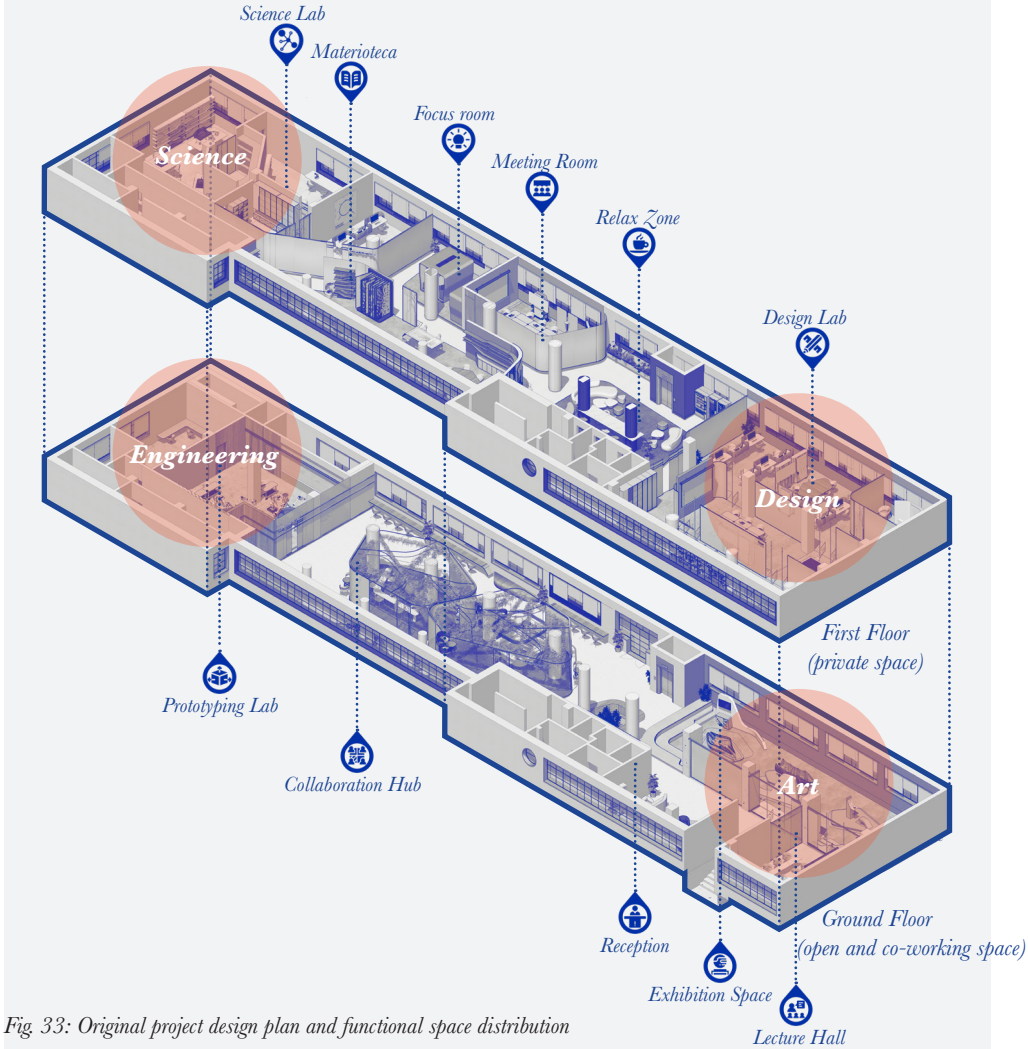


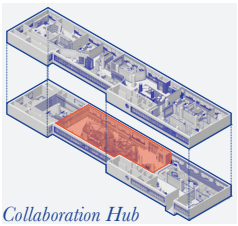
Fig. 33: Original project design plan and functional space distribution

Private and open working spaces: the first floor of the original design project is a private office space, mainly provided for project teams who work here for a long time. The ground floor is open and co-working space for all innovative workers (includeing long-term, short-term and related major student users).

Functional spaces: first floor (private): science lab, design lab, materioteca, meeting room, focus room and relax zoon; ground floor (open): prototyping lab, collaboration space, exhibition space, lecture hall and reception.

7.1.3 Redesign part: Collaboration Hub

Collaboration space is the focus of research in this consolidation thesis. The design chapter will further research and redesign the collaborative space part of the Contest Design Studio project.



Collaboration Hub

Original design plan analysis

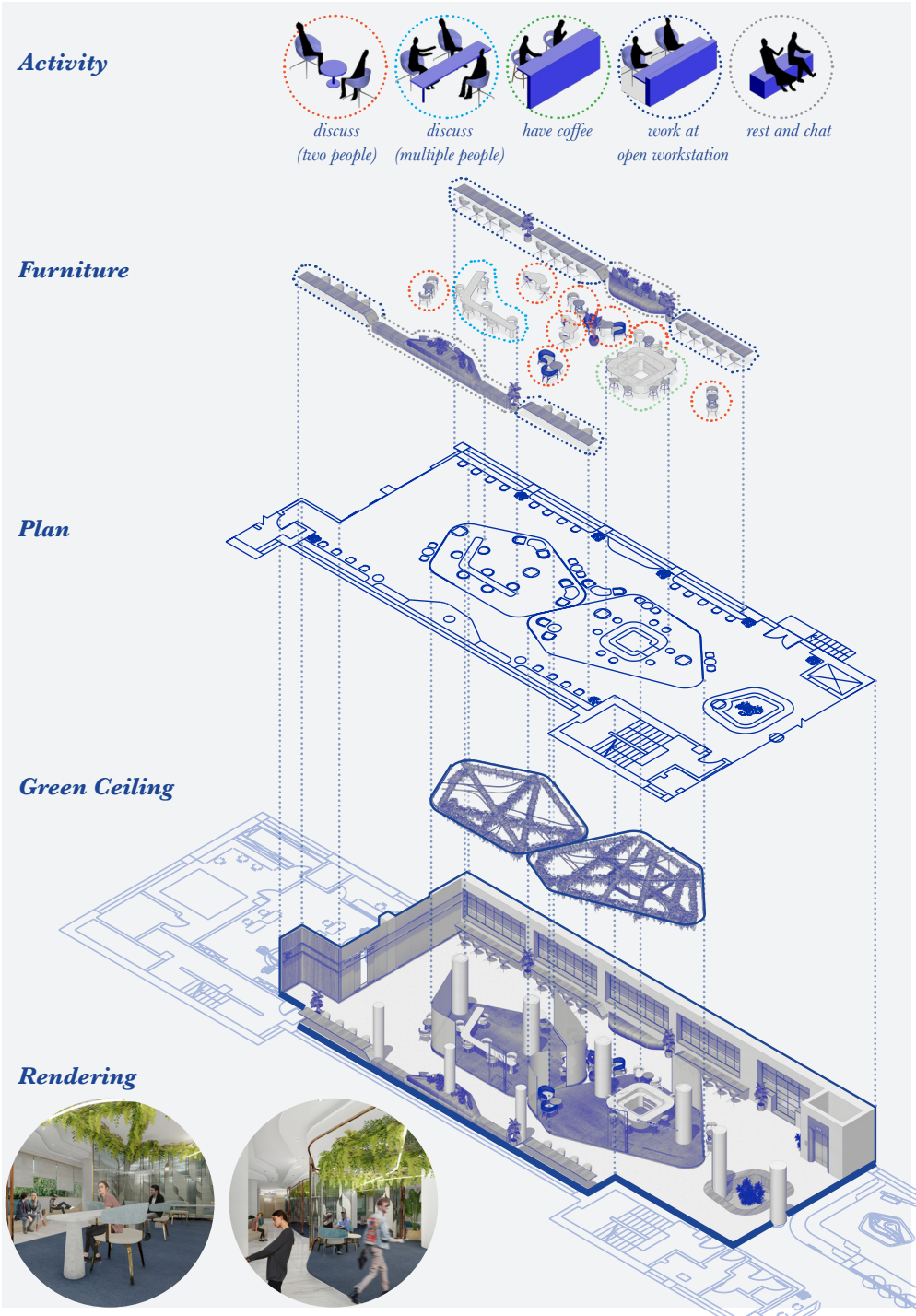


Fig. 34: Exploded diagram of Collaboration Hub in original design

Advantages: 1.biophilic design benefits employee well-being; 2.large leisure and informal discussion areas create a relaxed social atmosphere.
Disadvantages: 1.the original work did not fully take into account the diversity of user activities in the Collaboration Hub, such as focused thinking, brainstorming, formal and informal meetings, face-to-face collaboration and collaboration with remote colleagues, etc., which all require different types of spaces. 2.it did not take into account neurodiversity, for example some people prefer to work in open spaces and some prefer to work in relatively closed quiet spaces. 3.furniture in the central area is disordered and scattered, and the overall area is more like a leisure area. The one-sided linear workstation near the window is not conducive to promoting collaborative activities.

The Collaboration Hub carries important collaborative functions throughout the co-working space. As shown in Figure 35, innovative workers from all over the place gather here, and the design of the Collaboration Hub should provide corresponding space support for their activities.

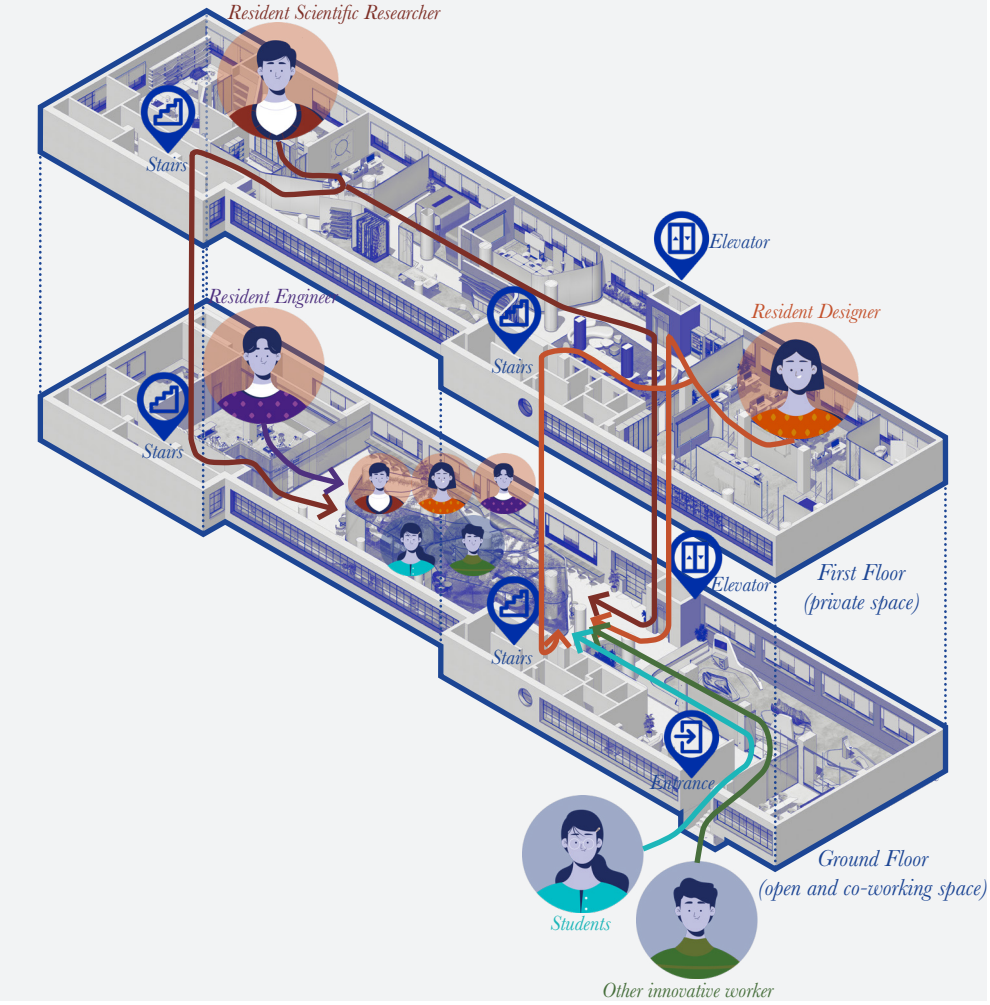


Fig. 35: Users of the Collaboration Hub and their arrival trajectories

7.2 Design drivers

Space design drivers can be mainly divided into three contents: user type, the experience provided by the space and unique characteristics of the space.

7.2.1 Target users

As mentioned in the 7.1 project introduction, the users of the co-working space (including the ground floor and the first floor) are innovative workers, including:

1. long-term user: scientific research teams and design teams on the first floor, and the engineering teams working with them.
2. short-term users: innovative workers from other individuals or organizations and students from nearby universities or colleges.

As part of this co-working space, the Collaboration Hub is open to all long-term and short-term innovative workers (including students). Users of the Collaboration Hub are mainly divided into three categories: scientific researchers, designers and engineers.

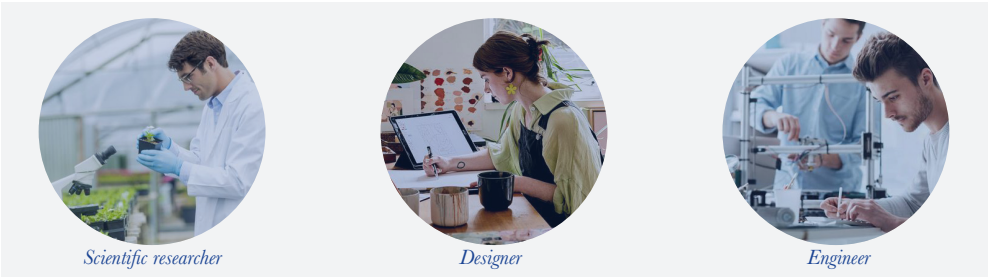


Fig. 36: Target user types of the Collaboration Hub

7.2.2 Interview: user needs

Through interviews with innovative workers around the area where the project is located, we understand the main needs of potential users in order to shape and provide the activity spaces that users need in collaboration. The interviews mainly focused on three aspects: user activities, employee well-being and technology drivers.

Questions:

What activities require collaboration in your daily work?
What kind of space experience can meet your expectations for well-being?
What technologies do you think can support your collaboration with colleagues?

The survey results are shown on the next page. Although the needs of each major group may be very similar, the differentiated needs of individuals also need to be considered.

The answer to: What activities require collaboration in your daily work?

	Work content	Detailed description	Activity form	Corresponding space
Scientific researcher	Data Sharing and Analysis	Collaboratively managing and sharing research data with team members.	Group discussion	Booth, Discussion room or area
		Conducting data analysis collectively using statistical tools and software.		
	Experiment Design and Planning	Collaborating on the design and planning of experiments or research studies.	Group discussion	Booth, Discussion room or area
		Discussing methodologies, variables, and potential challenges.		
	Results and Findings	Sharing and discussing preliminary and final research results.	Group discussion	Booth, Discussion room or area
		Collaboratively interpreting data and drawing conclusions.		
	Peer Review	Participating in peer review processes for research papers.	Meeting	Meeting room
		Providing constructive feedback on colleagues' work.		
	Lab Meetings and Seminars	Participating in regular lab meetings or seminars to discuss ongoing research.	Meeting	Meeting room
		Sharing updates on individual projects and seeking input from colleagues.		
	Collaboration with External Partners	Collaborating with researchers from other institutions or industry partners.	Meeting	Meeting room
		Facilitating communication and coordination between different research groups.		
	Training and Skill Development	Sharing expertise and skills within the research team.	Training	Training room
		Collaboratively organizing training sessions or workshops.		
Designer	Brainstorming Sessions	Designers collaborate to generate and share ideas for a project.	Group discussion	Huddle, Booth, Discussion area, Stand-up space
		Use of whiteboards, sticky notes or mind mapping tools to capture and organize thoughts.		
	Concept Development	Collaborative sketching or prototyping to explore and refine design concepts.	Group discussion	Booth, Discussion room or area
		Sharing and critiquing different design iterations.		
	Design Reviews	Regular meetings to review and discuss design progress.	Meeting	Meeting room
		Providing constructive feedback and suggestions for improvement.		
	Client Collaboration	Involving clients in the design process through collaborative workshops or presentations.	Workshop	Open collaborative area, Meeting room
		Gathering client feedback and incorporating it into the design.		
	Cross-Functional Collaboration	Collaborating with other departments to ensure design aligns with overall project goals.	Meeting	Meeting room
	Training and Skill Development	Sharing knowledge and skills within the team through training sessions or mentorship.	Training	Training room
Engineer	Design Collaboration	Collaborating on the design of products, systems, or structures.	Group discussion	Booth, Discussion room or area
		Sharing and reviewing design schematics, blueprints, and CAD models.		
	Brainstorming and Ideation	Participating in brainstorming sessions to generate creative ideas for solving engineering challenges.	Group discussion	Huddle, Booth, Discussion area, Stand-up space
		Collaborating on the conceptualization of new projects or features.		
	Problem-Solving Sessions	Collaboratively addressing engineering problems and challenges.	Meeting	Meeting room
		Brainstorming solutions and evaluating their feasibility.		
	Meetings and Updates	Participating in regular team meetings to discuss progress, challenges, and updates.	Meeting	Meeting room
		Providing status updates on individual tasks.		
	Cross-Disciplinary Collaboration	Collaborating with engineers from different disciplines to integrate various components of a project.	Meeting	Meeting room
		Interacting with professionals from other departments.		
	Training and Skill Development	Sharing technical skills and knowledge through training sessions.	Training	Training room
		Collaboratively participating in professional development opportunities.		
	Client Collaboration	Engaging with clients to understand requirements and expectations.	Meeting	Meeting room
		Collaboratively iterating on designs based on client feedback.		

The answer to: What kind of space experience can meet your expectations for well-being?

	Space experience	Detailed description	Design elements	Corresponding space
Sensory	Comfortable Furniture	Ergonomic chairs and desks that support good posture.	Ergonomic furniture	
		Adequate desk space for tools and materials.		
	Natural Light	Designing workspaces with ample natural light to reduce eye strain and improve mood.	Light	
		Incorporating adjustable window coverings to control light levels.		
	Task Lighting	Providing adjustable task lighting to reduce eye strain during detailed design work.	Light	
		Allowing users to control the lighting in their immediate workspace.		
	Inspiring Aesthetics	Incorporating elements of inspiration, such as artwork, design samples, or mood boards.	Decoration	
		Using a color scheme and layout that fosters creativity and focus.		
	Greenery and Biophilic Design	Introducing plants and natural elements into the workspace.	Plant	
		Incorporating biophilic design principles for a connection to nature.		
	Cafe and Healthy Food Options	Offering access to healthy food options in cafe or break areas.		Cafe and dining area
		Creating communal spaces for shared meals and breaks.		
Work	Flexible Workspaces	Providing options for standing desks or flexible seating arrangements.	Flexible and moveable furniture	Open collaborative area
		Designing versatile spaces that accommodate different work styles and preferences.		
	Quiet and Focused Work Areas	Designating quiet zones for focused work or concentration.	Sound-absorbing materials	Focus room
		Implementing sound-absorbing materials to reduce noise levels.		
	Breakout Areas and Relaxation Spaces	Designing comfortable breakout areas for relaxation and informal meetings.		Breakout Areas and Relaxation Spaces
		Incorporating features like lounge seating and recreational activities.		
	Technology Integration	Providing access to the latest design tools and technology.	Technical support	
		Ensuring reliable and fast internet connectivity for seamless work.		
	Well-Defined Work-Life Boundaries	Encouraging a healthy work-life balance by defining clear boundaries.	Area boundaries	
	Professional Development Opportunities	Providing opportunities for skill development and continuing education.		Training/meeting room /Open collaborative area
		Supporting attendance at design conferences and workshops.		

The answer to: What technologies do you think can support your collaboration with colleagues?

High-speed internet	Communication Platforms	Real-time collaboration tools	Virtual meeting platform
Cloud Storage and File Sharing	Virtual Reality (VR) and Augmented Reality (AR)	IoT (Internet of Things) Development Platforms	Artificial intelligence system

7.2.3 User portraits

Persona 1

Scientific researcher

"Every sustainable material we discover is a step closer to a greener, more responsible future."

Maira

Age: 30

User type: long-term

Key Attributes:

- Holds a Ph.D. in Sustainable Materials Science.
- Published researcher with a focus on eco-friendly and renewable materials.

Short Description:

Maira is a dedicated researcher committed to advancing sustainable materials science, exploring innovative solutions for reducing environmental impact.

Needs:

- Collaboration with designers and engineers to apply research findings in real-world applications.
- Sensitive to noise and need to work in a quiet environment.

Challenges:

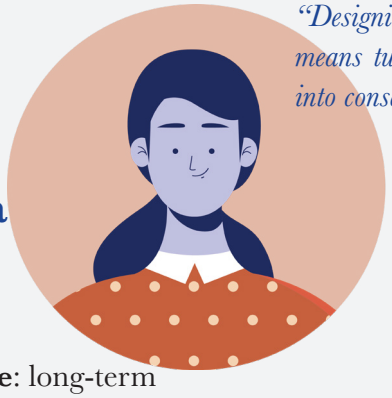
- Obsessed with research and seldom socializes
- Work-life balance

Opportunities:

- Discuss the application and promotion of eco-friendly materials with professionals from various industries

Persona 2

Designer



"Designing with a green mindset means turning nature's inspiration into conscious creations."

Olivia

Age: 25

User type: long-term

Key Attributes:

- Environmental design advocate with a degree in Sustainable Design.
- Passionate about creating aesthetically pleasing designs with minimal environmental impact.

Short Description:

Olivia is a creative designer focused on integrating environmentally friendly materials into functional and visually appealing designs, aiming for a harmonious balance between form and sustainability.

Needs:

- Flexible collaboration space to adapt to fast-paced work needs.
- Collaborative design tools for real-time ideation.
- Personalized workspace inspires design

Challenges:

- Sitting for long periods of time while drawing design drawings caused physical discomfort. Unable to maintain one posture for a long time at work.

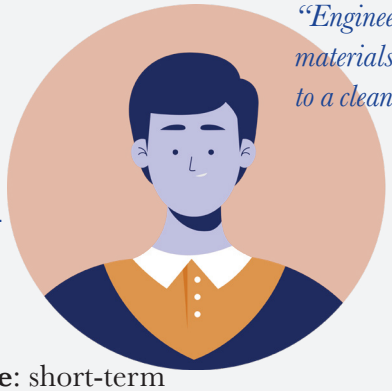
Opportunities:

- Communicate with professionals in various fields to expand more knowledge and better assist design capabilities.

Persona 3

Engineer

"Engineering with sustainable materials is about building a bridge to a cleaner and smarter tomorrow."



Ethan

Age: 34

User type: short-term

Key Attributes:

- Holds a degree in Environmental Engineering.
- Specializes in developing sustainable technologies and applications.

Short Description:

Ethan is an innovative engineer dedicated to implementing environmentally friendly materials in technological solutions, striving for a balance between technological advancements and ecological responsibility.

Needs:

- Collaborate with materials researchers and designers to implement eco-friendly solutions into projects.
- Work remotely with colleagues around the world to prototype and test on a real-time collaboration platform.
- Choose working methods independently according to work needs.

Challenges:

Often faced with work challenges, the psychological pressure is relatively high.

Opportunities:

Improve problem-solving skills by communicating with people from different professions.

7.2.4 Proposed activities and corresponding space

Based on previous research, interviews and case studies, a series of activities that take place in the Collaboration Hub are proposed to meet the different needs of target users. While some activities are available to all users, some are designed to address the specific needs or issues of some users. These activities are divided into two main types: collaborate and social, and are composed of sub-activities that can be linked to other activities in different groups when needed. Through the analysis of activities, four functional spaces were finally obtained to meet these activities: multi-functional collaboration area, multi-functional booth, multi-sized meeting room, and leisure area.

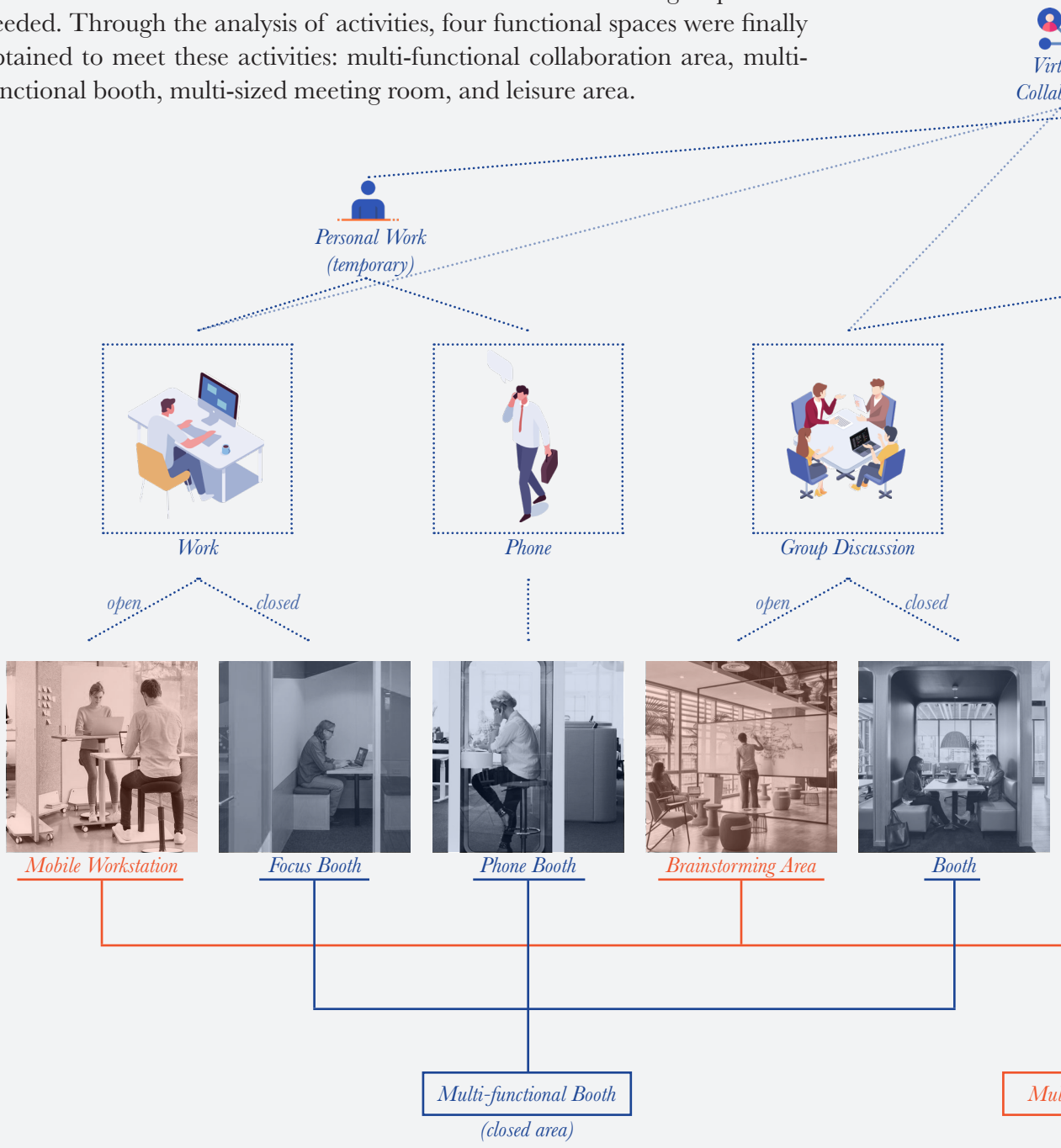
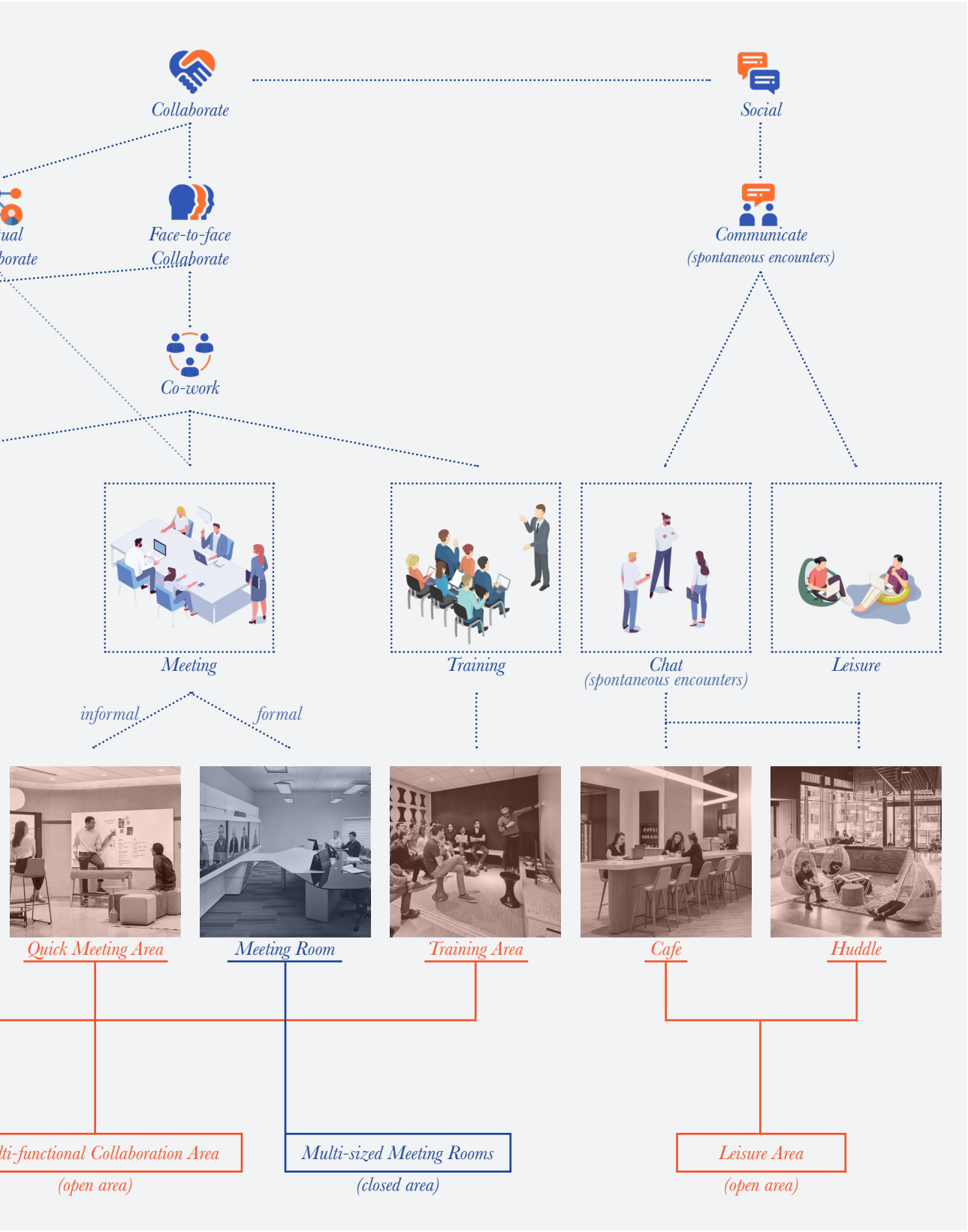


Fig. 37: Activity types and corresponding spaces in the Collaboration Hub


Collaborate
Social
Face-to-face Collaborate
Communicate (spontaneous encounters)
Co-work
Meeting
Training
Chat (spontaneous encounters)
Leisure
informal
formal
Quick Meeting Area
Meeting Room
Training Area
Cafe
Huddle
Multi-sized Meeting Rooms
(closed area)
Leisure Area
(open area)

7.2.5 Service diagram

In the Collaboration Hub, the four functional spaces that have been identified are: multi-functional collaboration area, multi-functional booth, multi-sized meeting room, and leisure area. As shown in Figure 38, visualize functional areas, users involved, activities that users can do in the space, features of the space and technical support through bubble diagramming.

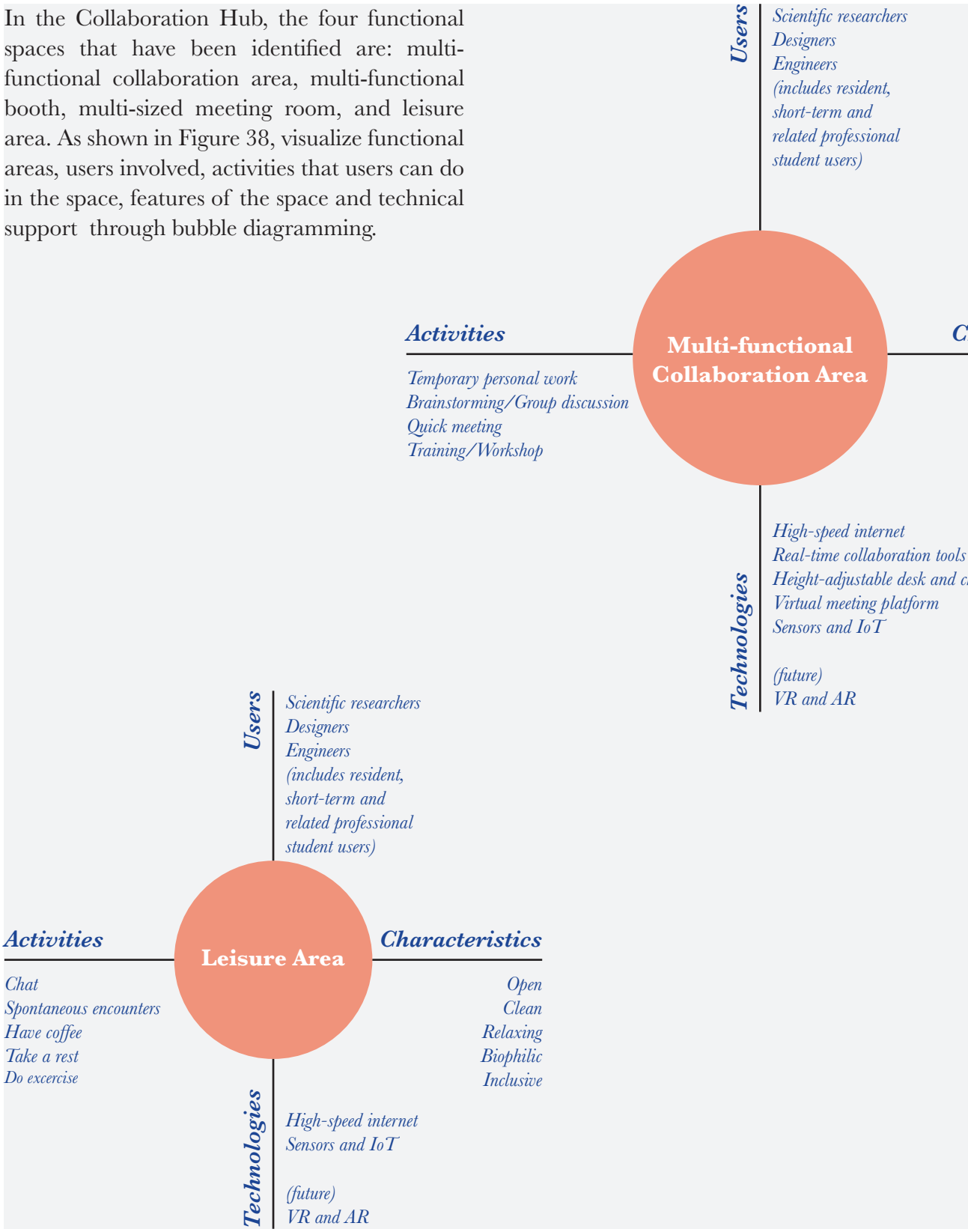
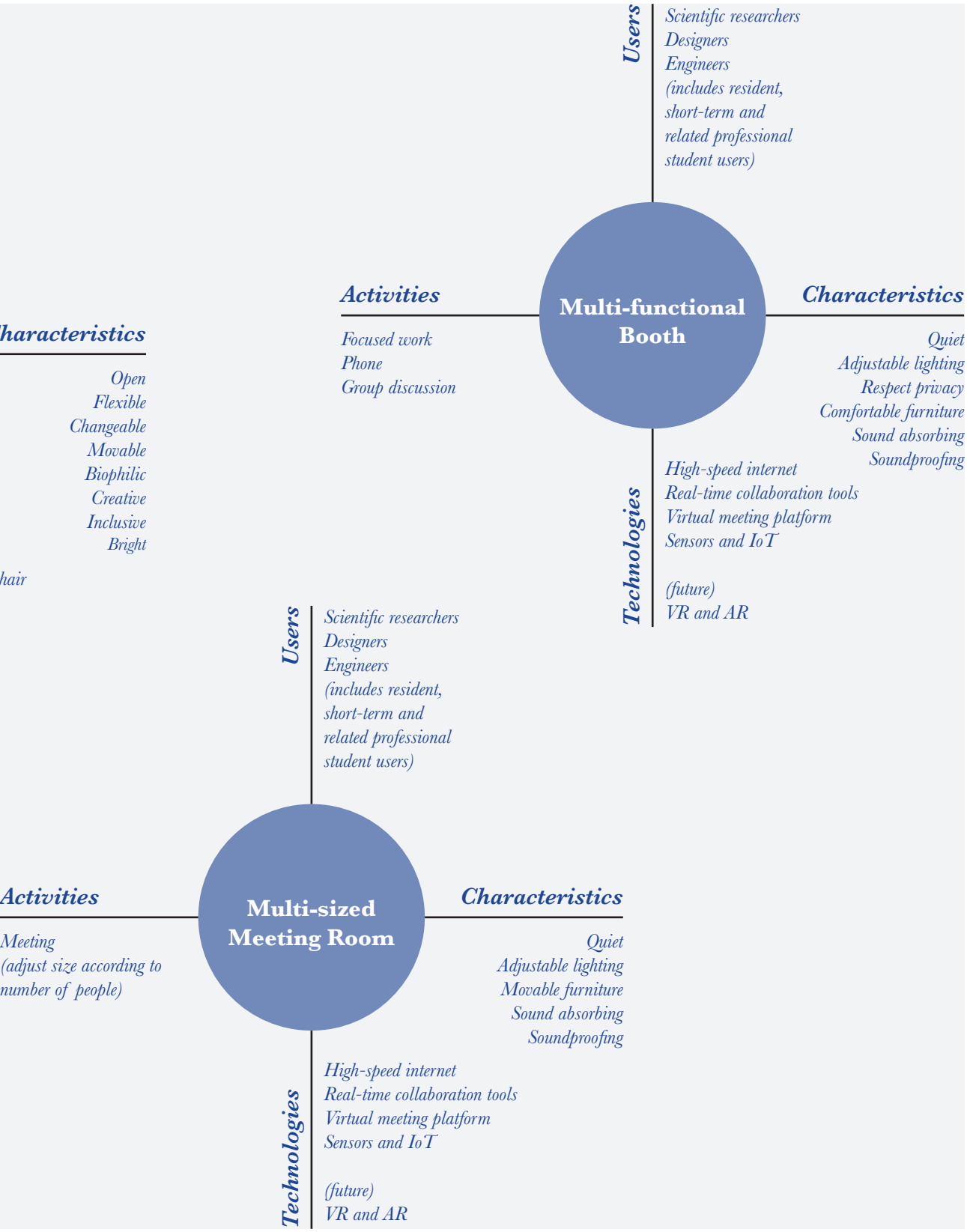


Fig. 38: Service diagram of functional spaces in the Collaboration Hub


Users
Scientific researchers
Designers
Engineers
(includes resident,
short-term and
related professional
student users)
haracteristics
Open
Flexible
Changeable
Movable
Biophilic
Creative
Inclusive
Bright
hair
Activities
Focused work
Phone
Group discussion
Multi-functional Booth
Characteristics
Quiet
Adjustable lighting
Respect privacy
Comfortable furniture
Sound absorbing
Soundproofing
Technologies
High-speed internet
Real-time collaboration tools
Virtual meeting platform
Sensors and IoT
(future)
VR and AR
Users
Scientific researchers
Designers
Engineers
(includes resident,
short-term and
related professional
student users)
Activities
Meeting
(adjust size according to
number of people)
Multi-sized Meeting Room
Characteristics
Quiet
Adjustable lighting
Movable furniture
Sound absorbing
Soundproofing
Technologies
High-speed internet
Real-time collaboration tools
Virtual meeting platform
Sensors and IoT
(future)
VR and AR

7.2.6 User experience

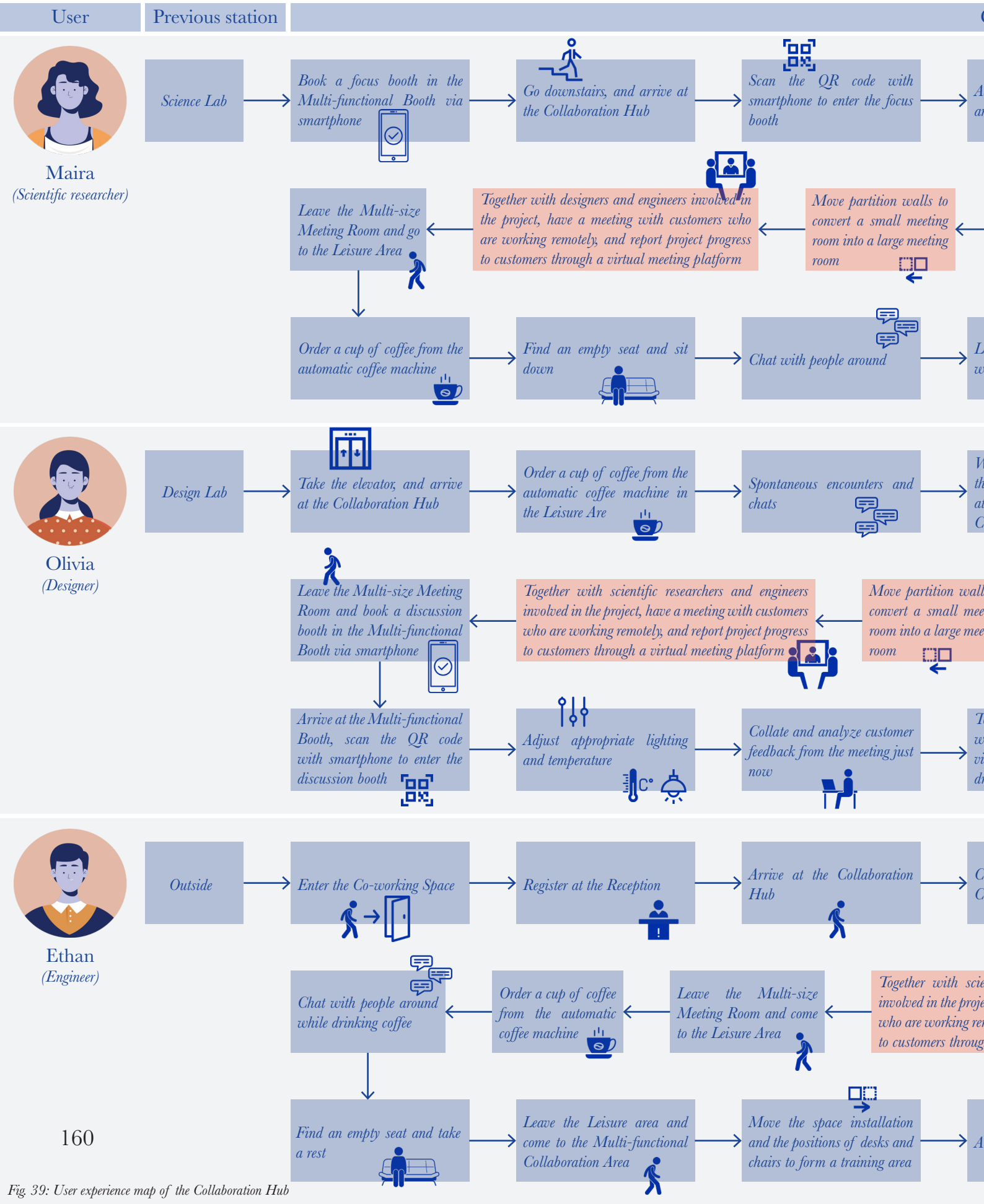


Fig. 39: User experience map of the Collaboration Hub

Individual experience

Collaboration experience

Collaboration Hub

Next station

djust appropriate lighting nd temperature

Focus on organizing research materials to prepare for the discussion later.

Leave the focus booth and go to the Multi-functional Collaboration Area

Move the space installation and the positions of desks and chairs to form a discussion area

Discuss with designers to finalize material application plan

Move the space installation and the positions of desks and chairs to form a quick meeting area

Have a quick meeting with designers and engineers to formulate project implementation plan

Leave the Multi-functional Collaboration Area and go to the Multi-sized Meeting Room

eave the leisure area and alk to the elevator

Take the elevator to the first floor

Materioteca

Walk and chat as leaving e leisure area and arrive t the Multi-functional ollaboration Area

Move the space installation and the position of desk and chair to form a personal workstation

Prepare the drawn design plan and information for the discussion later

Move the space installation and the positions of desks and chairs to form a discussion area

Discuss with scientific researchers to finalize material application plan

Move the space installation and the positions of desks and chairs to form a quick meeting area

Have a quick meeting with scientific researchers and engineers to formulate project implementation plan

Leave the Multi-functional Collaboration Area and go to the Multi-sized Meeting Room

ls to ting ting

ogether with other designers present, discuss ith designers working remotely through a rtual conference platform, and optimize design awings through real-time collaboration tools

Leave the discussion booth and reach the first floor via the stairs

Design Lab

ome to the Multi-functional ollaboration Area

Move the space installation and the position of desk and chair to form a personal workstation

Prepare project materials for upcoming meetings

Move the space installation and the positions of desks and chairs to form a quick meeting area

Have a quick meeting with scientific researchers and designers to formulate project implementation plan

Leave the Multi-functional Collaboration Area and go to the Multi-sized Meeting Room

Move partition walls to convert a small meeting room into a large meeting room

ntific researchers and designers ct, have a meeting with customers motely, and report project progress h a virtual meeting platform

ttend a skills sharing session

Leave the Multi-functional Collaboration Area and go to the phone booth to answer the call

Leave the phone booth and head to the Prototyping Lab

Prototyping Lab

7.2.7 Visual journey

Collect and clusterize images that can inspire the athmosphere of those functional areas, turn the user experience into a visual journey.

Fig. 40: Visual journey map of the Collaboration Hub

7.3 Concept

During the design-driven analysis process, the user types, space functions, and user experiences of the Collaboration Hub were determined. Next comes the concept development phase, exploring how to organize the functional spaces and infuse space with qualities and atmosphere.

7.3.1 Metaphor

The design inspiration of the space is closely connected with the cultural elements of Italy, the country where this project is located.

Scuola di Atene

Fig. 41: Scuola di Atene

In the painting *Scuola di Atene*, Raphael gathered people from different periods in one space. More than fifty philosophers, artists, and scientists from ancient Greece, ancient Rome, and Italy of the painter's time gathered together. In this painting, we can see human wisdom and innovation crossing the divide of the times, closely linking the past, present and future. The scenes of brainstorming, intense discussions, and focused thinking among today's innovative workers in collaborative spaces remind me of the painting. By deconstructing the character activities and spatial distribution in the painting, the spatial layout of the collaboration center can be inspired.

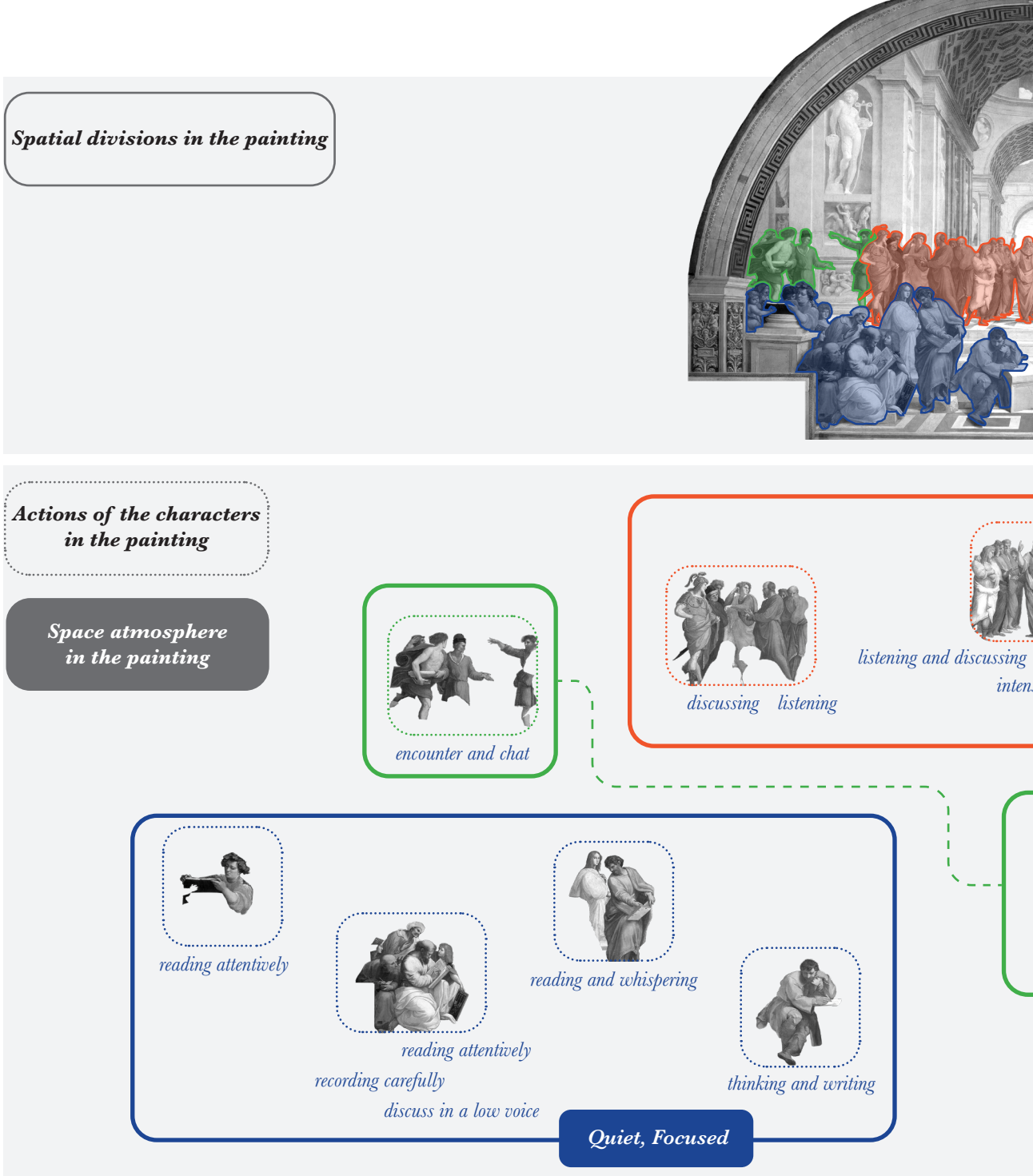
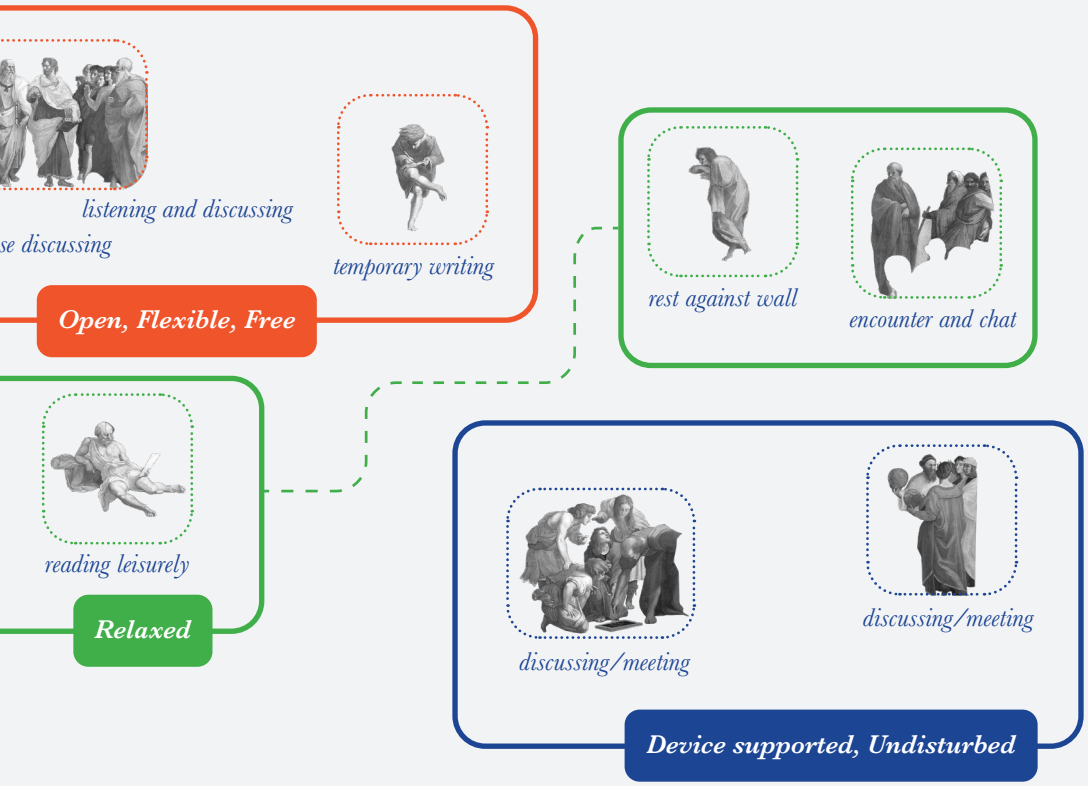
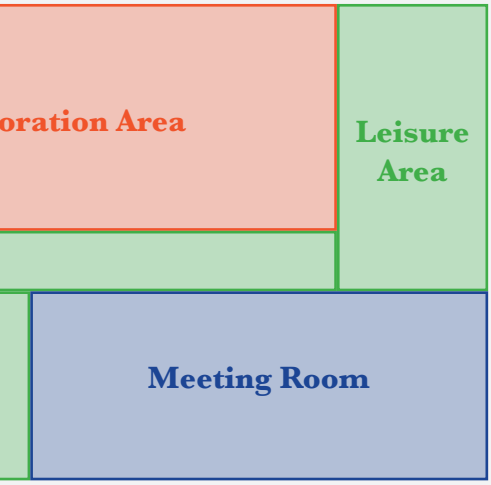


Fig. 42: Analysis of the spatial atmosphere in the painting and the corresponding transformation space


listening and discussing
se discussing
temporary writing
Open, Flexible, Free
rest against wall
encounter and chat
reading leisurely
Relaxed
discussing/meeting
discussing/meeting
Device supported, Undisturbed


oration Area
Leisure Area
Meeting Room

7.3.2 Zoning

Main function distribution

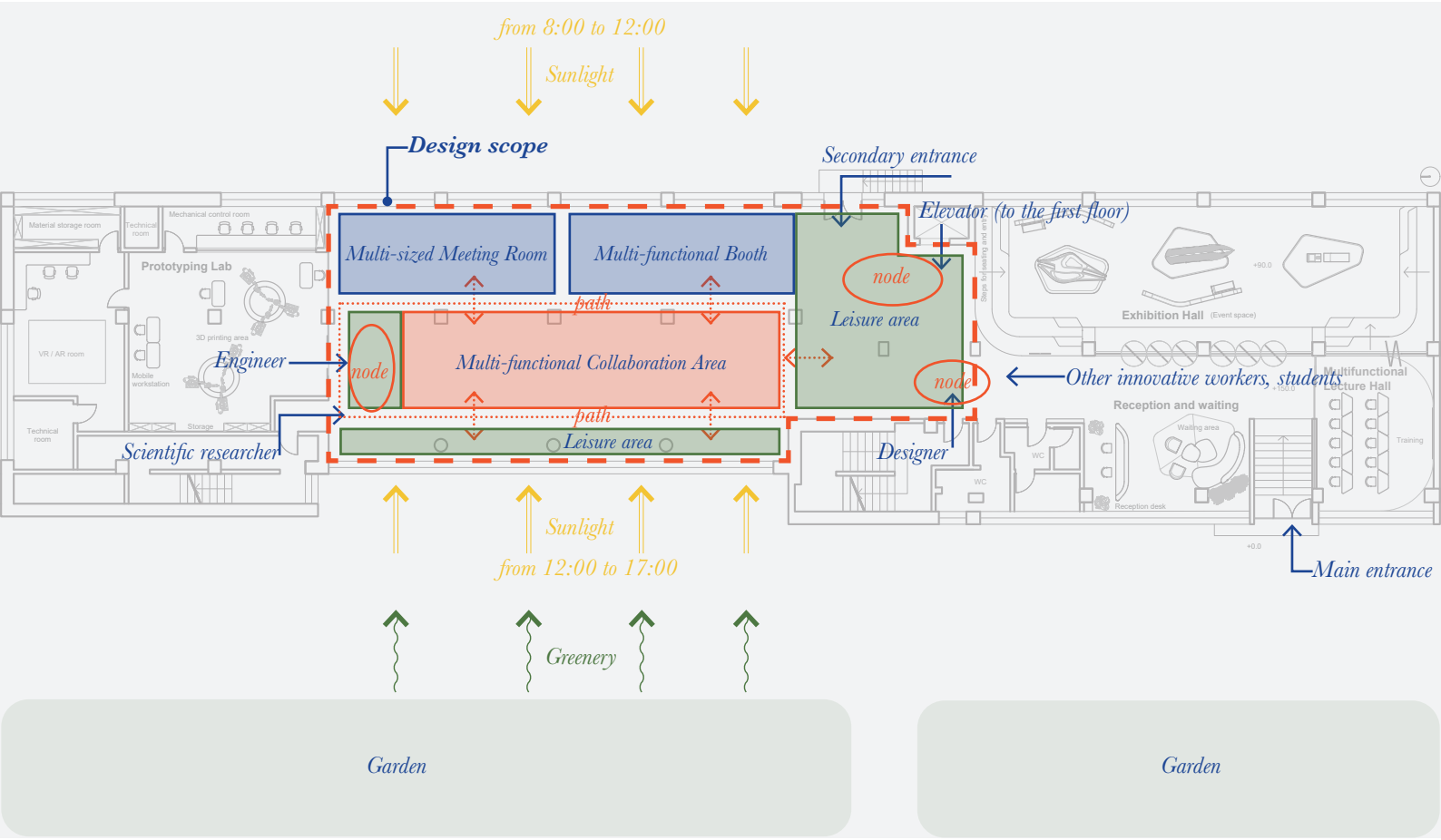


Fig. 43: Initial functional space division

Improve the function

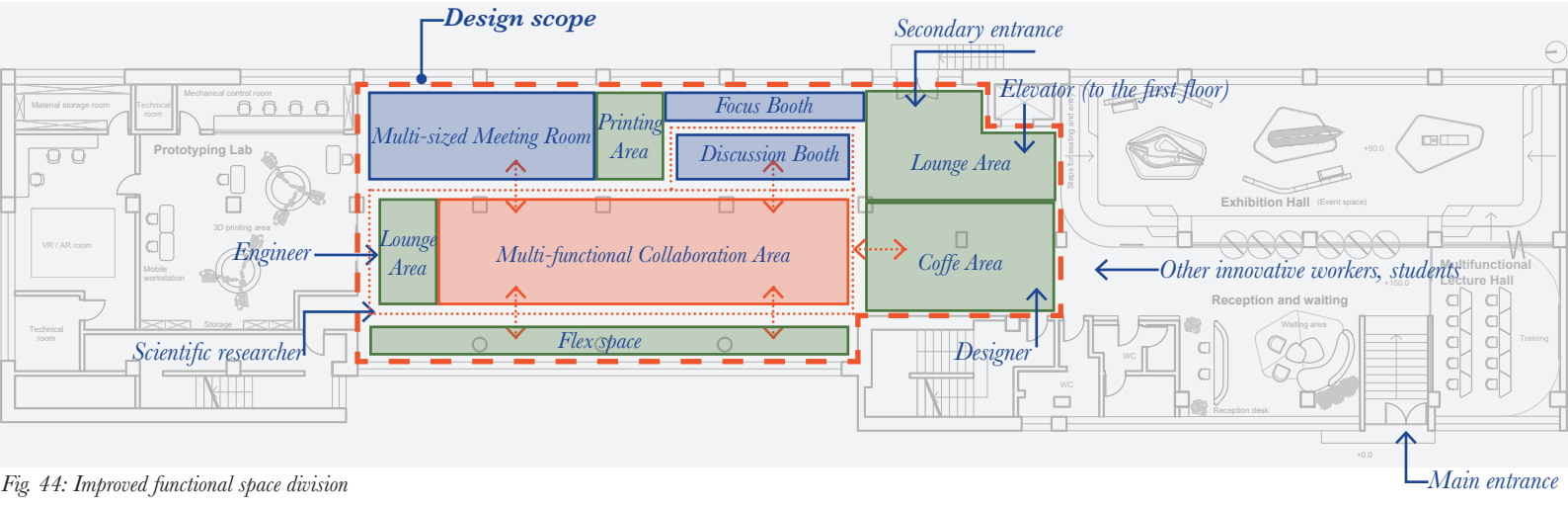
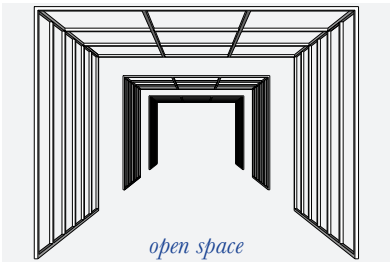


Fig. 44: Improved functional space division

7.3.3 Identity of spaces

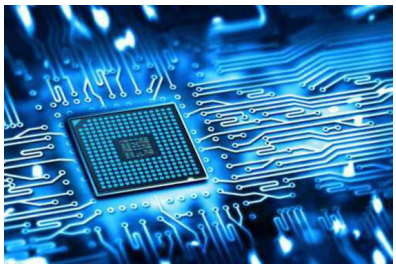
Scuola di Atene: wisdom and innovation



Spatial elements

Drawing on the method of space limitation in the central core area of the painting, the spatial elements are abstracted and simplified. The spatial limitation method of open collaboration space comes from this.

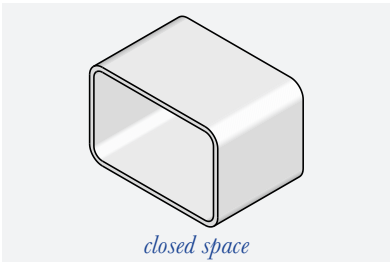
Technology: interconnection



Linear element

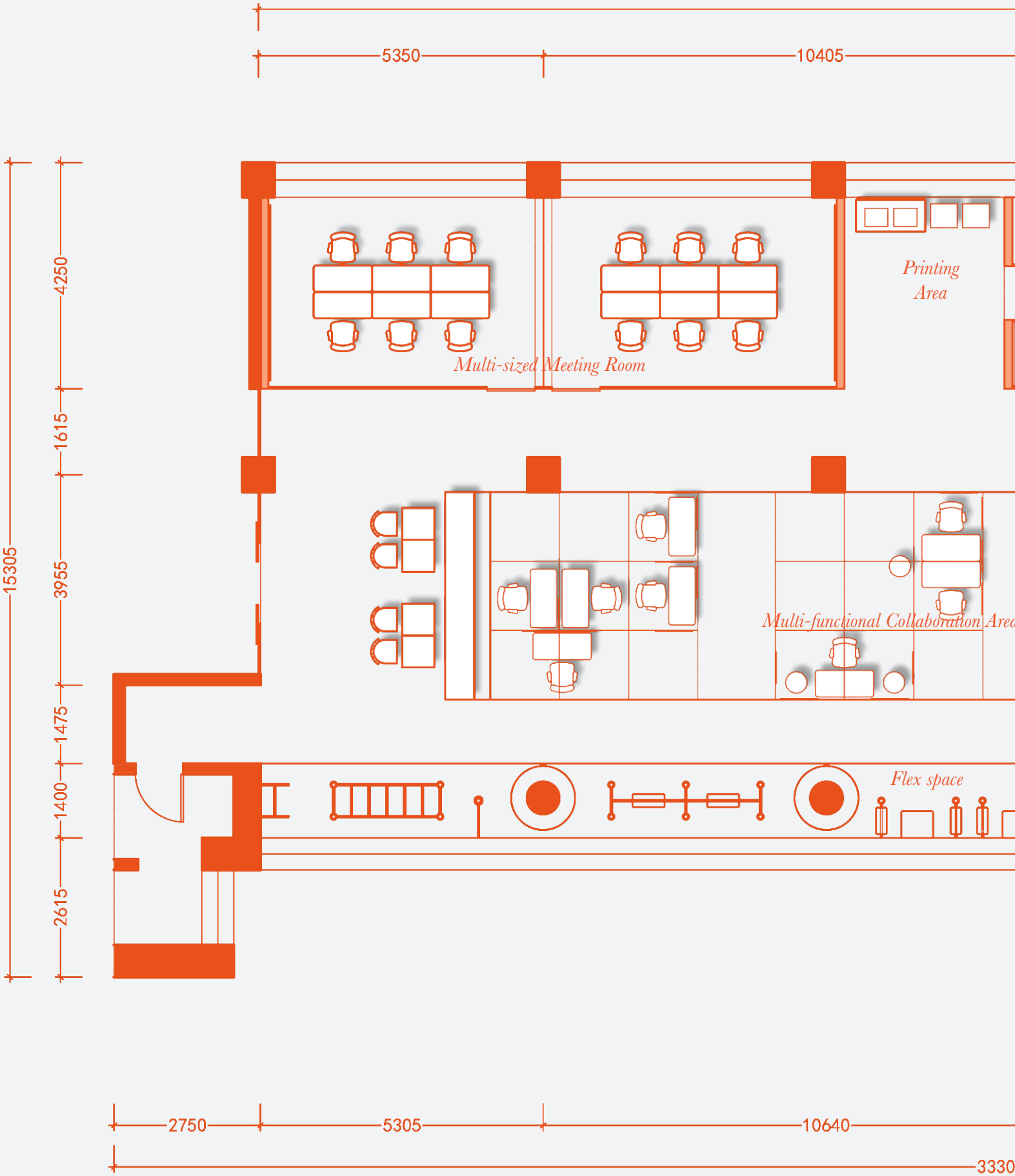
Linear elements symbolize the connection of spaces, connect onsite and remote. Reality and virtuality are connected. Everything is also connected through the Internet.

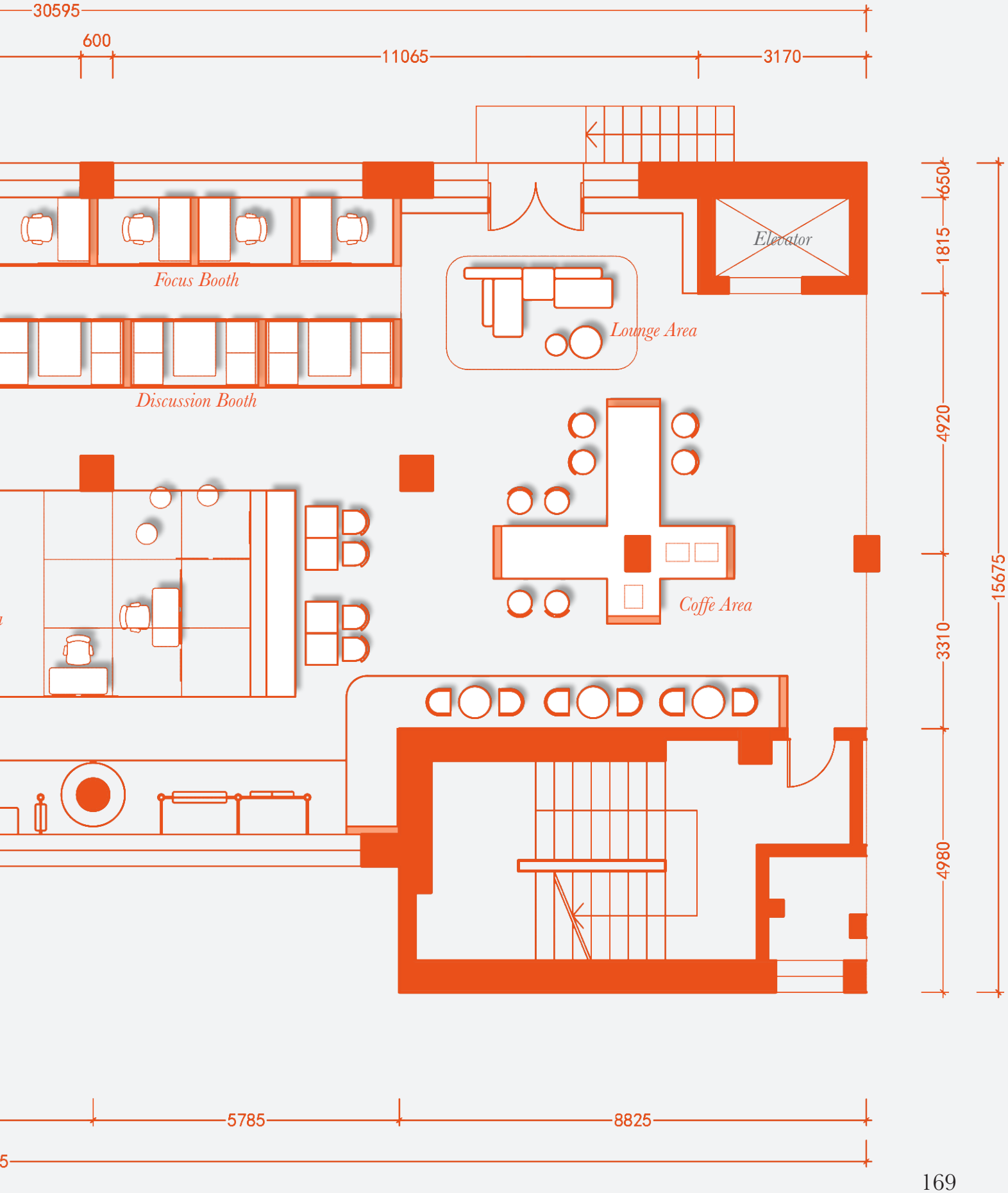
Space capsule: explore the future



The space capsule symbolizes the entrance into the future of exploration. The enclosed environment of the space capsule isolates external noise, and together with adjustable lighting, controllable temperature, and professional equipment, it provides an immersive atmosphere for focused work and discussion. At the same time, it also provides a good environment for entering the virtual world through VR devices.

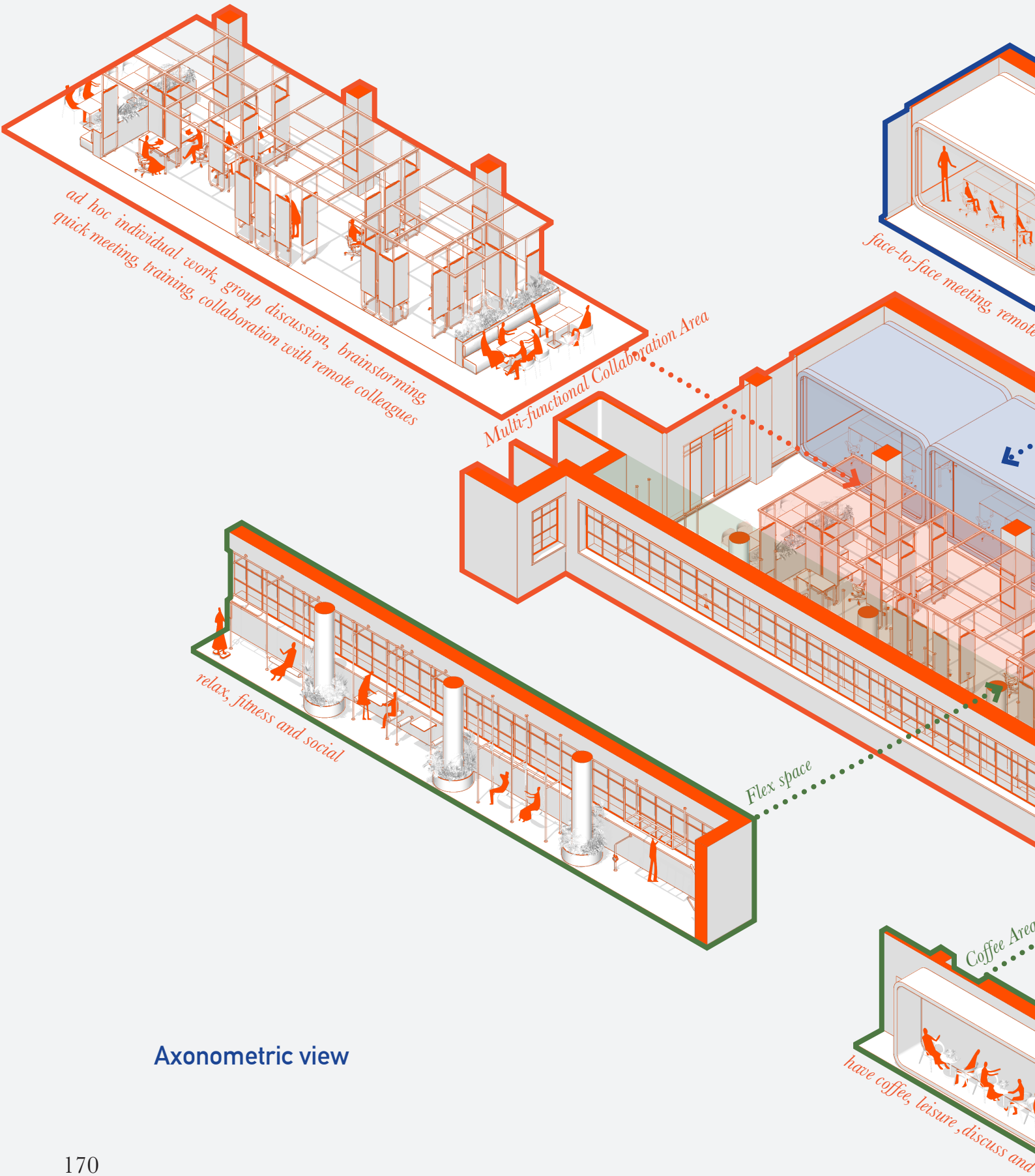
7.3.4 Plan


5350
10405
15305
4250
1615
3955
1475
1400
2615
Printing
Area
Multi-sized Meeting Room
Multi-functional Collaboration Area
Flex space
2750
5305
10640
3330

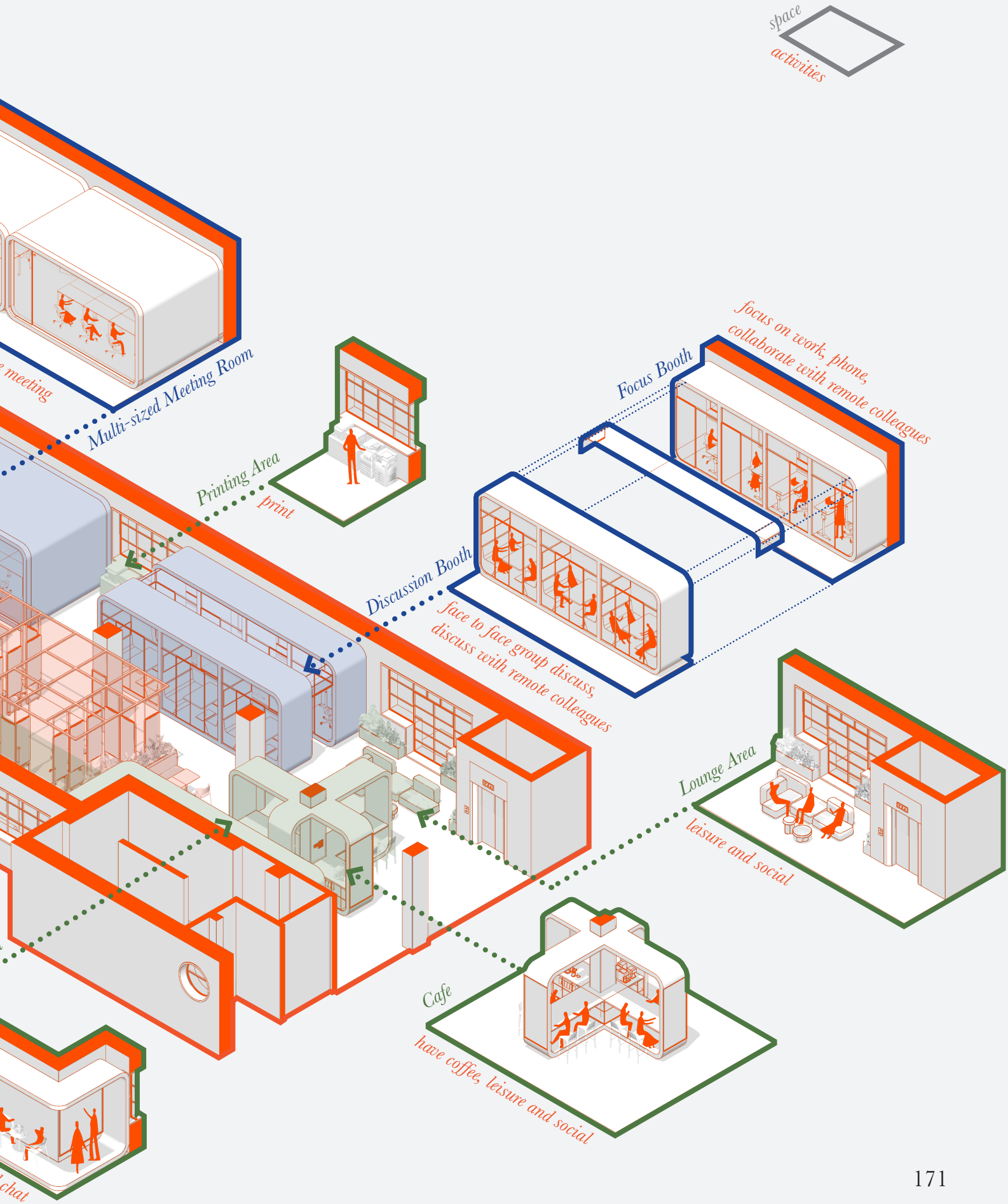

30595
600
11065
3170
650
1815
4920
3310
4980
15675
Elevator
Focus Booth
Lounge Area
Discussion Booth
Coffe Area
5785
8825

7.4 Detailed design

7.4.1 Activity-based workspace

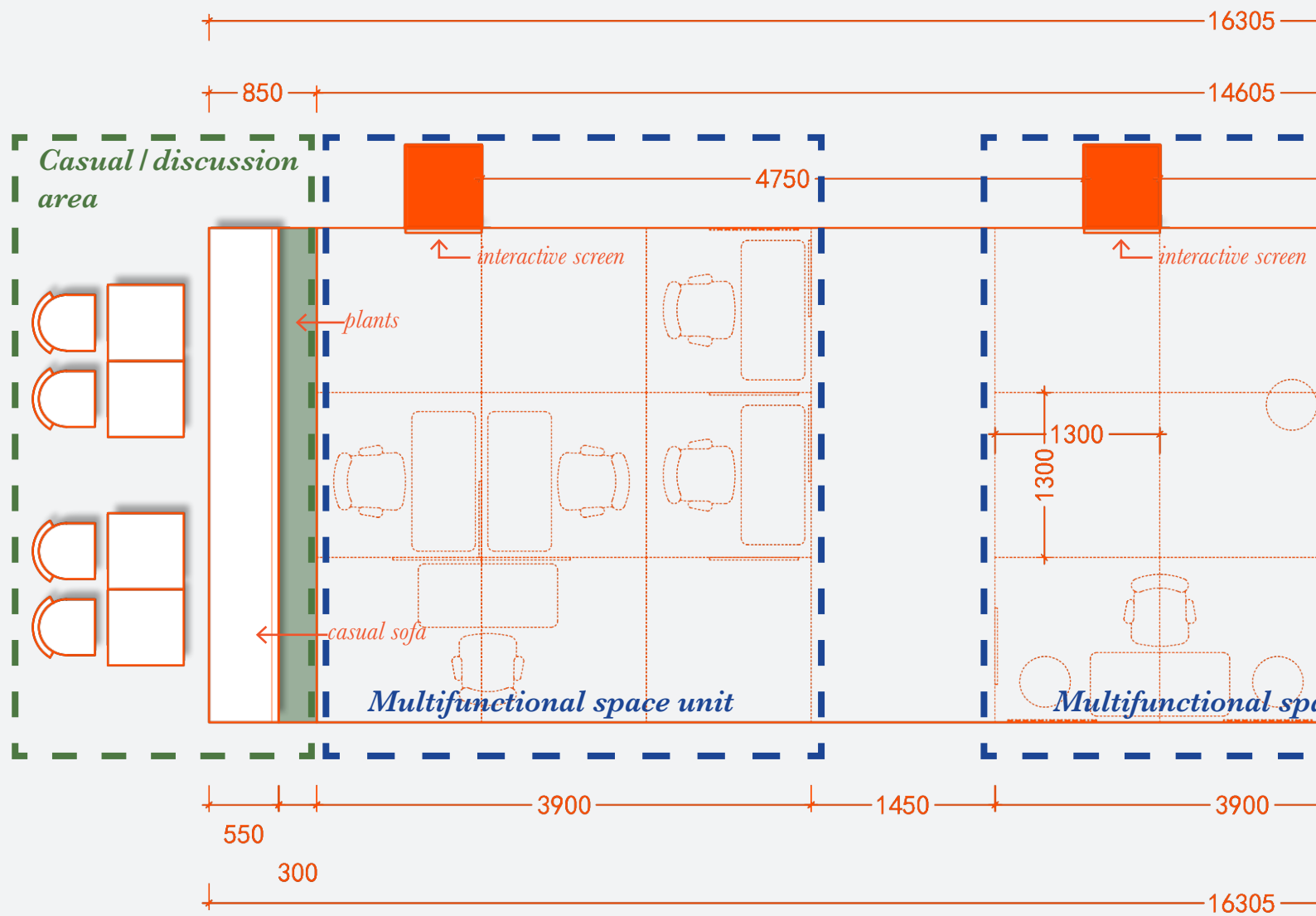


Axonometric view

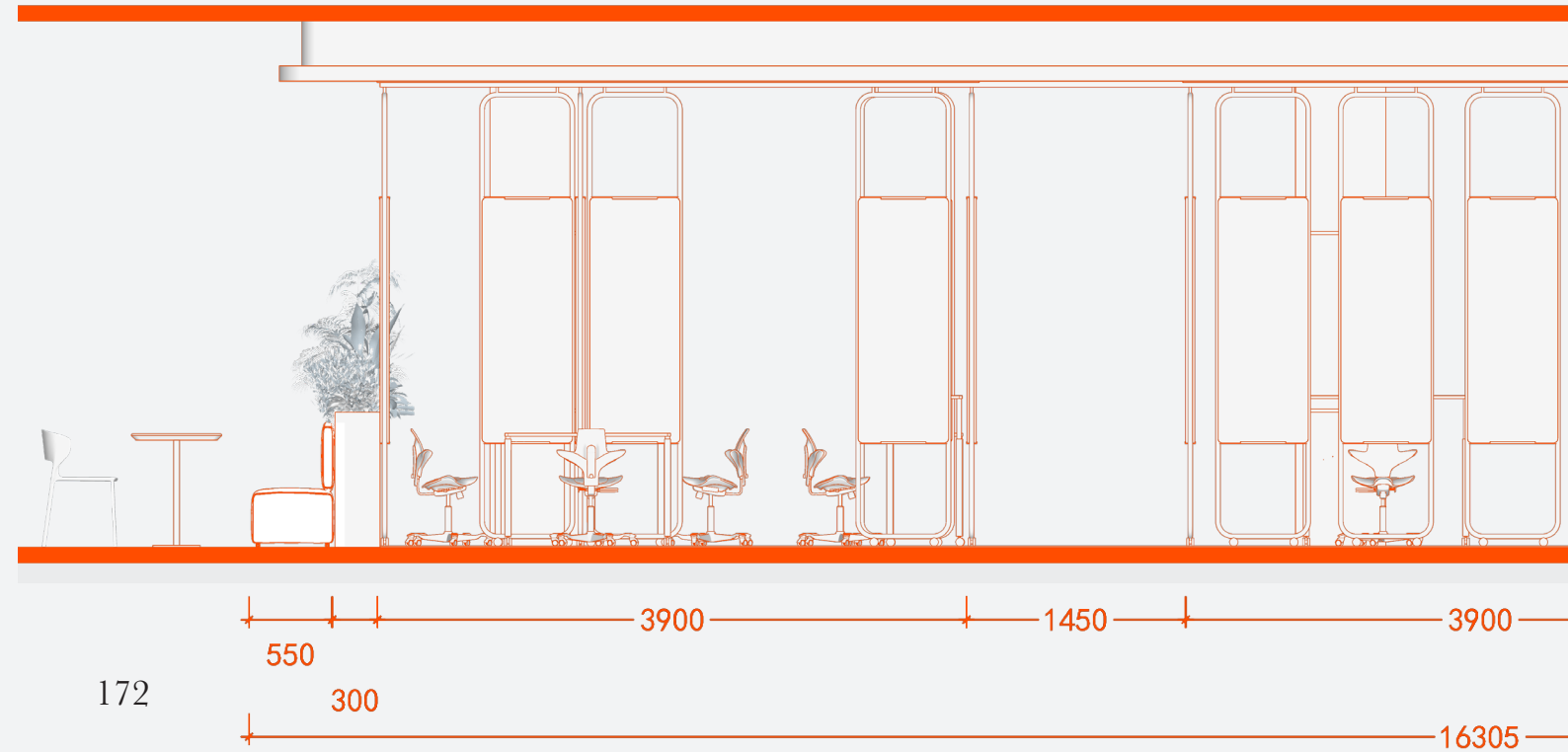

space
activities
Multi-sized Meeting Room
Printing Area
print
Focus Booth
focus on work, phone,
collaborate with remote colleagues
Discussion Booth
face to face group discuss,
discuss with remote colleagues
Lounge Area
leisure and social
Cafe
have coffee, leisure and social

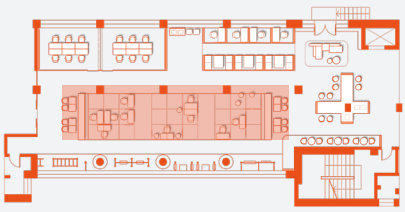
Multi-functional Collaboration Area

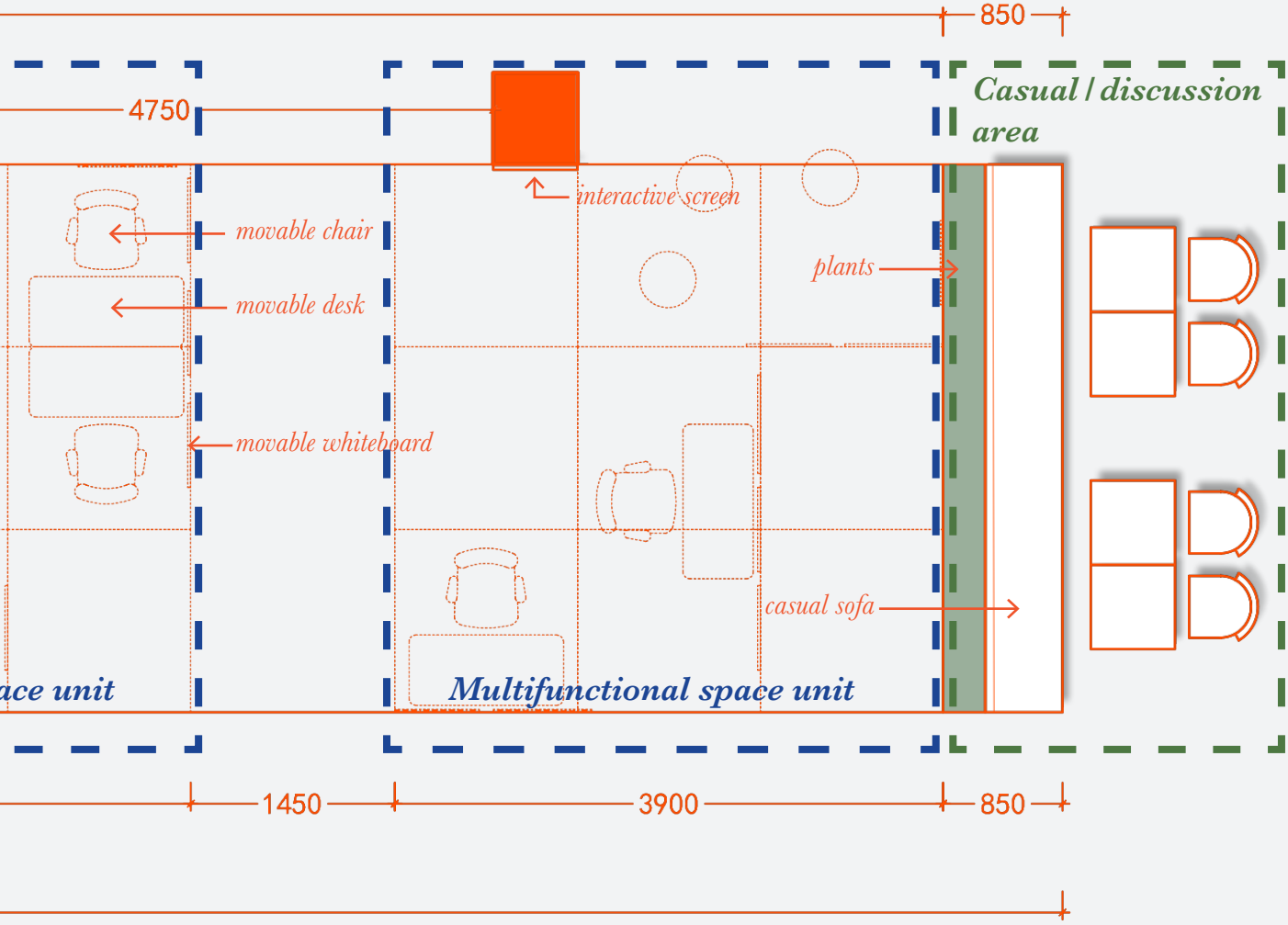
Plan

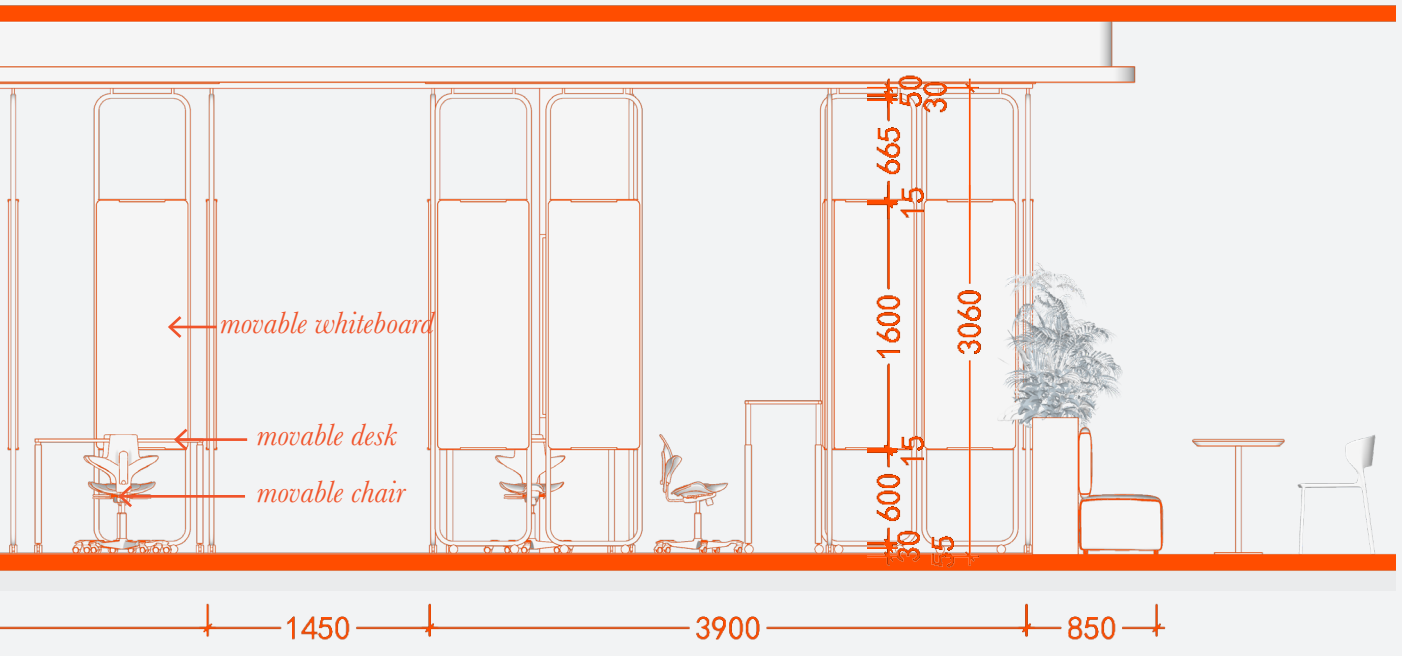


Elevation

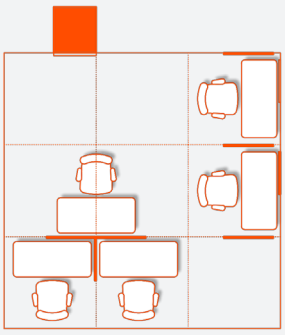




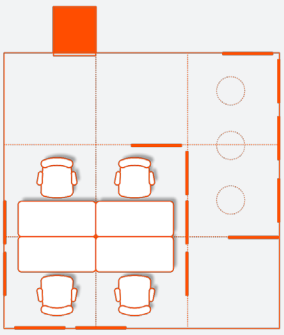

850
4750
Casual / discussion area
interactive screen
movable chair
movable desk
movable whiteboard
plants
casual sofa
ace unit
Multifunctional space unit
450
600
600
600
1200
450
3900
1450
3900
850


movable whiteboard
movable desk
movable chair
50
30
665
15
1600
3060
15
600
30
5
400
40
3060
3500
1450
3900
850

Multifunctional space unit: activity types

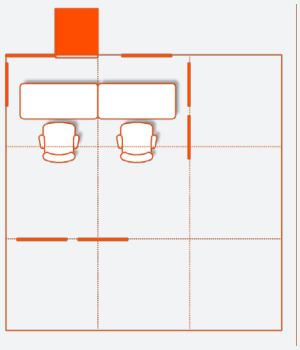


Ad hoc individual work

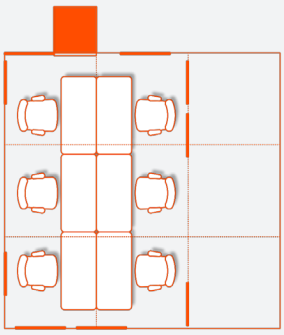


Group discussion/brainstorming

Multifunctional space unit: activity types

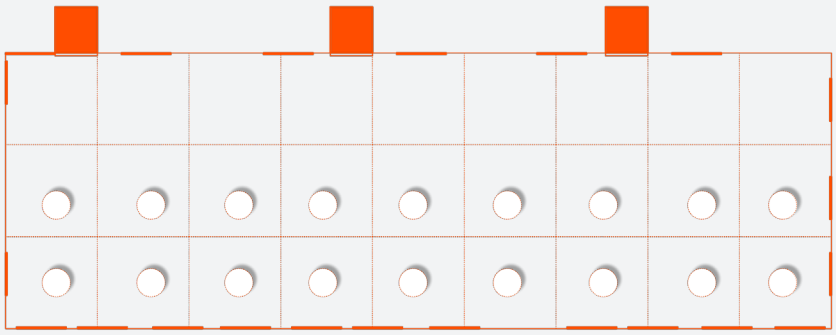


Collaboration with remote colleagues

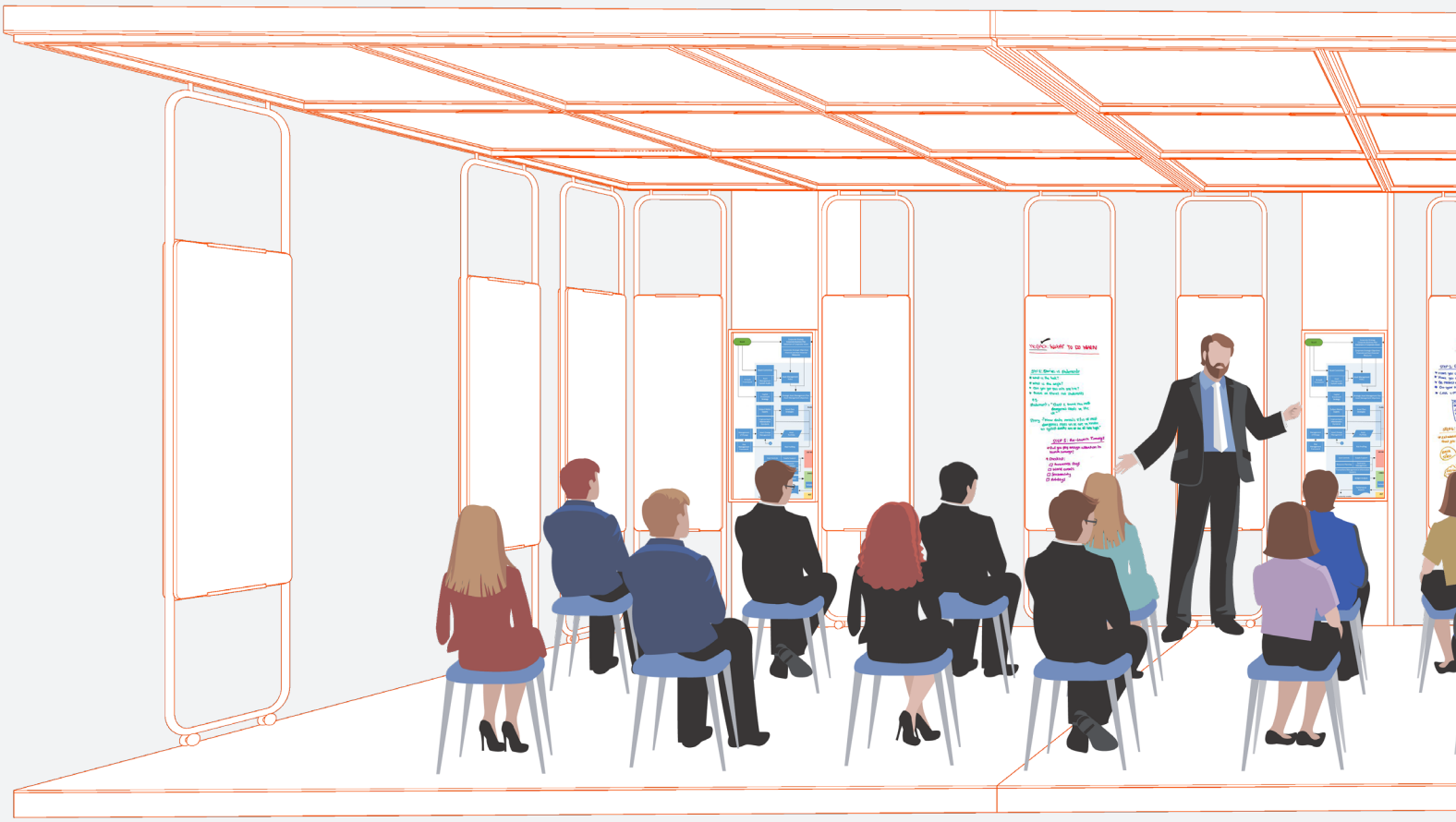


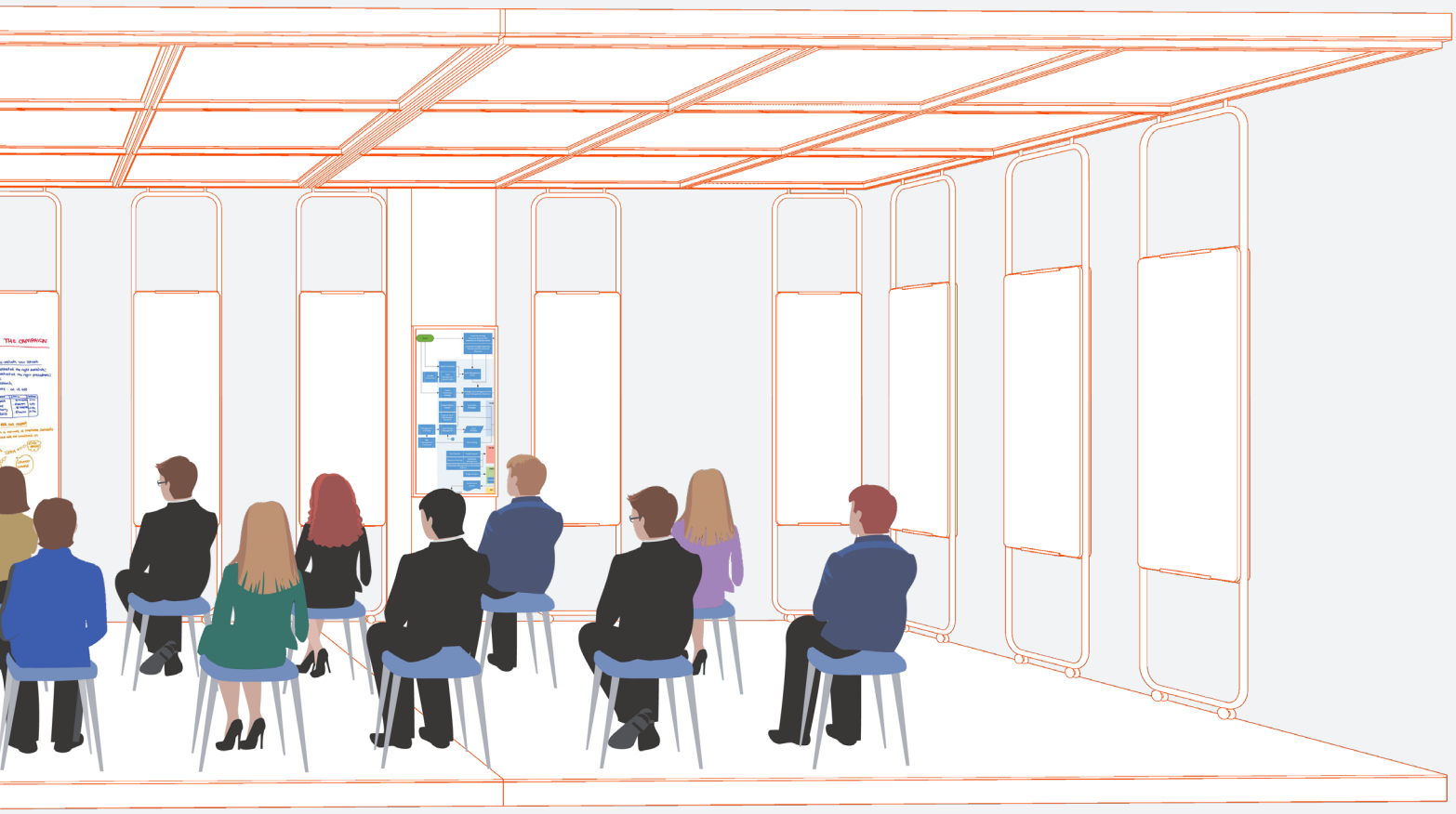
Quick meeting

Multifunctional space - three units merged: activity type



Training

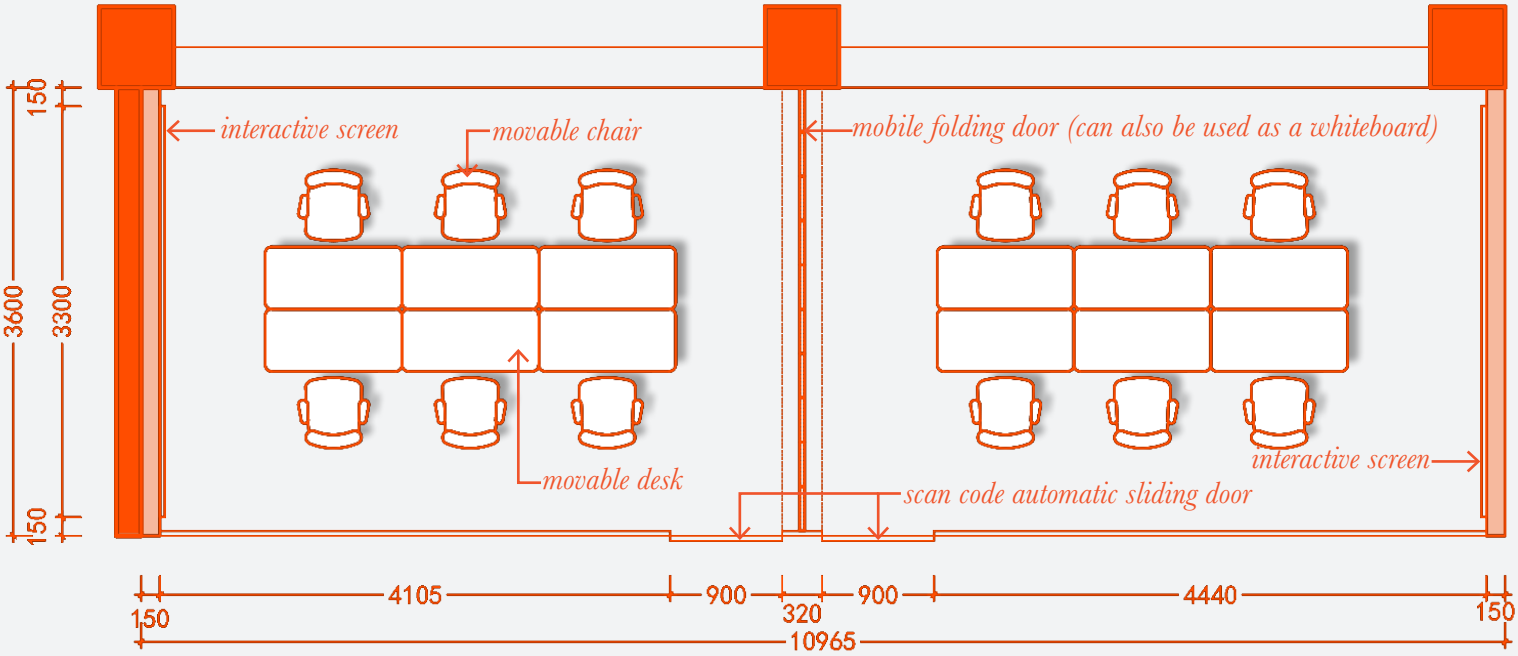




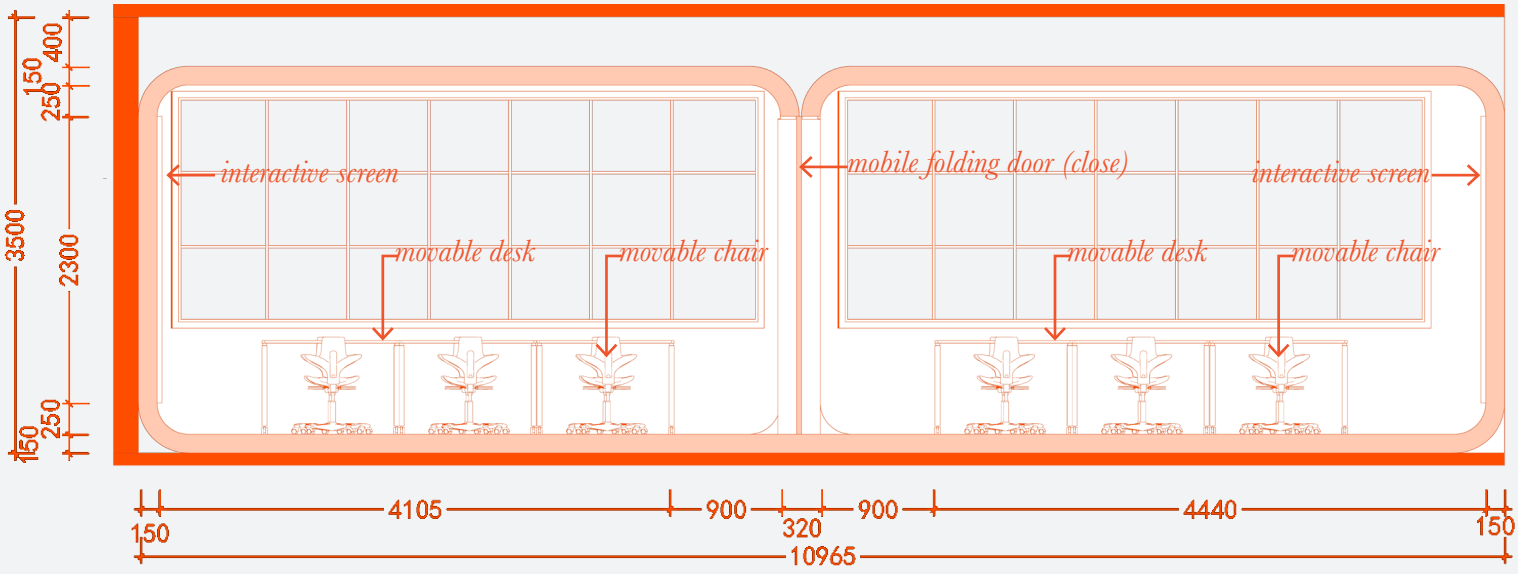
Multi-sized Meeting Room

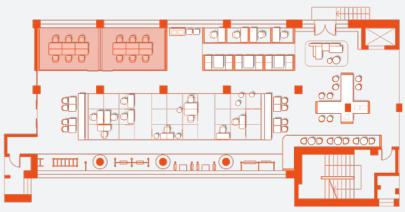
Plan 1

Close the mobile folding door: two 6-person meeting rooms



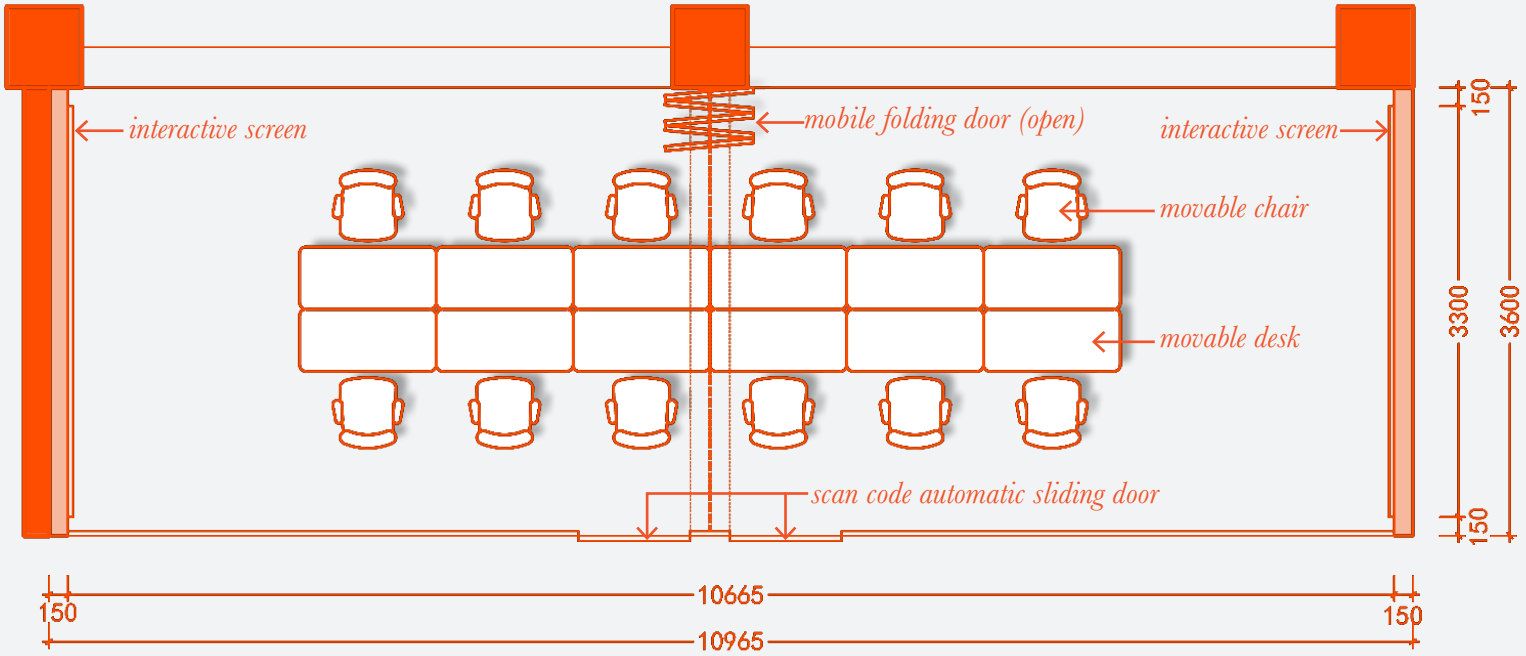
Elevation 1





Plan 2

Open the mobile folding door: one 12-person meeting room



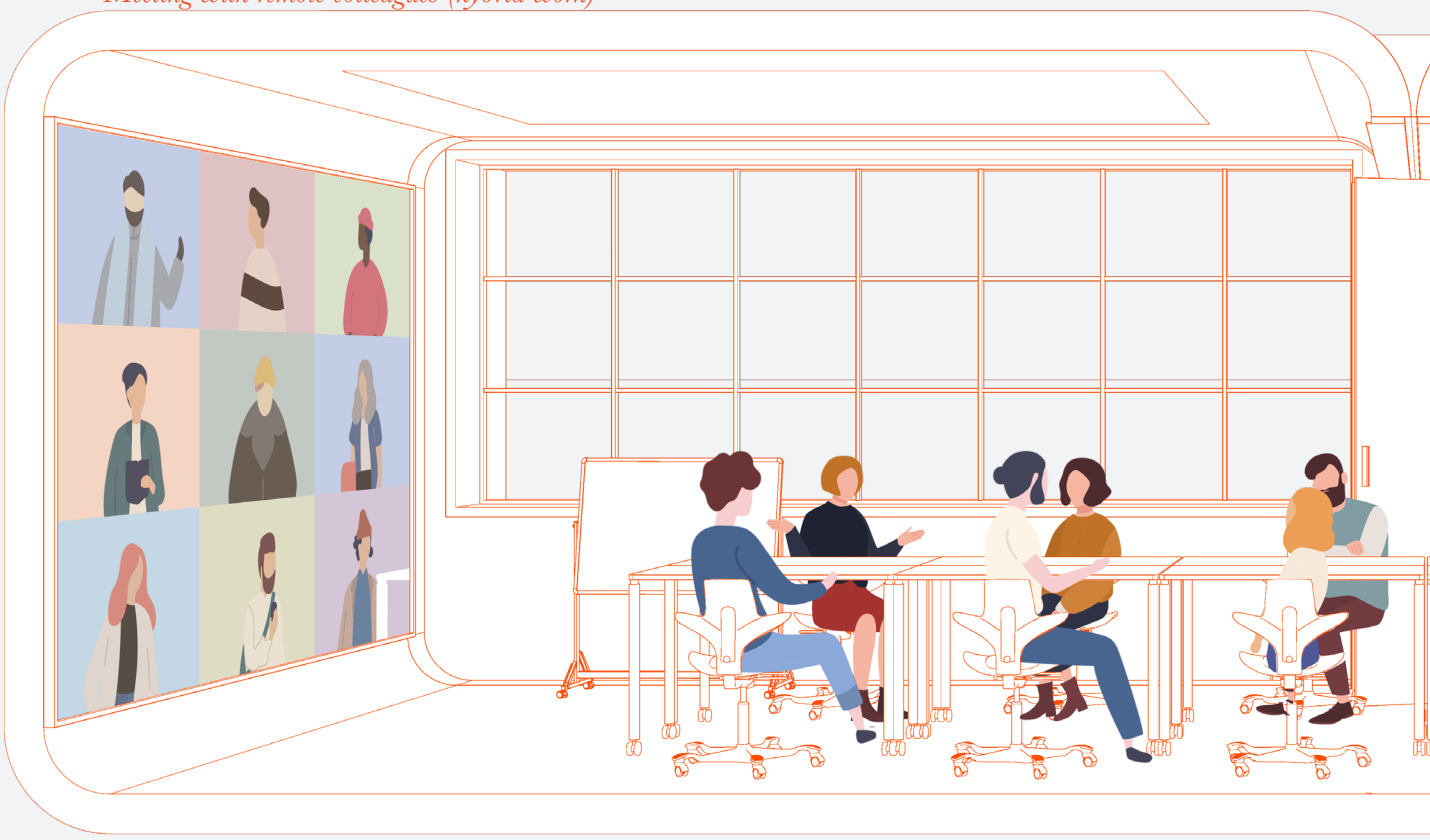
Elevation 2

6-person meeting room: activity types

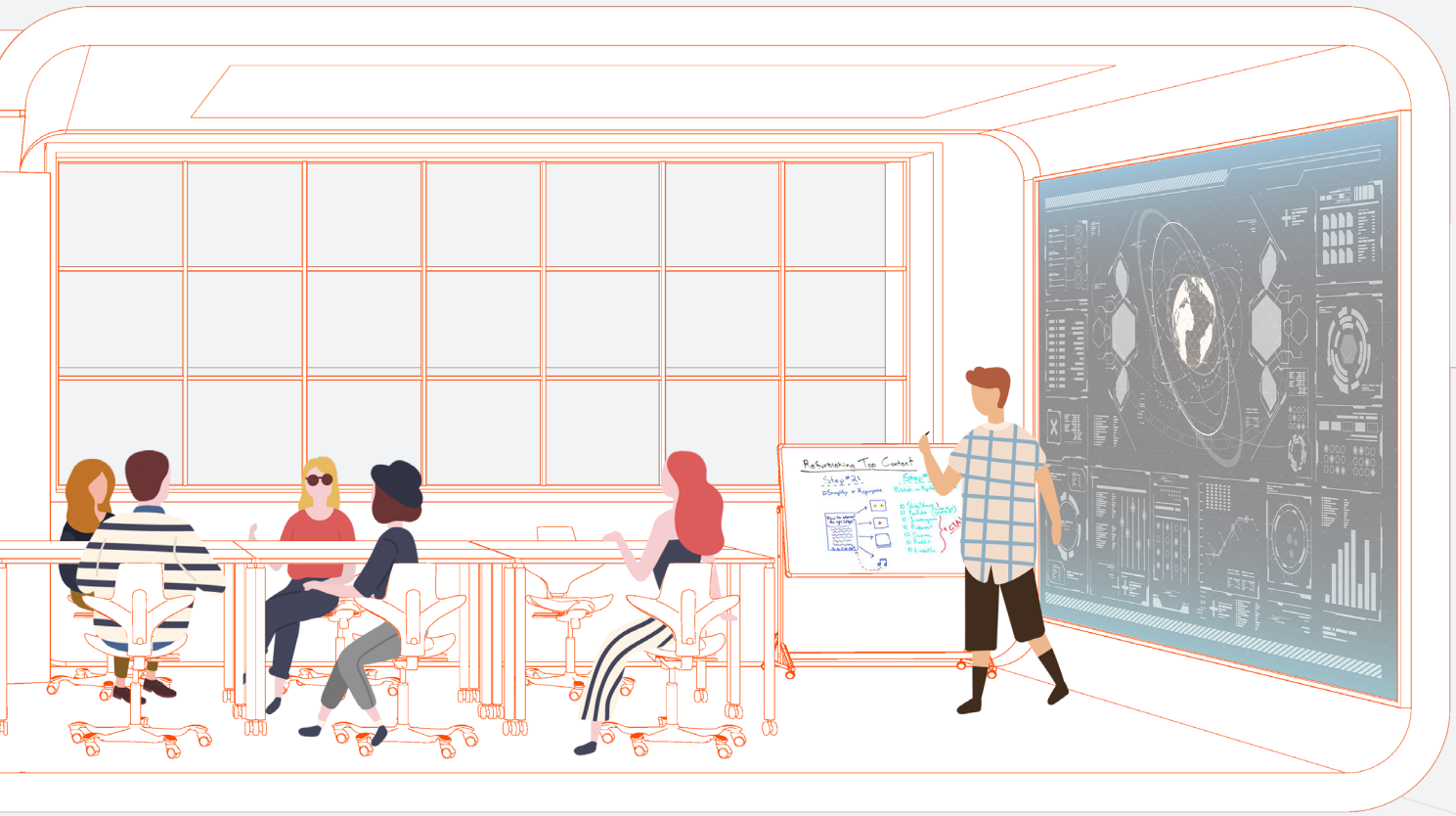
Meeting room 1: Meeting with remote colleagues (hybrid work)

12-person meeting room: activity type

Meeting with remote colleagues (hybrid work)

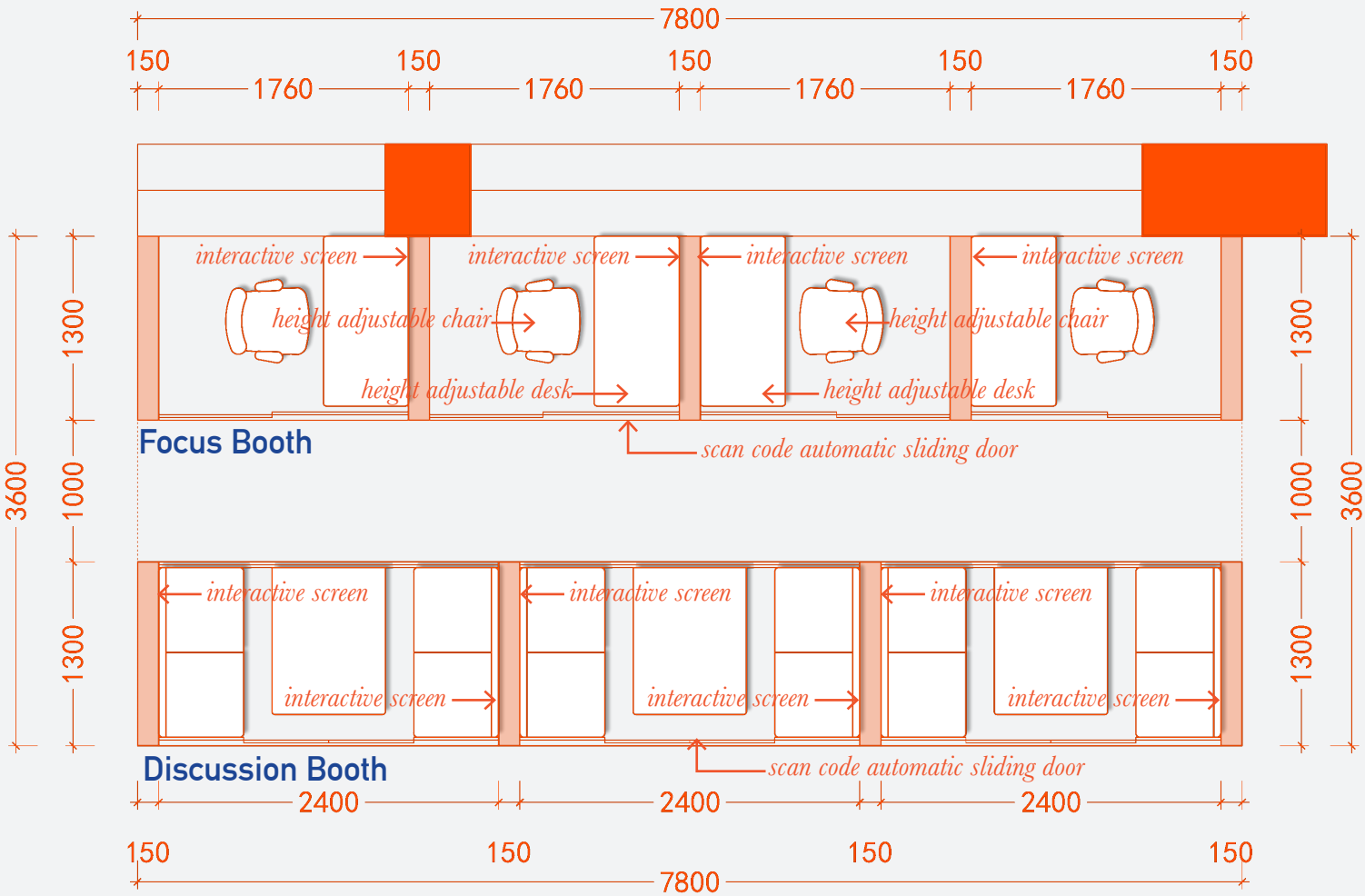


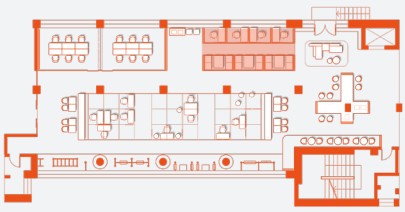
Meeting room 2: Face-to-face meeting



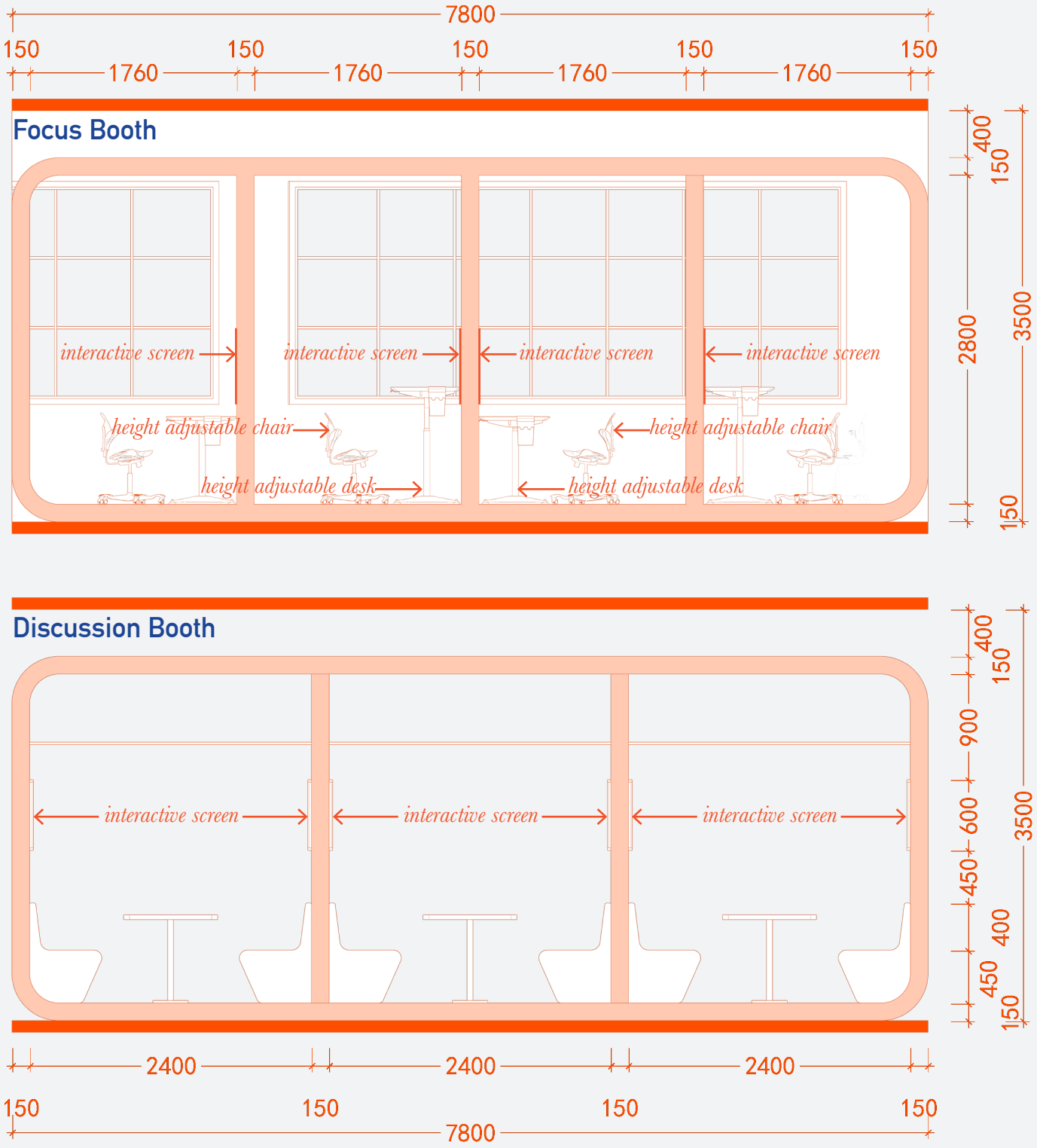
Multi-functional Booth

Plan





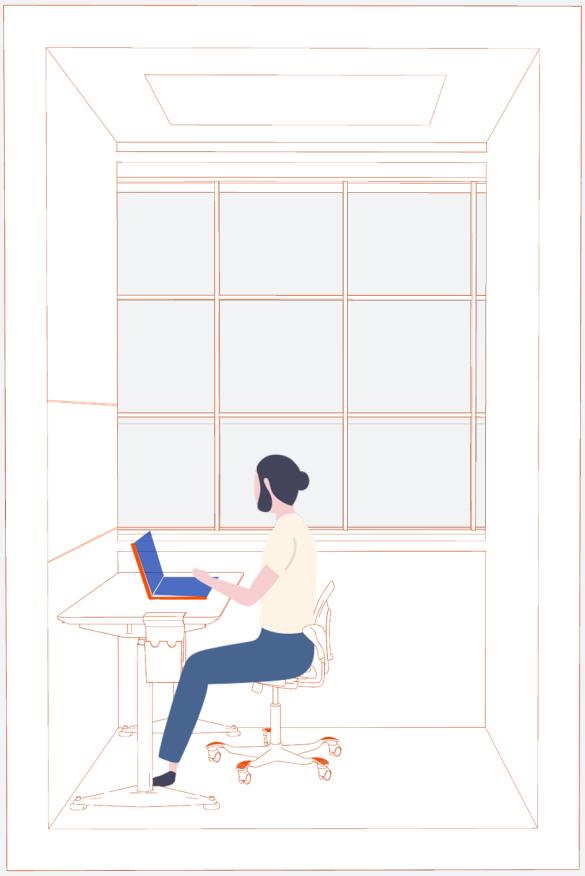
Elevation


7800
150
1760
150
1760
150
1760
150
1760
150
Focus Booth
interactive screen
interactive screen
interactive screen
interactive screen
height adjustable chair
height adjustable chair
height adjustable desk
height adjustable desk
400
150
2800
3500
150
Discussion Booth
interactive screen
interactive screen
interactive screen
400
150
900
600
450
400
450
150
3500
2400
2400
2400
150
150
150
150
7800

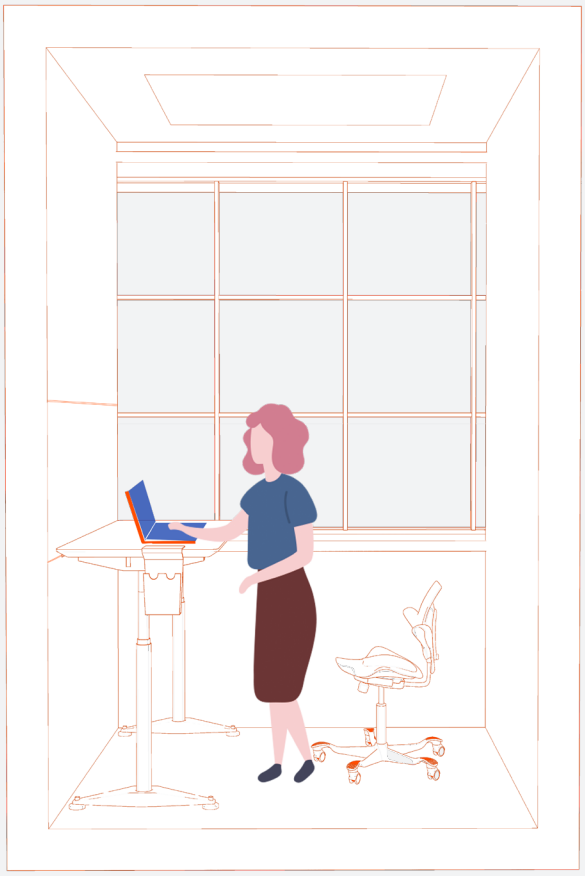
Multi-functional Booth

Focus booth unit : activity types

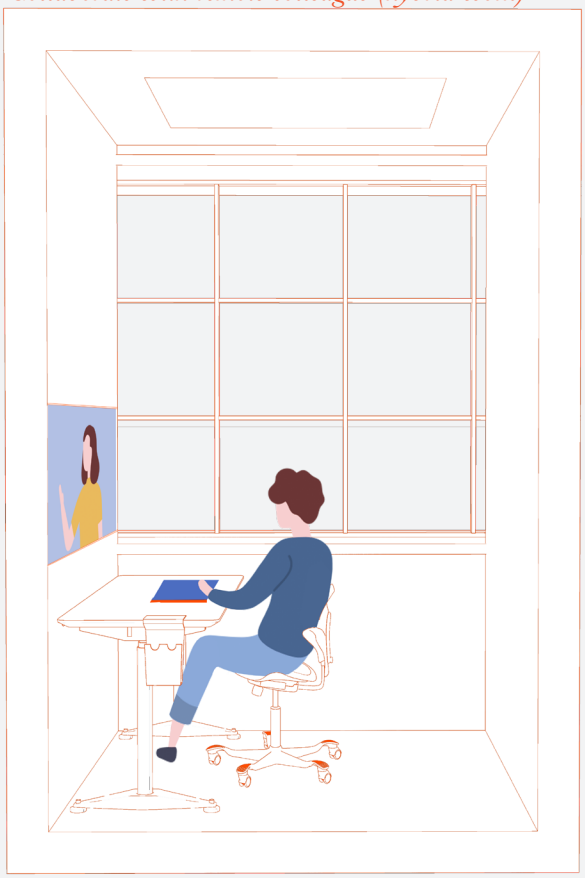
Focus on working independently (sit)



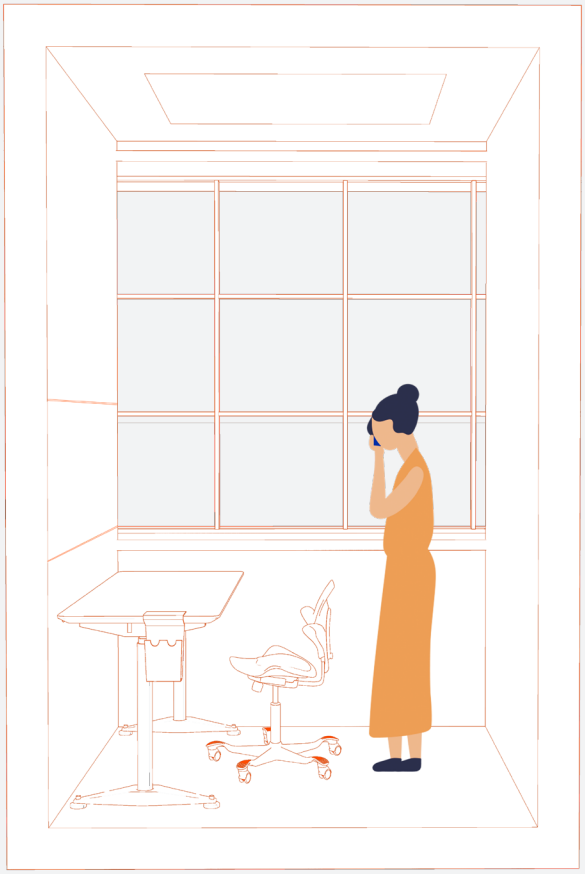
Focus on working independently (stand)



Collaborate with remote colleague (hybrid work)



Phone



Discussion booth unit : activity types

Face to face group discussion

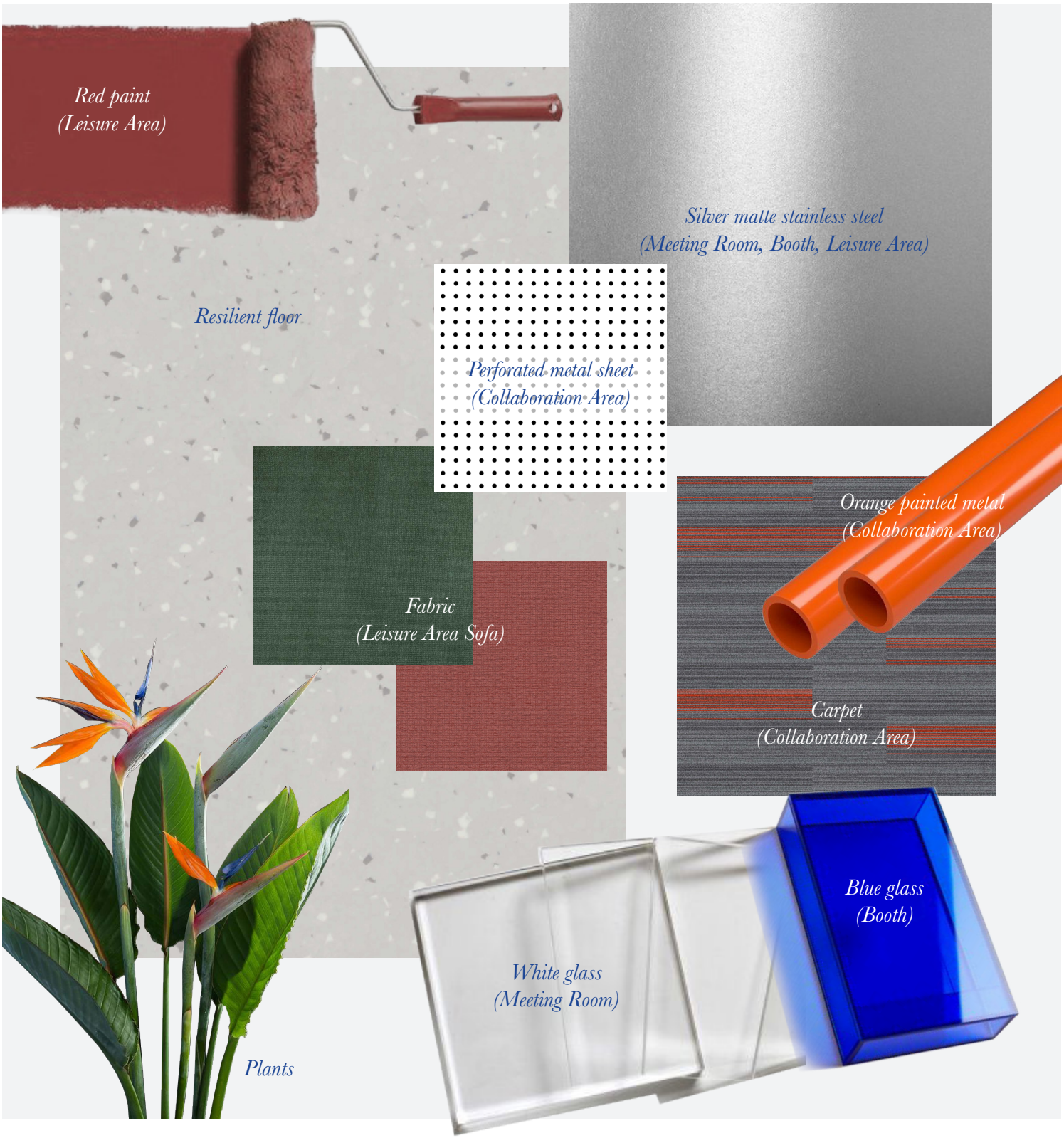
Group discussion with remote colleagues (hybrid work)

7.4.2 Sensory experience workspace

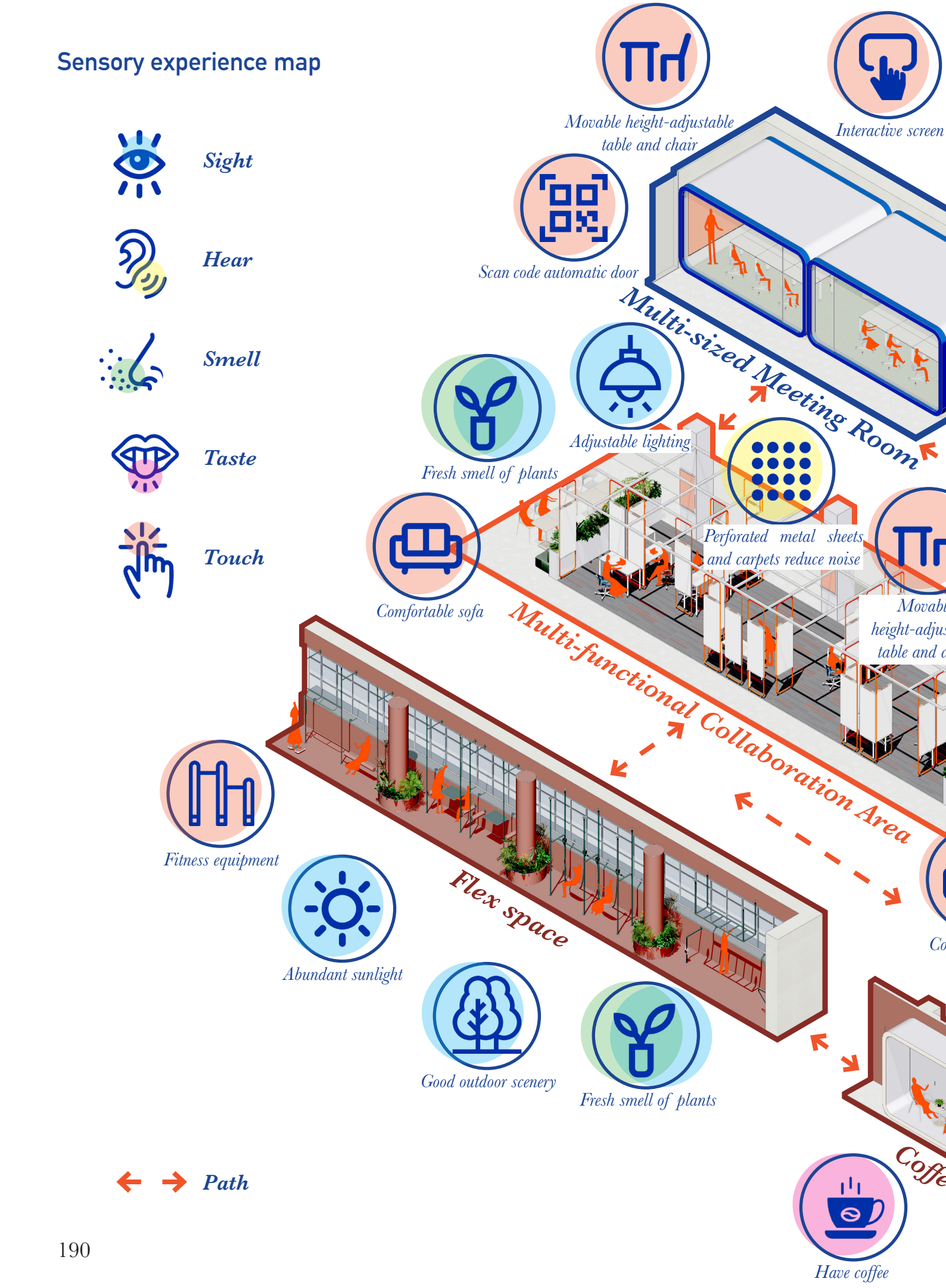
Color palette

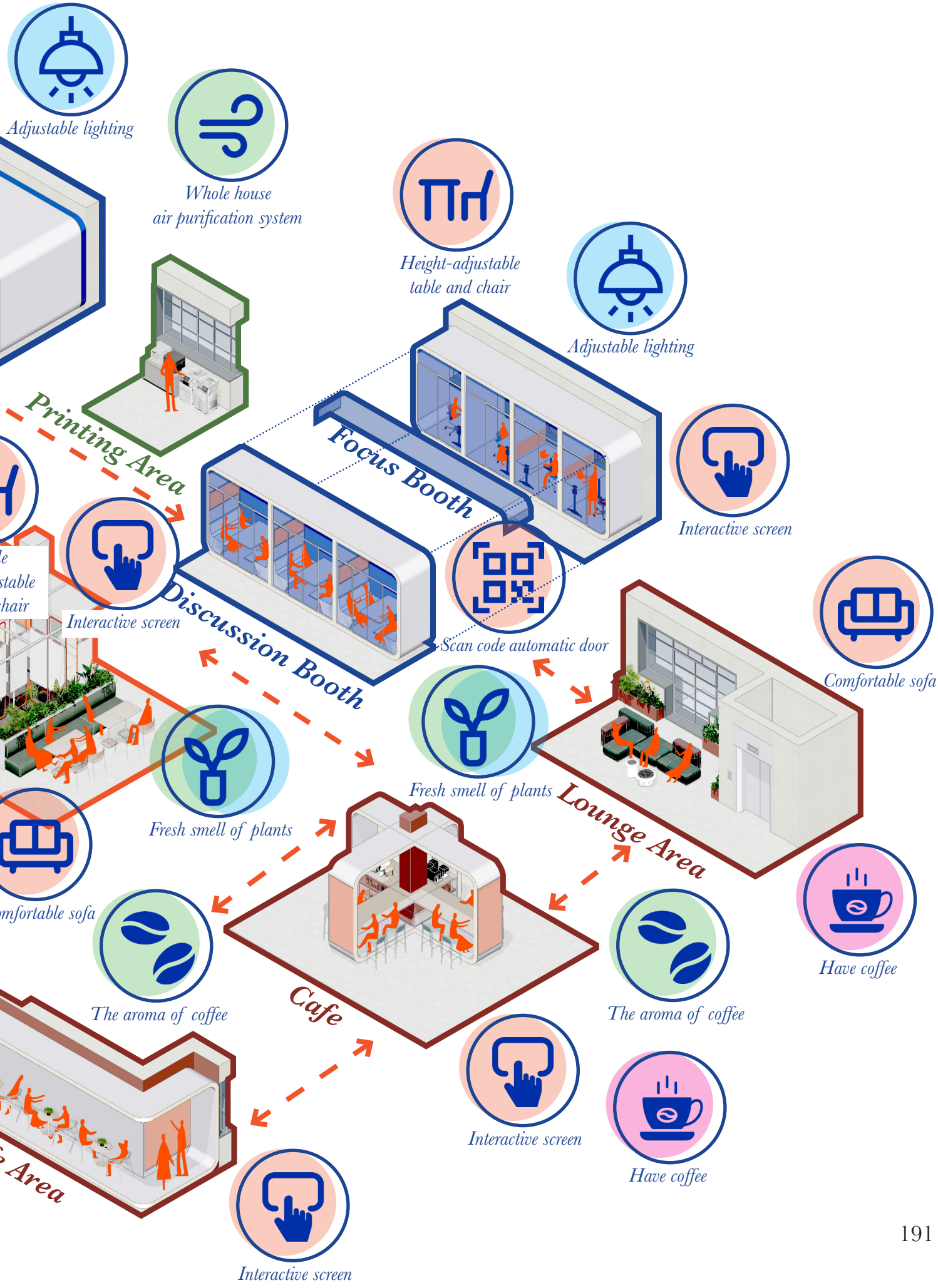
Color ID	*RGB: 255,77,0* *CMYK: 0,82,93,0* *# ff4d00*	*RGB: 0,47,167* *CMYK: 100,88,0,0* *# 002fa7*	*RGB: 130,54,46* *CMYK: 32,81,74,41* *# 82362e*	*RGB: 66,84,67* *CMYK: 77,60,76,24* *# 425443*
Color Character	*Vibrant, Creative*	*Technological,Calm*	*Passionate, Sporty*	*Natural, Relaxing*
Inspiration Source	*Microsoft office logo*	*Meta logo*	*Playground*	
Space	*Collaboration Area*	*Meeting Room, Booth*	*Leisure Area*	*Leisure Area Furniture*

Material board



Sensory experience map




Adjustable lighting
Whole house
air purification system
Height-adjustable
table and chair
Adjustable lighting
Printing Area
Focus Booth
Interactive screen
Interactive screen
Discussion Booth
Scan code automatic door
Comfortable sofa
Fresh smell of plants
Fresh smell of plants
Lounge Area
mfortable sofa
The aroma of coffee
Cafe
The aroma of coffee
Have coffee
Interactive screen
Have coffee
Interactive screen

7.4.3 Smart technology-enabled workspace

- *Interact with remote colleagues*
- *Connect to computer to display required content*
- *Information inquiry*
- *Artificial Intelligence Q&A*
- *Smart light and temperature control interface*

Meeting Room

Interactive screen

Smart lighting

Automatic door

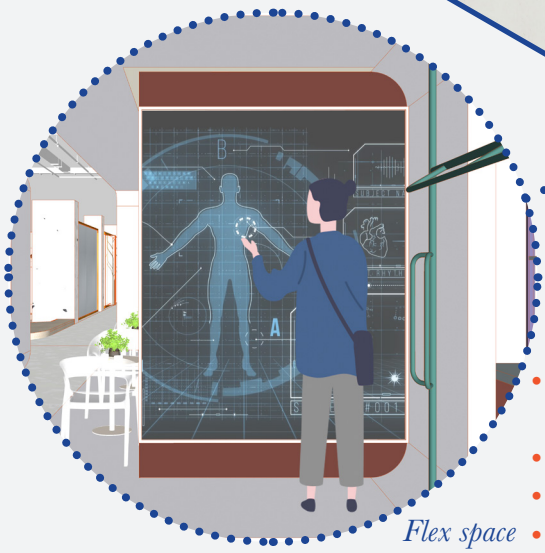
Interactive screen

Smart lighting

Smart temperature

Multi-functional Collaboration Area

- *Interact with remote colleagues*
- *Connect to computer to display required content*
- *Book a workspace*
- *Information inquiry*
- *Artificial Intelligence Q&A*
- *Smart light and temperature control interface*
- *Digital art and creative displays*



Flex space

- *Physical and Mental Health and feedback*
- *Sports interactive games*
- *Community online sports com*
- *Artificial Intelligence Q&A*

- Interact with remote colleagues
- Connect to computer to display required content
- Information inquiry
- Artificial Intelligence Q&A
- Personalized workstation settings
- Smart light and temperature control interface

IoT

Focus Booth

- Interact with remote colleagues
- Connect to computer to display required content
- Information inquiry
- Artificial Intelligence Q&A
- Smart light and temperature control interface

t temperature

Smart printer

Smart lighting

Smart temperature

Interactive screen

active screen

Smart lighting

Automatic door

Smart temperature

Interactive screen

Discussion Booth

Interactive screen

Interactive screen

Automatic door

Interactive screen

Interactive screen

Interactive screen

Automatic coffee machine

Interactive screen

testing

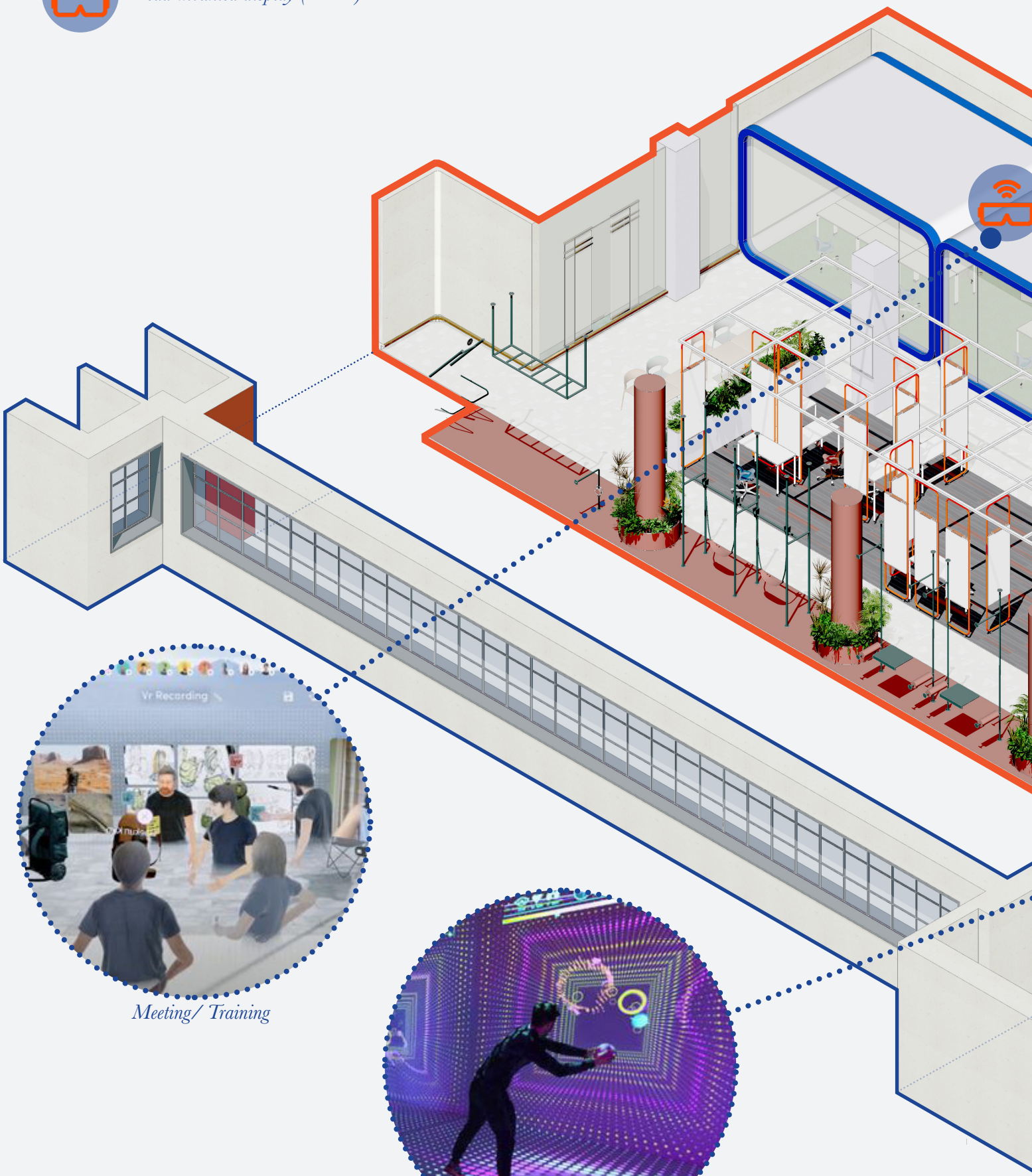
petition

- Order a cup of coffee
- Book a workspace
- Information inquiry
- View community activities
- Entertainment interaction
- Wayfinding
- Artificial Intelligence Q&A
- Digital art and creative displays

Cafe

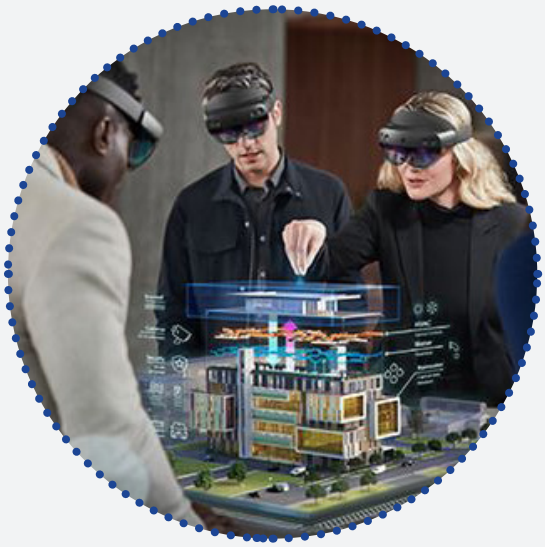
7.4.4 Vision of virtual workspace

Head-mounted display (HMD)



Meeting/ Training

Entertainment / Sports



Group discussion

Personal work

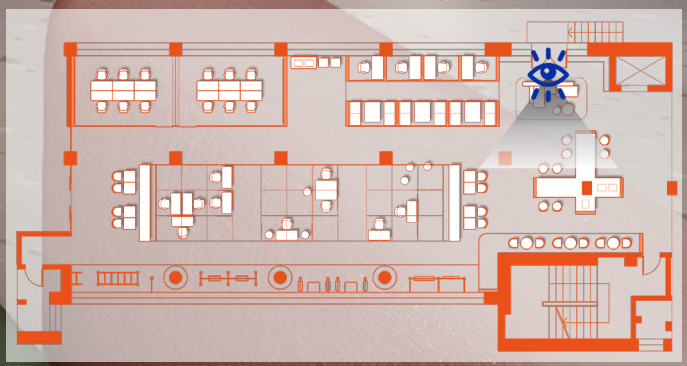
7.4.5 Rendering

Coffee area


Account
Messages
Favorites
MENU BOX
Md Joy
Lorem ipsum dolor sit amet consectetuer adipiscing
CLUJ-NAPOCA / RO
FRI 29/06
24°
SAT 29/06 25°
SUN 30/06 22°
MON 01/07 24°
TUE 02/07 26°
WED 03/07 27°
THU 04/07 29°
LATEST TWEETS
Ice-cream trucks only play music when out of ice-cream. Well played dad. On @Quora
3 minutes ago
We are in the process of pushing out all of the new CC apps! We will tweet again once they are live #CreativeCloud
6 hours ago

7.4.5 Rendering

Lounge area



7.4.5 Rendering

Flex space, Multi-functional collaboration area, Discussion booth

7.4.5 Rendering

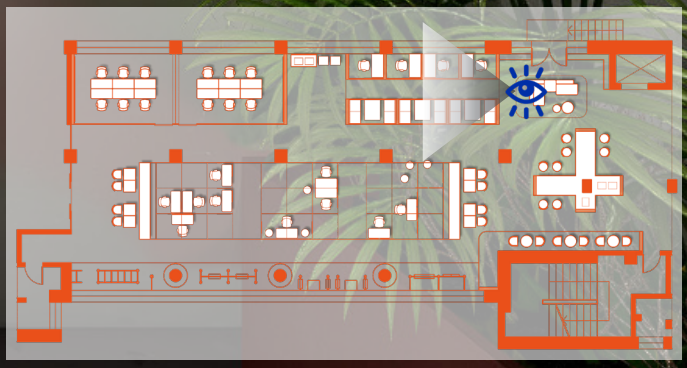
Multi-sized Meeting Room, Multi-functional collaboration area

7.4.5 Rendering

Multi-functional collaboration area, Flex space

7.4.5 Rendering

Discussion booth, Focus booth



8 Conclusion

8 Conclusion

In the wake of the global pandemic, the dynamics of work have undergone a significant transformation, ushering in the era of the hybrid work model. Embracing the flexibility of the hybrid work model, individuals now have the autonomy to tailor their work hours and locations to align with the demands of their roles. The role of physical workspaces has also changed. Based on the background of this ongoing hybrid work model, this paper explores future work space trends from three aspects: technology, people and space.

A historical examination of the nexus between technological advancements, work behaviors, and work spaces reveals a recurring theme: adaptable worksplace that cater to employees' evolving needs emerges as the focal point in the evolution of work environment. The intricate dance between technological progress and human behavior creates a cyclical relationship, where technology shapes work behaviors, which, in turn, dictate the requisites of workspaces. Concurrently, technology serves as a catalyst, providing necessary supports to meet the diverse needs of individuals in their professional endeavors. The overarching influencers shaping the trajectory of future work space development converge around the dual forces of employee needs and technological innovations. Young people who have just entered the workplace now are the main force in the future work space. A deeper exploration of the people element involves dissecting the work characteristics of Generation Z, a cohort seamlessly integrating into the workforce amidst the ubiquity of the internet. The "people needs" focus on well-being, which includes physical, psychological, and social aspects. Collaboration emerges as a pivotal purpose for physically attending work. At the same time, people seek a diverse experiential combinations in workplace. Co-working space has emerged as a compelling alternative for employees in the new normal of hybrid work. This kind of space not only offer heightened flexibility but also foster collaboration and innovation.

The thesis delves into the design strategies for technology-driven well-being work space, embarking on a user-centric journey grounded in activity-based work, sensory design, and inclusive design.The exploration navigates through user behaviors and work requirements, emphasizing physical sensory experiences and the satisfaction of psychological needs. In future workspace design, intelligent technology and metaverse technology will stitch together physical workspace and virtual work space. Virtual spaces will complement rather than replace physical workspaces. The use of technology in physical workspace design strives to enhance the overall work experience and safeguard employee well-being.

The design section of the thesis focuses on the application of strategies grounded in activity-based work. Use service design tools to systematically explore user needs, pay attention to users' sensory experience and psychological needs, and integrate technology to optimize employee well-being. The ultimate goal is to harmoniously blend technology and design to create a flexible, activity-based collaboration space that not only adapts to the changing nature of work, but also enhances employee well-being.

Bibliography

- 2021 Workplace Impact Report. (2021). VergeSense. https://info.vergesense.com/hubfs/VergeSense-2021-Workplace-Impact-Report-Expanded.pdf
- 99 Things You Need to Know Now. (2023). Steelcase. https://www.steelcase.com/research/articles/99-things-you-need-to-know-now/. Accessible for download by providing business email address on the publisher's website.
- Activity Based Working: A Research on Measurable Outcomes and Key Differentiators. (2020). Veldhoen + Company. Retrieved November 15, 2023, from https://www.veldhoencompany.com/measuring-the-impact-of-activity-based-working. Accessible for download by providing business email address on the publisher's website.
- Adiatma, N. (2019). REDESAIN INTERIOR OFFICE & PENGEMBANGAN CO-WORKING SPACE BANDUNG TECHNO PARK DI BANDUNG. Universitas Telkom, S1 Desain Interior. https://repository.telkomuniversity.ac.id/pustaka/156053/redesain-interior-office-pengembangan-co-working-space-bandung-techno-park-di-bandung.html
- Ahn, Y. (2020). Coworking Spaces and Resource Sharing: A Strategic Perspective (SSRN Scholarly Paper 3773350). https://papers.ssrn.com/abstract=3773350
- Akhavan, M., & Mariotti, I. (2023). Coworking Spaces and Well-Being: An Empirical Investigation of Coworkers in Italy. Journal of Urban Technology, 30(1), 95–109. https://doi.org/10.1080/10630732.2022.2081832
- Akhavan, M., Hölzel, M., & Leducq, D. (Eds.). (2023). European Narratives on Remote Working and Coworking During the COVID-19 Pandemic: A Multidisciplinary Perspective. Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-26018-6
- Alansari, A., & Alnajadah, A. (2022). Coworking Spaces Phenomenon in Kuwait: Challenges and Opportunities. Journal of Heritage and Design, 2(11), 311–327. https://doi.org/10.21608/jsos.2022.118955.1158
- Alonso-Almeida, M. D. M., Escat, M., & Perez-Encinas, A. (2021). Coworking Spaces: Threat or Opportunity to Face Crisis Situations. Medical Sciences Forum, 4(1), Article 1. https://doi.org/10.3390/ECERPH-3-09099
- Anderson, J., & Rainie, L. (2022). The Metaverse in 2040. Pew Research Centre. https://www.pewresearch.org/internet/2022/06/30/the-metaverse-in-2040/

- Appel-Meulenbroek, R., Weijs-Perrée, M., Orel, M., Gauger, F., & Pfnür, A. (2021). User preferences for coworking spaces; a comparison between the Netherlands, Germany and the Czech Republic. Review of Managerial Science, 15(7), 2025–2048. https://doi.org/10.1007/s11846-020-00414-z
- Ayodele, T. O., Ogunbayo, O. T., Kajimo-Shakantu, K., & Babatunde, T. (2021). Coworking space practices: Assessing space users' preferences and challenges in Ibadan, Nigeria. Journal of Corporate Real Estate, 24(4), 256–272. https://doi.org/10.1108/JCRE-03-2021-0011
- Bai, C., Dallasega, P., Orzes, G., & Sarkis, J. (2020). Industry 4.0 technologies assessment: A sustainability perspective. International Journal of Production Economics, 229, 107776. https://doi.org/10.1016/j.ijpe.2020.107776
- Ballegaard, E., Kajita, M., & Nicholas, P. (2021). Users' Experience in Digital Architectural Design: Combining Qualitative Research Methods with a Generative Model. In Universal Design 2021: From Special to Mainstream Solutions (pp. 315–332). IOS Press. https://doi.org/10.3233/SHTI210407
- Bandinelli, C. (2020). The production of subjectivity in neoliberal culture industries: The case of coworking spaces. International Journal of Cultural Studies, 23(1), 3–19. https://doi.org/10.1177/1367877919878449
- Banfi, F., Brumana, R., & Stanga, C. (2019). A CONTENT-BASED IMMERSIVE EXPERIENCE OF BASILICA OF SANT'AMBROGIO IN MILAN: FROM 3D SURVEY TO VIRTUAL REALITY. The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XLII-2-W11, 159–166. https://doi.org/10.5194/isprs-archives-XLII-2-W11-159-2019
- Batat, W., & Hammedi, W. (2022). The extended reality technology (ERT) framework for designing customer and service experiences in phygital settings: A service research agenda. Journal of Service Management, 34(1), 10–33. https://doi.org/10.1108/JOSM-08-2022-0289
- Bednář, P., Danko, L., & Smékalová, L. (2023). Coworking spaces and creative communities: Making resilient coworking spaces through knowledge sharing and collective learning. European Planning Studies, 31(3), 490–507. https://doi.org/10.1080/09654313.2021.1944065
- Bencivenga, M., & Camocini, B. (2022). 5. Post-pandemic scenarios of office workplace: new purposes of the physical spaces to enhance social and individual well-being. In DESIGNING BEHAVIOURS FOR WELL-BEING SPACES (pp. 90–111). https://series.francoangeli.it/index.php/oa/catalog/book/772
- Benedikt, J. C. (2019). Methods to create better coworking spaces: How work environment can increase satisfaction with the coworking space and performance of individual workers [Master's thesis, University Institute of Lisbon]. https://repositorio.iscte-iul.pt/handle/10071/18717

- Berbegal-Mirabent, J. (2021). What Do We Know about Co-Working Spaces? Trends and Challenges Ahead. Sustainability, 13(3), Article 3. https://doi.org/10.3390/su13031416
- Berdicchia, D., Fortezza, F., & Masino, G. (2023). The key to happiness in collaborative workplaces. Evidence from coworking spaces. Review of Managerial Science, 17(4), 1213–1242. https://doi.org/10.1007/s11846-022-00558-0
- Bigošová, E., Horvathova, B., & Dolina, Ľ. (2019). The Future of Office Workplaces with an Emphasis on Ergonomics. https://doi.org/10.24132/PI.2019.08948.018-025
- Blagoev, B., Costas, J., & Kärreman, D. (2019). 'We are all herd animals': Community and organizationality in coworking spaces. Organization, 26(6), 894–916. https://doi.org/10.1177/1350508418821008
- Blazek, P., & Arnold, P. (2022, September 21). VIRTUAL ENHANCED CO- INNOVATION SPACES. 10th International Conference on Mass Customization and Personalization in Central Europe (MCP-CE 2022), Serbia. https://mcp-ce.org/wp-content/uploads/2022/10/2.pdf
- Boland, B., De Smet, A., Palter, R., & Sanghvi, A. (2020, June 8). Reimagining the office and work life after COVID-19. McKinsey & Company. http://ceros.mckinsey.com/coronavirus-promo-video-desktop
- Bonin, H., Eichhorst, W., & Krause-Pilatus, A. (2022). Bedeutung von Coworking Spaces als Dritter Arbeitsort in Deutschland (Vol. FB595). Bundesministerium für Arbeit und Soziales. https://www.ssoar.info/ssoar/handle/document/79975
- Boss, S. (2020). The future of workplace with focus on user demand and value delivery [Master's thesis, Technische Universität Wien]. https://doi.org/10.34726/hss.2020.85803
- Bouncken, R. B. (2023). Awakening the Management of Coworking Spaces. Emerald Group Publishing. https://books.google.it/books?hl=zh-CN&lr=&id=qKenEAAAQBAJ&oi=fnd&pg=PR1&dq=coworking+space&ots=JrZynjTjzo&sig=5D5XGidQXD0cAENg-mySC15wxzk&redir_esc=y#v=onepage&q=coworking%20space&f=false
- Bouncken, R. B., & Aslam, M. M. (2023). Bringing the design perspective to coworking-spaces: Constitutive entanglement of actors and artifacts. European Management Journal, 41(1), 101–113. https://doi.org/10.1016/j.emj.2021.10.008
- Bouncken, R. B., & Aslam, M. M. (2023). Permeability in Coworking Spaces as an Innovation Facilitator. In R. B. Bouncken (Ed.), Awakening the Management of Coworking Spaces (pp. 55–81). Emerald Publishing Limited. https://doi.org/10.1108/978-1-80455-029-820231006
- Bouncken, R. B., Aslam, M. M., & Qiu, Y. (2021). Coworking spaces: Understanding, using, and managing sociomateriality. Business Horizons, 64(1), 119–130. https://doi.org/10.1016/j.bushor.2020.09.010

- Bouncken, R. B., Aslam, M. M., Gantert, T. M., & Kallmuenzer, A. (2023). New work design for knowledge creation and sustainability: An empirical study of coworking-spaces. Journal of Business Research, 154, 113337. https://doi.org/10.1016/j.jbusres.2022.113337
- Bouncken, R. B., Lapidus, A., & Qui, Y. (2022). Organizational sustainability identity: 'New Work' of home offices and coworking spaces as facilitators. Sustainable Technology and Entrepreneurship, 1(2), 100011. https://doi.org/10.1016/j.stae.2022.100011
- Bouncken, R., & Aslam, M. M. (2019). Understanding knowledge exchange processes among diverse users of coworking-spaces. Journal of Knowledge Management, 23(10), 2067–2085. https://doi.org/10.1108/JKM-05-2018-0316
- Bouncken, R., Ratzmann, M., Barwinski, R., & Kraus, S. (2020). Coworking spaces: Empowerment for entrepreneurship and innovation in the digital and sharing economy. Journal of Business Research, 114, 102–110. https://doi.org/10.1016/j.jbusres.2020.03.033
- Brinks, V. (2022). Fluid objects? An attempt to conceptualise the global rise of "coworking spaces." Area, 54(3), 435–442. https://doi.org/10.1111/area.12778
- Bronkhorst, J. (2020). The impact of disruptive innovation on the demand for coworking space. OpenUCT. http://hdl.handle.net/11427/32697
- Caballero Estebanell, X. (2021). The use of CWS as an alternative to home office [Master's thesis, Politecnico di Torino]. https://webthesis.biblio.polito.it/20345/
- Cabral, V. (2023). A look inside the coworking space: The social and entrepreneurial relevance of new flexible office space environments [Doctoral thesis, University of Amsterdam]. https://dare.uva.nl/search?identifier=c88b7f0a-939b-4292-9236-34c94824568c
- Cabral, V., & van Winden, W. (2022). The reaction of coworking spaces to the COVID-19 pandemic. A dynamic capabilities perspective. Service Business, 16(2), 257–281. https://doi.org/10.1007/s11628-022-00489-6
- Cappelli, P. (2021). The Future of the Office: Work from Home, Remote Work, and the Hard Choices We All Face. Wharton School Press. https://doi.org/10.2307/j.ctv2hdrfff
- Carter, D. (2022). Immersive Employee Experiences in the Metaverse: Virtual Work Environments, Augmented Analytics Tools, and Sensory and Tracking Technologies. Psychosociological Issues in Human Resource Management, 10(1), 35. https://doi.org/10.22381/pihrm10120223
- Chen, S. X., Wu, H.-C., & Huang, X. (2023). Immersive experiences in digital exhibitions: The application and extension of the service theater model. Journal of Hospitality and Tourism Management, 54, 128–138. https://doi.org/10.1016/j.jhtm.2022.12.008

- Chen, Z. (2022), "Exploring the application scenarios and issues facing Metaverse technology in education", Interactive Learning Environments, Vol. 4, pp. 1-13, doi: 10.1080/10494820.2022.2133148.
- Chen, Z. (2023). Metaverse office: Exploring future teleworking model. Kybernetes, ahead-of-print(ahead-of-print). https://doi.org/10.1108/K-10-2022-1432
- Chevez Bernaldo de Quiros, A. (2009). Evolution of workplace architecture as a consequence of technology development [Doctoral thesis, Royal Melbourne Institute of Technology]. https://core.ac.uk/reader/15614590
- Chi, J., & Xu, J. (2022). Design Research on Maker Office Space Based on User Experience. Proceedings of the 2021 International Conference on Culture, Design and Social Development (CDSD 2021), 387–391. https://doi.org/10.2991/assehr.k.220109.080
- China Workplace Survey 2021. (2021). Gensler. https://www.gensler.com/gri/china-workplace-survey-2021. Accessible for download by providing business email address on the publisher's website.
- Cho, H. Y., & Lee, H.-J. (2022). Digital Transformation for Efficient Communication in the Workplace: Analyzing the Flow Coworking Tool. Business Communication Research and Practice, 5(1), 20–28. https://doi.org/10.22682/bcrp.2022.5.1.20
- Cho, K. Y., Ibrahim, F. I., & Zubir, Z. (2020). Analyzing Spaces for Social Interaction in Coworking Space: A case study on Common Ground Damansara Heights. Environment-Behaviour Proceedings Journal, 5(13), Article 13. https://doi.org/10.21834/e-bpj.v5i13.2068
- Cipresso, P., Giglioli, I. A. C., Raya, M. A., & Riva, G. (2018). The Past, Present, and Future of Virtual and Augmented Reality Research: A Network and Cluster Analysis of the Literature. Frontiers in Psychology, 9, 2086. https://doi.org/10.3389/fpsyg.2018.02086
- Clifton, N., Füzi, A., & Loudon, G. (2022). Coworking in the digital economy: Context, motivations, and outcomes. Futures, 135, 102439. https://doi.org/10.1016/j.futures.2019.102439
- Cnossen, B., & Stephenson, K. (2022). Towards a spatial understanding of identity play: Coworking spaces as playgrounds for identity. Culture and Organization, 28(5), 448–470. https://doi.org/10.1080/14759551.2022.2072309
- Colenberg, S. E., Romero Herrera, N. A., & Keyson, D. V. (2020). Workplace design for social well-being: a conceptual model and research strategy. TWR 2020 : Transdisciplinary Workplace Research Conference. Proceedings of the Transdisciplinary Workplace Research (TWR) Conference 2020, 203–216. https://www.twrnetwork.org/wp-content/uploads/2020/11/TWR2020_Future_Workspaces_Ed2.pdf

- Colenberg, S., & Jylhä, T. (2020). Designing for health: strategies for enhancing employee health by workplace design. Future workspaces, 84. https://www.twrnetwork.org/wp-content/uploads/2020/11/TWR2020_Future_Workspaces_Ed2.pdf
- Cornaro, A., & Lambri, A. (2022). 4. Spaces as thresholds. New design approaches for mental well-being. In DESIGNING BEHAVIOURS FOR WELL-BEING SPACES (pp. 75–89). https://series.francoangeli.it/index.php/oa/catalog/book/772
- Coworking: Fad or fixture? (2016). JLL. https://www.joneslanglasalle.com.cn/zh/trends-and-insights/research/china-coworking-report. Accessible for download by providing business email address on the publisher's website.
- Cruz, R., Franqueira, T., & Pombo, F. (2021). Furniture as Feature in Coworking Spaces. Spots in Oporto City as Case Study. Res Mobilis, 10(13–3), 316–338. https://doi.org/10.17811/rm.10.13-3.2021.316-338
- Dancstep (Née Dancu), T., Gutwill, J. P., & Sindorf, L. (2015). Comparing the Visitor Experience at Immersive and Tabletop Exhibits. Curator: The Museum Journal, 58(4), 401–422. https://doi.org/10.1111/cura.12137
- Danivska, V., & Nenonen, S. (2020). Smart tools to enhance wellbeing at workplace, 554. https://www.twrnetwork.org/wp-content/uploads/2020/11/TWR2020_Future_Workspaces_Ed2.pdf
- Dastoornikoo, N. (2023). What affects sustainable coworking behavior: A psychological ownership perspective [Master's thesis, Chalmers University of Technology]. http://hdl.handle.net/20.500.12380/306049
- Davis, M. (2022). Working Here, There, and Everyware: The Impact of Virtual Work on Employee Belonging. Electronic Theses and Dissertations. https://digitalcommons.du.edu/etd/2038
- de Sousa, A., Paradise, C., Proulx, M., Jicol, C., Esenkaya, T., & Hynes, R. (2018). The psychology of workplace design. Retrieved November 19, 2023, from https://www.researchgate.net/publication/337029405_The_psychology_of_workplace_design
- de Vaujany, F.-X. (2022). Workplaces as Intensifications of Events: From Temporalities of Scene to Plateau. 28. https://www.researchgate.net/publication/369730919_Workplaces_as_Intensifications_of_Events_From_Temporalities_of_Scene_to_Plateau
- de Vaujany, F.-X. de, Haefliger, S., & Ungureanu, P. (2022). From Collaborative Spaces to New Modes of Organizing: Society, Democracy and Commons on the Way to Novelty. Post-Print, Article hal-03827462. https://ideas.repec.org//p/hal/journl/hal-03827462.html
- Design Forecast 2023: Transformation - Design Strategies for the Human Experience. (2023). Gensler. https://www.gensler.com/publications/design-forecast/2023

- Dickson, A. (2020). The Effect of Coworking Spaces on Work-Life and Work-Family Boundaries [Doctoral dissertation, The University of North Carolina at Charlotte).
- Draper, B.M. (2021), "And justice for none: how COVID-19 is crippling the criminal jury right", BCL Review Electronic Supplement I., Vol. 62, p. 1.
- Eight Futures of Work: Scenarios and their Implications. (2018). World Economic Forum. https://www.weforum.org/publications/eight-futures-of-work-scenarios-and-their-implications/
- Endrissat, N., & Leclercq-Vandelannoitte, A. (2021). From sites to vibes: Technology and the spatial production of coworking spaces. Information and Organization, 31(4), 100353. https://doi.org/10.1016/j.infoandorg.2021.100353
- Ertan, S. (2019). Collaborative working spaces: Project ecologies and means of interaction and collaboration [Master Thesis, Middle East Technical University]. https://open.metu.edu.tr/handle/11511/44266
- Everything You Need to Know About Activity-Based-Work. (2022). Robin Powered. Retrieved November 15, 2023, from https://robinpowered.com/guides/what-is-activity-based-work-ebook. Accessible for download by providing business email address on the publisher's website.
- Fauth, R., & Pieper, M. (2022). Designing sustainable office spaces – how to combine workspace characteristics with sufficiency strategies. IOP Conference Series: Earth and Environmental Science, 1078(1), 012032. https://doi.org/10.1088/1755-1315/1078/1/012032
- Fayard, A.-L., Weeks, J., & Khan, M. (2021, March 1). Designing the Hybrid Office. Harvard Business Review. https://hbr.org/2021/03/designing-the-hybrid-office
- Folgado, A. R. M. L. G. (2021). City, space and place in the digital age: An analysis of how technology shapes our everyday experience of space in cities : a case-study analysis of a coworking space - Second Home Lisbon [Master's thesis, Universidade Católica Portuguesa]. https://repositorio.ucp.pt/handle/10400.14/34270
- Forester, T. (1985). The information technology revolution.
- Forty, A. (1987). Objects of Desire, Design and Society 1750–1980. Oxford Art Journal, 10(2), 114–115. https://doi.org/10.1093/oxartj/10.2.114
- Frank, J. A., & Kapila, V. (2017). Mixed-reality learning environments: Integrating mobile interfaces with laboratory test-beds. Computers & Education, 110, 88–104. https://doi.org/10.1016/j.compedu.2017.02.009
- Franzén, A., & Mynsberge, J. (2020). Coworking: A Case Study at The Ground. [Master's thesis, Lund University]. https://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=9021795&fileOId=9021796
- Fukumura, Y. E., Gray, J. M., Lucas, G. M., Becerik-Gerber, B., & Roll, S. C. (2021). Worker Perspectives on Incorporating Artificial Intelligence into Office Workspaces: Implications for the Future of Office Work. International Journal of Environmental Research and Public Health, 18(4), 1690. https://doi.org/10.3390/ijerph18041690

- Future of work. (2017). JLL. https://www.joneslanglasalle.com.cn/en/trends-and-insights/research/future-of-work. Accessible for download by providing business email address on the publisher's website.
- Future of Work: Enabling women across the workforce to be productive anywhere. (2023). Accenture. https://www.accenture.com/content/dam/accenture/final/accenture-com/document/Accenture-Future-of-Work-IWD-Research-2023-FINAL.pdf
- Gabrielli, L., & Fiorentino, S. (2022). Guest editorial: Co-working spaces after COVID-19. The differences between sharing office spaces in urban cores and peripheral locations. Journal of Property Investment & Finance, 40(5), 445–447. https://doi.org/10.1108/JPIF-08-2022-196
- Galloway, L. (1919). Office management, its principles and practice: Covering organization, arrangement, and operation with special consideration of the employment, training, and payment of office workers. Ronald Press. https://ia600309.us.archive.org/9/items/officemanagemen00gallgoog/officemanagemen00gallgoog.pdf
- Gandini, A., & Cossu, A. (2021). The third wave of coworking: 'Neo-corporate' model versus 'resilient' practice. European Journal of Cultural Studies, 24(2), 430–447. https://doi.org/10.1177/1367549419886060
- Gao, Y., Wu, D., & Zhou, L. (2022). How to Improve Immersive Experience? IEEE Transactions on Multimedia, 1–14. https://doi.org/10.1109/TMM.2022.3199666
- Gauer, S. (2020). Analysing the Impact of a Room on our Perception and Experience – an Architectural Psychology Approach to Modern Working. Future workspaces, 355. https://www.twrnetwork.org/wp-content/uploads/2020/11/TWR2020_Future_Workspaces_Ed2.pdf
- Gauger, F., Pfnür, A., & Skarabi, J. (2020). Arbeitswelten im Wandel: Coworking Spaces. Eine empirische Befragung der Eigenschaften und Nutzerpräferenzen von Coworking Spaces (Working Paper 39). Technische Universität Darmstadt, Forschungscenter Betriebliche Immobilienwirtschaft. https://www.econstor.eu/handle/10419/223375
- Gazzaneo, L., Padovano, A., & Umbrello, S. (2020). Designing Smart Operator 4.0 for Human Values: A Value Sensitive Design Approach. Procedia Manufacturing, 42, 219–226. https://doi.org/10.1016/j.promfg.2020.02.073
- Gillen, N. (2019). Future Office: Next-generation workplace design (1st ed.). RIBA Publishing. https://www.perlego.com/book/1523054/future-office-nextgeneration-workplace-design-pdf
- Global Workplace Survey Comparison 2023. (2023). Gensler. https://www.gensler.com/gri/global-workplace-survey-comparison-2023. Accessible for download by providing business email address on the publisher's website.
- Goermar, L., Barwinski, R. W., Bouncken, R. B., & Laudien, S. M. (2021). Co-creation in coworking-spaces: Boundary conditions of diversity. Knowledge Management Research & Practice, 19(1), 53–64. https://doi.org/10.1080/14778238.2020.1740627

- Grubert, J., Ofek, E., Pahud, M., & Kristensson, P. O. (2018). The Office of the Future: Virtual, Portable, and Global. IEEE Computer Graphics and Applications, 38(6), 125–133. https://doi.org/10.1109/MCG.2018.2875609
- Gruenwald, H. (2020). Coworking Spaces in Germany during the Covid-19 Crisis Utilized for Homeoffice and Homeschooling. South Asian Journal of Social Studies and Economics, 57–67. https://doi.org/10.9734/sajsse/2020/v8i430219
- Guan, J., & Morris, A. (2023). Design Frameworks for Hyper-Connected Social XRI Immersive Metaverse Environments. IEEE Network, 37(4), 12–21. https://doi.org/10.1109/MNET.005.2300129
- Ha, J. Y. (2022). Co-Working in Seoul: Integrating Public Infrastructure into the Metaverse [Master's thesis, Massachusetts Institute of Technology]. https://dspace.mit.edu/handle/1721.1/144959
- Hajo, H. (2022). The Future of Innovative Workplaces A socio-spatial investigation of interaction patterns in accelerator and incubator workplaces. 13th International Space Syntax Symposium, SSS 2022. https://www.hvl.no/globalassets/hvl-internett/arrangement/2022/13sss/427hajo.pdf
- Halvitigali, D., Antoniades, H., & Eves, C. (2019, October 2). COWORKING: THE NEW DESIGN OF WORKPLACES. https://opus.lib.uts.edu.au/handle/10453/139005
- Häne, E., & Windlinger, L. (2021). Switching behaviour in activity-based working environments: An exploration of the reasons and influencing factors. Journal of Corporate Real Estate, 24(3), 149–172. https://doi.org/10.1108/JCRE-12-2020-0072
- Hansen, K., & Saini, A. N. (2020, July 15). A Brief History of the Modern Office. Harvard Business Review. https://hbr.org/2020/07/a-brief-history-of-the-modern-office
- Haroun, M., Gohar, N., & Hanna, H. (2020). TOE Model: Adoption of Block Chain. The Business and Management Review, 11. https://doi.org/10.24052/BMR/V11NU01/ART-19
- Hartono, M. (2021). Kansei Engineering and Self Determination Theory (SDT) for Sustainable Service Design: An Empirical Study on Coworking Space. 11(1). https://index.ieomsociety.org/index.cfm/article/view/ID/1155
- Heiberg, D. (2022). The everything guide to motivating Gen Z in the workplace. Firstup. https://firstup.io/ebooks/everything-guide-to-motivating-gen-z-in-the-workplace/. Accessible for download by providing business email address on the publisher's website.
- Hensher, D. A., Wei, E., & Beck, M. J. (2023). The impact of COVID-19 and working from home on the workspace retained at the main location office space and the future use of satellite offices. Transport Policy, 130, 184–195. https://doi.org/10.1016/j.tranpol.2022.11.012

- Hobsbawm, J. (2022). The Nowhere Office: Reinventing Work and the Workplace of the Future. Hachette UK. https://books.google.it/books?id=kHE9EAAAQBAJ&lpg=PT7&dq=%20future%20coworking%20space%20Metaverse&lr&hl=zh-CN&pg=PT7#v=onepage&q=future%20coworking%20space%20Metaverse&f=false
- Hofeditz, L., Mirbabaie, M., & Stieglitz, S. (2020). Virtually Extended Coworking Spaces? – The Reinforcement of Social Proximity, Motivation and Knowledge Sharing Through ICT. ACIS 2020 Proceedings. https://aisel.aisnet.org/acis2020/3
- Hölzel, M., & de Vries, W. T. (2021). Digitization as a Driver fur Rural Development—An Indicative Description of German Coworking Space Users. Land, 10(3), Article 3. https://doi.org/10.3390/land10030326
- Hou, H. (Cynthia), Remøy, H., Jylhä, T., & Vande Putte, H. (2021). A study on office workplace modification during the COVID-19 pandemic in The Netherlands. Journal of Corporate Real Estate, 23(3), 186–202. https://doi.org/10.1108/JCRE-10-2020-0051
- How Tomorrow Will Work: Returning to the Office After COVID-19. (2021). Insights for Professionals. https://www.insightsforprofessionals.com/hr/pay-and-benefits/how-tomorrow-will-work-returning-to-the-office
- Howell, T. (2022). Coworking spaces: An overview and research agenda. Research Policy, 51(2), 104447. https://doi.org/10.1016/j.respol.2021.104447
- Howell, T., & Bingham, C. (2019). Coworking Spaces: Working Alone, Together. https://www.kenaninstitute.unc.edu/wp-content/uploads/2019/04/Coworking_04042019.pdf
- Hu, X. (2021). Insight into the Development Trend of Future Office Intelligent Devices from the Perspective of User Experience. 2021 International Conference on Social Science and Education Research (SSER2021). 2021 International Conference on Social Science and Education Research. https://doi.org/10.38007/Proceedings.0002067
- Hutson, J. (2022). Social Virtual Reality: Neurodivergence and Inclusivity in the Metaverse. Societies, 12(4), Article 4. https://doi.org/10.3390/soc12040102
- Isac, C. (2019). Coworking Spaces – A Source for Developing Creative Business. Ovidius University Annals: Economic Sciences Series, 19(2), 36–41. https://stec.univ-ovidius.ro/html/anale/RO/wp-content/uploads/2020/02/Section%20I/5.pdf
- Ivaldi, S., Galuppo, L., Calvanese, E., & Scaratti, G. (2020). Coworking space as a practised place between welfare working and managerial challenges. Journal of Workplace Learning, 33(1), 26–44. https://doi.org/10.1108/JWL-02-2020-0021

- Jackson, N., & Campbell, S. (n.d.). The Nature of Immersive Experience. https://www.lifewideeducation.uk/uploads/1/3/5/4/13542890/d6._jackson_and_campbell.pdf
- Jayantha, W. M., & Oladinrin, O. T. (2019). Knowledge mapping of office workspace: A scientometric review of studies. Facilities, 38(3/4), 316–345. https://doi.org/10.1108/F-07-2018-0086
- Jones, D., PhD. (2020). The Future of Coworking? GRIT Hub. https://www.thegrithub.org/whitepapers/The-Future-of-Coworking-White-Paper-OpenWork-Agency-May-29-2020.pdf
- Just, T., & Plößl, F. (Eds.). (2022). European Cities After COVID-19: Strategies for Resilient Cities and Real Estate. Springer International Publishing. https://doi.org/10.1007/978-3-030-89788-8
- Kane, C. (2020). Where is My Office?: Reimagining the Workplace for the 21st Century (1st ed.). Bloomsbury Business. https://www.perlego.com/de/book/1811619/where-is-my-office-reimagining-the-workplace-for-the-21st-century-pdf
- Karslı, U. T. (2021). Design for the Future of Work: A Theoretical Framework for Coworking Space Design. In Anywhere Working and the Future of Work (pp. 163–189). IGI Global. https://doi.org/10.4018/978-1-7998-4159-3.ch007
- Kaufmann-Buhler, J. (2021). Open plan: A design history of the American office. Bloomsbury Publishing.
- Keefe, D. F., Feliz, D. A., Moscovich, T., Laidlaw, D. H., & LaViola, J. J. (2001). CavePainting: A fully immersive 3D artistic medium and interactive experience. Proceedings of the 2001 Symposium on Interactive 3D Graphics, 85–93. https://doi.org/10.1145/364338.364370
- Kohlert, C. (2020). The ‚human 'workplace–health-relevant factors for learning and working spaces. Future workspaces, 76. https://www.twrnetwork.org/wp-content/uploads/2020/11/TWR2020_Future_Workspaces_Ed2.pdf
- Kojo, I., & Nenonen, S. (2016). Typologies for co-working spaces in Finland – what and how? Facilities, 34(5/6), 302–313. https://doi.org/10.1108/F-08-2014-0066
- Kopplin, C. S. (2023). Chatbots in the Workplace: A Technology Acceptance Study Applying Uses and Gratifications in Coworking Spaces. https://doi.org/10.1080/10919392.2023.2215666
- Kopplin, C. S., Gantert, T. M., & Maier, J. V. (2022). Acceptance of matchmaking tools in coworking spaces: An extended perspective. Review of Managerial Science, 16(6), 1911–1943. https://doi.org/10.1007/s11846-021-00498-1
- Kraus, S., Bouncken, R. B., Görmar, L., González-Serrano, M. H., & Calabuig, F. (2022). Coworking spaces and makerspaces: Mapping the state of research. Journal of Innovation & Knowledge, 7(1), 100161. https://doi.org/10.1016/j.jik.2022.100161

- Krause, I. (2019). Coworking Space: A Window to the Future of Work? Foresight and STI Governance, 13(2), 52–60. https://doi.org/10.17323/2500-2597.2019.2.52.60
- Kuo, F. E., & Faber Taylor, A. (2004). A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence From a National Study. American Journal of Public Health, 94(9), 1580–1586. https://doi.org/10.2105/ajph.94.9.1580
- Lee, H. (2020). A Conceptual Model of Immersive Experience in Extended Reality. PsyArXiv. https://doi.org/10.31234/osf.io/sefkh
- Lee, H., Jung, T. H., tom Dieck, M. C., & Chung, N. (2020). Experiencing immersive virtual reality in museums. Information & Management, 57(5), 103229. https://doi.org/10.1016/j.im.2019.103229
- Lee, M., Yun, J. J., Pyka, A., Won, D., Kodama, F., Schiuma, G., Park, H., Jeon, J., Park, K., Jung, K., Yan, M.-R., Lee, S., & Zhao, X. (2018). How to Respond to the Fourth Industrial Revolution, or the Second Information Technology Revolution? Dynamic New Combinations between Technology, Market, and Society through Open Innovation. Journal of Open Innovation: Technology, Market, and Complexity, 4(3), 21. https://doi.org/10.3390/joitmc4030021
- Lescarret, C., Lemercier, C., & Le Floch, V. (2022). Coworking spaces vs. home: Does employees' experience of the negative aspects of working from home predict their intention to telework in a coworking space? Frontiers in Psychology, 13. https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1079691
- Li, J., Tashman, P., Gonzales, J., & Oztekin, A. (2022). Measuring and Understanding CSR performance on Social Media. NEAIS 2022 Proceedings. https://aisel.aisnet.org/neais2022/48
- Lim, W. M. (2023). The workforce revolution: Reimagining work, workers, and workplaces for the future. Global Business and Organizational Excellence, 42(4), 5–10. https://doi.org/10.1002/joe.22218
- Luo, Y., & Chan, R. C. K. (2020). Production of coworking spaces: Evidence from Shenzhen, China. Geoforum, 110, 97–105. https://doi.org/10.1016/j.geoforum.2020.01.008
- Luo, Y., & Chan, R. C. K. (2021). Gendered digital entrepreneurship in gendered coworking spaces: Evidence from Shenzhen, China. Cities, 119, 103411. https://doi.org/10.1016/j.cities.2021.103411
- Macaraeg, K. (2021). The coworking experience: Myth and reality for Canterbury coworkers. https://www.researchbank.ac.nz/handle/10652/5476
- Mammadrzayeva, G. (2020). Understanding the expectations of occupants on coworking space [Master's thesis, Kadir Has Üniversitesi]. https://acikbilim.yok.gov.tr/handle/20.500.12812/372968

- Mandeno, P., & Baxter, W. L. (2020). BARRIERS TO HUMAN CONNECTIVITY AND THE DESIGN OF MORE COLLABORATIVE COWORKING SPACES. Proceedings of the Design Society: DESIGN Conference, 1, 1475–1484. Cambridge University Press. https://doi.org/10.1017/dsd.2020.142
- Manzini Ceinar, I., & Mariotti, I. (2021). Teleworking in post-pandemic times: May local coworking spaces be the future trend? Romanian Journal of Regional Science, 15(1), Article 1. https://discovery.ucl.ac.uk/id/eprint/10139557/
- Manzini Ceinar, I., Pacchi, C., & Mariotti, I. (2020). Emerging work patterns and different territorial contexts: Trends for the coworking sector in pandemic recovery. Professionalità Studi, 2020(4), Article 4. https://discovery.ucl.ac.uk/id/eprint/10139503/
- Margolies, J., & McClellan, K. (2022, May 10). Say Goodbye to the Boring Conference Room. The New York Times. https://www.nytimes.com/2022/05/10/business/conference-room-decor-offices-rto.html
- Mariotti, I., & Akhavan, M. (2020). Exploring Proximities in Coworking Spaces: Evidence from Italy. European Spatial Research and Policy, 27(1), 37–52. https://doi.org/10.18778/1231-1952.27.1.02
- Mariotti, I., Akhavan, M., & Rossi, F. (2023). The preferred location of coworking spaces in Italy: An empirical investigation in urban and peripheral areas. European Planning Studies, 31(3), 467–489. https://doi.org/10.1080/09654313.2021.1895080
- Mariotti, I., Di Marino, M., Akhavan, M., & Capdevila, I. (2022). The Effects of COVID-19 on Coworking Spaces. https://doi.org/10.1007/978-3-319-57365-6_322-1
- Mariotti, I., Marino, M. D., & Bednář, P. (Eds.). (2022). The COVID-19 Pandemic and the Future of Working Spaces. Routledge. https://doi.org/10.4324/9781003181163
- Markkanen, P., Juuti, E., & Herneoja, A. (2020). Creating need-supply fit affordances in knowledge work environments through user-centred design processes, 428. https://www.twrnetwork.org/wp-content/uploads/2020/11/TWR2020_Future_Workspaces_Ed2.pdf
- Marzban, S., Candido, C., Mackey, M., Engelen, L., Zhang, F., & Tjondronegoro, D. (2022). A review of research in activity-based working over the last ten years: Lessons for the post-COVID workplace. Journal of Facilities Management, 21(3), 313–333. https://doi.org/10.1108/JFM-08-2021-0081
- Mason, L. (2021). Possible Futures of the Workplace: How has the Covid-19 pandemic amplified the need for a change towards an evidence-based, human- centred approach to office design? https://interioreducators.co.uk/uploads/submitted-files/127.W_.CS_.2021.c_.pdf

- Mátyus, E. (2021). Digitalization of Coworking Space Services. Proceedings of the International Conference on Business Excellence, 15(1), 1060–1068. https://doi.org/10.2478/picbe-2021-0100
- Mayerhoffer, M. (2021). The impact of Covid-19 on coworking spaces: Evidence from Germany. Journal of Corporate Real Estate, 23(3), 170–185. https://doi.org/10.1108/JCRE-10-2020-0044
- Meet Gen Z. (2019, June 3). The Workforce Institute at UKG. https://workforceinstitute.org/wp-content/uploads/2019/05/Meet-Gen-Z-Hopeful-Anxious-Hardworking-and-Searching-for-Inspiration.pdf
- Memud, M. W., & Tabibi, B. (2023). Effective Design of Coworking Spaces to Improve Users' Experience in Lagos State, Nigeria. Art and Design Review, 11(2), 80–103. https://doi.org/10.4236/adr.2023.112007
- Merkel, J. (2022). Coworking Spaces as Destinations and New Stakeholders in Hospitality Ecosystems. In Towards an Ecosystem of Hospitality – Location:City:Destination (pp. 140–147). https://www.researchgate.net/publication/361794319_Coworking_Spaces_as_Destinations_and_New_Stakeholders_in_Hospitality_Ecosystems_In_N_Olbrich_J_Philipp_H_Thees_H_Pechlaner_Hrsg_Towards_an_Ecosystem_of_Hospitality_-_LocationCityDestination_Graffeg_Li
- Michel, B. (2022). Les espaces de coworking comme clubs ? Créativité et entre-soi dans les espaces collaboratifs spécialisés dans les secteurs culturels et créatifs. Interventions Economiques : Papers in Political Economy, 68. https://doi.org/10.4000/interventionseconomiques.19317
- Miller, N. (2012). Estimating Office Space per Worker. Burnham-Moores Center for Real Estate University of San Diego. https://www.ccimef.org/pdf/2012-6.Estimating-Office-Space-per-Worker.5-1-12.pdf
- Milotay, N. (2020). Next generation or lost generation? Children, young people and the pandemic. https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/659404/EPRS_BRI%282020%29659404_EN.pdf
- Mirbabaie, M., Hofeditz, L., & Schmid, L. (2022). Ausgestaltungs- und Anwendungspotenziale von Virtual und Augmented Reality Technologien im Kontext von Coworking Spaces. HMD Praxis der Wirtschaftsinformatik, 59(1), 189–206. https://doi.org/10.1365/s40702-021-00818-9
- Mittal, E., & Rani, T. (2022). Do Social Interactions Really Moderate Job Productivity in Coworking Spaces? Acta Universitatis Sapientiae, Economics and Business, 10(1), 145–160. https://doi.org/10.2478/auseb-2022-0009
- Mohora, I. (2019). Importance of biophilic attributes in european coworking spaces. Proceedings of INTCESS, 979-988. https://www.ocerints.org/intcess19_e-publication/papers/109.pdf
- Mohora, I. (2019). IMPORTANCE OF BIOPHILIC ATTRIBUTES IN EUROPEAN COWORKING SPACES. INTCESS 2019-6th International Conference on Education and Social Sciences. https://www.ocerints.org/intcess19_e-publication/papers/109.pdf

- Monero Flores, V. (2020). The spatial dimension of the flexible workplace: exploring the relationship between utilization practices and architectural space quality. In Transdisciplinary Workplace Research (TWR) Conference, Frankfurt, Germany, 16-19 September 2020, 342-354. TWR Network. https://doi.org/10.21256/zhaw-24192
- Morrison, R. L., & Macky, K. A. (2017). The demands and resources arising from shared office spaces. Applied Ergonomics, 60, 103–115. https://doi.org/10.1016/j.apergo.2016.11.007
- Morrison, R. L., & Smollan, R. K. (2020). Open plan office space? If you're going to do it, do it right: A fourteen-month longitudinal case study. Applied Ergonomics, 82, 102933. https://doi.org/10.1016/j.apergo.2019.102933
- Muth, S., & Rauscher, S. J. M. (2022). Coworking Spaces as Facilitators for Professional Coworker Development: A Study about Coworking Spaces in Mid-Sized Cities in Sweden. [Master's thesis, Jonkoping University]. https://www.diva-portal.org/smash/get/diva2:1433361/FULLTEXT01.pdf
- Nagy, Z., Shah, D., Osztian-Hadfield, K., Gupta, G., & Awomolo, O. (2023). Designing Individual and Team Personas. Gensler. https://www.gensler.com/gri/designing-personas-in-the-inclusive-workplace. Accessible for download by providing business email address on the publisher's website.
- Nakano, D., Shiach, M., Koria, M., Vasques, R., Santos, E. G. dos, & Virani, T. (2020). Coworking spaces in urban settings: Prospective roles? Geoforum, 115, 135–137. https://doi.org/10.1016/j.geoforum.2020.04.014
- Nanayakkara, K. T., Wilkinson, S. J., & Ghosh, S. (2021). Future office layouts for large organisations: Workplace specialist and design firms' perspective. Journal of Corporate Real Estate, 23(2), 69–86. https://doi.org/10.1108/JCRE-02-2020-0012
- Novitsky, B., Montilla, C., Brady, C., Jessen, J., Allen, K., Vedanayagam, K., Otarola, M., DeCurtis, M., Evers, S., Benkert, S., & Lin, V. (2020). Beyond the Senses. Gensler. https://www.gensler.com/gri/beyond-the-senses. Accessible for download by providing business email address on the publisher's website.
- Office Space X Tech Firms. (2019). JLL. https://www.joneslanglasalle.com.cn/en/trends-and-insights/research/office-space-x-tech-firms. Accessible for download by providing business email address on the publisher's website.
- Ondia, E. P. (2019). Addressing the Dilema Between Collaboration and Privacy in Coworking Spaces. International Journal of Architecture and Urban Development, 9(3), 5–10. https://ijaud.srbiau.ac.ir/article_14783.html
- Oprean, D. (2014). Understanding the immersive experience: Examining the influence of visual immersiveness and interactivity on spatial experiences and understanding [Doctoral thesis, University of Missouri]. https://mospace.umsystem.edu/xmlui/handle/10355/45770

- Orel, M. (2019). Coworking environments and digital nomadism: Balancing work and leisure whilst on the move. World Leisure Journal, 61(3), 215–227. https://doi.org/10.1080/16078055.2019.1639275
- Orel, M. (2019). Supporting work–life balance with the use of coworking spaces. Equality, Diversity and Inclusion: An International Journal, 39(5), 549–565. https://doi.org/10.1108/EDI-01-2019-0038
- Orel, M. (2022). Collaboration Potential in Virtual Reality (VR) Office Space: Transforming the Workplace of Tomorrow. Springer International Publishing. https://doi.org/10.1007/978-3-031-08180-4
- Orel, M., & Alonso Almeida, M. del M. (2019). The ambience of collaboration in coworking environments. Journal of Corporate Real Estate, 21(4), 273–289. https://doi.org/10.1108/JCRE-12-2018-0050
- Orel, M., & Bennis, W. (2020). The perspective of a coworking space model in scholarly settings. On the Horizon, 28(2), 101–111. https://doi.org/10.1108/OTH-10-2019-0074
- Orel, M., & Bennis, W. M. (2021). Classifying changes. A taxonomy of contemporary coworking spaces. Journal of Corporate Real Estate, 23(4), 278–296. https://doi.org/10.1108/JCRE-12-2020-0061
- Orel, M., & Mayerhoffer, M. (2021). Qualitative Research Methods for the Exploration of Coworking Environments. The Qualitative Report, 26(5), 1364–1382. https://doi.org/10.46743/2160-3715/2021.4673
- Orel, M., Dvouletý, O., & Ratten, V. (Eds.). (2021). The Flexible Workplace: Coworking and Other Modern Workplace Transformations. Springer International Publishing. https://doi.org/10.1007/978-3-030-62167-4
- Orel, M., Mayerhoffer, M., Fratricova, J., Pilkova, A., Starnawska, M., & Horvath, D. (2022). Coworking spaces as talent hubs: The imperative for community building in the changing context of new work. Review of Managerial Science, 16(5), 1503–1531. https://doi.org/10.1007/s11846-021-00487-4
- Oswald, K., & Zhao, X. (2020). What Is a Sustainable Coworking Space? Sustainability, 12(24), Article 24. https://doi.org/10.3390/su122410547
- Pacchi, C., & Mariotti, I. (2021). Shared Spaces or Shelters for Precarious Workers? Coworking Spaces in Italy. Professions and Professionalism, 11(1), Article 1. https://doi.org/10.7577/pp.3911
- Philbeck, T., & Davis, N. (2018). The Fourth Industrial Revolution: Shaping a New Era. Journal of International Affairs, 72(1), 17–22. https://www.jstor.org/stable/26588339
- Piña, L. A. (1998). Classic Herman Miller. Schiffer Pub.
- Porceddu, E. (2021). The role of IT and space in community driven Coworking Spaces (Dissertation). Retrieved from https://urn.kb.se/resolve?urn=urn:nbn:se:hj:diva-52823
- Pradère, F. (2022). Workforce Preferences Barometer 2022. JLL. https://www.jll.de/en/trends-and-insights/research/workforce-preferences-barometer. Accessible for download by providing business email address on the publisher's website.

- Pyun, K. R., Rogers, J. A., & Ko, S. H. (2022). Materials and devices for immersive virtual reality. Nature Reviews Materials, 7(11), Article 11. https://doi.org/10.1038/s41578-022-00501-5
- Rådman, E., Johansson, E., Bosch-Sijtsema, P., & Raharjo, H. (2023). In search of member needs in coworking spaces. Review of Managerial Science, 17(3), 881–907. https://doi.org/10.1007/s11846-022-00546-4
- Regenerative Workplace. (2021). JLL. https://www.jll.de/en/trends-and-insights/research/regenerative-workplace. Accessible for download by providing business email address on the publisher's website.
- Regodon, A., Armand, M., Lastres, C., De Pedro, J., & García-Santos, A. (2021). Data-Driven Methodology for Coliving Spaces and Space Profiling Based on Post-Occupancy Evaluation through Digital Trail of Users. Sustainability, 13(22), Article 22. https://doi.org/10.3390/su132212607
- Regodón, A., García-Navalón, E., Santiso-Hernandez, J., Delgado-Rodriguez, E., & Garcia-Santos, A. (2021). Learnings from User Digital Trail Post-Occupancy Evaluation before COVID-19 for Future Workplace Analysis and Design. Buildings, 11(11), Article 11. https://doi.org/10.3390/buildings11110513
- Reimagining Human Experience. (2020). JLL. https://www.us.jll.com/en/trends-and-insights/research/global-workforce-expectations-shifting-due-to-covid-19. Accessible for download by providing business email address on the publisher's website.
- Rese, A., Görmar, L., & Herbig, A. (2022). Social networks in coworking spaces and individual coworker's creativity. Review of Managerial Science, 16(2), 391–428. https://doi.org/10.1007/s11846-021-00445-0
- Rese, A., Kopplin, C. S., & Nielebock, C. (2020). Factors influencing members' knowledge sharing and creative performance in coworking spaces. Journal of Knowledge Management, 24(9), 2327–2354. https://doi.org/10.1108/JKM-04-2020-0243
- Richardson, L. (2021). Coordinating office space: Digital technologies and the platformization of work. Environment and Planning D: Society and Space, 39(2), 347–365. https://doi.org/10.1177/0263775820959677
- Ridho, M. R., Cardiah, T. C., & Murdowo, D. M. (2022). Pengembangan Desain Interior Coworking Space Bandung Techno Park. eProceedings of Art & Design, 9(3). https://openlibrarypublications.telkomuniversity.ac.id/index.php/artdesign/article/view/17946/17579
- Riratanaphong, C. (2021). FACTORS INFLUENCING USER SATISFACTION: CASE STUDIES OF TEN COWORKING SPACES. Proceedings of International Structural Engineering and Construction, 8(1). https://doi.org/10.14455/ISEC.2021.8(1).FAM-04
- Robelski, S., de Jong, J., Harth, V., & Mache, S. (2022). Analyse ergonomischer Arbeitsplatzmerkmale in Coworking Spaces. Prävention und Gesundheitsförderung, 17(2), 171–177. https://doi.org/10.1007/s11553-021-00848-7

- Robelski, S., Keller, H., Harth, V., & Mache, S. (2019). Coworking Spaces: The Better Home Office? A Psychosocial and Health-Related Perspective on an Emerging Work Environment. International Journal of Environmental Research and Public Health, 16(13), 2379. https://doi.org/10.3390/ijerph16132379
- Robelski, S., Keller, H., Harth, V., & Mache, S. (2020). Ergonomische Arbeitsbedingungen in Coworking Spaces: Eine quantitative Analyse. In Kongressband zum 66. Frühjahrskongress der Gesellschaft für Arbeitswissenschaften (GfA) 2020. https://fis-uke.de/portal/de/publications/ergonomische-arbeitsbedingungen-in-coworking-spaces-eine-quantitative-analyse(dd85a54a-5902-4146-a816-0f6c7b5319e0).html
- Rodríguez-Modroño, P. (2021). Non-standard work in unconventional workspaces: Self-employed women in home-based businesses and coworking spaces. Urban Studies, 58(11), 2258–2275. https://doi.org/10.1177/00420980211007406
- Rose, P. (2020), Pillars of the Post-Pandemic Economy, Sovereign Wealth Funds.
- Rosencrans, K. (2019). Narratives of Ingenuity: Using Coworking Space Stories to See Systems Change. [Doctoral dissertation, Saybrook University]. https://www.proquest.com/openview/31eda70976423bdda627fed6b4ef2816/1?pq-origsite=gscholar&cbl=18750&diss=y
- Rossi, M. (2022). 6. Color and lighting in the new healthy domestic landscape. In DESIGNING BEHAVIOURS FOR WELL-BEING SPACES (pp. 112–111-137). https://series.francoangeli.it/index.php/oa/catalog/book/772
- Ruscella, J. J., & Obeid, M. F. (2021). A Taxonomy for Immersive Experience Design. 2021 7th International Conference of the Immersive Learning Research Network (iLRN), 1–5. IEEE. https://doi.org/10.23919/iLRN52045.2021.9459328
- Sailer, K. (2020, August 4). Covid will force us to reimagine the office. Let's get it right this time. The Guardian. https://www.theguardian.com/commentisfree/2020/aug/04/covid-reimagine-office-workplace-cubicles-hotdesking
- Sareen, S., & Müller, K. (Eds.). (2023). Digitisation and Low-Carbon Energy Transitions. Springer International Publishing. https://doi.org/10.1007/978-3-031-16708-9
- Scholz, J., & Smith, A. N. (2016). Augmented reality: Designing immersive experiences that maximize consumer engagement. Business Horizons, 59(2), 149–161. https://doi.org/10.1016/j.bushor.2015.10.003
- Seppälä, E., & McNichols, N. K. (2022, June 21). The Power of Healthy Relationships at Work. Harvard Business Review. https://hbr.org/2022/06/the-power-of-healthy-relationships-at-work

- Shin, D. (2019). How do users experience the interaction with an immersive screen? Computers in Human Behavior, 98, 302–310. https://doi.org/10.1016/j.chb.2018.11.010
- Simons, J., Major, J., Awomolo, O., Kneuven, T., Damashek, E., Collier, R., Chong, D., Kaiser, K., Nagy, Z., & Engels, N. (2023). Adjusting for Bias in the Workplace. Gensler. https://www.gensler.com/gri/bias-in-workplace-safe-spaces-for-black-employees. Accessible for download by providing business email address on the publisher's website.
- Slater, M., Lotto, B., Arnold, M., & Sanchez-Vives, M. V. (2009). How we experience immersive virtual environments: The concept of presence and its measurement. Anuario de Psicología. https://www.semanticscholar.org/paper/How-we-experience-immersive-virtual-environments%3A-*-Slater-Lotto/4e95e71a226dea2eddc1a85019652099867fbaee
- Spinuzzi, C. (2012). Working Alone Together: Coworking as Emergent Collaborative Activity. Journal of Business and Technical Communication, 26(4), 399–441. https://doi.org/10.1177/1050651912444070
- State of the Hybrid Workplace Report. (2021). VergeSense. https://www.vergesense.com/state-of-the-hybrid-workplace-report. Accessible for download by providing business email address on the publisher's website.
- State of the Workplace Data Report. (2022). VergeSense. https://www.vergesense.com/2022-state-of-the-workplace-data-report-download. Accessible for download by providing business email address on the publisher's website.
- Steed, A., Archer, D., Izzouzi, L., Numan, N., Shapiro, K., Swapp, D., Lammiman, D., & Lindeman, R. W. (2023). Immersive competence and immersive literacy: Exploring how users learn about immersive experiences. Frontiers in Virtual Reality, 4. https://doi.org/10.3389/frvir.2023.1129242
- Steed, A., Ortega, F. R., Williams, A. S., Kruijff, E., Stuerzlinger, W., Batmaz, A. U., Won, A. S., Rosenberg, E. S., Simeone, A. L., & Hayes, A. (2020). Evaluating immersive experiences during Covid-19 and beyond. Interactions, 27(4), 62–67. https://doi.org/10.1145/3406098
- Steffen, M., & Schulze, H. (2020). Workspace-Related Needs of Knowledge Workers–Based on Their Work Activity Profile. Future workspaces, 108. https://www.twrnetwork.org/wp-content/uploads/2020/11/TWR2020_Future_Workspaces_Ed2.pdf
- Stogner, M. B. (2011). "The Immersive Cultural Museum Experience – Creating Context and Story with New Media Technology." The International Journal of the Inclusive Museum, 3(3), 117–130. https://doi.org/10.18848/1835-2014/CGP/v03i03/44339
- Suh, A., & Prophet, J. (2018). The state of immersive technology research: A literature analysis. Computers in Human Behavior, 86, 77–90. https://doi.org/10.1016/j.chb.2018.04.019

- Sun, L., Axhausen, K. W., Lee, D.-H., & Huang, X. (2013). Understanding metropolitan patterns of daily encounters. Proceedings of the National Academy of Sciences, 110(34), 13774–13779. https://doi.org/10.1073/pnas.1306440110
- Tagliaro, C., Zhou, Y., & Hua, Y. (2020). Analyze group work activity pattern through work type and collaboration network in a large organization. Future workspaces, 162. https://www.twrnetwork.org/wp-content/uploads/2020/11/TWR2020_Future_Workspaces_Ed2.pdf
- Tay, L., & Diener, E. (2011). Needs and subjective well-being around the world. Journal of Personality and Social Psychology, 101(2), 354–365. https://doi.org/10.1037/a0023779
- Thao, V. T., Ohnmacht, T., von Arx, W., & Endrissat, N. (2019). "Local Office With Soul" -Business Model Innovation of Coworking Spaces in Switzerland. 3rd International Conference on Tourism and Business 2019, Thailand. https://www.researchgate.net/publication/340620928_Local_Office_With_Soul_-Business_Model_Innovation_of_Coworking_Spaces_in_Switzerland
- The A-Z of Future Workplace Design. (2020). JLL. https://www.jll.com.hk/en/trends-and-insights/research/the-a-z-of-future-workplace-design
- The Deloitte Global 2023 Gen Z and Millennial Survey. (2023). Deloitte. https://www.deloitte.com/global/en/issues/work/content/genzmillennialsurvey.html
- The emergent industrial metaverse. (2023). MIT Technology Review Insights, Siemens. https://www.siemens.com/global/en/company/digital-transformation/industrial-metaverse/the-emergent-industrial-metaverse.html
- The Future of Flex. (2021). JLL. https://www.jll.de/en/trends-and-insights/research/the-future-of-flex. Accessible for download by providing business email address on the publisher's website.
- The future of work is hybrid—Here's what that will look like. (2021, April 13). WeWork. https://www.wework.com/ideas/research-insights/research-studies/the-future-of-work-is-hybrid. Accessible for download by providing business email address on the publisher's website.
- The Future of Work Survey 2022. (2022). JLL. https://www.joneslanglasalle.com.cn/zh/trends-and-insights/research/jll-future-of-work-survey-2022. Accessible for download by providing business email address on the publisher's website.
- The great rebalancing: Priorities and work-life balance in a hybrid working environment. (2022). Economist Impact. https://impact.economist.com/projects/nextpectations/downloads/The_great_rebalancing.pdf
- The Hybrid Workplace Playbook. (2021). VergeSense. https://www.vergesense.com/en/hybrid-work-playbook. Accessible for download by providing business email address on the publisher's website.

- The Impact of COVID-19 on the Future of Work. (2020). Veldhoen + Company. Retrieved November 15, 2023, from https://www.veldhoencompany.com/impact-of-covid-19-on-activity-based-working. Accessible for download by providing business email address on the publisher's website.
- The Intersection of Digital and Spatial Immersion: Architecture of Pavilions at Expo Dubai 2020 | AM Journal of Art and Media Studies. (2023). https://fmkjournals.fmk.edu.rs/index.php/AM/article/view/59
- The Workplace Reset. (2023). Leesman Index. https://www.leesmanindex.com/publications/the-workplace-reset/. Accessible for download by providing business email address on the publisher's website.
- Thilakarathne, T. M. S. K., & Hettiarachchi, A. A. (2022). Environmental psychological considerations for people working in shared spaces; a study of co-working spaces: Concerning Colombo, Sri Lanka. 15th International Research Conference - FARU 2022, 205–213. https://doi.org/10.31705/FARU.2022.23
- Ting, C.-H., Chang, C.-L., & Huang, W.-T. (2019). Fact Affecting Comsumer's Experience within Tea House. Journal of Physics: Conference Series, 1168(3), 032014. https://doi.org/10.1088/1742-6596/1168/3/032014
- To be Future Fit. (2019). JLL. https://www.joneslanglasalle.com.cn/en/campaign/future-fit. Accessible for download by providing business email address on the publisher's website.
- Tremblay, D.-G., & Scaillerez, A. (2020). Coworking Spaces: New Places for Business Initiatives? Journal of Innovation Economics & Management, 31(1), 39–67. https://doi.org/10.3917/jie.pr1.0063
- Trunfio, M., Jung, T., & Campana, S. (2022). Mixed reality experiences in museums: Exploring the impact of functional elements of the devices on visitors' immersive experiences and post-experience behaviours. Information & Management, 59(8), 103698. https://doi.org/10.1016/j.im.2022.103698
- U.S. Workplace Survey 2020. (2020). Gensler. https://www.gensler.com/uploads/document/677/file/Gensler_US_WPS_Report_2020.pdf
- U.S. Workplace Survey 2022. (2022). Gensler. https://www.gensler.com/gri/us-workplace-survey-2022. Accessible for download by providing business email address on the publisher's website.
- van Meel, J. (2020). The Activity-Based Working Practice Guide. https://www.researchgate.net/publication/350400023_The_Activity-Based_Working_Practice_Guide
- Vaujany, F.-X. de, Haefliger, S., & Ungureanu, P. (2022). From Collaborative Spaces to New Modes of Organizing: Society, Democracy and Commons on the Way to Novelty. Post-Print, Article hal-03827462. https://ideas.repec.org//p/hal/journl/hal-03827462.html

- Ventura, S., Brivio, E., Riva, G., & Baños, R. M. (2019). Immersive Versus Non-immersive Experience: Exploring the Feasibility of Memory Assessment Through 360° Technology. Frontiers in Psychology, 10. https://www.frontiersin.org/articles/10.3389/fpsyg.2019.02509
- Verhulst, I., Woods, A., Whittaker, L., Bennett, J., & Dalton, P. (2021). Do VR and AR versions of an immersive cultural experience engender different user experiences? Computers in Human Behavior, 125, 106951. https://doi.org/10.1016/j.chb.2021.106951
- Vidaillet, B., & Bousalham, Y. (2020). Coworking spaces as places where economic diversity can be articulated: Towards a theory of syntopia. Organization, 27(1), 60–87. https://doi.org/10.1177/1350508418794003
- Waters-Lynch, J., & Duff, C. (2021). The affective commons of Coworking. Human Relations, 74(3), 383–404. https://doi.org/10.1177/0018726719894633
- Waters-Lynch, J., & Duff, C. (2021). The affective commons of Coworking. Human Relations, 74(3), 383–404. https://doi.org/10.1177/0018726719894633
- Weerasinghe, M., Čopič Pucihar, K., Ducasse, J., Quigley, A., Toniolo, A., Miguel, A., Caluya, N., & Kljun, M. (2023). Exploring the future building: Representational effects on projecting oneself into the future office space. Virtual Reality, 27(1), 51–70. https://doi.org/10.1007/s10055-022-00673-z
- Weijs-Perrée, M., van de Koevering, J., Appel-Meulenbroek, R., & Arentze, T. (2019). Analysing user preferences for co-working space characteristics. Building Research & Information, 47(5), 534–548. https://doi.org/10.1080/09613218.2018.1463750
- Woudhuysen, J. (1984, August 28). Tayloring People for Production. Design, 34–37. https://www.woudhuysen.com/tayloring-people-production/, https://www.woudhuysen.com/tayloring-people-production/
- Wu, D., Yang, J., Wang, H., Yang, B., & Wang, R. (2020). Terminal-Edge-Cloud Collaboration: An Enabling Technology for Robust Multimedia Streaming. 2020 16th International Conference on Mobility, Sensing and Networking (MSN), 427–434. https://doi.org/10.1109/MSN50589.2020.00075
- Xu, X.-Y., & Tayyab, S. M. U. (2021). How the intensity of the immersive experience impels the extent of Social Streaming App dependency? An empirical assessment with mediation and moderation effects. Telematics and Informatics, 63, 101661. https://doi.org/10.1016/j.tele.2021.101661
- Yacoub, G., & Haefliger, S. (2022). Coworking spaces and collaborative practices. Organization, 13505084221074037. https://doi.org/10.1177/13505084221074037

- Yang, E., Bisson, C., & Sanborn, B. E. (2019). Coworking space as a third-fourth place: Changing models of a hybrid space in corporate real estate. Journal of Corporate Real Estate, 21(4), 324–345. https://doi.org/10.1108/JCRE-12-2018-0051
- Yang, E., Sanborn, B. E., & Zhou, Y. (2022). The role of coworking spaces in the changing landscape of future workplace agility: Linking boundary organization theory and organizational development models. Journal of Corporate Real Estate, 25(2), 139–157. https://doi.org/10.1108/JCRE-12-2021-0046
- Zerella, S., von Treuer, K., & Albrecht, S. L. (2017). The influence of office layout features on employee perception of organizational culture. Journal of Environmental Psychology, 54, 1–10. https://doi.org/10.1016/j.jenvp.2017.08.004
- Zhang, C. (2020). The Why, What, and How of Immersive Experience. IEEE Access, 8, 90878–90888. https://doi.org/10.1109/ACCESS.2020.2993646
- Zhang, C., Hoel, A., & Perkis, A. (2016, June 8). Quality of Immersive Experience in Storytelling: A Framework. QoMEX 2016. https://www.researchgate.net/publication/305755105_Quality_of_Immersive_Experience_in_Storytelling_A_Framework
- Zhang, C., Perkis, A., & Arndt, S. (2017). Spatial immersion versus emotional immersion, which is more immersive? 2017 Ninth International Conference on Quality of Multimedia Experience (QoMEX), 1–6. IEEE. https://doi.org/10.1109/QoMEX.2017.7965655
- Zhao, F., Prentice, C., Wallis, J., Patel, A., & Waxin, M.-F. (2020). An integrative study of the implications of the rise of coworking spaces in smart cities. Entrepreneurship and Sustainability Issues, 8(2), 467–486. https://doi.org/10.9770/jesi.2020.8.2(28)
- Zheng, Z. (2023). Preserving the Past, Embracing the Future: A Study of the Design Solutions for Fostering Tea Culture Space in Modern Cities for the Younger Generation in China [Master's thesis, University of Alberta]. https://doi.org/10.7939/r3-2bw1-aq39
- Zhou, Y. (2019). A Taxonomy of Coworking Space: Manhattan, NYC. https://hdl.handle.net/1813/70837
- Zioulis, N., Alexiadis, D., Doumanoglou, A., Louizis, G., Apostolakis, K., Zarpalas, D., & Daras, P. (2016). 3D tele-immersion platform for interactive immersive experiences between remote users. 2016 IEEE International Conference on Image Processing (ICIP), 365–369. https://doi.org/10.1109/ICIP.2016.7532380

Sitography

- 11 future of work trends you need to know about. (n.d.). Workplace from Meta. Retrieved November 13, 2023, from https://en-gb.workplace.com/blog/future-of-work-trends
- 2023 Gen Z and Millennial Survey. (2023, May 17). Deloitte. https://www.deloitte.com/global/en/about/press-room/2023-gen-z-and-millenial-survey.html
- 4 Types of Collaborative Spaces. (2023, January 17). Haworth. https://www.haworth.com/na/en/spark/articles/2019/4-types-of-collaborative-spaces
- 5 Key Takeaways from the World's Largest Remote Work Conference. (2021, June 1). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/5-key-takeaways-from-the-worlds-largest-remote-work
- 5 ways companies are helping employees return to the office. (2021, October 19). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/five-ways-companies-are-helping-employees-return-to-the-office
- 6 Ideas to Design Offices for a Sensory Experience. (2022, May 31). https://www.sunonglobal.com/inspiration/ideas-and-tips/6-ideas-to-design-offices-for-a-sensory-experience
- A historical timeline of office design. (2019, May 17). Opencreatesspace. https://opencreatesspace.com/2019/05/17/office-design-timeline/
- A History of the Evolution of the Office Workplace: A 2023 Retrospective. (2023, March 20). Phase Two Space. https://www.phasetwospace.com/blog/a-history-of-the-evolution-of-the-office-workplace-a-2023-retrospective-phase-two
- A Look Back: 2022 Global Workplace Trends. (2023, January 17). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/occupancy-insights/2023-workplace-trends
- A Short History of Agile. (2023, March 9). Agile Alliance. https://www.agilealliance.org/a-short-history-of-agile/
- A workplace with heart. (n.d.). Gensler. Retrieved November 14, 2023, from https://dxd.gensler.com/insights/a-workplace-with-heart
- ABW Case Study: Bankwest. (n.d.). Veldhoen + Company. Retrieved November 21, 2023, from https://www.veldhoencompany.com/case-studies-bankwest-happy-banking-happy-work
- ABW Case Study: PwC Netherlands. (n.d.). Veldhoen + Company. Retrieved November 21, 2023, from https://www.veldhoencompany.com/case-studies-pwc-netherlands

- Activating the Workspace for Activity-Based Working: DBS Singapore. (n.d.). Gensler. Retrieved November 21, 2023, from https://www.gensler.com/projects/dbs-singapore-change-management
- Activity Based Working & Agile Working explained. (2023, August 29). Veldhoen + Company. https://www.veldhoencompany.com/blog/activity-based-working-and-agile-explained
- Activity Based Working | What is it? . (n.d.). Veldhoen + Company. Retrieved November 15, 2023, from https://www.veldhoencompany.com/activity-based-working
- Activity Based Working and Office Design. (n.d.). Modus. Retrieved November 16, 2023, from https://www.modus.space/blog/activity-based-working-and-what-that-means-for-office-design/
- Activity Based Working. (2017, May 22). Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/activity-based-working-changing-workplace-design
- Activity Based Working. (n.d.). Ahrend. Retrieved November 16, 2023, from https://www.ahrend.com/en/expertise/activity-based-working/
- Adams, D. K. (2023, May 2). 4 Ways To Capture Hearts And Minds In A Hybrid And Remote World. Forbes. https://www.forbes.com/sites/forbeshumanresourcescouncil/2023/05/02/4-ways-to-capture-hearts-and-minds-in-a-hybrid-and-remote-world/
- Advantages of Activity-Based Working. (2023, May 22). Truworth Wellness https://www.truworthwellness.com/blog/activity-based-working/
- AIKINS, M. (2019, June 6). How The Workplace Can Help Combat SAD. SDI Interior Design & Project Coordination. http://www.sdi-design.com/ideas22/sad-at-work
- Ali, A. (2020, March 11). How Office Design Can Impact Employee Wellness. Allwork. https://allwork.space/2020/03/how-office-design-can-impact-employee-wellness/
- Ali, A. (2023, February 23). 3 Steps To Build A Three-Dimensional Hybrid Workplace. Work Design Magazine. https://allwork.space/2023/01/3-steps-to-build-a-three-dimensional-hybrid-workplace/
- Andreasyan, A. (2023, May 1). Three Reasons Remote Work Is Not The Solution You Think It Is. Forbes. https://www.forbes.com/sites/forbesbusinesscouncil/2023/05/01/three-reasons-remote-work-is-not-the-solution-you-think-it-is/
- Angelopoulou, S. L. (2018, November 4). Daewha kang design's experimental workspace combines biophilic principles with technology. Designboom | Architecture & Design Magazine. https://www.designboom.com/architecture/daewha-kang-design-experimental-workspace-biophilic-technology-shard-11-04-2018/

- Antonini, M. C. (2019, February 20). Meet Milan Design Week's Newest District: La Repubblica del Design. ELLE Decor. https://www.elledecor.com/it/best-of/a26471757/milan-design-week-fuorisalone-2019-dergano-bovisa-repubblica-del-design/
- ANZ Centre – Interior. (2020, April 20). INDE.Awards. https://www.indeawards.com/best-of-the-decade-the-work-space-2020/anz-centre-interior/
- Artlist Office / Switchup. (2022, March 31). ArchDaily. https://www.archdaily.com/979398/artlist-office-switchup
- Ascott, E. (2021, August 20). Future Of Work: VR In The Workplace Can Reduce Staff Training Time By Up To 60%. Allwork.Space. https://allwork.space/2021/08/future-of-work-vr-in-the-workplace-can-reduce-staff-training-time-by-up-to-60/
- Ascott, E. (2022, January 28). 10 Things You Need To Know About The Metaverse. Work Design Magazine. https://allwork.space/2022/01/10-things-you-need-to-know-about-the-metaverse/
- Ascott, E. (2022, September 29). Tips To Achieve Sustainable Biophilic Design Vs. Greenwashed Aesthetics. Work Design Magazine. https://allwork.space/2022/09/follow-these-tips-to-achieve-sustainable-biophilic-design-vs-greenwashed-aesthetics/
- Avia, R. K. (2023, January 18). How the Future of Work Is Influencing Workplace Design. Gensler. https://www.gensler.com/blog/how-the-future-of-work-is-influencing-workplace-design
- Baillon, C. (2021, June 18). The Evolution of the Modern Office – How the Modern Office has Evolved over the last 100 years. Spacestor. https://spacestor.com/insights/industry-trends/Evolution-of-Modern-Office-Design/
- Ball, M. (2020, January 13). The Metaverse: What It Is, Where to Find it, and Who Will Build It. MatthewBall.Co. https://www.matthewball.vc/all/themetaverse
- Bartlett, I. (2022, December 29). 2023 Trends: Creating Places for Privacy in the Collaborative Office. Work Design Magazine. https://www.workdesign.com/2022/12/2023-trends-creating-places-for-privacy-in-the-collaborative-office/
- Batti, K. (2020, February 6). Council Post: How Technology Could Impact The Workplace Over The Next Decade. Forbes. https://www.forbes.com/sites/forbestechcouncil/2020/02/06/how-technology-could-impact-the-workplace-over-the-next-decade/
- BCG UnOffice: A journey into user-driven workspace design. (n.d.). Space Matrix. Retrieved November 20, 2023, from https://www.spacematrix.com/cn/content/bcg-unoffice

- Bear, L. (2019, September 24). How to future-proof your workplace design. Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/how-to-future-proof-your-workplace-design
- Beckmann, G. (2022, August 24). Farbkonzept: Gestalten Sie Ihr Zuhause mit Farben zum Strahlen. Designfunktion. https://www.designfunktion.de/blog/farbkonzept
- Best Practices for Bringing Employees Back to the Office. (2022, November 18). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/best-practices-for-bringing-employees-back-to-the-office
- Bliss, L. (2018, February 5). How WeWork Has Perfectly Captured the Millennial Id. The Atlantic. https://www.theatlantic.com/magazine/archive/2018/03/wework-the-perfect-manifestation-of-the-millennial-id/550922/
- Bob Weis, Former President of Walt Disney Imagineering, on Immersive Experiences and the Story of Our Cities and Spaces. (2023, January 12). Gensler. https://www.gensler.com/blog/bob-weis-on-immersive-experience-design
- Boucher, B. Build a place of experience for your people. (2017, January 10). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/build-a-place-of-experience-for-your-people
- Bringing privacy to the open plan office. (2017, May 12). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/bringing-privacy-to-the-open-plan-office
- Brink, E., Engels, N., Heinly, J. K., & McLaurin, J. P. (2022, July 11). Why It's Time to Demand More From Our Workplace Experience. Gensler. https://www.gensler.com/blog/why-its-time-to-demand-more-from-our-workplace-experience
- Brink, N. (2015, February 23). Dave keune adapts design innovation space for flexible office use. Designboom | Architecture & Design Magazine. https://www.designboom.com/design/design-innovation-space-dave-keune-02-23-2015/
- Brower, T. (2017, September 8). Inspiring Spaces to Boost Creative Confidence. Work Design Magazine. https://www.workdesign.com/2017/09/inspiring-spaces-to-boost-creative-confidence/
- Brower, T. (2021, April 12). What The CEO Of Radio Flyer Can Teach Us About Happiness And Work-Life. Forbes. https://www.forbes.com/sites/tracybrower/2021/04/12/what-the-ceo-of-radio-flyer-can-teach-us-about-happiness-and-work-life/
- Brower, T. (2021, April 4). How To Build Relationships And Enhance Happiness: 4 Insights From Neuroscience. Forbes. https://www.forbes.com/sites/tracybrower/2021/04/04/how-to-build-relationships-and-enhance-happiness-4-insights-from-neuroscience/

- Brower, T. (2021, February 7). The Future Of Work And The New Workplace: How To Make Work Better. Forbes. https://www.forbes.com/sites/tracybrower/2021/02/07/the-future-of-work-and-the-new-workplace-how-to-make-work-better/
- Brower, T. (2021, July 25). How To Be More Creative And Boost Happiness: 6 Ways To Get Inspired. Forbes. https://www.forbes.com/sites/tracybrower/2021/07/25/how-to-be-more-creative-and-boost-happiness-6-ways-to-get-inspired/
- Brower, T. (2022, April 17). Better Benefits In A Hybrid World: Here's What You Can Demand. Forbes. https://www.forbes.com/sites/tracybrower/2022/04/17/better-benefits-in-a-hybrid-world-heres-what-you-can-demand/
- Brower, T. (2022, June 23). 5 factors to consider if you're debating returning to the office. Fast Company. https://www.fastcompany.com/90763464/5-factors-to-consider-if-youre-debating-returning-to-the-office
- Brower, T. (2023, April 30). Why art may be the secret to better stress management. Fast Company. https://www.fastcompany.com/90888281/why-art-may-be-the-secret-to-better-stress-management
- Brower, T. (2020, July 2). Why Coworking Is Still Relevant: Lessons for the Future of Work. Work Design Magazine. https://www.workdesign.com/2020/07/why-coworking-is-still-relevant-lessons-for-the-future-of-work/
- Brower, T. (2021, January 14). Work Better: Expanded Expectations for Wellbeing at Work. Work Design Magazine. https://www.workdesign.com/2021/01/work-better-expanded-expectations-for-wellbeing-at-work/
- Brower, T. (2021, April 25). Create Great Experiences That Make People Want To Return To The Office. Forbes. https://www.forbes.com/sites/tracybrower/2021/04/25/create-great-experiences-that-make-people-want-to-return-to-the-office/
- Brower, T. (2021, June 6). To Bring People Back, Your Office Must Change: Here's How. Forbes. https://www.forbes.com/sites/tracybrower/2021/06/06/to-bring-people-back-your-office-must-change-heres-how/
- Brower, T. (2022, Jan 23). More Than A Clubhouse: 7 Purposes For The Post-Pandemic Office. Forbes. https://www.forbes.com/sites/tracybrower/2022/01/23/more-than-a-clubhouse-7-purposes-for-the-post-pandemic-office/
- Brower, T. (2023, August 8). The business benefits of employee well-being. Newsweek. https://www.newsweek.com/business-benefits-employee-well-being-1817363

- Buffington, M. (2023, April 6). Technology has Changed the Way we Work: Some Good, Some Bad. LinkedIn. https://www.linkedin.com/pulse/technology-has-changed-way-we-work-some-good-bad-matt-buffington/
- Bulchandani, S. (2022, December 8). Workplace Design Best Practices. VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/workplace-design-best-practices
- Byun, A., & Silvester, K. (2022, December 7). Experimentation in the Workplace: Adopting a Software Mindset. Gensler. https://www.gensler.com/blog/experimentation-in-the-workplace-adopting-a-software-mindset
- Can a four-day workweek revitalise working life? (2022, February 16). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/can-a-four-day-workweek-revitalise-working-life
- Can companies design a happy workplace? (2017, July 28). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/can-companies-design-a-happy-workplace
- Can your surroundings make you more creative? (2021, February 10). Spaces. https://www.spacesworks.com/can-your-surroundings-make-you-more-creative/
- Carroll, A., & Giannetti, R. (2021, November 4). The Future of Work Is Flexible. Gensler. https://www.gensler.com/blog/the-future-of-work-is-flexible
- Carroll, T. (2017, August 31). It's the workplace, but not as we know it. JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/its-the-workplace-but-not-as-we-know-it
- Center for Universal Design. (n.d.). North Carolina State University. Retrieved November 21, 2023, from https://design.ncsu.edu/research/center-for-universal-design/
- Chavez, J. (2010, November 9). Coworking: You could work from home but don't want to. The Seattle Times. https://www.seattletimes.com/business/coworking-you-could-work-from-home-but-dont-want-to/
- Cherney, M. A. (2021, November 9). Nvidia launches Omniverse for enterprise collaboration—Protocol. Protocol. https://www.protocol.com/enterprise/nvidia-omniverse-gtc-enterprise
- Cherney, M. A. (2021, November 9). Nvidia's Omniverse design collaboration tool is ready for the enterprise. Protocol. https://www.protocol.com/enterprise/nvidia-omniverse-gtc-enterprise
- Chiang, A. (2019, January 30). Rethinking the Relationship Between Service Design and Space Design. Cantina. https://cantina.co/rethinking-the-relationship-between-service-design-and-space-design/
- Church, G. (2021, December 16). Here's Why The World Of Work Could Be The Perfect Environment To Introduce The Metaverse To The Masses. Work Design Magazine. https://allwork.space/2021/11/heres-why-the-world-of-work-could-be-the-perfect-environment-to-introduce-the-metaverse-to-the-masses/

- Club Office: Concept, origin, composition. (2021, June 10). Weixin Official Accounts Platform. https://mp.weixin.qq.com/s/qXTmUu88KgebHak_RA6N0w
- Connected Environments. (n.d.). Gensler. Retrieved November 13, 2023, from https://dxd.gensler.com/solutions/connected-environments
- Covarrubias, S. (2023, June 01). Why Inclusive Design Is Critical to Workplace Transformation. Gensler. https://www.gensler.com/blog/why-inclusive-design-is-critical-to-workplace-transformation
- Creating an accessible and inclusive workplace. (n.d.). IncludeAbility. Retrieved November 20, 2023, from https://includeability.gov.au/resources-employers/creating-accessible-and-inclusive-workplace
- Creating an Accessible and Welcoming Workplace. (n.d.). Employer Assistance and Resource Network on Disability Inclusion. Retrieved November 21, 2023, from https://askearn.org/page/creating-an-accessible-and-welcoming-workplace
- Creating Spaces for Employee Wellbeing. VergeSense. Retrieved July 5, 2022, from https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/creating-spaces-for-employee-wellbeing
- Creating value with the workplace. (2016, December 13). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/creating-value-with-the-workplace
- Creative spaces that inspire the best ideas. (2021, March). ACTIU. https://www.actiu.com/en/articles/creative-spaces-that-inspire-the-best-ideas
- Cresswell, H. (2020, July 24). What does Activity Based Working (ABW) really mean? Smartway2. https://smartway2.com/blog/what-is-activity-based-working-abw/
- Dare, P. (2017, October 18). Hot desking vs agile working. Morgan Lovell. https://www.morganlovell.co.uk/insights/hot-desking-vs-agile-working
- Decompression Area: Ideas for Leisure and Rest Environments in the Office. (2022, May 4). ArchDaily. https://www.archdaily.com/981025/decompression-area-ideas-for-leisure-and-rest-environments-in-the-office
- deHahn, J. (2022, July 18). Optimizing Hybrid Meetings for Neurodiversity and Inclusion at Work. Gensler. https://www.gensler.com/blog/optimizing-hybrid-meetings-for-neurodiversity-and-inclusion
- Delaney, K. J. (2023, February 13). How Offices Are Using Less, Better Space. Time. https://time.com/charter/6255144/how-offices-are-using-less-better-space/
- Delaney, K. J. (2023, January 23). How IDEO's Chief Creative Officer Makes In-Office Time Better. Time. https://time.com/charter/6249965/ideo-paul-bennett/
- Delfino, S. (2023, June 1). The Workplace Cafeteria: The All-In-One Collaboration Space. Work Design Magazine. https://www.workdesign.com/2023/06/the-workplace-cafeteria-the-all-in-one-collaboration-space/

- Design Forecast 2022: Digital Experience Design. (n.d.). Gensler. Retrieved November 21, 2023, from https://www.gensler.com/design-forecast-2022-digital-experience-design
- Designing a Better Work Experience. (2021, March 16). Steelcase. https://www.steelcase.com/asia-en/research/articles/topics/design/designing-better-work-experience/
- Developers transforming office buildings with co-working. (2021, January 1). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/developers-transforming-office-buildings-co-working
- Diallo, T.(2020, August 12). Why it's time to switch to activity-based work. Robin Powered. https://robinpowered.com/blog/guide-to-activity-based-work
- Digital, C. (n.d.). NAB Place Melbourne. Hassell. Retrieved November 21, 2023, from https://www.hassellstudio.com/project/nab-place-melbourne
- DiLeo, S., Hubbard, N., & Reese, B. (2023, May 23). Rethinking Engagement: Strategies for Immersive Design. Gensler. https://www.gensler.com/blog/rethinking-engagement-strategies-for-immersive-design
- Dishman, L. (2021, September 20). Hate the thought of returning to your cubicle? Thank medieval monks. Fast Company. https://www.fastcompany.com/90236769/hate-your-cubicle-thank-medieval-monks
- Dizikes, P. (2017, July 10). Proximity boosts collaboration on MIT campus. MIT News | Massachusetts Institute of Technology. https://news.mit.edu/2017/proximity-boosts-collaboration-mit-campus-0710
- Donoghue, R. (2023, March 16). Commuting to the Metaverse: 3 Considerations for Designing a Virtual Office. Work Design Magazine. https://www.workdesign.com/2023/03/commuting-to-the-metaverse-3-considerations-for-designing-a-virtual-office/
- Dubisar, K., & Gallimore, G. (2020, November 18). A Workplace With Heart: Inclusive, Connected, and Unmuted. Gensler. https://www.gensler.com/blog/a-workplace-with-heart-inclusive-connected-and-unmuted
- Ellerbeck, S. (2023, May 2). Here's what we've learned from 3 years of working remotely. World Economic Forum. https://www.weforum.org/agenda/2023/05/remote-hybrid-working-home/
- Elliott B. (2020, September 1). Slack launches the Future Forum to create a better way to work. Slack. https://slack.com/intl/zh-cn/blog/news/slack-launches-the-future-forum
- Embrace technology or be left behind. (2017, January 19). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/embrace-technology-or-be-left-behind

- Employees Need High Wellbeing for High Performance. (n.d.). Gallup. Retrieved November 20, 2023, from https://www.gallup.com/workplace/215924/well-being.aspx
- Engels, N., & Gallivan, S. (2023, April 12). Adobe's Founders Tower Provides a Glimpse Into the Future of Work. Gensler. https://www.gensler.com/blog/adobes-founders-tower-a-glimpse-into-the-future-of-work
- Epstein, R. (2022, December 7). 2023 Workplace Trends: The Meta World. Work Design Magazine. https://www.workdesign.com/2022/12/2023-workplace-trends-the-meta-world/
- Evolution of office design. (2021, December 14). SKV India. https://skvindia.com/blog/evolution-of-office-design/
- Fisher, K. I., & Noval, F. (2022, September 26). The Future of Office and Lab Space Has No Boundaries. Gensler. https://www.gensler.com/blog/the-future-of-office-and-lab-space-has-no-boundaries
- Fisico, psicologico, relazionale. I nuovi spazi di lavoro post covid-19 punteranno su questi tre ambiti. (2020, May 19). Archiportale. https://www.archiportale.com/news/2020/05/architettura/fisico-psicologico-relazionale.-i-nuovi-spazi-di-lavoro-post-covid-19-punteranno-su-questi-tre-ambiti_76494_3.html
- Five lessons from neuroscience to boost office productivity. (2018, May 29). Spaceoasis Ltd. https://www.spaceoasis.com/news/2018/05/five-lessons-from-neuroscience-to-boost-office-productivity/
- Flexible office is a powerful part of workplace strategy. (2022, September 16). WeWork. https://www.wework.com/ideas/research-insights/flexible-office-is-a-powerful-part-of-workplace-strategy-gated
- Flexible Spaces Are Becoming The New Normal. (2023, January 17). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/2023-predictions-flexible-spaces
- Foster, S. (n.d.). Sensory design for offices—It's child's play. M Moser Associates. Retrieved November 21, 2023, from https://www.mmoser.com/ideas/sensory-design-in-the-office/
- Frankfurt, Stuttgart, and Munich Studios Through the Lens of Marc Goodwin. (2022, September 27). ArchDaily. https://www.archdaily.com/988457/frankfurt-stuttgart-and-munich-studios-through-the-lens-of-marc-goodwin
- Fredrickson, T. (2014, June 21). KNOL conducts out of office as experiment on work environments. Designboom | Architecture & Design Magazine. https://www.designboom.com/design/knol-out-of-office-06-21-2014/
- From sterile to social: How scientific workplaces are changing. (2023, March 27). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/from-sterile-to-social-how-scientific-workplaces-are-changing

- Gallimore, G., & Hubbard, N. (2022, October 20). The Infinite Office: How the Metaverse Connects Us, in Real Life. Gensler. https://www.gensler.com/blog/infinite-office-how-the-metaverse-connects-us-in-real-life
- Gastoldi, M. (2023, August 09). Why Biophilic Design Is Crucial in the Workplace and Beyond. Gensler. https://www.gensler.com/blog/why-biophilic-design-is-crucial-in-workplace
- Gauthier, J. (2022, December 21). 2023 Trends: Supporting Neurodiversity in the Workplace. Work Design Magazine. https://www.workdesign.com/2022/12/2023-trends-supporting-neurodiversity-in-the-workplace/
- Gen Z don't want to work for you. Here's how to fix that. (2022, May 19). World Economic Forum. https://www.weforum.org/agenda/2022/05/gen-z-don-t-want-to-work-for-you-here-s-how-to-change-their-mind/
- Generation Z is stressed, depressed and exam-obsessed. (2019, February 27). The Economist. https://www.economist.com/graphic-detail/2019/02/27/generation-z-is-stressed-depressed-and-exam-obsessed
- Global Millennial & Gen Z Survey 2022 | Deloitte Insights. (2022, May 18). Deloitte. https://www.deloitte.com/conf/modern/settings/wcm/templates/modern--di-research-template/initial.html
- Global millennial survey 2021 | Deloitte Insights. (2021, June 15). Deloitte. https://www.deloitte.com/conf/modern/settings/wcm/templates/modern--di-research-template/initial.html
- Guard, G. (2015, July 23). The Evolution of the Office Cubicle. ROSI Blog Archives. https://www.rosiinc.com/blog/the-evolution-of-the-office-cubicle/
- Gunasekera, T. (2021, March 29). Workplace wellbeing: What the future holds for the hybrid workplace. Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/workplace-wellbeing-what-the-future-holds-for-the-hybrid-workplace
- Gusain, A. S. (n.d.). Work from home to work from anywhere: The future of co-working spaces. ORF. Retrieved November 20, 2023, from https://www.orfonline.org/expert-speak/work-home-anywhere-future-coworking-spaces/
- Hala, M. (2020, November 23). Activity-Based Working in the post pandemic era. Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/our-insight/activity-based-working-in-the-post-pandemic-era
- Hanc, M. (2021, July). What is the purpose of the office? Leesman Index. https://www.leesmanindex.com/what-is-the-purpose-of-the-office/
- Hate your open plan office? Here's how to fix it. (2023, March 30). BOOQED. https://www.booqed.com/blog/open-office-problems-why-activity-based-workspaces-are-on-the-rise

- HAZAN, N. (2019, May 6). The Essential Guide To: Activity Based Working. SDI Interior Design & Project Coordination. http://www.sdi-design.com/ideas22/activitybasedwork
- Heath, A. (2021, October 20). Facebook is planning to rebrand with a new name. The Verge. https://www.theverge.com/2021/10/19/22735612/facebook-change-company-name-metaverse
- Hitch, A. (2020, August 14). Workplace stress and the millennial. Deloitte. https://www.deloitte.com/global/en/about/people/blogs/workplace-stress-and-the-millennial.html
- Hogarty, S. (2021, August 19). What is office hoteling? And is it similar to hot desking? WeWork. https://www.wework.com/ideas/workspace-solutions/flexible-products/what-is-office-hoteling-and-is-it-similar-to-hot-desking
- Hogarty, S. (2021, July 14). What is a collaboration hub? WeWork. https://www.wework.com/ideas/workspace-solutions/flexible-products/what-is-a-collaboration-hub
- Hogarty, S. Technology in the workplace: Its advantages, importance, and influence. (2022, August 30). WeWork. https://www.wework.com/ideas/professional-development/business-solutions/technology-in-the-workplace-its-advantages-importance-and-influence
- Hogarty, S., What is a collaboration hub? (2021, July 14). WeWork. https://www.wework.com/ideas/workspace-solutions/flexible-products/what-is-a-collaboration-hub
- Hong Kong University of Science and Technology Guangzhou Campus Red Bird Maker Space. (2023, October 25). ArchDaily. https://www.archdaily.cn/cn/1008799/xiang-gang-ke-ji-da-xue-yan-zhou-xiao-qu-hong-niao-chuang-ke-kong-jian-remix-lin-jie-gong-zuo-shi
- Hopper, E. (2020, February 24). Maslow's Hierarchy of Needs Explained. ThoughtCo. https://www.thoughtco.com/maslows-hierarchy-of-needs-4582571
- Horizon Workrooms virtual office and meetings. (n.d.). Meta for Work. Retrieved November 21, 2023, from https://forwork.meta.com/horizon-workrooms/
- Horn, M. B. (2022, July 6). Meet the Metaverse. The Future of Education. https://michaelbhorn.substack.com/p/meet-the-metaverse?utm_medium=reader2
- Hornsey, J. (2020, September 16). Flexible working and wellbeing in the future workplace. Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/flexible-working-and-wellbeing-in-the-future-workplace
- How a new type of coworker is changing office life. (2016, May 3). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/how-a-new-type-of-coworker-is-changing-office-life

- How active offices are getting people moving. (2016, May 30). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/how-active-offices-are-getting-people-moving
- How Activity-Based Working Is Impacting Workplace Wellness. (2019, December 12). Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/how-activity-based-working-is-impacting-workplace-wellness
- How can I get people back into the office? (2023, June 28). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/how-can-i-get-people-back-into-the-office
- How can you ensure your workplace design is inclusive and accessible? (n.d.). LinkedIn. Retrieved November 21, 2023, from https://www.linkedin.com/advice/0/how-can-you-ensure-your-workplace-design-inclusive-0uexf
- How companies are bringing a buzz back to office working. (2022, February 8). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/how-companies-are-bringing-a-buzz-back-to-office-working
- How companies are fostering wellbeing in the workplace. (2017, July 17). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/how-companies-are-fostering-wellbeing-in-the-workplace
- How coronavirus is driving new workplaces and workforces. (2020, April 14). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/how-coronavirus-is-driving-new-workplaces-and-workforces
- How do you choose between working in the Metaverse and going to the office? (2022, August 2). 36kr. https://36kr.com/p/1853546591080322
- How meeting rooms are getting a modern makeover. (2020, February 5). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/how-meeting-rooms-are-getting-a-modern-makeover
- How researchers use virtual reality to capture a 'vibe.' (2019, July 31). WeWork. https://www.wework.com/ideas/research-insights/research-studies/how-researchers-use-virtual-reality-to-capture-a-vibe
- How the office experience makes Gartner R&D centers truly talent-centric workplaces. (n.d.). Space Matrix. Retrieved November 20, 2023, from https://www.spacematrix.com/cn/content/gartner-r-and-d-hub
- How the smart home is influencing the smart office. (2019, October 30). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/how-the-smart-home-is-influencing-the-smart-office
- How the workplace can support Diversity and Inclusion. (2017, September 7). https://www.jll.it/it/tendenze-e-ricerca/workplace/how-the-workplace-can-support-diversity-and-inclusion
- How third places are becoming mainstream. (2022, June 13). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/how-third-places-are-becoming-mainstream

- How to Calculate Your Ideal Employee-to-Seat Ratio. (2022, April 21). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/calculating-ideal-employee-to-seat-ratio
- How to Design a Workplace to Support Activity-Based Working. (2022, July 6). Cloudbooking. https://cloudbooking.com/blogs/how-to-design-a-workplace-to-support-activity-based-working/
- How to Design the Best Huddle Room for Your Workplace. (2022, July 11). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/how-to-design-the-best-huddle-room-for-your-workplace
- Howell, T. (2021, November 4). Coworking Spaces Offer a Post-Pandemic Office Alternative. MIT Sloan Management Review. https://sloanreview.mit.edu/article/coworking-spaces-offer-a-post-pandemic-office-alternative/
- Howren, R. (2023, January 4). 2023 Trends: A Well-Being Approach Vs. A Wellness Program. Work Design Magazine. https://www.workdesign.com/2023/01/2023-trends-a-well-being-approach-vs-a-wellness-program/
- Hubbell, D. (2022, December 13). A WeWork space with a neighborhood vibe, inside and out. WeWork. https://www.wework.com/ideas/workspace-solutions/flexible-products/a-wework-space-with-a-neighborhood-vibe-inside-and-out
- Hunter, T. (2023, March 9). What's a scanner? Gen Z is discovering workplace tech. Washington Post. https://www.washingtonpost.com/technology/2023/03/08/office-tech-young-old/
- Hybrid collaboration guide. (2021). Steelcase. https://www.steelcase.com/asia-zh/hybrid-collaboration-guide/. Accessible for download by providing business email address on the publisher's website.
- Hybrid Collaboration Is Hard. (2021, July 13). Steelcase. https://www.steelcase.com/eu-en/research/articles/topics/hybrid-work/hybrid-collaboration-hard/
- Inclusion & Diversity at WeWork. (n.d.). WeWork. Retrieved November 19, 2023, from https://www.wework.com/info/inclusion
- Interactions in the Metaverse. (2022, May 17). Medium. https://medium.com/@freedomx/interactions-in-the-metaverse-382799ad985e
- Interior for Amber Office / Atelier van Berlo. (2022, May 15). ArchDaily. https://www.archdaily.com/981848/interior-for-amber-office-atelier-van-berlo
- Iqbal, M. Z., & Campbell, A. G. (2022). Metaverse as Tech for Good: Current Progress and Emerging Opportunities (SSRN Scholarly Paper 4150689). https://doi.org/10.2139/ssrn.4150689

- Is Your Workplace Right-Sized? (2022, April 7). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/is-your-workplace-right-sized
- It's official: Remote working is here to stay. (2020, December 10). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/its-official-remote-working-is-here-to-stay
- Jahansouz, M., & Osmond, T. (2020, October 12). Returning to the office: How WeWork is making it happen. WeWork. https://www.wework.com/ideas/research-insights/research-studies/returning-to-the-office-how-wework-is-making-it-happen
- JIDU ROBOVERSE Sanlitun Experience Center. (n.d.). Gensler. Retrieved November 21, 2023, from https://www.gensler.com/projects/jidu-roboverse-sanlitun-experience-center
- JLL Staff Reporter. Staying on top of change: Five ways to futureproof the workplace. (2017, February 7). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/staying-on-top-of-change-five-ways-to-futureproof-the-workplace
- Johnson, S. (2023, March 22). Workplace Acoustics: A Tool To Draw Employees Back To The Office. Work Design Magazine. https://www.workdesign.com/2023/03/workplace-acoustics-a-tool-to-draw-employees-back-to-the-office/
- Kalita, S. M. (2022, October 25). The Plight of the Wall Street Worker Forced Back to the Office. Time. https://time.com/charter/6224301/wall-street-office-return/
- Kerr, A. (2023, August 17). Adapting Workspaces For the Next Generation. Work Design Magazine. https://www.workdesign.com/2023/08/adapting-workspaces-for-the-next-generation/
- Kidd, J., & Nieto McAvoy, E. (2019, November 14). Immersive experiences in museums, galleries and heritage sites: A review of research findings and issues. Creative Industries Policy & Evidence Centre. https://pec.ac.uk/discussion-papers/immersive-experiences-in-museums-galleries-and-heritage-sites-a-review-of-research-findings-and-issues
- Kohlstedt, K. (2017, November 20). Office Space Time Loop: From Open Plans to Cubicle Farms and Back Again. 99% Invisible. https://99percentinvisible.org/article/office-space-time-loop-open-plans-cubicle-farms-back/
- Kuehn, E. (2016, February 22). Research into our sense of touch leads to new treatments for autism. Science in the News. https://sitn.hms.harvard.edu/flash/2016/research-into-our-sense-of-touch-leads-to-new-treatments-for-autism/
- Kuitert, F., & Heuschkel, F. (2021, May 11). How the two-day office responds to the rise of hybrid work. Frame Magazine. https://frameweb.com/article/how-the-two-day-office-responds-to-the-rise-of-hybrid-work

- Kurvey, D., & Lustgarten, E. (2021, September 27). Beyond the Lab Module: What Scientists Want From New-Age Lab Buildings. Gensler. https://www.gensler.com/blog/beyond-the-lab-module-what-scientists-want-from-new-age-lab
- Laatz, T. (2023, June 29). Lessons Learned from the Coworking Revolution. Work Design Magazine. https://www.workdesign.com/2023/06/lessons-learned-from-the-coworking-revolution/
- Laroui, F. (2020, January 8). The history of office design: From home offices to remote working. eXo Platform. https://www.exoplatform.com/blog/the-history-of-office-design-from-home-offices-to-remote-working/
- Lavoro. Milano sperimenta nuovi spazi e modi di lavorare per una città a 15 minuti. (2021, March 15). Comune di Milano. https://www.comune.milano.it/-/lavoro.-milano-sperimenta-nuovi-spazi-e-modi-di-lavorare-per-una-citta-a-15-minuti
- Lawton, G. (2022, November 18). How Will the Metaverse Have an Impact on the Future of Work? TechTarget. https://www.techtarget.com/searchcio/tip/How-will-the-metaverse-affect-the-future-of-work
- Lehewych, D. (2022, November 24). Meta Wants To Fix Ongoing Zoom Fatigue—But You'll Be Waiting A While. Work Design Magazine. https://allwork.space/2022/11/meta-wants-to-fix-ongoing-zoom-fatigue-but-youll-be-waiting-a-while/
- Leveling the playing field in the hybrid workplace. (2022, January 25). Future Forum. https://futureforum.com/research/leveling-the-playing-field-in-the-hybrid-workplace/
- Leveraging Technological Advancements to Bring Workers Back to Office. (2022, March 16). ArchDaily. https://www.archdaily.com/978646/leveraging-technological-advancements-to-bring-workers-back-to-office
- Lewis, S., Burnett, S., & Waters, K. (2022, October 20). The Hospitality-Driven Workplace. Gensler. https://www.gensler.com/blog/the-hospitality-driven-workplace
- Li, W. (2021, April 14). BMW Group and Nvidia jointly build a virtual factory to create digital models before building cars. https://www.jiemian.com/article/5948868.html
- Light, A. (2020, December 16). The office of the future: Transform your workplace for changing space requirements. Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/the-office-of-the-future-transform-your-workplace-for-changing-space-requirements
- Linton, K. (2023, January 5). 2023 Trends: Sensory Experiences Supporting a Hybrid Workplace. Work Design Magazine. https://www.workdesign.com/2023/01/2023-trends-sensory-experiences-supporting-a-hybrid-workplace/

- Little, B. (2021, October 28). What is employee well-being, and can employers boost it? WeWork. https://www.wework.com/ideas/research-insights/research-studies/what-is-employee-well-being-and-can-employers-boost-it
- Little, B. (2021, September 21). Is your workplace ready for Gen Z? WeWork. https://www.wework.com/ideas/research-insights/research-studies/is-your-workplace-ready-for-gen-z
- Little, B. (2022, March 21). The state of women in the workplace. WeWork. https://www.wework.com/ideas/research-insights/research-studies/the-state-of-women-in-the-workplace
- Little, B. (2022, October 7). Four challenges solved by WeWork Workplace. WeWork. https://www.wework.com/ideas/workspace-solutions/flexible-products/four-challenges-solved-by-wework-workplace
- Little, B. (2022, September 27). What does Gen Z want out of work? WeWork. https://www.wework.com/ideas/research-insights/research-studies/what-does-gen-z-want-out-of-work
- Little, B. Hybrid work means something different to everyone. (2021, August 26). WeWork. https://www.wework.com/ideas/research-insights/research-studies/hybrid-work-means-something-different-to-everyone
- Lossack, J. (2021, April 12). Großraumbüro einrichten: Effizienz, Zusammenarbeit und Wohlbefinden. Designfunktion. https://www.designfunktion.de/blog/grossraumbuero-einrichten
- Lossack, J. (2021, May 17). Bürogestaltung: So schaffen Sie einen Raum für erfolgreiches Arbeiten. Designfunktion. https://www.designfunktion.de/blog/buerogestaltung
- Lossack, J. (2022, June 15). Aktivity Based Working: Zukunft der Büroorganisation & Zusammenarbeit. Designfunktion. https://www.designfunktion.de/blog/activity-based-working
- Łukasik, K. (2021, April 12). Ergonomie am Arbeitsplatz: Gesundheit und Produktivität im Einklang. Designfunktion. https://www.designfunktion.de/blog/ergonomie-am-arbeitsplatz
- Łukasik, K. (2021, November 3). Bürokonzepte der Zukunft: Inspirierende Arbeitsumgebungen von morgen. Designfunktion. https://www.designfunktion.de/blog/buero-der-zukunft
- Łukasik, K. (2022, October 28). Schallschutz im Büro: Produktivität steigern, Störungen reduzieren. Designfunktion. https://www.designfunktion.de/blog/schallschutz-im-buero
- Luscombe, B. (2022, May 8). 'The Office As We Know It Is Over,' Says Airbnb CEO Brian Chesky. Time. https://time.com/6174653/airbnb-ceo-brian-chesky-interview/
- Machines for work: Technology as a determinant of office design. (2021, May 25). Omrania. https://omrania.com/insights/machines-for-work-technology-as-a-determinant-of-office-design/

- Make Room for Modern Tribes. (n.d.). Steelcase. Retrieved November 21, 2023, from https://www.steelcase.com/360-flex/
- Mansson, H. (2022, November 15). The History of the Office: Office Trends Through the Centuries. Hubble. https://hubblehq.com/blog/the-history-of-the-office
- Marelli, C. (2019, February 25). A TOUR OF MILAN'S DERGANO NEIGHBORHOOD BETWEEN HISTORIC ARCHITECTURE, QUAINT BISTROS, AND DESIGN STUDIOS. ELLE Decor. https://www.elledecor.com/it/best-of/a26554169/milan-design-week-district-dergano-fuorisalone-guide/
- Maroney, J. (2019, November 25). What does Gen Z Expect at Work? The Workforce Institute at UKG. https://workforceinstitute.org/what-does-gen-z-expect-at-work/
- Marsh, M. (2017, July 29). Activity-Based Working & Wellness: The Human/Nature Side of the Popular Design Typology. Work Design Magazine. https://www.workdesign.com/2017/07/activity-based-working-wellness-the-humannature-side-of-the-popular-design-typology/
- Marsh, M. (2021, March 4). Stretching the Boundaries of Workplace: Why Your Portfolio Needs More Elastic. Work Design Magazine. https://www.workdesign.com/2021/03/stretching-the-boundaries-why-your-portfolio-strategy-needs-more-elastic/
- McCallum, D. (2022, July 20). Neurodiversity, Inclusion and the Metaverse. Work Design Magazine. https://www.workdesign.com/2022/07/neurodiversity-inclusion-and-the-metaverse/
- McDannald, E. (2022, December 28). 2023 Trends: Optimizing Office Space With Smart Technology. Work Design Magazine. https://www.workdesign.com/2022/12/2023-trends-optimizing-office-space-with-smart-technology/
- McDannald, E. (2022, October 13). Keeping the Office Collaboration Alive in The Metaverse. Work Design Magazine. https://www.workdesign.com/2022/10/keeping-the-office-collaboration-alive-in-metaverse-environments/
- McDannald, E. (2023, March 1). Paving the Way for the Future of the Workplace with the Metaverse. Work Design Magazine. https://www.workdesign.com/2023/03/paving-the-way-for-the-future-of-the-workplace-with-the-metaverse/
- McDonald, J. (2021, May 25). Activity-Based Working In The Hybrid Era. iOFFICE. https://www.iofficecorp.com/blog/activity-based-working-hybrid-workplace
- McLaurin, J. P. (2021, October 07). How Younger Workers' Preferences and Workstyles Will Define the Future Workplace. Gensler. https://www.gensler.com/blog/how-younger-workers-will-define-the-future-workplace

- McLaurin, J. P. (2022, August 8). Are People the New Workplace Amenity? Gensler. Gensler. https://www.gensler.com/blog/are-people-the-new-workplace-amenity
- McLaurin, J. P. (2022, December 16). What's Next for the Office? Here's What Corporate Real Estate Executives Say. Gensler. https://www.gensler.com/blog/whats-next-for-the-office-what-cre-executives-say
- McLaurin, J. P. (2022, February 24). Why the New Workplace Ecosystem Is Key to the Future of Work. Gensler. https://www.gensler.com/blog/what-does-the-new-workplace-ecosystem-look-like
- McLaurin, J. P. (2022, May 2). Hybrid Is Here to Stay: 5 Considerations for Creating a Better Hybrid Experience. Gensler. https://www.gensler.com/blog/5-considerations-for-a-better-hybrid-work-experience
- McLaurin, J. P. (2023, February 13). 3 Surprises Impacting the Return to the Office. Gensler. https://www.gensler.com/blog/3-surprises-impacting-the-return-to-the-office
- McLaurin, J. P. (2023, February 6). 10 Spaces That Are No Longer Optional to Create a Great Workplace Experience. Gensler. https://www.gensler.com/blog/10-critical-spaces-to-create-a-great-workplace-experience
- McLaurin, J. P. (2023, January 23). As We Return to the Workplace, It's Not the Same — What Works? What Doesn't? Gensler. https://www.gensler.com/blog/return-to-the-workplace-what-works-what-doesnt
- McLaurin, J. P. (2023, July 12). 5 Trends Driving the New Workplace. Gensler. https://www.gensler.com/blog/5-trends-driving-the-new-post-pandemic-workplace
- McLaurin, J. P. (2023, July 18). People Have Choice in the Workplace, But Not the Choices They Need. Gensler. https://www.gensler.com/blog/choice-in-the-workplace-but-not-the-choices-people-need
- McLaurin, J. P. (2023, May 17). 3 Ways the Most Innovative Companies Work Differently. Gensler. https://www.gensler.com/blog/3-ways-the-most-innovative-companies-work-differently
- McLaurin, J. P. (2023, May 17). Younger Generations Work Differently. What Does This Mean for the Future Workplace? Gensler. https://www.gensler.com/blog/younger-generations-work-differently-future-workplace
- McLaurin, J. P., & Grabowska, A. (2023, June 13). Hybrid Is Here to Stay. So Is the Office. Gensler. https://www.gensler.com/blog/hybrid-is-here-to-stay-so-is-the-office
- Mcleod, S. (2022, November 3). Maslow's Hierarchy of Needs. Simply Psychology. https://www.simplypsychology.org/maslow.html
- Mejia, J. (2023, March 23). Is the Metaverse the New Workplace of the Future? Work Design Magazine. https://www.workdesign.com/2023/03/is-the-metaverse-the-new-workplace-of-the-future/

- Meta releases the 2023 VR office collection report. What will the metaverse office look like in the future? (2022, December 23). Snowball Finance. https://xueqiu.com/8520530702/238491019
- Metaverse and VR in the Workplace. (n.d.). Workplace from Meta. Retrieved November 14, 2023, from https://en-gb.workplace.com/blog/how-we-work-in-the-metaverse
- Metaverse opens an "Inception" physical store. (2022, December 16). Redian News. https://redian.news/wxnews/179743
- Michal. (2017, February 13). A Tour of Etsy's Super Cool Brooklyn Headquarters. Officelovin'. https://www.officelovin.com/2017/02/tour-etsys-super-cool-brooklyn-headquarters/
- Microsoft and Steelcase: Pioneering Hybrid Together. (2023, May 19). Steelcase. https://www.steelcase.com/eu-en/research/articles/topics/hybrid-work/microsoft-steelcase-pioneering-hybrid-together/
- Microsoft's Satya Nadella on Flexible Work, the Metaverse, and the Power of Empathy. (2021, October 28). Harvard Business Review. https://hbr.org/2021/10/microsofts-satya-nadella-on-flexible-work-the-metaverse-and-the-power-of-empathy
- Moore, M. (2019, November 5). What is Industry 4.0? Everything you need to know. TechRadar. https://www.techradar.com/news/what-is-industry-40-everything-you-need-to-know
- Mullenix, R. (2022, January 12). How Space Impacts Creativity in the Hybrid Workplace. NBBJ. https://www.nbbj.com/ideas/how-space-impacts-creativity-in-the-hybrid-workplace
- Murad, A. (2022, April 20). The hybrid strategies companies are implementing. WeWork. https://www.wework.com/ideas/research-insights/expert-insights/the-hybrid-strategies-companies-are-implementing
- Murray, C. (2019, August 28). The essential guide to activity-based working. WeWork. https://www.wework.com/ideas/research-insights/expert-insights/essential-guide-activity-based-working
- Napell, G. (2020, July 02). Accessible Design for All in the Post-COVID Workplace. Gensler. https://www.gensler.com/blog/accessible-design-for-all-in-the-post-covid-workplace
- Napell, G. (2021, December 02). Why Inclusive Design Is a Critical Advantage in the War for Talent. Gensler. https://www.gensler.com/blog/why-inclusive-design-is-an-advantage-in-the-war-for-talent
- Napell, G., Park, M., & Ellis-Rosa, J. (2023, February 17). Why Embedding Inclusive Design From Start to Finish Is Critical. Gensler. https://www.gensler.com/blog/why-embedding-inclusive-design-is-critical

- Nelson, H. (2022, December 15). 2023 Trends: A People-First Design Approach To The Workplace. Work Design Magazine. https://www.workdesign.com/2022/12/2023-trends-a-people-first-design-approach-to-the-workplace/
- New Data Signals How Employees Will Use the Office When They Return. (2021, April 6). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/new-data-signals-how-employees-will-use-the-office-when-they-return
- New Work. New Rules. (n.d.). Steelcase. Retrieved November 20, 2023, from https://www.steelcase.com/teams/
- Nine workplace trends for 2023. (n.d.). Workplace from Meta. Retrieved November 13, 2023, from https://en-gb.workplace.com/blog/workplace-trends-2023
- No Laughing matter: Workplace crimes against productivity. (2016, July 20). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/no-laughing-matter-workplace-crimes-against-productivity
- Nobre, P., Cubbison, E., Webster, M., & McLaurin, J. P. (2022, February 22). 3 Lessons From Today's Students That Will Shape the Future Workplace. Gensler. https://www.gensler.com/blog/3-lessons-from-students-that-will-shape-the-future-workplace
- O'Boyle, E. (2021, March 30). 4 Things Gen Z and Millennials Expect From Their Workplace. Gallup. https://www.gallup.com/workplace/336275/things-gen-millennials-expect-workplace.aspx
- Office Design Layout: A Timeline. (2016, November 21). Office Reality. https://www.officereality.co.uk
- Office Spaces Throughout the Years: History of Office Design Trends. (2022, May 16). Working Spaces. https://wspaces.com/office-spaces-throughout-the-years-a-brief-history-of-office-design-trends-and-how-they-started/
- Office utilization has increased 135% since the start of the pandemic [New Report] | VergeSense. (2021, October 19). VergeSense. https://www.vergesense.com/blog/q3-2021-state-of-the-hybrid-workplace-data-report
- Okawa, S. (2023, August 9). 5 Ways Workplaces and Workplace Designers are Adapting to Gen Z. Work Design Magazine. https://www.workdesign.com/2023/08/5-ways-workplaces-and-workplace-designers-are-adapting-to-gen-z/
- Oldman, T., & Scott, J. (2023, June). The Hybrid Future. Leesman Index. https://www.leesmanindex.com/review-articles/the-hybrid-future/
- O'Neill, M., Dr. (2022, September 12). A Future Vision of Workplace Metrics. Gensler. https://www.gensler.com/blog/a-future-vision-of-workplace-metrics

- Overstreet, K. (2022, February 8). Designing Physical Spaces to Support a Virtual World. ArchDaily. https://www.archdaily.com/976349/designing-physical-spaces-to-support-a-virtual-world
- Packard, K. (2023, February 2). How to Improve Collaboration in the Workplace. VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/how-to-improve-collaboration-in-the-workplace
- Papa E. (2020, May 14). Ritorno al lavoro: Tutti meno stressati se l'ufficio diventa un po' casa, la nuova tendenza. Corriere della Sera. https://corriereinnovazione.corriere.it/cards/ritorno-lavoro-senza-stress-l-ufficio-diventa-po-casa-nuova-tendenza/barriere-anti-virus_principale.shtml
- Papandrea, D. (2022, March 26). Aktivitätsbasiertes Arbeiten: Acht innovative Raumgestaltungsideen für dein Büro. WeWork. https://www.wework.com/de-DE/ideas/growth-innovation/eight-kinds-of-space-your-office-needs-for-activity-based-working
- Papandrea, D., The WeWork architect designing collaboration hubs. (2021, January 20). WeWork. https://www.wework.com/ideas/community-stories/employee-spotlight/the-wework-architect-designing-collaboration-hubs
- Patrick, N. (2023, January 9). Why I don't work from home even though I could. WeWork. https://www.wework.com/ideas/research-insights/expert-insights/why-i-dont-work-from-home-even-though-i-could
- Pendell, R. (2021, March 22). Wellness vs. Wellbeing: What's the Difference? Gallup. https://www.gallup.com/workplace/340202/wellness-wellbeing-difference.aspx
- Plattner, A. (2021, July 20). Arbeitsplatz einrichten: Effizienz & Komfort für produktives Arbeiten. Designfunktion. https://www.designfunktion.de/blog/arbeitsplatz-einrichten
- Plattner, A. (2022, April 6). Desk Sharing: Effizientes Teilen von Arbeitsplätzen für Unternehmen. Designfunktion. https://www.designfunktion.de/blog/desk-sharing
- Plattner, A. (2023, June 14). Bürobeleuchtung: Effizientes Licht für eine produktive Arbeitsumgebung. Designfunktion. https://www.designfunktion.de/blog/buerobeleuchtung
- Pointr, E. C. (2023, May 3). Evolving from remote to hybrid working: Is your workplace ready? | Pointr. VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/evolving-from-remote-to-hybrid-working-is-your-workplace-ready-pointr
- Preparing Your Conference Rooms and Meeting Experience for Hybrid Work. (2021, June 24). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/hybrid-conference-rooms-meeting-experience

- Proust, M. (2023, January 6). The next year will cement new trends in how we work. WeWork. https://www.wework.com/ideas/research-insights/expert-insights/the-next-year-will-cement-new-trends-in-how-we-work
- Puybaraud, M. Dr. (2021, January 1). Decoding workplace experience. JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/decoding-workplace-experience
- Quito, A. (2021, January 20). A global survey of 32,000 workers reveals the biggest concerns about returning to the office. Quartz. https://qz.com/work/1959365/steelcase-poll-finds-common-anxieties-about-returning-to-offices
- Reimagining work in the era of COVID-19. (2020, June 16). WeWork. https://www.wework.com/ideas/research-insights/research-studies/reimagining-work-in-the-era-of-covid-19
- Remote Work in the Metaverse. (n.d.). Workplace from Meta. Retrieved November 14, 2023, from https://en-gb.workplace.com/metaverse-work-infinite-office
- Robinson, A. (2022, March 9). Remote Work Statistics & Facts for 2023. Teambuilding.Com. https://teambuilding.com/blog/remote-work-statistics
- Rothenberg, J. (2022, December 29). 2023 Trends: Marrying Office Technology and Design Thoughtfully. Work Design Magazine. https://www.workdesign.com/2022/12/2023-trends-marrying-office-technology-and-design-thoughtfully/
- Rousseau, K. (2023, February 22). What Can Workplace Design Practitioners Learn From Human Psychology? Work Design Magazine. https://www.workdesign.com/2023/02/what-can-workplace-design-practitioners-learn-from-human-psychology/
- Rowell, C. (2019, June 27). Looking to improve your workplace energy? Start here. WeWork. https://www.wework.com/ideas/research-insights/expert-insights/workplace-energy
- Ruelas, F. (2023, February 2). Emotion's Leading Role in Designing Positive Workplace Interiors. Work Design Magazine. https://www.workdesign.com/2023/02/emotions-leading-role-in-designing-positive-workplace-interiors/
- Ruh, D. (2021, July 21). Council Post: Creating A More Accessible And Inclusive Workplace For People With Disabilities. Forbes. https://www.forbes.com/sites/forbesbusinesscouncil/2021/07/21/creating-a-more-accessible-and-inclusive-workplace-for-people-with-disabilities/
- SAP India Focuses in on Collaboration. (2023, July 13). Steelcase. https://www.steelcase.com/asia-en/research/articles/topics/culture-talent/sap-india-focuses-in-on-collaboration/

- Satya Nadella Talks to Adam Grant about the Future of Work. (n.d.). Microsoft. Retrieved November 19, 2023, from https://www.microsoft.com/en-us/worklab/satya-nadella-talks-to-adam-grant-about-the-future-of-work
- Schneuer, B. (2021, June 10). So geht Büro 2.0! Vitras neues „Club Office“. AD Magazin. https://www.ad-magazin.de/article/vitra-neues-club-office
- Seven ways to create downtime space in the workplace. (2016, August 23). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/seven-ways-to-create-downtime-space-in-the-workplace
- Shaban, H. (2023, April 13). How offices looked in each decade of the past hundred years. The Washington Post. https://www.washingtonpost.com/technology/2023/04/13/office-work-place-through-the-years/
- Shah, J. (2023, February 03). Creating Spaces That Evoke Joy Through Immersive Design. Gensler. https://www.gensler.com/blog/creating-spaces-that-evoke-joy-through-immersive-design
- Shah, J. (2023, October 11). 4 Ways AI Can Create a More Engaging and Enriching Workplace Experience. Gensler. https://www.gensler.com/blog/4-ways-ai-can-create-engaging-workplace
- Shapiro, E. (2022, July 29). Industry News: No One Wants A Sea Of Desks Anymore. Work Design Magazine. https://www.workdesign.com/2022/07/industry-news-no-one-wants-a-sea-of-desks-anymore/
- Shapiro, E. (2022, October 7). Industry News: How DC Bosses Are Luring Workers Back to the Office. Work Design Magazine. https://www.workdesign.com/2022/10/industry-news-how-dc-bosses-are-luring-workers-back-to-the-office/
- Shapiro, E. (2022, September 30). Industry News: What It's Like To Work In The World's Greatest Office. Work Design Magazine. https://www.workdesign.com/2022/09/industry-news-what-its-like-to-work-in-the-worlds-greatest-office/
- Shapiro, E. (2023, March 24). Industry News: 2023 Is The Year Of Third Space Working. Work Design Magazine. https://www.workdesign.com/2023/03/industry-news-2023-is-the-year-of-third-space-working/
- Show and sell: How virtual reality is shifting luxury homes. (2016, October 6). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/show-and-sell-how-virtual-reality-is-shifting-luxury-homes
- Shreeves, V. (2021, November 18). How is the cost of your new office changing? JLL. https://www.jll.it/it/tendenze-e-ricerca/research/talking-points/how-is-the-cost-of-your-new-office-changing
- Six key zones for activity-based workspaces. (2018, May 16). Spaceoasis Ltd. https://www.spaceoasis.com/news/2018/05/six-key-zones-for-activity-based-workspaces/

- Skaalen, M., & Morris, E. (2023, August 16). The Future of Work: Generation Z, Office Design and Human Connection. Work Design Magazine. https://www.workdesign.com/2023/08/the-future-of-work-generation-z-office-design-and-human-connection/
- Smith, M. (2021, August 23). What is Activity-Based Working (ABW)? I-Brokers. https://i-brokers.com/what-is-activity-based-working/
- Stromquist, B. (2023, January 23). Nature + Nurture in the Inclusive Workplace. Gensler. https://www.gensler.com/blog/inclusive-by-nature-the-future-of-the-tech-workplace
- Studie: Das Metaverse kann bis 2030 einen Wert von bis zu 5 Billionen Dollar erreichen. (n.d.). McKinsey & Company. Retrieved November 21, 2023, from https://www.mckinsey.com/de/news/presse/2022-06-21-metaverse
- Stueve, M. (2023, May 18). Tips For Designing a People-First Workplace. Work Design Magazine. https://www.workdesign.com/2023/05/tips-for-designing-a-people-first-workplace/
- Supporting Flexibility & Performance at Work. (n.d.). Veldhoen + Company. Retrieved November 15, 2023, from https://www.veldhoencompany.com/curiosity-flexibility-and-performance
- Survey Findings Emphasize The Need for Adaptability in Workplace Design. (2019, August 20). Capital One. https://www.capitalone.com/about/newsroom/wps-survey
- Taemets, A. (2021, July 9). How workplace design inspires in one Brisbane building. WeWork. https://www.wework.com/ideas/research-insights/expert-insights/how-workplace-design-inspires-in-one-brisbane-building
- Taemets, A. (2021, July 9). How workplace design inspires in one Brisbane building. WeWork. https://www.wework.com/ideas/research-insights/expert-insights/how-workplace-design-inspires-in-one-brisbane-building
- Tanedo, B. (2019, December 23). Reinventing the Office Experience: How Office Design Has Changed. Dumb Little Man. https://www.dumblittleman.com/history-of-office-design/
- Teale, C. (2022, May 31). Tech Employees Are Interested in Doing Work Tasks in the Metaverse. Morning Consult Pro. https://pro.morningconsult.com/articles/tech-workers-survey-metaverse
- Telfer, M. (2021, September 6). Activity-based work (ABW): Redesigning your office for the age of hybrid. Honeywell Forge Visitor and Contractor Management. https://www.sine.co/blog/activity-based-working-hybrid-workplace/
- The 12 Competencies for Measuring Health & Well-being for Human and Social Capital. (2022, March 1). WELL Resources. https://resources.wellcertified.com/tools/12-competencies. Accessible for download by providing business email address on the publisher's website.

- The 8 Best Designed Offices of 2022. (2023, April 27). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/the-8-best-designed-offices-of-2022
- The benefits of working in smart buildings. (2017, February 9). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/the-benefits-of-working-in-smart-buildings
- The Complete Guide to Activity Based Working. (n.d.). Retrieved November 16, 2023, from https://www.cbre.com/insights/articles/the-complete-guide-to-activity-based-working
- The conditions necessary for a successful return to work. (2020, November 29). WeWork. https://www.wework.com/ideas/research-insights/research-studies/the-conditions-necessary-for-a-successful-return-to-work
- The Digital Revolution. (2008, October 7). Internet Archive. https://web.archive.org/web/20081007132355/http://history.sandiego.edu/gen/recording/digital.html
- The Evolution Of Office Design. (2013, December 7). Applied Workplace. https://www.appliedworkplace.co.uk/blog/the-evolution-of-office-design/
- The Evolution of Office Design. (n.d.). Morgan Lovell. Retrieved November 20, 2023, from https://www.morganlovell.co.uk/the-evolution-of-office-design
- The future of VR: Top trends for 2023. (n.d.). Workplace from Meta. Retrieved November 14, 2023, from https://en-gb.workplace.com/blog/the-future-of-vr
- The future of work. (n.d.). Workplace from Meta. Retrieved November 13, 2023, from https://en-gb.workplace.com/blog/the-future-of-work
- The global working model is undergoing a "big reshuffle" and the "Metaverse" is born. Is the next trend coming?. (n.d.). LinkedIn. Retrieved November 20, 2023, from https://business.linkedin.com/zh-cn/talent-solutions/talent-blog/metaverse-talent-insight
- The great reset. (2020, November). Leesman Index. https://www.leesmanindex.com/the-great-reset/
- THE HISTORY & EVOLUTION OF OFFICE DESIGN. (2022, February 23). Fusion Projects. https://www.fusion-projects.com/posts/the-history-evolution-of-office-design
- The History of Office Design. (2017, May 10). K2 Space. https://k2space.co.uk/knowledge/history-of-office-design
- The History of Office Design. (2020, July 15). Inside The Lines. https://insidethelines.net/2020/07/15/the-history-of-office-design/
- The History of the Office Workplace. (n.d.). Condeco Software. Retrieved November 20, 2023, from https://www.condecosoftware.com/modern-workplace/history-of-the-workplace/

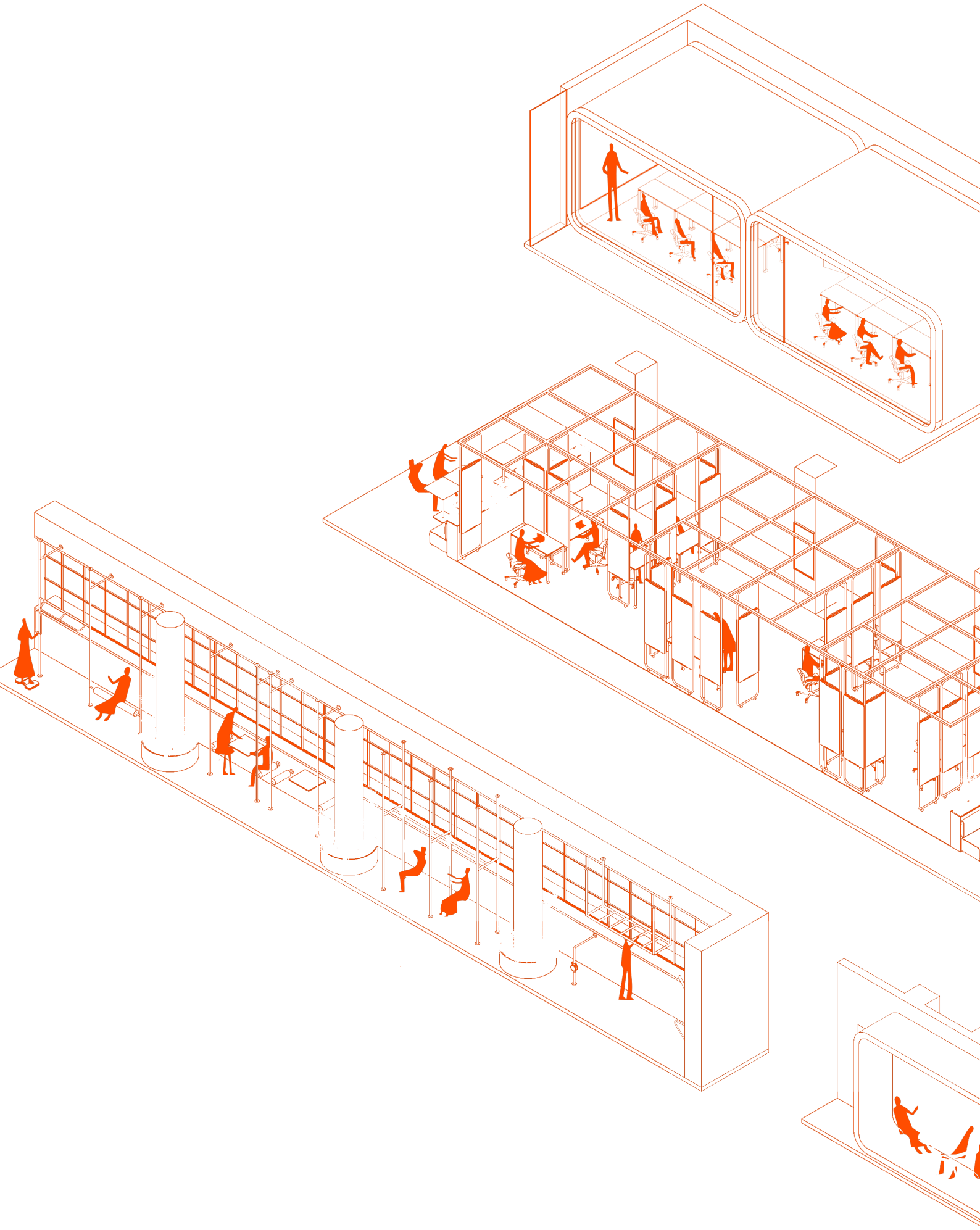
- The hybrid work model: Welcome to the new way of working. (n.d.). Workplace from Meta. Retrieved November 13, 2023, from https://en-gb.workplace.com/blog/hybrid-work
- The Impact of COVID-19 on the Future of Work. (n.d.). Veldhoen + Company. Retrieved November 16, 2023, from https://www.veldhoencompany.com/impact-of-covid-19-on-activity-based-working
- The Manager's Guide to Activity-Based Working (ABW) in the Hybrid Era. (2022, August 23). Cloudbooking. https://cloudbooking.com/blogs/the-managers-guide-to-activity-based-working-abw-in-the-hybrid-era/
- The mental health pandemic. (2020, November). Leesman Index. https://www.leesmanindex.com/the-mental-health-pandemic/
- The new ways companies are investing in employee wellbeing. (2021, January 14). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/the-new-ways-companies-are-investing-in-employee-wellbeing
- The Next Great Disruption Is Hybrid Work—Are We Ready? (2021, March 22). Microsoft. https://www.microsoft.com/en-us/worklab/work-trend-index/hybrid-work
- The unpredictable challenges of flexible working. (2023, April 4). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/the-unpredictable-challenges-of-flexible-working
- The wall that brings people together. (2017, December 1). Spaceoasis Ltd. https://www.spaceoasis.com/news/2017/12/the-wall-that-brings-people-together/
- Thorbecke, C. (2022, November 10). Silicon Valley's greatest minds misread pandemic demand. Now their employees are paying for it. | CNN Business. CNN. https://www.cnn.com/2022/11/10/tech/tech-layoffs-analysis/index.html
- Three ways technology will transform how we collaborate. (n.d.). JLL. Retrieved November 13, 2023, from https://www.us.jll.com/en/views/three-ways-technology-will-transform-how-we-collaborate
- Tranel, B. (2020, July 02). The Future Workplace Will Embrace a Hybrid Reality. Gensler. https://www.gensler.com/blog/the-future-workplace-will-embrace-a-hybrid-reality
- Tsipursky, D. G. (2023, July 19). The Real Reasons For Hybrid Workers To Come To The Office. Work Design Magazine. https://allwork.space/2023/07/the-real-reasons-for-hybrid-workers-to-come-to-the-office/
- Tsipursky, G. (2023, May 9). The AI Revolution Transforming Hybrid And Remote Work And The Return To Office. Forbes. https://www.forbes.com/sites/glebtsipursky/2023/05/09/the-ai-revolution-transforming-hybrid-and-remote-work-and-the-return-to-office/

- Tsipursky, G., Dr. (2023, August 23). 4 Ways to Enhance DEI in Hybrid and Remote Work Environments. Work Design Magazine. https://allwork.space/2023/08/4-ways-to-enhance-diversity-equity-and-inclusion-in-hybrid-and-remote-work-environments/
- Turning to tech to boost employee wellbeing. (2018, June 18). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/turning-to-tech-to-boost-employee-wellbeing
- US Workplace Survey Winter 2021. (n.d.). Gensler. Retrieved November 14, 2023, from https://www.gensler.com/gri/us-workplace-survey-winter-2021
- Usher, N. (2023, February 22). Why go to the office? Medium. https://workessence.medium.com/why-go-to-the-office-6123dc0c2d7c
- Using Data to Optimize Flexible Work. (2023, June 29). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/flexible-work-is-here-to-stay
- Vagasi, R. (2023, July 3). What is WeWork On Demand and How Does it Work? WeWork. https://www.wework.com/ideas/workspace-solutions/flexible-products/what-is-wework-on-demand-and-how-does-it-work
- Valeova, I. (2021, November 29). How Office Design Has Evolved Through the Centuries. Oktra. https://www.oktra.co.uk/insights/the-evolution-of-office-design/
- Verizon at The Hub. (n.d.). Gensler. Retrieved November 20, 2023, from https://www.gensler.com/projects/verizon-at-the-hub
- Verizon Innovation Center Customer Experience Strategy. (n.d.). Gensler. Retrieved November 20, 2023, from https://www.gensler.com/projects/verizon-innovation-center-customer-experience-strategy
- Villarica, H. (2011, August 17). Maslow 2.0: A New and Improved Recipe for Happiness. The Atlantic. https://www.theatlantic.com/health/archive/2011/08/maslow-20-a-new-and-improved-recipe-for-happiness/243486/
- Wearable tech: The new tool for the modern construction workforce. (2017, April 24). https://www.jll.it/it/tendenze-e-ricerca/workplace/wearable-tech-the-new-tool-for-the-modern-construction-workforce
- Weiss, M. (n.d.). Enter the 2022 Next Work Environment Competition. Work Design Magazine. Retrieved November 21, 2023, from https://www.workdesign.com/2022-next-work-environment-competition/
- WELL v2™. (n.d.). WELL Standard. WELL Standard. Retrieved November 13, 2023, from https://v2.wellcertified.com/en/wellv2/overview/
- Wellbeing: A Bottom Line Issue. (2015, October 20). Steelcase. https://www.steelcase.com/eu-en/research/articles/topics/wellbeing/wellbeing-a-bottom-line-issue/

- What are the key steps to creating an inclusive and accessible workplace design? (n.d.). LinkedIn. Retrieved November 21, 2023, from https://www.linkedin.com/advice/3/what-key-steps-creating-inclusive-accessible-workplace
- What could the office of 2030 look like? (2016, October 28). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/what-could-the-office-of-2030-look-like
- What does the future office that integrates virtual and real look like? (2021, August 14). Weixin Official Accounts Platform. https://mp.weixin.qq.com/s/d5EqAalbuArrxEQLYhB1aA
- What Is Activity Based Working? (2021, October 22). Midwich. https://www.midwich.com/news-and-events/blogs/what-is-activity-based-working/
- What is productivity and why does it matter? (n.d.). Workplace from Meta. Retrieved November 20, 2023, from https://en-gb.workplace.com/blog/productivity
- What is the future of employee experience? (n.d.). Workplace from Meta. Retrieved November 14, 2023, from https://en-gb.workplace.com/blog/the-future-of-employee-experience
- What we can learn from the world's best workplaces. (2023, January 27). Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/harnessing-next-webinar-insights
- White, G. (2018, January 25). What is Augmented Reality and Why You Should Care. Cantina. https://cantina.co/what-is-augmented-reality-and-why-you-should-care/
- Why Changing towards Activity Based Working in your Office. (2021, September 2). Vecos. https://blog.vecos.com/en/why-changing-towards-activity-based-working-in-your-office
- Why companies are flocking to the newest offices. (2022, February 8). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/why-companies-are-flocking-to-the-newest-offices
- Why companies are looking to data in the return to office life. (2020, April 27). JLL. https://www.jll.it/it/tendenze-e-ricerca/workplace/why-companies-are-looking-to-data-in-the-return-to-office-life
- Why Multisensory Office Design is the Future. (2023, November 8). Absolute Commercial Interiors. https://www.absoluteci.co.uk/blog/why-multisensory-office-design-is-the-future
- Why Your Workplace Design Strategy Should be Founded on Data. (2021, September 23). VergeSense. https://www.vergesense.com/occupancy-intelligence-collaborative/industry-resources/data-driven-workplace-design

- Wilhelms, P. (2021, August 10). Five Considerations for the New Lab of the Future. Gensler. https://www.gensler.com/blog/five-considerations-for-the-new-lab-of-the-future
- Will activity-based working survive COVID-19? (n.d.). Morgan Lovell. Retrieved November 21, 2023, from https://www.morganlovell.co.uk/insights/post-lockdown-pre-vaccine-will-activity-based-working-survive
- Williams, J. A. (n.d.). Top 5 Ways to Build an Accessible and Inclusive Workplace. Heartmanity. Retrieved November 21, 2023, from https://blog.heartmanity.com/top-5-ways-to-build-an-accessible-and-inclusive-workplace
- Williamson, C. (2013, January 28). NOVA ISKRA Multifunctional Coworking Space for Creatives. Design Milk. https://design-milk.com/nova-iskra-a-multifunctional-workspace-for-creatives/
- Williamson, C. (2019, June 25). Where I Work: Mark Rios. Design Milk. https://design-milk.com/where-i-work-mark-rios/
- Work Better. (2021, March 16). Steelcase. https://www.steelcase.com/asia-en/research/articles/topics/culture-talent/work-better/
- Work in an activity-based office? Why you should consider acoustic pods... (2019, May 8). Tsunami Axis. https://tsunami-axis.com/products/work-in-an-activity-based-office-why-you-should-consider-acoustic-pods
- Work-Life Fulfillment And Happiness At Work With Dr. Tracy Brower. (2022, December 19). PathWise. https://pathwise.io/podcasts/dr-tracy-brower/
- Xenofontos, A. (2017, September 19). Collaborative Workplace Design | The Perfect Office. Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/the-perfect-office-for-your-dream-team
- Xenofontos, A. (2020, July 27). Collaboration in the workplace of the future. Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/collaboration-in-the-workplace-of-the-future
- Xenofontos, A. (2020, June 14). After COVID-19: What will the office of the future look like? Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/after-covid-19-what-will-the-office-of-the-future-look-like
- Xenofontos, A. (2022, April 12). Will the metaverse replace the office in the future of work? Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/will-the-metaverse-replace-the-office
- Xenofontos, A. (2022, March 29). Design matters: Creating a space where we can work smarter. Axiom Workplaces. https://www.axiomworkplaces.com.au/blog/design-matters-creating-a-space-where-we-can-work-smarter
- Yang, B. (2022, November 9). The world's first "Metaverse" library will open in Lingang, Shanghai by the end of the year. Sina. https://finance.sina.com.cn/blockchain/roll/2022-11-09/doc-imqqsmrp5486898.shtml

- Zapata, I. (2023, May 24). How Third Places Are Shaping Workplace Design. Work Design Magazine. https://www.workdesign.com/2023/05/how-third-places-are-shaping-workplace-design/
- Zhang, L. (2012, December 13). A century of designing modern office spaces: efficiency, class and identity. Izhsh. http://www.izhsh.com.cn/doc/247/2096.html
- Ziegler, C. (2022, December 15). 2023 Trends: Accessible And Inclusive Design. Work Design Magazine. https://www.workdesign.com/2022/12/2023-trends-accessible-and-inclusive-spaces/
- Ziegler, C. (2022, December 21). Trends to Watch: Accessible and Inclusive Design Will Draw Workers Back to the Office. Gensler. https://www.gensler.com/blog/2023-trends-accessible-and-inclusive-design



POLITECNICO
MILANO 1863

SCUOLA DEL DESIGN