

The Influence of the Built Environment of the Workplaces on the Workers' Well-being
A Study Towards Enhancing Prime Working Age Workers' Productivity through Interior
Design
by
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ABSTRACT

Workplaces are the place where people spend mostly half of their life there. It is not exclusive to office buildings and companies; indeed, in each department in every building there are individuals working behind the scenes in an attempt to better the society. The workplace environment must accomplish workers' requirements that vary between physical, emotional, psychological, and spiritual needs. Thus, the employees can provide high performance and be more productive, which leads to a successful group, corporations, society, and world generally. The aims for this study were to explore the different strategies that big companies used to attract new employees and to ensure the well-being of the current workers within workplaces. In addition to investigating the effects of the workplace environment on the workers' well-being in the previous studies, this research analyzes six cases of good examples for companies' headquarters and evaluating their design techniques. The results showed that these companies share the same factors to increase their workers' well-being. Flexible workspaces that provide workers the ability to choose where, how, and when to work is the first factor. Promoting body movements, reducing stress and depression, and building private spaces or facilities to energize workers are other factors. However, most of the cases involved the inspirational encouragement in interior design as major factors to enhance workers' well-being. Furthermore, some of the applied techniques in the buildings are similar, like offering a flexible workplace, while others vary following the company industry, image and location.

DEDICATION

This thesis is dedicated to the memory of my mother who had been always a great inspiration and support. Thanks for your love, for the times you were staying up to pray for me, and for teaching me what persistence exactly means.

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CHAPTER 1

INTRODUCTION

The workplace is the area where a person works individually or in teams within the space to provide values for the companies (Heathfield, 2019). That ranges between home offices, private offices, large office buildings, factories, and any location includes working performance. These places are also where most people spend half of their day, and years of their life. Workplace term includes offices and all spaces that utilize the employment activities by workers. Recently, there are many type of workplaces has improved as a result of technological and cultural factors which stand on the leveraging of communication through internet network. However, physical workplaces still constitute the most prevalent type of work environment because most companies consider it more efficient and offer the opportunity of interaction directly with colleagues and clients. This would supports the advancement of the company's brand and values through utilizing its interior space elements, and prioritizing the special qualities and experiences alike. Therefore, the working spaces idea allows employees to produce a high performance in their job, and provides a place that offers facilities with no concerns about other responsibilities or tasks outside of the job.

In recent years, the concept of workplace design has been extensively studied and the subject of debate as it plays an important role in employees' health and level of satisfaction toward their life generally (Kohll,2019). The key for creating an optimal working environment is to merge the official traditional offices in a workspace that support employees' activities, encourage their inspiration and creativity, and achieve the

organizations' goals (Shah, 2014). Offices that offer a home-like environment and combine different activities together through is one of the strategies to build a supporting environment to work. Therefore, the workplace is one of the most important social spaces, constituting "a central concept for several entities: the worker and his/her family, the employing organization, the customers of the organization, and the society as a whole " (Paul Jackson, 2004, p. 37). In other words, this explains the mechanism of designing the workplace that ensures benefits for all.

Justification

Work restrictions and policies result in emotional, mental or physical strains amplified by inappropriate designs for workspaces. Those rational reasons make leaders and managers seek to go to another technique that enhances well-being and provides comfort for workers in order to achieve better outcomes. Although workers put in dedication and hard work to optimize their work performance, often times their abilities to overcome with poor surrounding work environments are different. However, some companies and big headquarters started to think differently, and make changes in the interior environment of the building to further improve the quality. That is done by adding more active spaces like gyms, kitchens, small theaters, and others entertaining or recreational zones.

Scope and Limitations

The focus of this thesis is the physical workplace, especially the techniques that any company and organization use to attract and recruit more employees in addition to keeping current workers happy coming to their place. Employees need an appropriate

environment that motivates them to be productive and creative, avoiding any distractions or stress leading to health problems. The study's interest is the interior environment and how to design a space that supports users' well-being. Designers' and architects' task are to work in collaboration to create a space according to user's personality, needs, aspirations and requirements to improve the quality of their life. Interior environments are influenced by several elements such as colors, light, texture, pattern, zoning, graphics, wayfinding, signs, furniture, among other aspect impacting employees' well-being and their behavior. This thesis will analyze the influences of the physical interior environment of workplaces and the strategies companies implement to attract workers including their wellness, health, and comfort, which lead them to be more productive. It will be through interior design conditions, specifically how they utilize the different design principles to ensure occupants' well-being and satisfaction in their working environment.

For workplaces, there are many different types that vary according to the organization culture nature and all of them include the office as the main block. While some organizations require a whole office building as a commercial building, some other offices can be built in any location to generate the building in financial, administrative, facilitative and departmental fields. The whole office buildings also include several types that contain multiple spaces designed to be used for the organization's financial reward and workers' productivity. Public companies, headquarters, private companies, governmental societies, and small business entities. However, each workplace must be designed to the company culture, and nature of work (collaborative, personal, power culture, control-based, etc.)

Workplace analysis

The study focus is to analyze the interior environment of workplaces; its functional requirements, the rooms and spaces need, and its culture. However, each workplace has different criteria following to the company industry and brand image. Also, the strategies used to impact workers, which influences their performance within the space, and it improves their well-being. The strategies needed to enhance employees' well-being are considered as standards that could be applied to any company type, industry, size, culture, and working style or nature. This will help to increase the productivity levels and provide an optimal workspace. Nevertheless, there are different demographics of employees; however, they vary according to gender, age, races, cultures, etc. The focus of the group of people in this paper is the prime working age (25-54) which refers to the period of individual lifetime since starting their job to retiring.

Research Questions

The primary research question that drives the study is *how does the quality of the workplace's interior environment enhance the wellbeing of prime working age workers?*

The secondary questions that will support the study are:

- 1- How do big companies use the quality of lighting in the workplace to increase prime working age workers' well-being?
- 2- How do big companies deal with air quality and ventilation of the workplace to increase prime working age workers' well-being?
- 3- What are the strategies of the thermal comfort that used to enhance the well-being of the office workers?

- 4- What are the strategies that big companies use to promote and increase physical activity of prime working age workers?
- 5- What are the mechanisms to build connections with natural elements in order to enhance well-being?
- 6- What strategies and physical environmental features do big companies use to help reduce stress and depression at work?
- 7- In what way do big companies address the spatial arrangement of workspaces in order to optimize prime working age workers' wellbeing?

The collected data will have the answers for these research questions of this study. Then, the data could be used for firm workplace's interior design.

CHAPTER 2
LITERATURE REVIEW

Introduction

The following three topic areas help support the research questions and intent of this study. These include: (1) Workers' well-being, satisfaction, and happiness (2) The efficiency of workplaces and interior design. (3) The prime working age workers. Furthermore, these three topics lead to fulfill the situation of productivity.

Theoretical Framework Diagram 1
Workplace's Design

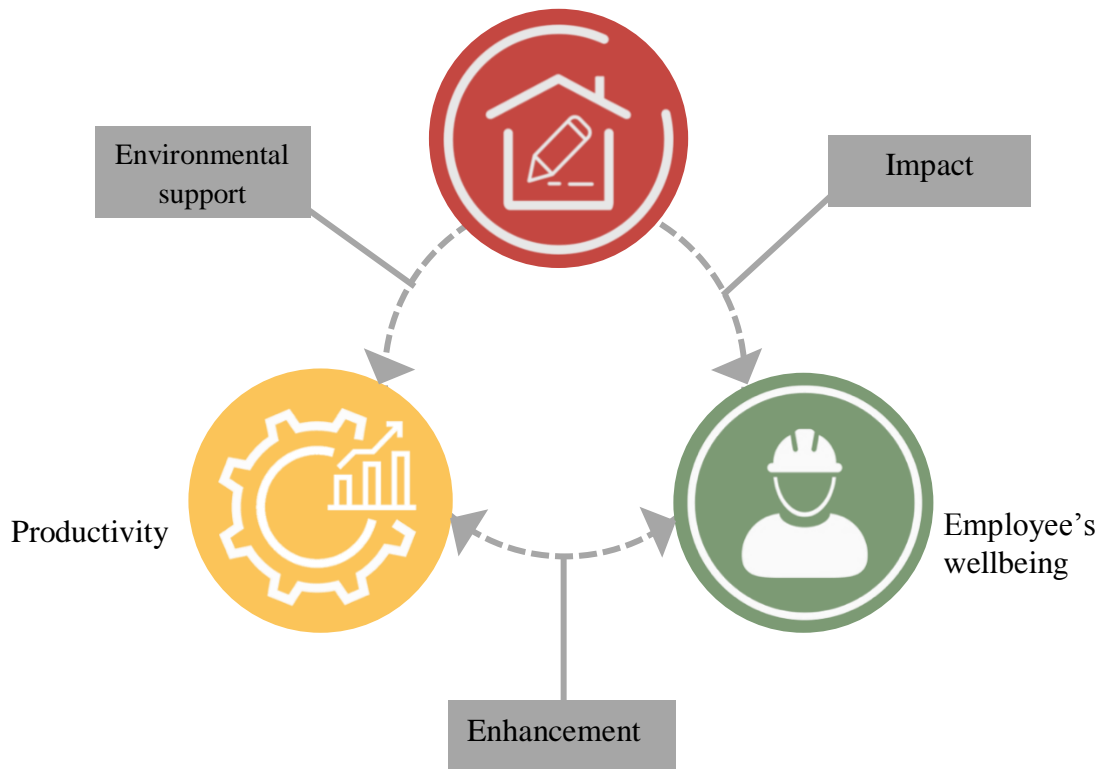


Figure 1. Initial Conceptual Framework

Workers' Well-Being and Satisfaction

Offices are the place where most people spend half their day, and that takes years of their life and maybe more away from their family. So, in this case, the workplace environment has to be comfortable and employees feel satisfied about their second home. This is required to reduce the stress that always becomes a part of the working environment because of the serious conditions and sometimes they have been under pressure from their bosses. On the other hand, they need to spend their time in the office within an atmosphere that motivates them to be creative, productive, and critical thinkers. They are in need for physical and mental energy to do their daily tasks according to Vischer (2005).

“Workers well-being is a key factor in determining an organisation's long-term effectiveness. Many studies show a direct link between productivity levels and the general health and well-being of the workforce” (workplace well-being, n.d).

A survey data cited by Stringer (2016) and done by HOK Global Workplace Statistics from 2011-2014 found the workers in U.S and Canada spend 1705 hours annually in work. This number includes the other extra work hours that employees spend at home checking emails, responding to messages and calls, and doing some extra job, which is about 30 hours a month- 360 hours a year as shown in Table 1. 37 percent of working time is put into collaboration, whether it is done in group meetings remotely by using technology devices or face to face. Therefore, some surveys found that workers sit most of their time while doing their job which nearly 68 to 82 percent of their office hours.

Table 1.

Working Hours Spent in U.S and Canada

| Spent Time | Working style |
|----------------------------|---------------------------------|
| 1705 hour/year | Spend at work |
| 360 hour/year | Spend for work at home |
| 68-82% of work time | Sit while doing job |
| 52% of work time | Working in office |
| 48% of work time | Working in different situations |

From “The Healthy Workplace: How to improve the well-being of your employees--and boost your company’s bottom line” by Leah Stringer, 2016.

With the technology evolution, workers could do their tasks anywhere by mobile phone or a laptop. So, according to the same study of HOK, employees have only 52 percent of their work time in an office. The remaining 48 percent is divided between conference rooms, cafeteria, work from home, working while travelling by plane or train, or other transformation ways, while waiting in lines, and any other location rather than office like a hotel or cafe’ by our electronic devices.

Healthy Building

Stringer (2016) states from HOK statistics that offices are not exclusive to the traditional look with fewer square feet spaces, it is any location where work could be done and employees are able to work there. Some collaborative spaces and amenities that companies facilitated for their staff are established. For example, meeting and communication rooms, reception areas, dining spaces, common relaxing areas, outdoor spaces, fitness areas and its facilities. They are also giving the employees the freedom to work anywhere and help to build business relationships. Providing multiple adjustable options of working environment in the workplace increases productivity and satisfaction

of workers. In addition, it improves their health by supporting the mobility rather than sitting on a seat to fulfill their tasks all day long.

Office work patterns today are extremely boring and not exactly healthy by anyone's standards. Stringer (2016) said that Edward O. Wilson father of biodiversity says that there is a unique and legal bond that connects between human beings and the other living creatures in the world. That was described in other words by Kellert, Heerwagen, and Mador (2008) in their book; they found the strong relationship between human productivity and the connection with natural elements that are received by the human senses in different patterns, textures, colors, and light.

According to Dodge Data and Analysis (2016), Figure 3 shows the five health features for buildings that seem to be used more in the next five years for the respondents in the U.S.

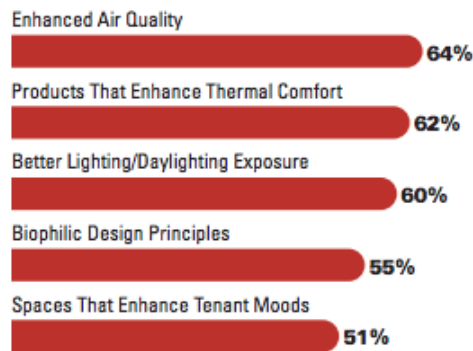


Figure 2. Healthier Building Features to be used more in the next five years, adapted from Dodge Data and Analysis smart marker report, 2016, retrieved from https://www.worldgbc.org/sites/default/files/Drive%20Toward%20Healthier%20Buildings%202016_ffff.pdf

“The top outcome they expect from healthier buildings is improved emotional and social well-being. Their focus in this area could provide a different and useful perspective on building health impacts for many owners, architects, interior designers and contractors. Their institutions are actively engaged in establishing building policies

addressing topics like design that encourages physical activity, avoiding use of hazardous materials in buildings and improving indoor air quality” (Dodge Data and Analysis, 2016).

Regarding the studies that demonstrate the advantages of direct connection with nature on health and wellness, and the ability to keep workers engaged and attended, there are different ways biophilic design can be accomplished in interior environments. One way is to integrate the real natural elements like plants, water, and views into building. Another way is to use natural analogue which means creating a space that contains materials or patterns with natural evoking elements like finishes, art, and living forms (Stringer, 2016). He summarizes the natural use in workplaces with evoking nature that could be implemented by allowing daylight inside building, natural space, outdoor accesses or views, skylights or view to sky and weather, interior plants and vegetation, outdoor plaza, water features, pleasant sounds, natural odors, and natural elements in material and furniture.

Lisa Heschong in her study found a 6 to 7 percent improvement in performance for workers with full window views of nature than others without windows, especially in the tasks that required attention and memorizing (as cited by Stringer, 2016).

Other studies found that workers with offices that have views to trees and landscapes have less health excuses from work than others with no view or a view to a street and parking. This is the same with patients in hospitals who recover faster than others (Done by researchers for offices in University of Oregon). One of the important factors that influences employees’ well-being and health is the design of workplace and furniture to be ergonomic. Making it flexible and adjustable increases the comfort level

and support productivity. U.S Labor statistics had reports 34 percent of all injuries happened for employees in 2012. Those match with wrong postures, sitting for a long time, and repetitive movement in addition to the psychological effects like stress during work hours.

Strategies to Increase well-being in a Space

Resilient team rooms, with accessible technology tools for teams, are most needed to improve teamwork. By providing a place that is in the workers' hands to use flexibly, they are free to change the arrangement of furniture and move equipment and technology tools in order to create a space that encourages them to be creative and satisfied.

On the other hand, being super focused on work or solving problems increases the opportunities of having insight on a stressed state. However, engaging in some relaxing activities, like walking, through working hours is a good choice to relieve stress. "To create productive workplaces, we need to design a workplace strategy that supports and enables efficient, happier and healthier employees" (Agarwal, 2018, p4).

Another study done by Marily Opezzo (2014) and cited by Stringer (2016) found that indoor or outdoor walking makes the creativity level goes higher and improves consciousness. So, the relaxation and movement is two factors that boost creativity and promote well-being, while other factors of face-to-face collisions and innovation districts offer great facilities for people, groups, and places.

Locke (2011) in her research, explored that changing positions and walking through the day helps to redouble the energy that we use every day (as cited in Stringer, 2016). It creates energy by stimulating our blood cells to produce more energy. "A sense

of freedom - the ability to choose what you work on, as well as how, when, and where you perform your work - is a growing priority for talented professionals across sectors and industries, and one of the core elements of a fulfilling career.” (Koloc, 2014, p.1). In addition, movement boosts the feeling of well-being because of endorphins produced. Taking those three factors, which are the place, time, and ways of working, into consideration in the workplaces’ physical environment, support achieving the best results. “If you have a job that doesn’t provide much choices in how you are able to manage stress, you are more likely to suffer mentally and physically” (Stringer, 2016, p.46).

A study has been done for 18 locations and includes 9000 participants of global financial services has found that 68 percent of them from all locations strongly agree that a flexible workplace that allows them to work anywhere, any time, and any way, made them more energized and productive (Stringer, 2016).

Sally Augustin (2009) said, “When we don’t feel in control of what happens to us in a place, we are stressed, discouraged, and frustrated. Feeling in control is the key here; we don’t have to actually exercise control to reap psychological benefits” (p. 29).

Integrating physical activities. How to integrate movement in the workplace successfully? A combination of strategies that includes social and behavioral aspects, environmental aspects, and informational aspects that show the health benefits of movement. Stringer (2016) suggests some techniques to encourage physical activity for employees.

Way Findings. Using signs, posters, or any campaign methods to promote best practices of movement and exercises lets the employees know about health benefits. Studies show that informational integrations in workplaces to let people know the advantages of using

stairs instead of elevators increases stair usage by 54 percent. Some companies use wall space to signify the importance of physical activities. Other companies by using neon posters, and the smart ways of advertising to boost movement.

Stairs Design. Another way to direct someone's eyes to the stairs is by designing attractively. Stringer (2016) advises to use an open, bright space for stairs instead of making it in a dark hidden area. Also, design it to be welcoming with size, artworks, views and nice materials, which increase the stair usage and using wide hallways to walk. "You can also change your building elevator setting to skip stops, so that the elevators stop only every other floor or every three floors, which encourages people to take at least one flight of stairs" (Stringer, 2016, p.65). In looking at the way to encourage employees to move, Barbara Armstrong, the dean of school of arts and design in Mount Mary University, Milwaukee said "I know a company that ordered the slowest elevators possible and put the staircase next to them. There is real benefit in people walking around, talking to each other" (as cited by International Interior Design Association, et al, n.d.). This encourages and enables employees to walk and use stairs which increase the blood flow to brain.

Encourage employees to stand up. Organizations provide sit to stand desk for their employees. Stand workstations and stand-up meeting zones. It is not only good for health and energy producing, but also makes the individuals more creative and engaged to their work within groups.

Locating office space by public transportation or amenities is a good strategy to motivate employees moving to and from bus stations and subway stops rather than using cars. It also has environmental advantages.

Other techniques. Providing a place for employees to work out, carve out space for bikes and showers, and double up workspace for exercise or stretching. For example, having on campus gym or even fitness buildings that are close to the organization when studies show the positive effects of outdoor exercise area or wide window with a natural view.

Managing stress. Stringer (2018) states that employees in their work are susceptible to different situations that cause stress and leave them with no control, which leads to health issues and influences their behavior out of work. “No one can avoid all stress, but you can counteract its detrimental effects by learning how to produce the relaxation response, a state of deep rest that is the polar opposite of the stress response. The relaxation response puts the brakes on stress and brings your body and mind back into a state of equilibrium” (Robinson, Segal, et al, n. a.). Thus, there are some strategies to manage stress and depression at work and applications like relaxation spaces. These spaces are based on relaxation techniques that vary between meditation sessions, yoga, prayer, breathing techniques, massages, and rhythmic exercises. They are functional and sufficient in lowering blood pressure, fatigue, stress, reducing anger and frustration, and improving concentration and focusing on work (Relaxation techniques: Try these steps to reduce stress, 2017).

Offices can have rooms specially designed for meditation and relaxation purposes for employees. In some cases, Stringer (2016) suggests that workplaces could have other things that work for meditative exercises by only having a smart design. This includes a good outdoor view, quiet spaces and well-designed furniture to be more comfortable, soft, and cozy. In general, any place that has a connection with a natural element and

provides the feeling of being safe and free from any distraction lets the mind focus deeply in a period for taking a mental break (Stringer, 2016).

He stated some personal experiences that found that open design workplaces make the workers easily distracted, trapped, and feel more nervous of being supervised, which reduces creativity and affects mental health. There are multiple studies about the benefits of open workspaces and collaborated work that could be more productive. However, some suggestions to offer enclosed areas combined with the open space lets the employees feel more comfortable to do private tasks, calls, conversations and conduct group meetings. This gives them the control to choose the place they want and reproduce their energy, which reduces stress and allows to get flow and creativity.

Stringer (2016) cites Augustin's perspective "Good places for restoration in workplaces should have some combination of views to the outdoors, plants, natural materials, daylight, nature sound, and/or minimal technology disruption" (p. 99).

"Whether you put in full- or part-time hours, it's difficult to be a parent who also works outside the home. Add the stress of finding reliable childcare to accommodate your work schedule and it can be absolutely soul-sucking" (McGreevy, 2017, p1|). In the same point of view, Stringer (2016) said that companies obtain more benefits with the parents employees when they provide facilities for child care. Thus, it reduces time and stress of looking for a nearby childcare, and allows them to stay longer at work, which increases their level of satisfaction and well-being. He stated that another study found same benefits for employees with pets in offices as well. In the other words, lots of employees are parents, and they face some difficulties taking care of their children or finding a good care provider for them in their working time. Therefore, when the companies facilitate

some spaces for the children, that makes the employees more confident to work without any stress about where to put their children, and what time they have to leave.

To sum up, In order to create a healthy workplace that supports well-being of employees and boosts the productivity as a result, Stringer (2016) addresses these 12 strategies:

- 1- Maximize natural light in the workplace by increasing windows size, and let employees have access to a view even by collaborated areas like cafeterias and walkways. It also could be achieved by reflecting sunlight through light colors of walls and furniture.
- 2- Choose a workplace building that has a high ceiling and double space height, that reduce crowding, provide more opportunities to orient and control natural light, and increase the feeling of freedom.
- 3- Integrate plants, water features, and views of nature into the work environment, which has an impact in stress reduction, increased comfort and relaxation level.
- 4- Have a clean work environment that releases the feeling of a crowded desk.
- 5- Select a high-performance quality and green interior material and furniture.
- 6- Have the ability to set up or adjust the workplace in aim to minimize injuries and meet the body's needs.
- 7- Some considerations for acoustical issues in wall construction, material, and height.
- 8- Remove noise distractions by separating activities spaces from quiet rooms and assume some policies to reduce behaviors that cause distractions.
- 9- The knowledge of using color with various meanings in different nations related to religion or culture and psychology experiences. For example, bright colors related to high

concentration tasks. Cool colors are calming colors and promote creativity thinking. Red boosts the feeling of energy and strength, green for creativity, yellow for alerting, etc.

10- Decrease the risk of being sick from communicable diseases or contagious illnesses by using some techniques in layout or even protection ways.

11- Improve the thermal comfort and air quality in the interior environment by using temperature controls.

12- Use smell to increase productivity; it is interesting to find that smell can affects workers' performance.

According to Workplace Well-being (n.d) "Workplace Wellbeing relates to all aspects of working life, from the quality and safety of the physical environment, to how workers feel about their work, their working environment, the climate at work and work organization. The aim of measures for workplace well-being is to complement OSH measures to make sure workers are safe, healthy, satisfied and engaged at work." In other words, in order to increase workers well-being and satisfaction in their workplace, it is important to ensure the quality of their physical environment, and the efficiency of the surrounding interior elements. Figure. 3 has summarized the factors that support well-being based on the reviewed literature. It shows that all strategies of interior design methods could be categorized under four categories of well-being.

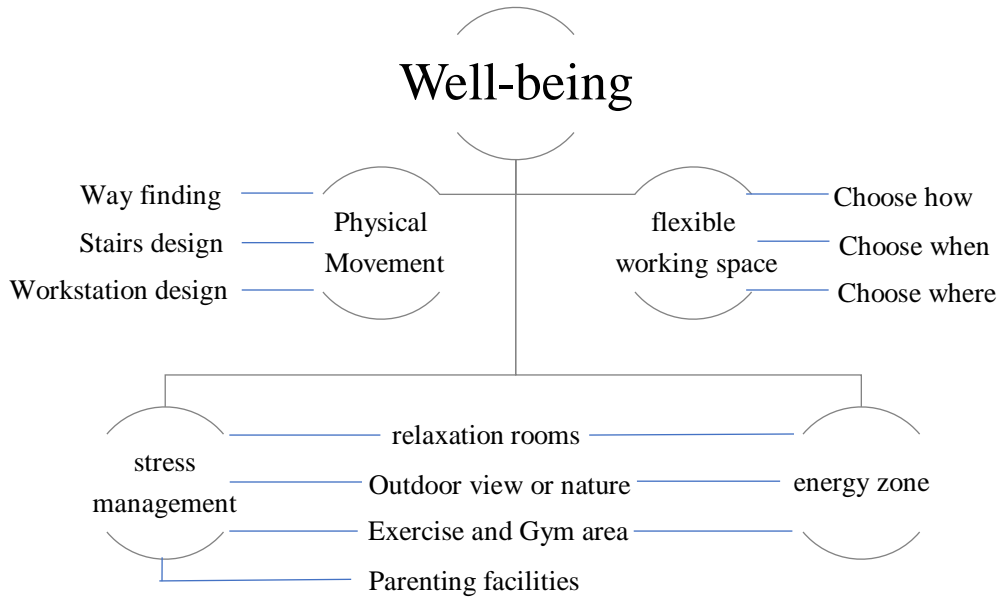


Figure 3. Well-being Summary, the four factors of increasing employee's well-being

The Efficiency of Workplace's Interior

Physical work environments, whether the corporation or company type, should promote individual self-respect, which means enhancing his needs and requirements as a human, then as a worker. People with their different and variable level of abilities are all candidates for a job if their qualifications and efficiencies meet the career requirements. So, as a designer and an architect, there are no limits to achieve and respect the employees' dreams about workspace goals. "People who have studied for years to become technical experts and professionals in their field, find their selves in small, box-like enclosures that all look alike" (Vischer, 2005, p.1).

Vischer (2005), in her book, examined how multiple principles in office's interior influence users negatively; however, she analyzed the flexible furniture, shared offices, low partitions and informal places. Most people feel that their workplace is their home;

furthermore, any physical element will have the impact that touches their personal contribution in the job and affects their dedication to productivity.

Vischer (2005) said “[People] see, hear, and feel their environment differently depending on psychological process (what’s going on inside their heads, like their expectations and memories) and social influences (connection with co-workers, longevity in the job, familiarity) as well as on physical stimuli” (p. 79).

She analyzes the issues of environmental comfort within a workspace. It is the dimension of three levels which incorporates physical, functional and psychological comfort, which have an impact to whether they create positive or negative effects on the workers morale and performance. Vischer (2005) put those three levels in a diagram to represents how they come together and can influence the user.

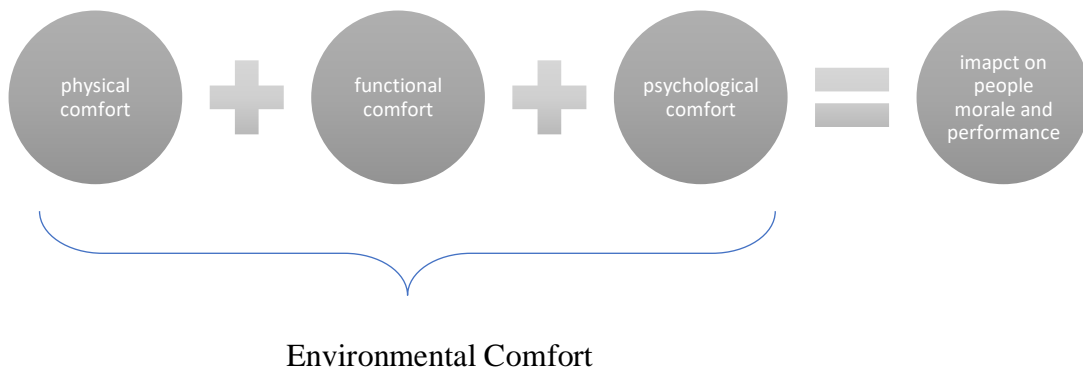


Figure 4. Three factors for creating productive workplace, re-illustrated from *Space Meets Status* (p. 84), by Jacqueline. C. Vischer, 2005, New York: Routledge. Copyright 2005 Jacqueline c. Vischer

In the Figure. 3, the relationship between factors is illustrated to indicate how to achieve the goal of designing a very creative workplace that encourage workers to productivity and high performance. Physical, psychological, and functional are the three level that interacted to measure the environmental conditions influences on human

behavior. To clarify each component meaning, Physical comfort is for the built environment, interior design, or necessary elements of buildings such as light, acoustic, temperature, ventilation, transportation access, parking, safe, vertical circulation, accessibilities, facilities, effective maintenance, privacy, furniture. However, the functional one indicates how much physical elements amount is required to output with right and perfect way to build the element like (right lighting fixture and illuminance for the task). It also includes the user special requirements to provide an appropriate design of the physical value in term to fulfil the task situation within the limits that ensure user demands. The third level is the Psychological comfort and that interpret user satisfaction according to the physical and functional comfort.

Besides that, the office buildings must be appropriately accessible to enhance the working process. So, when the people live in the place that correctly designed that helps them to work better, and communicate with costumers, co-workers, and managers properly. Vischer, (2005) states that “Workspace if designed correctly, will cause people to meet certain behavioral expectations” (p. 82). In other words, and with the environmental comfort relationship clarifying, if the physical built environment was completely perfect that lead to the psychological aspect of the workers, which increase the satisfaction level for the user about his surrounding environment positively, then he/she will carry out the tasks as required. Vischer (2005) wrote about environmental comfort “It is a conceptual approach to the different ways in which human in various climates and cultures have controlled, adapted and managed the environment in order to ensure well-being” (p. 83). In other words, people have different needs and demands, and to guarantee the best environment design for a public place that serves different users,

those needs should be taken into account. Therefore, the interior space will dive to the environmental and psychological comfort. However, the obverse of comfort is stress: situations of discomfort over time generate physical and/or mental strain, and sustainable stress (strain) is a major cause of illness (Vischer, 2005). The most sufficiently great elements in physical environment of workplaces that workers need are (air quality, thermal comfort, spatial comfort, lighting, and privacy). When those elements applied in the right amount of their demands, that increases the satisfaction level which lead them to work better.

Air quality

Indoor air quality in office buildings filled with polluted generating equipment cause the feelings of discomfort and even illness such as headache, fatigue, nausea, and respiratory problems (were often attributed to polluted indoor air or lack of fresh air (Vischer, 2005). The air circulation has impact the physical comfort and influences the psychological comfort, while the poor air quality can cause health issues. Actually, it is not directly related to the performance, but when it results to the health that definitely will decrease the enthusiastic level to do great work.

Thermal comfort

It consists of the place temperature and the humidity levels where People are looking for the comfort zone that makes them feel content with the atmosphere, as well as enhances their workplace performance. On the other hand, most workers staying positively comfortable in natural ventilation more than auto conditioned, and that refer to the balanced humidity level between outdoor and indoor.

Spatial comfort

“As offices shrink in size, office furniture dimension become more important to workers....ergonomic comfort with furniture & the amount of space they have in their office or workstation” (Vischer, 2005, p.92). This includes work surface dimensions, file storage, wall or partition height, choice of accessories, spatial orientation and way finding, access to meeting rooms and places to work together. Smaller workstations make users more aware of the amount of work surface they have.

In other words, spatial comfort has a direct impact on functional comfort and the performance of work. It affects teamwork productivity and individual task performance because it is affected by the appropriateness of furniture design to task demands (surface, storage, partition) and by accessible and sufficient places to meet and work. However, worker health and well-being may suffer when furniture is old, un-ergonomic for computer use and difficult to use. That also could be caused by spending more time in fixed positions in front of keyboards and screens.

Workstation Layout: One Size Fits all

Proximity to co-workers, varying partition height to enable contact with some colleagues and protect from contact with circulation areas and other workgroups, proximity to spaces to meet and work together and convenient access to shared storage and equipment all have direct effect on how well people work (Vischer, 2005). Size is important in the context of psychological comfort. The more functional appropriate the furniture elements are to the tasks being performed; the more workspace supports task performance.

Privacy

While most of workers suffer with open workspaces because of distraction of noise and movements, designers trying to create spaces that provide them a level of privacy when it needed. According to Vischer (2005) privacy of workers could be at two levels: functional, related to separateness and freedom from distraction to concentrate on the task. The other one is Psychological, exclusivity, status in the organization, environmental control. However, defining the type of tasks for each worker and position of work, help to accommodate the appropriate level of privacy. This could be clarified in the following functional relationship:

Privacy and type of task = strong relationship.

Ensuring the environmental and behavioral measures are in place to enable workers to control when and how they are approached by co-workers.

Lighting

The quality of the indoor illumination in workplace has the impact on workers' productivity and improving their satisfaction. Warner (2016) stated a report shows that a proper lighting design in the workplace has controlling the workers' performance to be 30-60 percent lower errors, while productivity increases 10-50 percent. He said "Proper lighting is also important to the health and happiness of employees, helping to reduce eyestrain, headaches, and fatigue, and making for an overall cheerier work environment." Nevertheless, the best lighting methods to illuminate workplace areas is using daylight, where it is better for health and for energy consumption which leads to be environmentally sustainable. Northwestern University studied the influence of lighting of

workplace on the workers, therefore, they found that workers who are exposed to natural light more have better quality of sleep and life, and they are active more comparing with workers with less amount of natural light. Paul 2014. Using glass walls, workstations with less partitions and panels and arranging offices to have space for hallways beside windows are three strategies that Warner (2016) suggested to raise the benefits of natural light.

Too low lighting is more uncomfortable than it is too bright. Psychologically people are affected by size of, view from and proximity to windows. On the other hand, worker morale tends to be poor in windowless environment (Vischer, 2005). On other words, the bright spaces is not like what everyone think, it also related to physical and emotional discomfort with light reflection and glares. Where the optimal way is to combine between natural and artificial light in order to keep workers healthy and productive.

Acoustics

Stringer (2016) said “Interestingly, noise can enable or disable productivity, depending on individual preferences and the type of work being done...., interruptions caused by noise during complex work, however, require a longer period of time to reorient, and continued interruptions are likely to have negative effects on mood that reduce the motivation to resume work” (p.132). In other word, acoustical noise affects the employees’ productivity and well-being. The key is to have the ability to collaborate and having team conversation with the acoustical comfort for those who need deeply concentrate and think. This can be well designed with the good selection of the absorptive

material like finishes of ceiling, flooring and fabrics, blocking with partitions and walls, and covering materials.

Prime Working Age Workers

“The employment rate for a given age group is measured as the number of employed people of a given age as a percentage of the total number of people in that same age group.”(OECD,2019).

In the employment categories, there are three groups of age that are measure among the working people according Organization for Economic Co-operation and Development (OECD, 2019), the age between 15 to 24 years that determine people who just start be in the labor market during education or directly after. The second group rates between 25 to 54 years those in the prime working age which is the target demographic for this study. The last group of employment age is for people retirement who are almost approach their retirement age and certainly their old between 55 to 64 years.

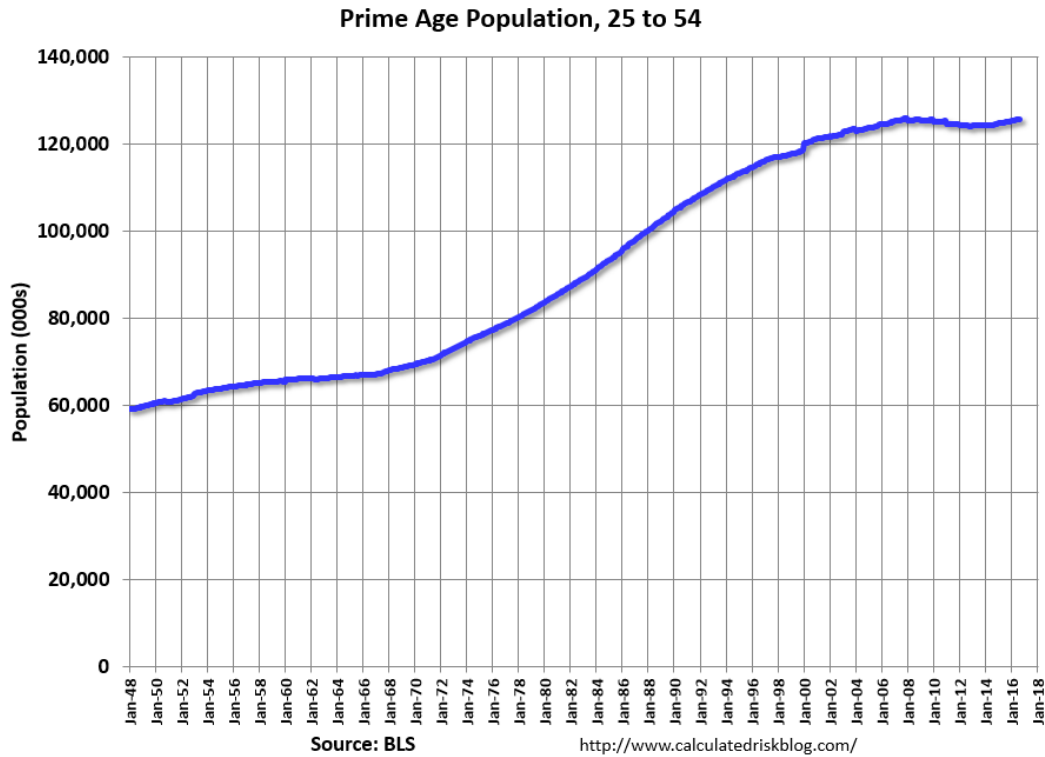


Figure 5. Prime Working Age Population between 1948-2018, adapted from Calculated Risk finance and economics, retrieved from <https://www.calculatedriskblog.com/2016/09/update-prime-working-age-population.html>.

Conclusion

In summary of the reviewed literature, the design of office buildings drives people positively or negatively and affects their health conditions in terms of achieving the physical comfort. On the other hand, consider the functional and psychological comfort may increase the workers' dedication to behave better. Therefore, the organization or company efficiency has affected by the value of workers' performance.

However, designers and architects can use different strategies in physical environment to influence the occupants. They can make them engaged, and highly concentrated or distracted. They easily can inspire their creativity and productivity by

enhancing their well-being and satisfaction in the building which motivate them to put more efforts in work and be efficient.

On the other hand, as a manager or owner, to get a successful organization, they have to invest in the place that involve employees and raising up the bottom line; however using last strategies and other techniques in this source increase their performance, working quality, and the organization community as a positive atmosphere. However, there are multiple strategies that stand behind a well-designed workplace that stimulate workers to overcome their daily circumstances that drive stress and depression during working hour. Creating an atmosphere that supports workers' well-being could be accomplished through promoting physical activities, providing flexible working spaces, building facilities to manage stress, and reproducing energy zones.

CHAPTER 3

METHODOLOGY

Theoretical Framework

Through the previous chapter, the concept of the optimal workplace is based on the creation of an environment that considers and prioritizes the human needs. There are overlapping ideas in this conceptual framework. These major ideas are about the relationships between the employee's wellbeing, productivity levels, and workplace's interior space design. Generally, the major topics go beyond the borders of psychological determinations, which are related to the environmental influences on the human, health determinations that could occur when staying long-term within the space, and physical determinations of the building. A study of the literature review presents that productivity of the workers increases if they work within a well-designed space. Others found that interior design can affect the physical and mental wellness situation of the workers, which influence their wellbeing, happiness and satisfaction toward the workplace. Furthermore, the link between workplace's design and workers' wellness is defined within the factors of physical, psychological and functional aspects, which could be either positive or negative influences.

Theoretical Framework Diagram 2

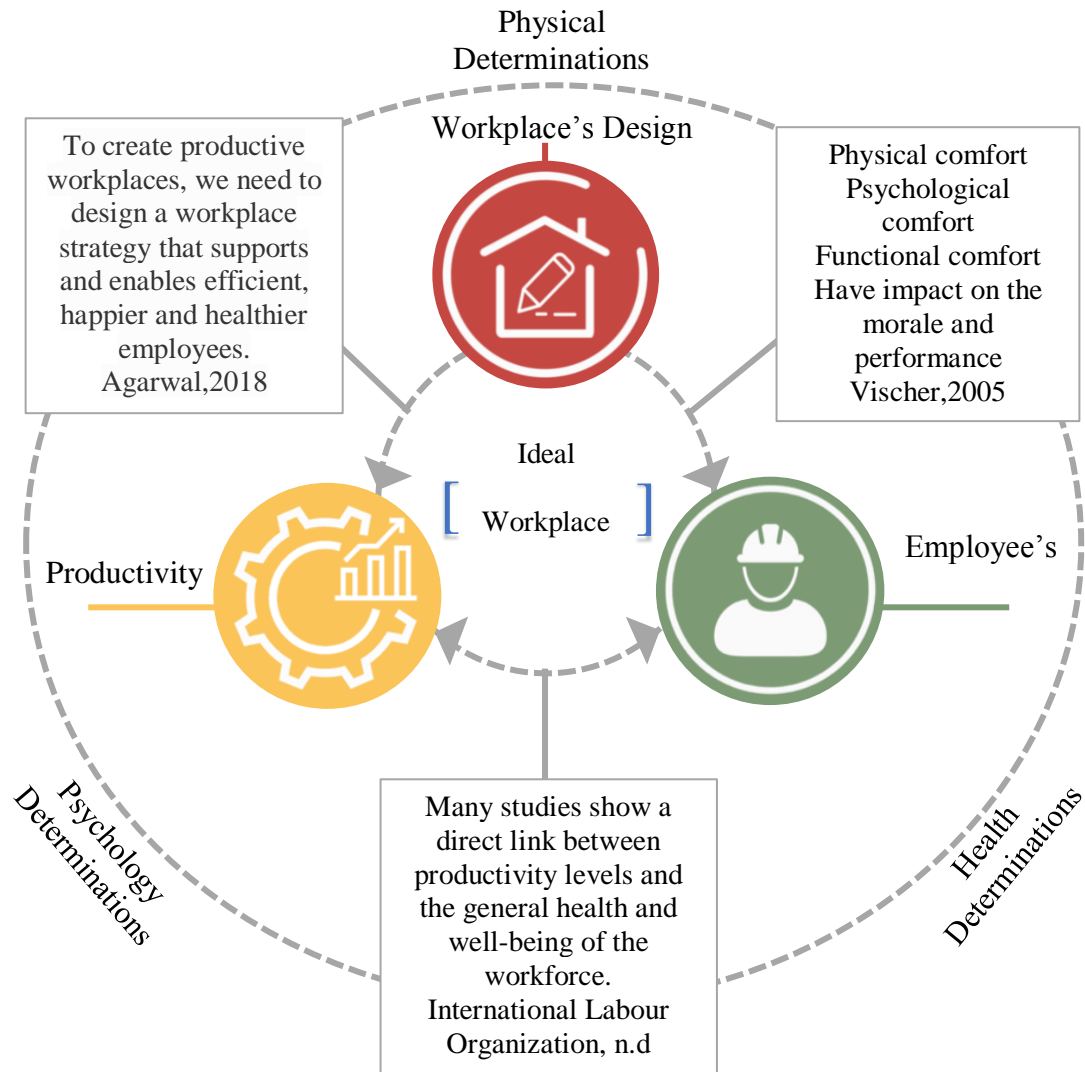


Figure 6. Conceptual Framework Diagram 2

While literature review reveals the theoretical aspects of the impact of the physical interior environment on the workers wellbeing, the visual case studies and analysis for the most famous and successful companies in the U.S will be used to draw out patterns of insights to determine if these theories are true or not. “The principles of case study research excels at bringing us to an understanding of a complex issue or object

and can extend experience or add strength to what is already known through previous research” (Kakulu, 2014, p. 8).

Research Design and Methodological Approach

This study employs a multiple case studies designs to explore the interior environment of workplaces in the United States that are built to impact workers positively. A case study is “. . . an empirical inquiry that investigates an empirical phenomenon (the ‘case’) in depth and within its real-world context, especially when the boundaries between the phenomenon and context may not be clearly evident” (Yin, 2014, p. 16). Having multiple case studies will increase the effectiveness of the relationship between interior environment principles and elements with workers wellbeing that will be analyzed through different company industries.

Rationale for this Design

The benefits of a case study design is to provide the best insight into the research questions because it offers an analysis for the data that open new ideas to understand complex phenomena (Miles, 2015). This method of research is the ideal one that can answer all the inquiries outlined in the first chapter ‘see section Research Questions in Chapter1’ and have in depth descriptions of the contents to comprehend the research under the different circumstances, like the company being evaluated, industry, location, size of the structure, and the organization style of work.

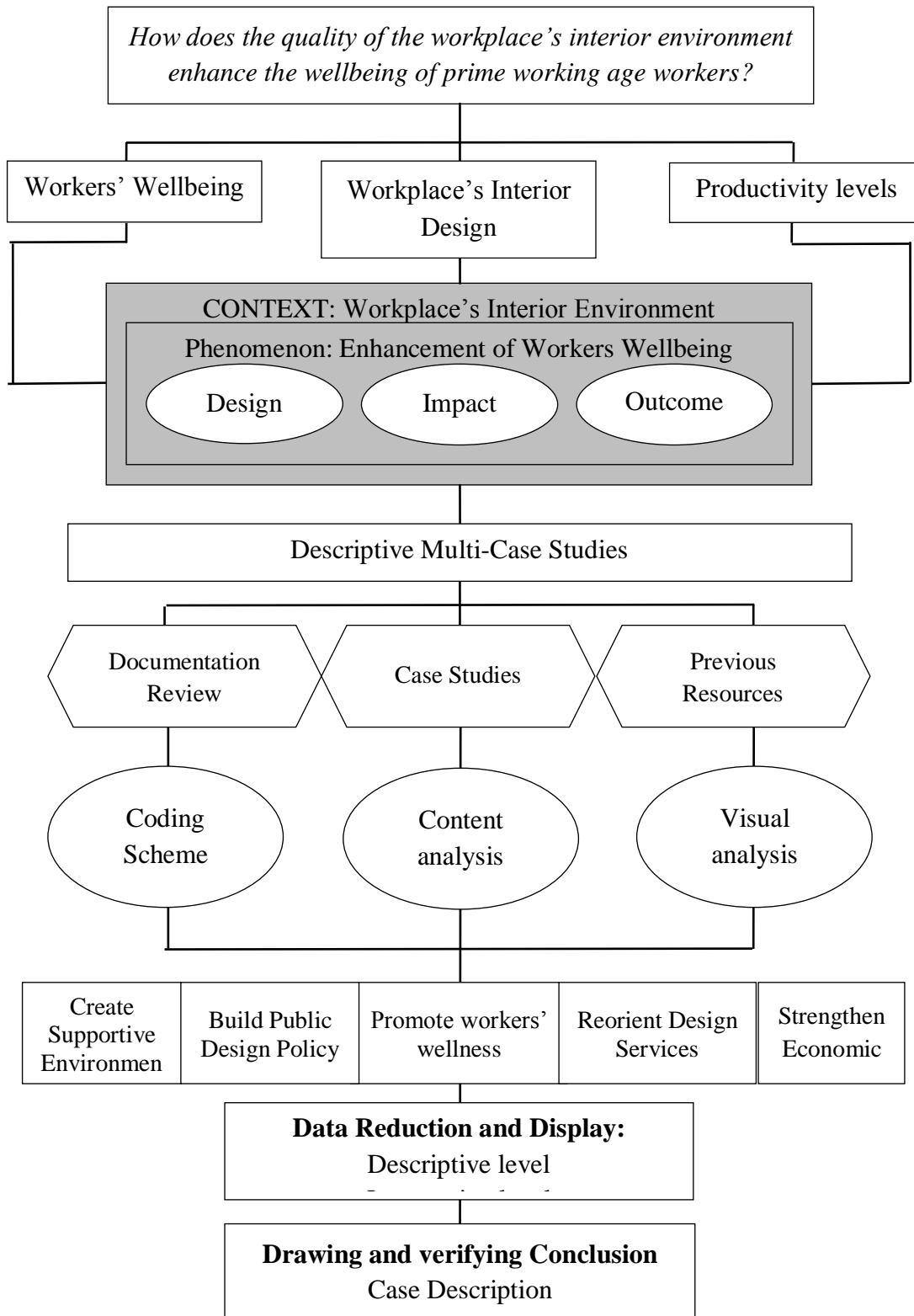


Figure 7. Graphic of Research Design and Methodology Approach

Unit of Analysis

In this research, the case study unit is the organizations that are located in the United States. However, the unit that will be studied represents the phenomenon of interest with a multiple case study types that explores the similarities and differences of each case. Yin (2008) explains that a multiple case study enables the researcher to explore differences within and between cases. The goal is to replicate findings across cases. Because comparisons will be drawn, it is imperative that the cases are chosen carefully so that the researcher can predict similar results across cases, or predict contrasting results based on a theory (as cited in Jack & Baxter, 2008).

Case Selection

Most of the selected cases are headquarters since they have more quantity of workers who vary between genders, ages, cultures, nationalities, personalities, etc. On the other hand, headquarter has more space to play with interior and exterior elements of the building through altering them so the company's physical environment is well designed. Organization's headquarters is the ideal to be as a representative case study and likely to reflect the research interest. In order to ensure that the phenomenon will be particularly well explored, and the research question is perfectly answered, coming up with cases that have more variations in the interior environment of work aspects is the key. Table 1 shows the selected companies that will be included, and a brief description for each one as well.

Table 2

Selected Case Studies Assortment

| Company | Description | Industry |
|--|---|---|
| 1- Under Armour Headquarter, Maryland | UA is a sports apparels producing company that was founded in 1996 and is recognizably different with their fast growth in business and is known as the preferred athletes' brand around the world. Its location makes it more distinguished, in addition to the interior environment which highlights the company's spiritual image. | Fitness Wear |
| 2- Google Headquarter, California | Google is known as the dream workplace for most graduates. It was founded in 1998 and since then there has been continuous improvement in services and benefits of the company. Google is distinctly featured with its perks and facilities, which create an ideal working environment for its workers. | Internet Services |
| 3- Facebook Headquarter, California | Since Facebook was founded in 2004, it is defined by its collaborative and encouraging work environment. Recently, its new headquarter buildings have added more features that are recognized as a sustainable and healthy building that motivates productivity and satisfaction toward work. | Social Media |
| 4- Adobe Headquarter, California | It was founded long time ago in 1982, and it specializes in the digital editing and visuals software. It has the eventual renovation that makes it in the list of the best innovative and creative workplace to work in. | Computer Software and Hardware |
| 5- Gensler Office, California | Gensler is widely recognized as a global and largest firm for architecture and design services. Although its big number of widespread offices around the world, it adopted the concept of one-firm firm. It was founded in 1965 by Arthur Gensler, and since then it stays in the top of the companies in Architecture and design | Architecture and design |
| 6- FedEx Headquarter, Tennessee | FedEx is well known as the preferred shipping company around the world. Its huge campus headquarters and well-designed landscape drive it to be awarded with several sustainability certification. It stands on the concept of being environment friendly and saving the energy by reducing consumption of the sources. | Trucking |

The companies that are studied are local, private, and public organizations in the United States. However, the selected companies have been identified as being in the top 100 best places to work according to the Glassdoor 2019 list since these companies are reputed to offer good quality of working environments for their members. In the exception, Under Armour headquarter has been defined by Stringer's (2018) book, *The Healthy Workplace*, as an example of a good workplace that supports workers' wellbeing and productivity. To examine sufficient data, we need to analyze between five to seven companies that will provide insight into the research question and make it possible to identify common themes and differences between cases.

CHAPTER 4

RESULTS

Introduction

In this chapter, the results from the methods that outlined in the previous chapter are organized to be in three parts. First part is to provide a general information and introduction about each case study. Second is a descriptive which related to the collected data of case studies, and analyzed by the author. The third part is the findings that will discuss the results of the analyzed data and report the results of the research.

Overview of the Case studies

Case study 1: Under Armour's Global Headquarter, Baltimore, Maryland

Under Armour is a company that produces sports, casual apparels, footwear, and everything related to athletics outfits gears. It found in 1996 by Kevin Plank who is a special team captain, then it grew fast to be widely known as the top athletic brand and the first choice for most of popular athletes in America and around the world.

However, Under Armour's company, specifically HQ, became the best workplace for sport's fan although they announced that the Headquarter will be moved to a new location in a global campus in Baltimore. It is designed by Alliance Architecture on the summer of 2008. Garfield, 2016 said "When its 2,000-some employees — or as Under Armour calls them, "teammates" — aren't working, they can shoot hoops at the company's swanky basketball court or work out in its high-tech gym." In another words, this technique that bosses use to create the spiritual unity between employees. But for the

architecture and design of the building, there are several features that attract people working there.

Case Study 2: Google Headquarter, Mountain View, California

While Google has been part of our life with its applications, services, and products, the company headquarter became the dream workplace for many people. The headquarter is located in Mountain View City in Santa Clara County, CA with a complex of 20 buildings and four core buildings, that connected together by glass bridges and centered courtyard, and modern designed. It includes multiple facilities not only offices with than 2 million square feet of space that inherited from Silicon Graphics in 2003 according to Clive Wilkinson Architects report. Googolplex, as it is named, had designed and constructed by Clive Wilkinson Architects Group in 2005 and he created a millstone of collaborative, recreational, and flexible environment.

However, Google Headquarter has consisted of workspace where most of offices are placed there, food facilities like café shops, bakery and restaurants, and other recreation spaces. Particularly, it is a combination of sport fields such as outdoor basketball field, tennis, fitness center, and spa where workers can take their stress away and be released. “They held an invited design competition, which we won based on our proposal to create a diversified campus environment, integrating highly focused software engineering workspace within a support system of learning, collaboration, recreation, and food facilities. These accessory functions were strategically placed along a logical “main street” which allowed for the churning of ideas among the community, while the

workplaces were located to allow for more concentrated, “head down” activities.” (John Meachem,2010).

CWA had win the competition to design Google headquarter, and during the existing buildings analysis steps, they faced some constraints related to the site, as per John Meachem a Vice President and Project Director, like existing infrastructure, structural constraints, fire compartmentation, and oversized height zones. On the other hand, there were advantages in the existing site that could be part of architectural solutions process.

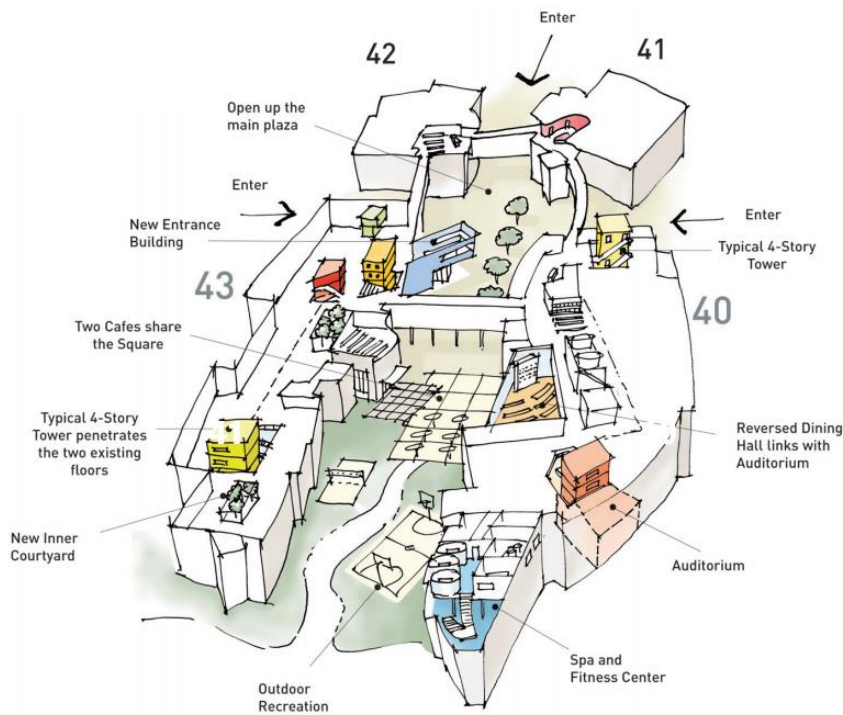


Figure 8. Campus View from the East, Clive Wilkinson, 2010, Retrieved from <https://clivewilkinson.com/case-studies-googleplex-a-new-campus-community/>. Copyright © 2010 Clive Wilkinson architects

Further to the concept of the complex, the architects group intend to provide the impression of education environment in the place, where most of the employees are new graduates. Meachem (2010) clarified that “A primary vision was to merge the idea of workplace with the experiences found in an educational environment into a new way of

working and maintenance of an edge. The reasoning for this was the idea that within the loosely structured university system, there are resources available to allow the individual to conceive, investigate, and execute the impossible—and that is how Google was originally conceived.” The concept of bringing university environment within workplace is created to evoke the powerful, energetic and spirited feelings during working hours. Moreover, working in a high education atmosphere provide the opportunities to choose the style of work that individuals usually need, however, each one has the power to choose the work environment whether it is private or with a team. Likewise, the university students have the ability in self learning and taking education under self-control without guidance or mastering (autodidactic), also in googolplex, the workers are self-directed workers focusing on individuals’ tasks, but when it is shared job, the collaboration is usually allowed any time.

Case Study 3: Facebook Headquarter, Menlo Park, California

“Facebook’s new 1+ million-square-foot corporate campus mirrors the company’s philosophy: It’s open, mobile, socially connected, dimensionally aware, culturally relevant and personally sustaining.” This how Gensler started identifying Facebook old headquarters in its official website. Facebook giant stoical media company has founded by Mark Zuckerberg and his other four friends who were all students in Harvard University. Although this great idea has been established in a small squared dorm room, facebook Headquarters has now 430,000 square feet of area that built in 2015. It is the largest open plan for offices all around the world with elegant, high tech, and biophilia principles-based architecture design. In fact, Facebook headquarter was previously

established in Sun Microsystems campus, Menlo Park, California that is existing since 1990's. They moved in a building in 2013, then the new headquarters location had the honor to be the current company HQ in 2015. What makes Facebook Headquarter more distinguished that the famous Canadian architect Frank Gehry designed the buildings 20 and 21 which are known with MPK 20 and MPK 21. While MPK20 had finished in 2015, Facebook contracted with Frank Gehry again to design and construct the new building MPK21 and it all set in 2018.

Facebook MPK21 had awarded by LEED with platinum version certification last on November 29, 2018. According LEED website, MPK21 had 88 points out of 100 in building design and construction (BD+C) type in the categories of Sustainable sites, Water efficiency, Energy & atmosphere, Material & resources, Indoor environmental quality, Innovation, and Regional priority credits. However, other buildings in Facebook headquarters in Menlo Park has certified with Gold LEED certification like MPK21, MPK61, MPK27, MPK62, MPK63, MPK60, MPK23, MPK17, MPK12, MPK16, MPK11, and MPK14.



Figure 9. MPK 20 building of Facebook Headquarters, adapted from Level10Constuction, retrieved from <https://www.level10gc.com/project/facebook-mpk-20/>. Copyright © 2011 - 2019 Level 10 Construction.

In this case study, the focus is the newest two buildings which are MPK20 and MPK21 designed by Frank Gehry and marked with sustainability. “All the things we learned doing building 20 prepared us for building 21,” Gehry said in the short informative film about the building published by Facebook. Therefore, the space analysis is divided into three bullet points, first, the architectural design and layout planning improvements that promotes both human wellbeing, and sustainability. Second, the interior environment techniques of the buildings to ensure providing the best working atmosphere supporting productivity and flow of workers. Finally, the other strategies aiming to create sustainable building.

Case Study 4: Adobe Headquarters, San Jose, California

“Adobe is changing the world through digital experience” this how Adobe describe its mission. Adobe company has awarded in the list of the best 100 places to work for in 2019 by Glassdoor Awards in the rank of 30. On the other side, it came in

number 9 in the list of the 25 best workplaces in technology according to Fortune magazine. It is well-known with its digital hardware and software products specializes in visuals like Adobe Photoshop, Adobe Illustrator, Adobe Reader, Adobe Light room, Adobe InDesign, Adobe Flash player, etc. Most of the Adobe software serve for photographers and designers in all fields. It has multiple offices al around the world, but the main headquarter is in U.S where it is founded long time ago in 1982.

The Headquarter is located in the heart of San Jose City in California where the public company has more than 10000 employees working there. its 20 years old vertical campus that was built in 90's had renovated by Gensler Architecture group. According to Architect Magazine, 2018, the new headquarter design reflects the company mission and evokes the creativity, innovation, and collaboration within the working environment. The project had been completed in 2016 with a size of 143,640 square feet and before that it had awarded with platinum LEED certification in 2006 in addition to the other awards and certifications. However, the community different spaces are designed to increase workers' productivity and their satisfaction toward the place they are working for. Gensler designed the center to be an open floor area, with a modern style of architecture and interior modeling in order to create an inspirational professional experience for workers. They focused on the visual beauty of bright colors in each space of the project as a company brand's extension, which also expresses the design concept that prioritizes vibrant and innovative interior environment. "Adobe's focus on creativity, innovation and community informed the design approach – a vibrant, purposeful use of color throughout, minimal finishes in each space, incorporation of curated art and locally made furnishings, and environmentally sustainable materials –resulting in a space that is the company's

brand manifested and a headquarters that expresses the next generation of the innovative workplace.” (Adobe Headquarters Renovation / Gensler, 2018). It includes several coffee shops and restaurants, retail stores, game area, Assembly space, outdoor seating, gym and fitness training spaces, learning kitchen, meditation space, massage room, peace in a pod, soma dome, and interactive touchscreen area. Gensler provides the sense of community by designing open work spaces and several gathering areas (Gensler, 2016). They said “Adobe’s culture of collaboration and creativity is achieved through an open and vibrant work environment.” Each space of Adobe headquarters had been created in both aesthetically and functionally methods in order to build an accommodation for its occupants along their day-to-day work activities.

According to that, this case study is going to be analyzed through sorting the spaces separately.

Case Study 5: Gensler Headquarter, San Francisco, California

“Gensler is widely recognized as the world’s leading collaborative design firm, not just the largest. The ability to work together as an integrated team is part of our DNA, and we’ve embraced it at every level, from our Co-CEOs to our studios and project teams.” (Gensler, n.d).

Gensler is a global firm for architecture and design with and 48 offices locations around the world worked in projects in 94 countries. It was founded in 1965 by the architect Millar Arthur Gensler Jr. with his wife Drue Gensler and associated partner James Follett. Although this expanded number of offices in different regions, Gensler

shared one values as one community from across the globe adapting the concept of one-firm firm.

In terms of unity, Gensler needs to enhance the strategies of communication between its workers and drive the innovation process to bring ideas together. “In 2018 we launched Design Labs. This initiative taps the creative power of 6,000+ people through an internal web portal and other digital tools” (Gensler Annual Report, 2018, p.11). One of these tools is Gensler VR to deliver a realistic rendering of the projects for clients and teams. Besides that, Gensler launched its own research lab.

However, they have some activities that helps to enrich the human experience in the local communities by building non-profit creative solutions for some problems. This includes health issues, homelessness issues, environmental solutions, and considering the next generations cases. “Our design work, by its very nature, impacts the communities in which we work. We want to be part of the solution to the big problems that cities are facing” (Carey, K, 2018)

For awards, Gensler has awarded as the first architecture firm in top of 300 firms list according to Architecture Record, 2018. Also, the same ranking from Building Design, ENR, and Interior Design lists. Moreover, it has listed with the top 10 most innovative companies in architecture across the world.

Case Study 6: FedEx Headquarters, Memphis, Tennessee

FedEx is an American tracking company that is specialized in delivery services in more than 220 countries around the globe. Its headquarter is located in Memphis, Tennessee while it was officially began in Arkansas 1973, and founded by Frederick W.

Smith as Federal Express Corporation. According to Connecting people and possibilities The History of FedEx (n.d.), the reason of moving the headquarters is the feature of the weather of Memphis that makes its airport more active and no flight changes because of a bad condition. Also, the central location of Memphis within the United States. FedEx has become the largest company with full services and all cargo shipping airlines that also expanding its benefits and business worldwide in global economic growth.

The Headquarter Campus in Memphis has the modern design for nine buildings with a space for more the 700 employees. The last building (Building I) that build in 2008 with three offices stories has add more area for the FedEx campus with 173,000 square feet. It also includes the Conference rooms, Training spaces, and other required facilities. As per what is anticipated, this building plays big role to reduce the cost of energy consumption for the world headquarter (FedEx World Headquarter, n.d.). "...using more efficient materials such as pre-cast in lieu of limestone, vertical glass curtain wall, structural system and a self-contained HVAC system." (FedEx World Headquarter, n.d.)

On the other hand, and according to the architecture firm that worked on this building, Building I has been certified by both Gold LEED EBOM and EPA Energy Star certifications. LRK (Looney Ricks Kiss) is the Architecture group that designed the building and the interior build-out spaces of this building, while The Crump Firm Architects did the planning of 13-acre sustainable site. Nevertheless, the FedEx logistics announced about moving the headquarter to downtown Memphis four months ago.

Data and Analysis

The research is going beyond all studies that are mentioned before to start analyzing the main concept through cases. It is an experiment to find real evidences proof that certain physical environment has impact of boosting the wellbeing of employees and employers, which leads to increase in the productivity.

Looking to the existing implementations that organizations work to actualize them in a built environment, supports the idea of this research.

Data and Analysis Summary

Each company has its different prospective to see how to increase employees' well-being within its space. Therefore, the results are collected through the case studies and categorized to be more readable and understood as shown in the table.3 below

Table 3

Summary of Data Analysis

| | Social wellbeing | Health wellbeing | Environmental considerations | Working style | Recreation facilities | Top Concentration |
|------------------------------------|---|--|---|---|---|---|
| Case study1 Under Armour HQ | Providing spaces to combine in group meeting and conversation, opportunities to celebrate and watch sponsored champions together. | Different Sports fields, indoor and outdoor, yoga classes, offering healthy food in the headquarter café | Bringing natural light by using glass windows and building outdoor spaces. | Collaborative working style is applied. The freedom to use the amenities within working hours. Focusing on employees' encouragement by posting words and athletes photos around the HQ | Sport and training classes. Outdoor spaces. | Body Movement and Fitness zones. |
| Case study2 Google HQ | The collaborated working and communication are allowed anytime. Conversation spaces are created in the courtyards for gatherings. Also, employees can interact together in the other activities and perks spaces. | Offering medical group and services in-site, massage and spa services. However, the indoor and outdoor sport fields and active system are found to boost the healthy body. Also, the offered food has multi-preferences. | Biophilic design with natural light by using glass windows, building outdoor spaces. Outdoor sport fields, outdoor sitting area. outdoor Landscape planning | Education working with both individuals and collective. University environment within workplace provide the powerful, energetic and spirited feelings during working hours. The power to choose the working way that each employee needs. | Gym and fitness rooms, game room, day care, laundry, recreation al center, and other fitness activities | Educational working environment, Perks, and active systems. |

| | Social wellbeing | Health wellbeing | Environmental considerations | Working style | Recreation facilities | Top Concentration |
|--|---|---|---|---|---|--|
| Case study3 Facebook HQ | Providing spaces to collaborate and gather in outdoor and indoor that help to get the stress level down. Group activities, meeting spaces and gaming rooms. | Using natural sources for healing like plants, and sun light. Increase body movement by using bicycles to move around buildings. | Sustainable and Biophilic building with renewable lighting sources, water recycling, and electricity reducing usage. Plants integration. | The right to choose where to work. Open spaces and collaborative workplace that put teamwork in priority. It supports the independent work for individuals with flexible interior planning. | Gaming rooms, multiple dining options, and gathering area. | Architectural strategies and sustainable methods to solve the building and environment issues. |
| Case Study4 Adobe HQ | Open floor includes interactive spaces like coffee shops and restaurants, retail stores, game area, outdoor seating, gym and fitness training spaces, learning kitchen, meditation space, and massage room. It provides the sense of community by designing open work spaces and several gathering areas. | Gym and fitness training spaces, meditation space, and massage room to increase workers health and reduce stress during working hours. Different options of food types. | Strong connection between indoor and outdoor spaces with natural source of light and natural view. Platinum LEED certification. Outdoor spaces. | Culture of collaboration and creativity is achieved through an open and vibrant work environment. The ability to choose where, how, and when to work. most of spaces have facilitation for working. | Game room, learning kitchen, wellness center, retail stores, and interactive screens. | Aesthetic aspects, brand image, and collaborative work. |

| | Social wellbeing | Health wellbeing | Environmental considerations | Working style | Recreation facilities | Top Concentration |
|-------------------------------|--|---|---|--|---|--|
| Case Study5 Gensler HQ | One community from across the globe. Open gathering area in front of the working zones. A joint floor connection for all social activities and events. | Red meaning in the interior design to increase breathing speed, energy and excitement, and attention grabbing. Natural light. | The outside is visible from almost any angle. The windows are spread within the building from each direction. | Design labs and workshop environments. Not completely separated, there are openings allow for interacting and socializing. | Middle floor special amenities like well-equipped kitchen and sitting area. | Collaboration and labs environment, one team firm. |
| Case study6 FedEx HQ | According to the information, there are outdoor and indoor sitting areas for social interactions. | Integration of plantings and vegetations, irrigation way, cold weather control, exterior and interior sustainable solutions | Reduce the cost of energy consumption. Gold LEED EBOM and EPA Energy Star certifications. | There is not enough information about the working style in this case study. | The huge sustainable site with lakes and plants. Shopping store. | Biophilic design, sustainable architecture and design. |

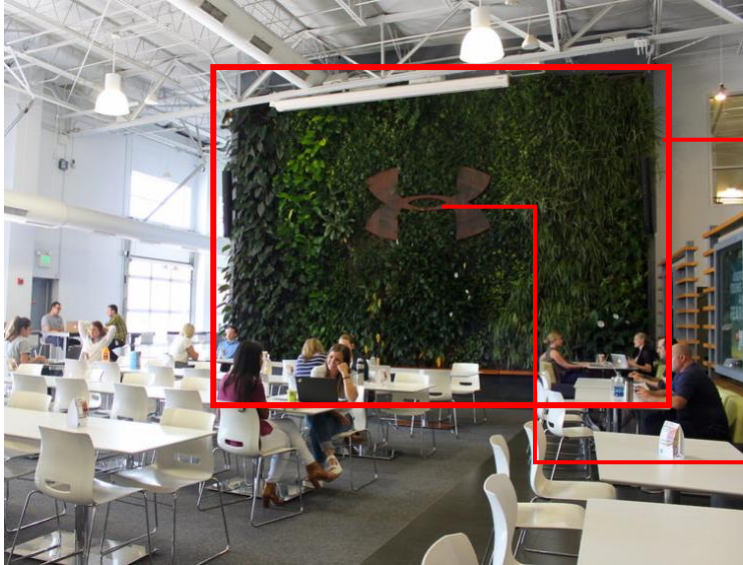
Health and Social well-being strategies.

Humble and hungry café. In this space of Under Armour, workers can have their food, join in conversations, or work there during break time. It is again the freedom of choosing the place that you like to do your tasks. In the same area, workers can go further and enjoy watching live events that sponsored by Under Armour like world cup champs which usually are presented in a huge screen that is hidden and could be rolled down for presenting. On the other hand, the natural elements have taken its place in the humble and hungry café where natural light and living wall, and the outside view support the biophilic design.



The green wall
bottom line
parallel with the
eye-level

Figure 10. Humble and Hungry Cafe green wall, original photo adapted from Matt Roth Photography, by Matt Roth Retrieved from <https://ssl.c.photoshelter.com/img-get/10000k8LW8dMUkkU/s/1200/10000k8LW8dMUkkU.jpg>. Copyright 2014, Matt Roth

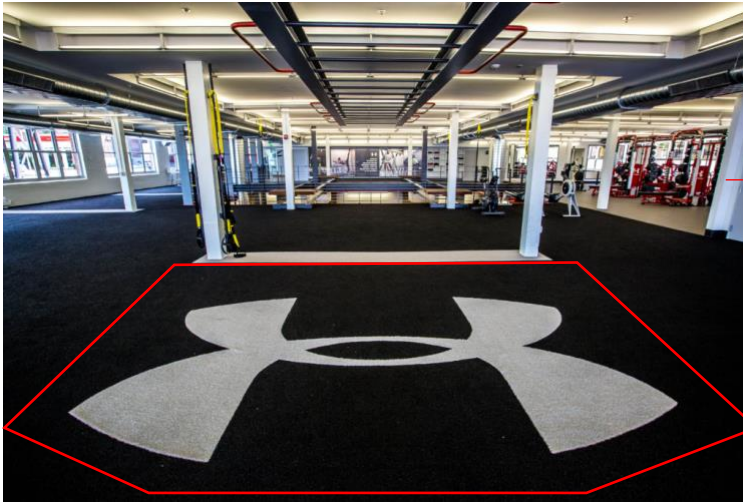


Big scale of green plants in the heart of the café.

UA Big logo promoting the brand

Figure 11. Humble and Hungry Café, Original photo adapted from Businessinsider by Leanna Garfield, Retrieved from <https://www.businessinsider.com/inside-photos-of-under-armours-headquarters-in-baltimore-2016-6#one-of-the-largest-areas-in-the-building-is-the-humble-and-hungry-caf-where-employees-can-buy-sandwiches-pizza-salads-and-smoothies-the-main-wall-features-living-leaves-and-vines-6>. Copyright © 2019 Insider Inc

Fitness Space and Basketball Court in Ander Armour. Enhancing the concept of the company and boost the body health. In the same time, workers can have their daily working out anytime in the same place where they are working. Providing this type of zones make the workplace more appealing and desirable which increase the chance of spending more hours in the work.



Natural light

Brand Promotion

Figure 12. Indoor Gym for Under Armour staff, original photo adapted from fxstudios, Retrieved from <https://fxstudios.com/locations/under-armour-hq/>. 2019 © COPYRIGHT FX STUDIOS



Figure 13. Basketball court in Under Armour HQ, Original photo adapted from Businessinsider by Leanna Garfield, Retrieved from <https://www.businessinsider.com/inside-photos-of-under-armours-headquarters-in-baltimore-2016-6#one-of-the-largest-areas-in-the-building-is-the-humble-and-hungry-caf-where-employees-can-buy-sandwiches-pizza-salads-and-smoothies-the-main-wall-features-living-leaves-and-vines-6>. Copyright © 2019 Insider Inc.

Boxers training room in Under Armour. In order to cover all the interests for the employees, Under Armour offer boxing room that equipped with this sport needs. The space is double height and there is a natural light that flowed from glass windows of the upstairs. Visibly, the repeated usage of red pure color in the space and other active spaces is quite noticeable, and it stands for the effects that hot colors usually leave on the human body and feelings. It increases the enthusiasm, and motivate them to be more energetic and active.



Figure 14. Boxing and training space, original photo adapted from [alliancearchitecture](https://alliancearchitecture.com/project/under-armour/), Retrieved from <https://alliancearchitecture.com/project/under-armour/>. Copyright 2018 Alliance Architecture.

Outdoor space for yoga and training classes. An outdoor area to working out and launching group or individual classes of yoga. However, this space has a view on the river.



Figure 15. Outdoor working out space, original photo adapted from [Inc.com](https://www.inc.com/magazine/201601/ss/tom-foster/under-armour.html) by JARED SOARES, 2016, Retrieved from <https://www.inc.com/magazine/201601/ss/tom-foster/under-armour.html>. Copyright © 2018 Manusetto Ventures.

Outdoor sport fields at Googolplex. Google employees have the opportunity to refresh during working hour or break time, move their body and feel healthy by playing basketball, or tennis in fresh air.



Figure 16. Outdoor sport field in Googolplex, adapted from officesnapshots.com, Retrieved from <https://officesnapshots.com/2008/02/19/google-mountainview-headquarters/>. Copyright © 2019 Office Snapshots, LLC.

Google Gym and Recreation Center. In addition of outdoor fields, Google staff can take their stress off and head up to indoor gym, where most of entertaining tools found. There is a gym with advanced equipment, swimming pools that supplied with water pumps creating endless pools and spa current exercise. Google operated lifeguards in swimming pools area ensuring its workers safety. Furthermore, rooms full of video games, playing tables and quick games are designed in different buildings in the campus.

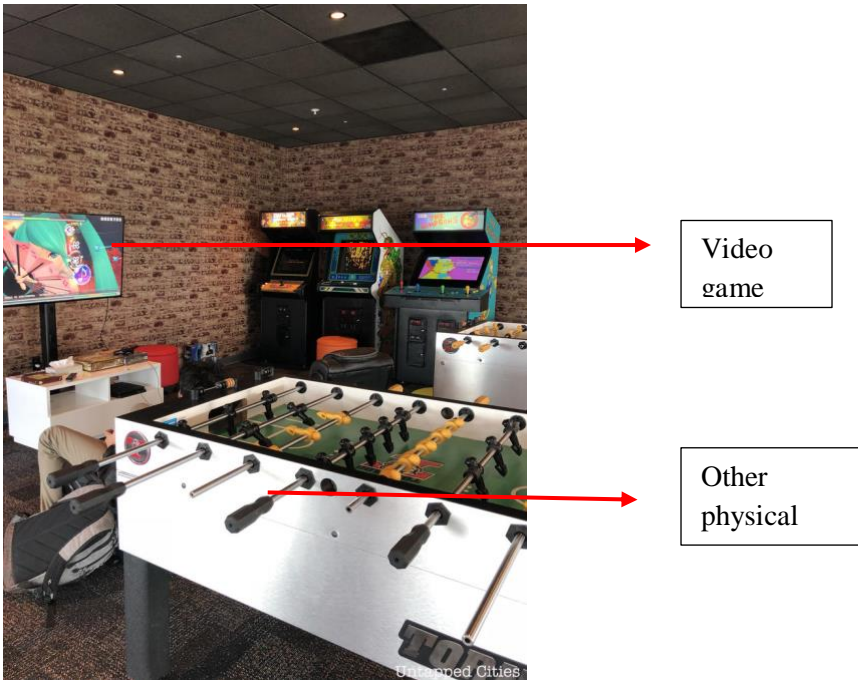


Figure 17. game room in Googolplex, original photo adapted from untappedcities.com, by Michelle Young, 2012, retrieved from <https://untappedcities.com/2012/01/02/googleplex-mountainview-designing-interior-spaces-at-an-urban-scale/>. Copyright © 2019 Untapped Cities

Google food. It is free to get all meals in Googolplex for staff from several cafés that have different choices of cuisines to serve the diversity of tastes and preferences. Also, it offers healthy and organic food with all type of diets from vegan and vegetarian, to average, to meat lovers. Strickland, 2008 in his report “How Google Works” affirmed that google employees have other options of getting food. He said in every building of the headquarters there are number of snack rooms that contains candy, chocolate, soft drinks, coffees, crackers, etc. which let them have a small amount of food between meals as needed. However, small open kitchens are distributed in different buildings.

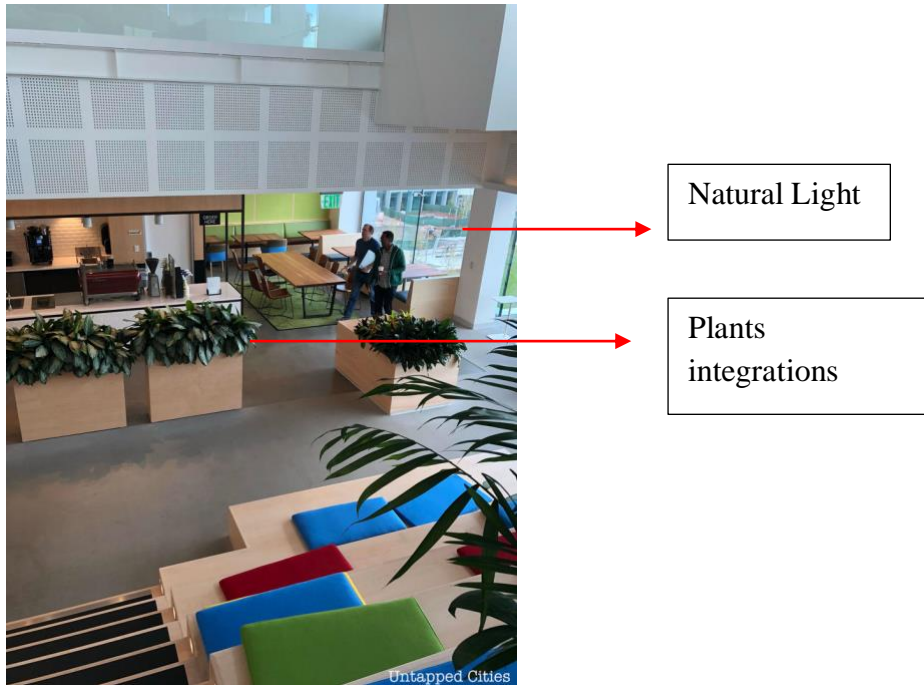
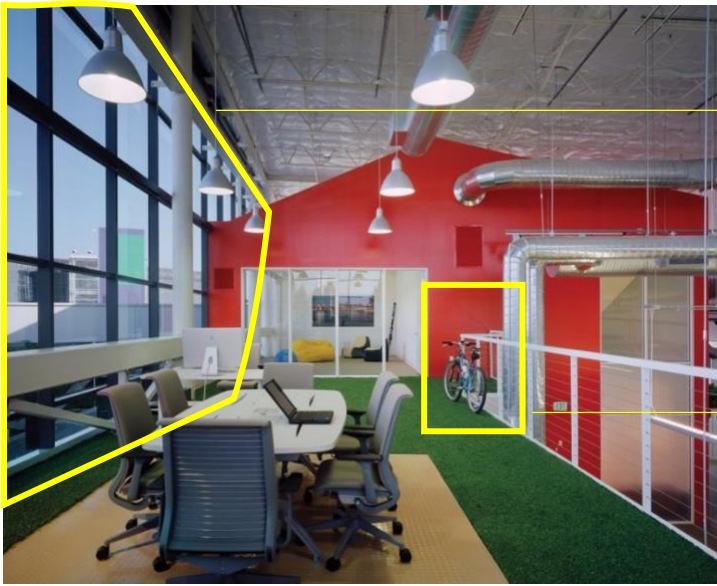


Figure 18: Open Kitchen in googolplex for workers, original photo adapted from untappedcities.com, by Michelle Young, 2012, retrieved from <https://untappedcities.com/2012/01/02/googleplex-mountainview-designing-interior-spaces-at-an-urban-scale/>. Copyright © 2019 Untapped Cities.

Healthcare services. On-site medical health providers who are ready for any emergent cases, then employees just need to make an appointment when it is required. Another benefit is the massage program where a licensed therapist could provide this service.

Active system. Using bikes, scooters and light weight transporting between buildings and between amenities inside buildings.



High and wide transparent wall

Bicycle access inside the headquarters

Figure 19: using Bikes inside the building, adapted from Clive Wilkinson Architects, 2010, Retrieved from https://clivewilkinson.com/portfolio_page/google-headquarters/ Copyright © 2010 Clive Wilkinson architects



Figure 20: bikes outside the buildings, adapted from Businessinsider, by Robert Johnson, 2013, retrieved from <https://www.businessinsider.com/here-are-the-crazy-colorful-bikes-google-employees-ride-around-campus-hq-2013-7>. Copyright © 2019 Insider Inc.

The bowel at Facebook. As it is known in Facebook HQ, it is the courtyard space that connects the two great buildings 20 and 21, and it takes the place for employees where they do aggregations and build good relationships between them. It is an open area filled with seats, tables, bright colors, plants, and employees their can enjoy fresh air. In the side of this space planning, it is an amphitheater style with pathways all around, stairs

to facilitate walking through different levels, and safety factors are taken into consideration in different methods. These great features could go beyond into furthermore to be a spectacular and flexible workspace.



Brand promotion with company colors

Figure 21: roof terrace for employees "the Bowl", original photo adapted from wallpaper.com, by HARRIET THORPE, 2018, retrieved from <https://www.wallpaper.com/architecture/frank-gehry-office-facebook-menlo-park-hq-san-francisco-opens>



Short stairs between levels

Figure 22: The bowl side view showing the levels and buildings access, original photo adapted from video by Facebook community, 2018, retrieved from <https://www.facebook.com/fbcommunity/videos/351333245688384/>. Facebook © 2019 Powered by WordPress.com

Interior environment at Facebook HQ. The interior environment design is concentrated on the open spaces and collaborative workplace that put teamwork in priority. However, it supports the independent work for individuals with flexible interior planning. According to Baldwin, 2018 “MPK21 was designed to reduce impact on the environment and enhance employee well-being. Inside, an open workspace connects to a

single pathway that runs the length of the building. The path features 15 art installations commissioned through an artist in residence program, five dining options, and a 2,000-person event and meeting space.”

On the other hand, most of the interior spaces in both building 20 and building 21 have wide and tall glass windows to allow natural light to pass inside which boost the occupants’ wellness and create the link between outdoor and indoor spaces.

Moreover, there is gaming room that is accessed for employees and visitors and filled with recreational equipment. Also, employees have the chance to move around the campus facilities with bicycles or skateboards, while the fitness center is located out of these two buildings.

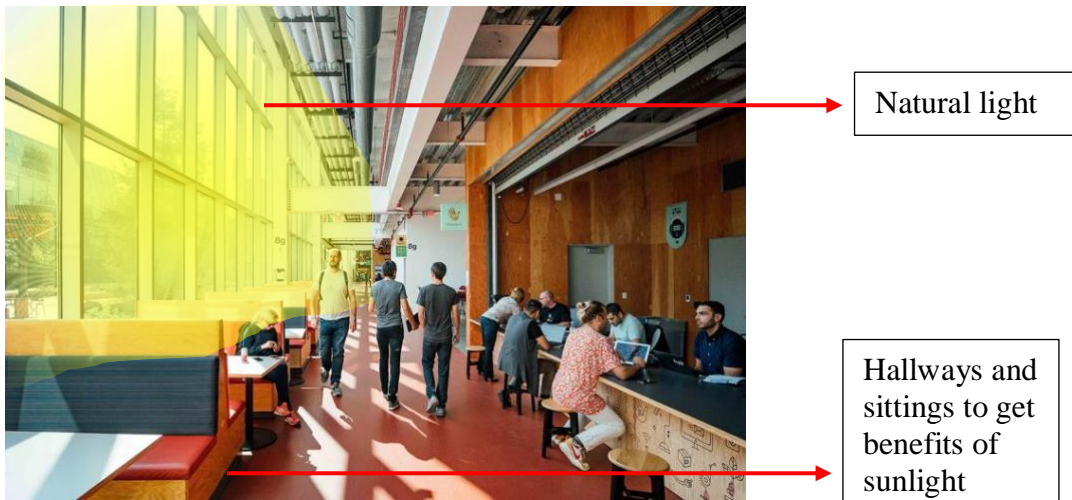
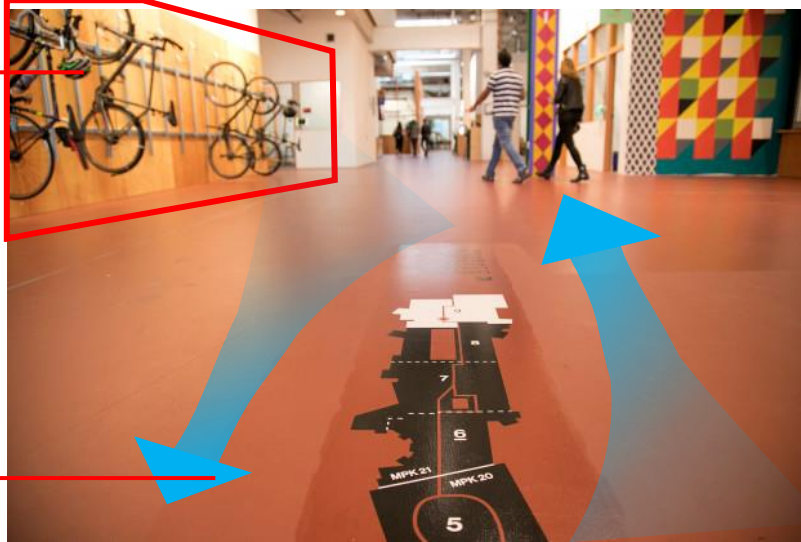


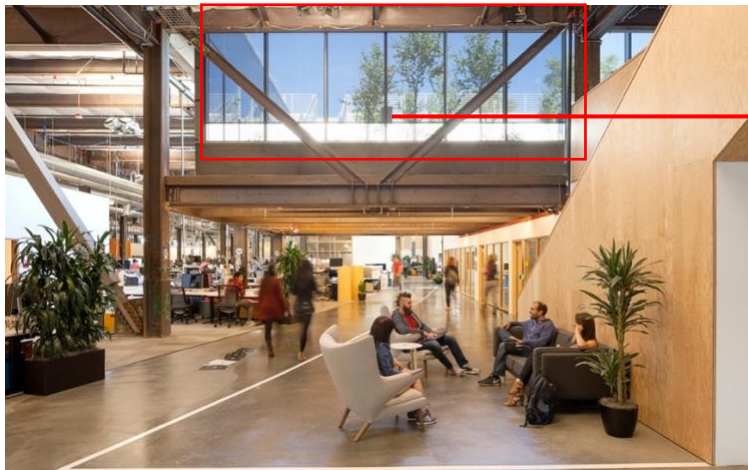
Figure 23: MPK21 interior design: open spaces, original photo adapted from wallpaper.com by PHILIPPE HORPE, 2018, retrieved from <https://www.wallpaper.com/architecture/frank-gehry-office-facebook-menlo-park-hq-san-francisco-opens>

Bikes parking inside the headquart



Wide smooth hallways for bikes

Figure 24: interior space with bicycles available for employees, original photo adapted from mercurynews.com, by LiPo Ching/Bay Area News Group, 2018, retrieved from <https://www.mercurynews.com/2018/09/04/facebooks-striking-new-menlo-park-building-akin-to-village-with-office-neighborhoods/>. Copyright © 2019 MediaNews Group, Inc.



High windows

Figure 25: Interior environment of MPk20, original photo adapted from Level10Constuction, retrieved from <https://www.level10gc.com/project/facebook-mpk-20/>. Copyright © 2011 - 2019 Level 10 Construction.



Figure 26: Interior creative art work, adapted from [observer.com](https://observer.com/2015/04/heres-what-one-artist-painted-on-the-walls-of-facebooks-new-menlo-park-offices/), by courtesy the artist, 2015, retrieved from <https://observer.com/2015/04/heres-what-one-artist-painted-on-the-walls-of-facebooks-new-menlo-park-offices/>



Figure 27: Facebook status wall, adapted from [jmorenophoto.com](http://www.jmorenophoto.com/perfect-home-interior-design-ideas/), retrieved from <http://www.jmorenophoto.com/perfect-home-interior-design-ideas/>. Copyright © All Rights Reserved. Jmoreno Photo

Interior Environment at Adobe HQ. The gathering areas that placed in different sections within the building are all supplied with facilities that required for performing work such as, appropriate tables and chairs, boards and screens, and electrical power outlets.

All spaces around the headquarter building are working space friendly. That ranges between cafés and restaurants, sitting areas, conferences rooms, hallways and corridors, relaxing zones, etc. In addition, some of sittings designed to raise privacy

levels with high partitions or walls to allow workers feel safe for performing any special or even personal tasks. On the other hand, there are several meeting and conference spaces that attributed with the same features of the working places, open floor, double high ceiling, and bright vibrant colors touches.



Figure 28: Adobe Headquarter working places, photo adapted from [archdaily.com](https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler) by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019

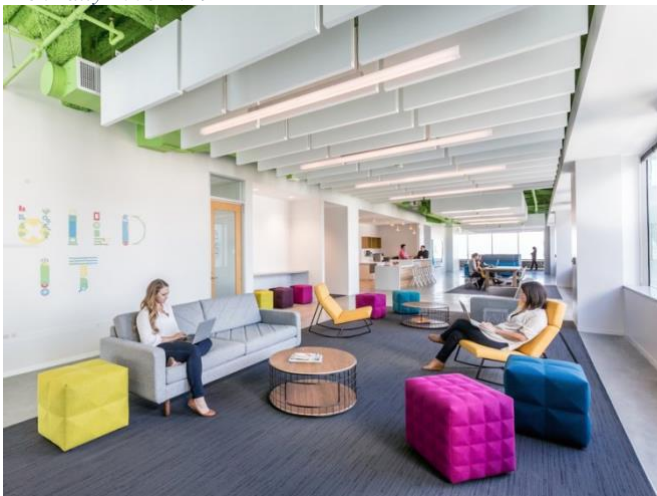


Figure 29: Adobe headquarter working places 2, photo adapted from [archdaily.com](https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler) by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019



Figure 30: Adobe's worker working in the relaxing hanged chair, photo adapted from archdaily.com by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019



Figure 31: Other view for Adobe employees during working hours, photo adapted from archdaily.com by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019



Figure 32: Performing work in the Cafe area in Adobe Headquarter, photo adapted from archdaily.com by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019



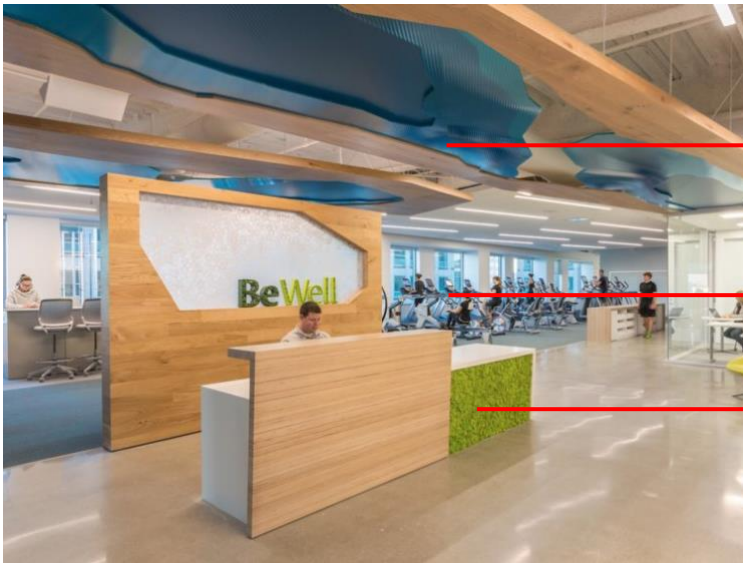
Figure 33: meetings and conferences could be done by employees in different locations inside the building, photo adapted from archdaily.com by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019



Figure 34: Employees work Any place They desire, adapted from archdaily.com by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019

Wellness Center. The fitness center of the Adobe headquarter has been created with a view to outdoor. Although the space has the least possible amount of interior finishes and design space dividing techniques, it has some other benefits that increase

worker health and wellness. One of them using elements denote natural looking as shown in the fig.45, that combines between wood panels in the reception ceiling, and the background board, greens in the reception counter and logo, and blue color in the ceiling panels which indicates a sky scene.



Imitating the nature with using natural-look materials, and view to outside.

Figure 35: wellness Center Reception in Adobe Headquarter, original photo adapted from *businessinsider.com*, by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

The wellness center in Adobe headquarter is not excluded with fitness area, there are different classes that offered with special trainees for all Adobe's staff. In the pictures below, we see a multipurpose hall that utilized to be as Yoga class, gymnasium, or any individual and group practices.



Figure 36: Yoga Group Class in Adobe, adapted from [businessinsider.com](https://www.businessinsider.com), by Adobe Photography, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.



Figure 37: Employees have individual working out, adapted from [businessinsider.com](https://www.businessinsider.com), by Adobe Photography, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

Another special room provided to increase the wellbeing level and relieve stress during working hours are meditation room. Although the small and close area with no opening windows or natural light, it filled with natural elements to strength the connection wth the mother nature. Bring the outdoor there with wood floor, forest wallpaper murals, wall frames full of green plants, and small passage paved with stones.

Show Figure. 38



Figure 38: Meditation Guided Session, adapted from [businessinsider.com](https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5), by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

On the other hand, the company offered a massage room as benefits for workers which also has the same interior features of the meditation room. Fig. 62

In the context of design, using natural look materials, and neutral colors like beige, gray, Ivory black and white highlights the earth tones colors, and relieving stress since the workers are exposed to have stressful and depressed times during work. Tucker (2018) said “...which means avoiding mentally stimulating colours like orange and using soft, neutral colours that create a calming effect instead – for example blues...” (as cited from Alter, 2013).

Both, Meditation and massage areas, has different theme from the whole Headquarter design. While the concept of design is boosting innovation and creativity by modern style and vibrant colors all around the building spaces, these two rooms was designed in intention of relaxation and unwinding anxiety with earth tones colors and materials.



Figure 39: Massage Treatment Room in Adobe Headquarter, adapted from [businessinsider.com](https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5), by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

Food Places. In the company's headquarter, there are several places that serve different styles of food to cover all workers' preferences. Each café has its own theme and zone separated from others, and furnished with same ideology of the popped colors that belong to the company concept.



Figure 40: Small Kitchen Area in Adobe, adapted from [archdaily.com](https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler) by Emily Hagopian, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019

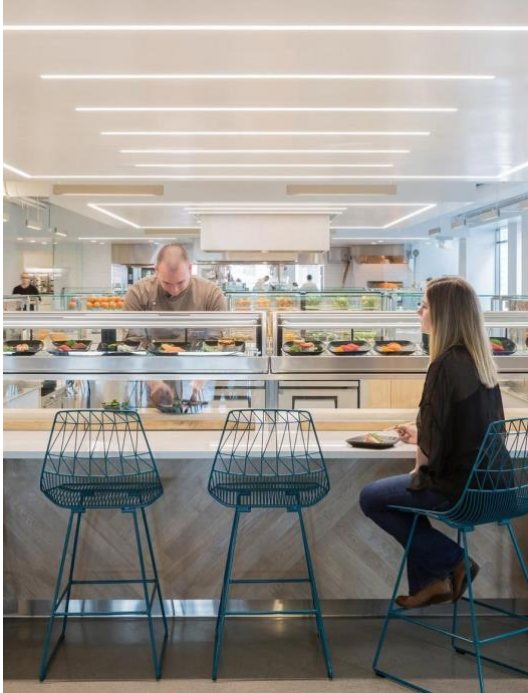


Figure 41: Customizing special plates in some Cafe's, adapted from [archdaily.com](https://www.archdaily.com) by Emily Hagopian, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019



Figure 42: Integrating Biophilic Elements in Food Courts, adapted from [archdaily.com](https://www.archdaily.com) by Emily Hagopian, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019



Figure 43: Another Cafe at Adobe Headquarter, adapted from *businessinsider.com*, by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

Interior Spaces at Gensler. Like previous case studies, Gensler employees need to be in a high level of productivity all times since they are required to design creative projects. In term of achieving that, Gensler staff are in demand to live in a space that enhances their wellbeing during the office hours. The interior spaces of Gensler firm in San Francisco are designed to be very simple, clear hallways, and different sitting areas types to perform work. In figure 72, the working highchairs and tables are arranged linearly in the right side with partitions between one and another. Indeed, they are not completely separated, there are openings in the partitions that allow for interacting and socializing among workers in addition of the open gathering area in front of the working zones. For designers and architects, they are most of time working collaboratively, they also need to get peer evaluations about projects, do group brainstorming, and consult other designers, architects and engineers from different disciplines to help bringing their designs to life. San Francisco office is a 3 floors office where the middle floor is a joint connection for all workers to collaborate, have conversations and sit for snack or relax, and that the reason stands beyond its name “The Bridge”. Bosanac (2018) in his

descriptive article about Gensler office said “Lunches are enjoyed there, among many other social activities and events. The other floors provide coffee service only, in a nod to keeping The Bridge as the connector.”

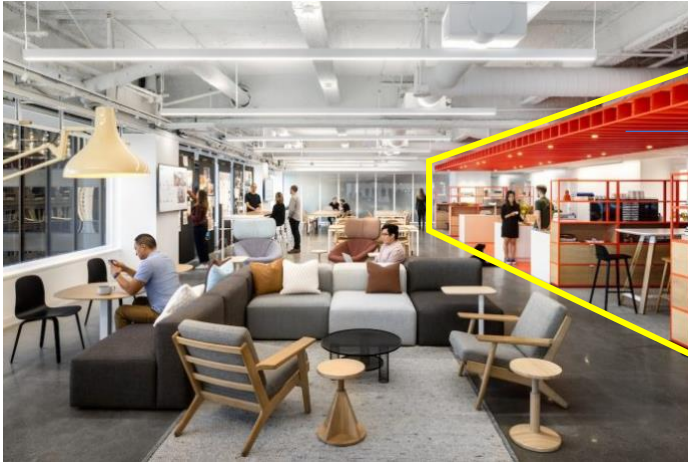


using brand color to emphasize company identity

Figure 44. Sitting area in Gensler, original photo adapted from [designmatters.iida](https://designmatters.iida.org/2018/09/18/a-visit-to-the-dynamic-new-gensler-san-francisco-workplace/), by Rafael Gamo, 2018, retrieved <https://designmatters.iida.org/2018/09/18/a-visit-to-the-dynamic-new-gensler-san-francisco-workplace/>



Figure 45. In building kitchen, adapted from [designmatters.iida](https://designmatters.iida.org/2018/09/18/a-visit-to-the-dynamic-new-gensler-san-francisco-workplace/), by Rafael Gamo, 2018, retrieved <https://designmatters.iida.org/2018/09/18/a-visit-to-the-dynamic-new-gensler-san-francisco-workplace/>

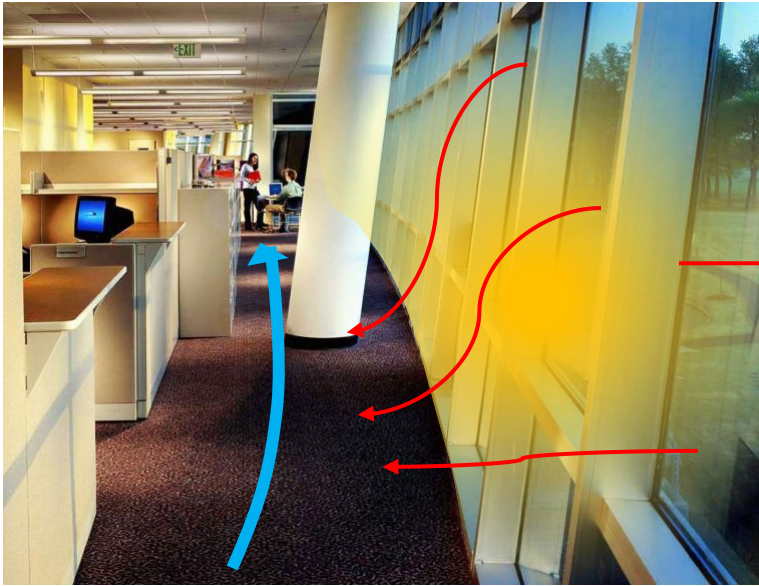


Brand color

Figure 46. Interior Spaces in Gensler firm, original photo adapted from *designmatters.iida*, by Rafael Gamo, 2018, retrieved <https://designmatters.iida.org/2018/09/18/a-visit-to-the-dynamic-new-gensler-san-francisco-workplace/>.

Health well-being strategies at FedEx HQ. FedEx World Headquarters (n.d) said “Each workstation and private office has a minimum of one adjustable supply air diffuser that can be controlled by the employee.” According to Federal Express World Headquarters (n.d) the ventilation system has high quality of efficiency to raise the thermal comfort up for the users, easily treat the employees’ issues, and has higher level for environmental cooling systems than other conventional systems.

However, there are different solution for windows to reduce solar heat during summer. Besides that, the material of interior and furniture used are recyclable in order to create healthier working environments and operate the sustainability principles. Moreover, the workstations are located near the windows to provide a comfortable lighting for the space and create connection with the outdoor. In figure 81, the workstations are not adjacent to the window directly, but there is space for hallways in between so both sitting and walking workers can have the benefit of daylight.



Sloped walls help to get more sunlight in with making shading solution for unwanted lights

Figure 47. FedEx offices from inside the building, original picture adapted from hbginc.com, retrieved from <https://www.hbginc.com/projects/corporate-community/fedex-world-headquarters/>



To encourage employees using stairs instead of elevators and increase body movement, stair was built to be open, easy accessed and in the heart of the area

Figure 48: Interior View for FedEx Headquarters, original photo adapted from hbginc.com, retrieved from <https://www.hbginc.com/projects/corporate-community/fedex-world-headquarters/>

Environmental considerations and strategies

Roof Design of Facebook HQ. 3.6 acres area roof garden with more than 200 trees and solar panels that generate 1.4 megawatts. “Among the improvements and enhancements to the extended design, rooflines were updated to bring in more natural

light, the roof garden was brought down into the office space and the circulation was concentrated to the heart of the building into a central channel.” According to Thrope, 2018. This feature in the building 21 is considered as a direct connection between outdoor and indoor spaces and mixing the landscape and urban design of the contexts of the whole area in order to approach the best method of applying biophilic architecture in the buildings. The roof garden is also a part of cooling system that reducing heat within high temperatures season which gives an opportunity to get rid of air conditioning. On the other hand, it works as a terrace to unwind during break time sitting, meditation, gathering and joining into conversation, or relaxing place that release stress within working hour.



Figure 49: MPK 21 top roof garden, adapted from video by Facebook community, 2018, retrieved from <https://www.facebook.com/fbcommunity/videos/351333245688384/>. Facebook © 2019 Powered by WordPress.com.



Figure 50: MPK20: Top roof garden, adapted from video by CNBC, by Andrew Evers, 2018, Retrieved from <https://www.cnbc.com/2018/09/04/facebook-new-campus-has-redwood-forest-rooftop-garden.html>. Copyright © 2019 CNBC LLC.

Town Square at Facebook HQ. A central courtyard filled with plants of redwood trees, natural sun light and wood furnished, provide the impression of nature and tropical landscape. It also opened for employees to walk through and get the benefits of the environmentally superior atmosphere. There are walking ways accessed and facilitated with different sitting areas.



Figure 51: Frank Gehry in Town Square, adapted from wallpaper.com, by HARRIET THORPE, 2018, retrieved from <https://www.wallpaper.com/architecture/frank-gehry-office-facebook-menlo-park-hq-san-francisco-opens>



Figure 52: Roof Garden and Town Square in MPK21, adapted from [dezeen.com](https://www.dezeen.com), by Eleanor Gibson, 2018, retrieved from <https://www.dezeen.com/2018/09/05/mpk21-frank-gehry-facebook-silicon-valley-headquarters-menlo-park-california-architecture/>.

Also, There are several features to achieve environmental sustainability of the building, like water recycling system, solar panel for renewable energy, green plants roof insulation to reduce heat, and enormous using of natural light to minimize using electricity with specific architectural techniques.



Figure 53: glass walls and skylight windows extended along the façade for natural light, adapted from [wallpaper.com](https://www.wallpaper.com), by HARRIET THORPE, 2018, retrieved from <https://www.wallpaper.com/architecture/frank-gehry-office-facebook-menlo-park-hq-san-francisco-opens>

Environmental considerations at FedEx /HQ. Although FedEx Headquarters has adopted the high-performance building and material concept, it supports the sustainable practices and the protection of the environment. This was applied, as shown in figures 78 and 79 below, by the integration of plantings and vegetations, irrigation way, cold weather control, building exterior and interior sustainable solutions, and reduction of water consumption. Figure 80 shows the techniques that used for the exterior materials which is glass for the front and sides of the building to lighten the inner space.

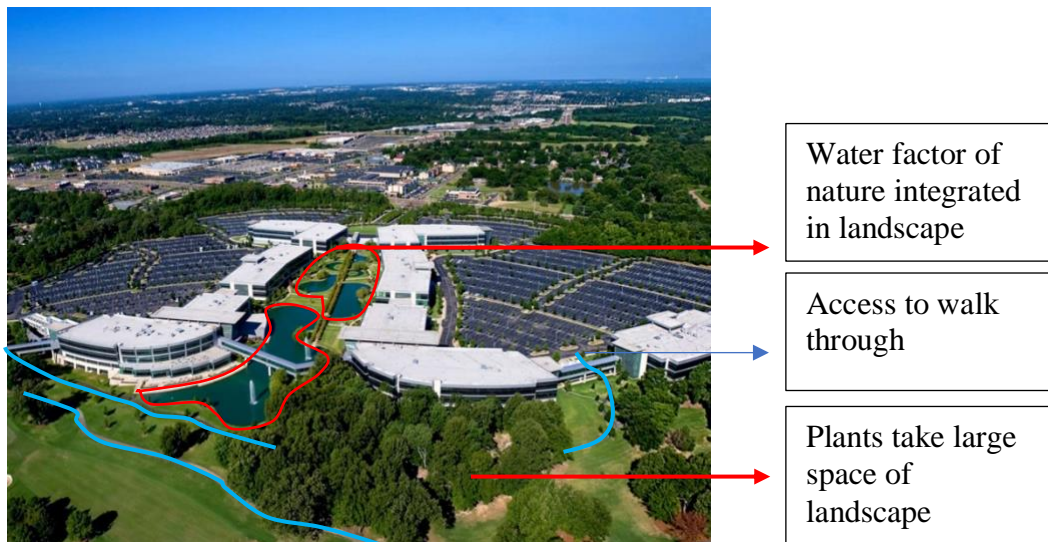
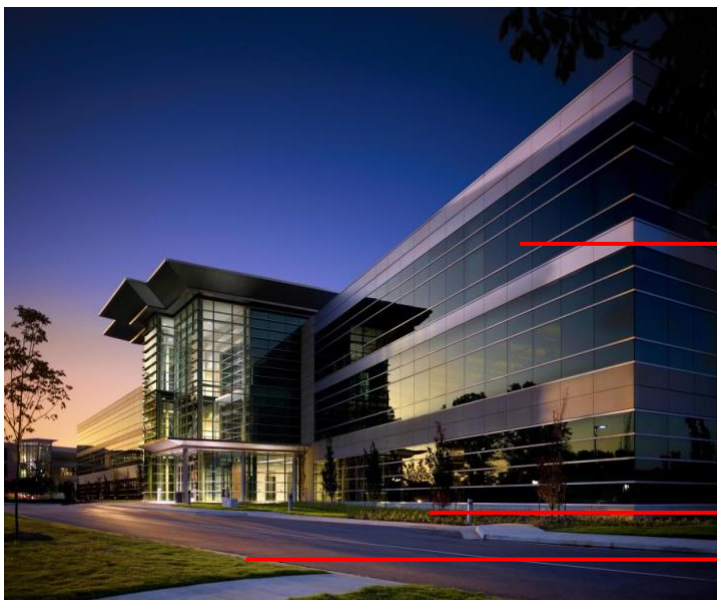


Figure 54. Sustainable site for FedEx headquarters, original picture adapted from hbginc.com, retrieved from <https://www.hbginc.com/projects/corporate-community/fedex-world-headquarters/>

The employees have the access to walk through the landscape not only for outer view. However, the nine buildings are connected with bridges that also consist of glass walls to allow for environmental elements to be visible on view. Although, the water is still continuous under the bridges, and the green surfaces as well.



Figure 55. Another view of FedEx Headquarters landscape shows the bridge connection between two building, original photo adapted from hbginc, retrieved from <https://www.hbginc.com/projects/corporate-community/fedex-world-headquarters/>



Glass façade allows natural light to flow

Green landscape as natural view for the building

Figure 56. Exterior Design for the Building I, Original photoadapted from crumpfirm.com, retrieved from <https://www.crumpfirm.com/projects/fedex-world-headquarters-building-i/>. copyright © 2019 THE CRUMP FIRM ARCHITECTS

Working style.

Workspaces Arrangement of Googolplex. As what reported earlier, architects who designed Googolplex intend the idea of education environment in the workspace zones. Grouping the employees who have the same tasks to sit together in the same area,

reveal the problem to keep them concentrated and not distracted. This has been solved by using glass walls to enclose the private rooms and simultaneously let them be interacted supporting the independent work style and collective accomplishments. However, each closed space has marked with a different color in glass, floor, or ceiling, which evokes the privacy, give identity, and give the intuition comprehension of entering separate zone with another function. According to Strickland (“Wilkinson decided to use glass walls to divide the space into clusters. This design cuts down on much of the ambient noise inside the office. It also allows sunlight to filter in through the entire office. Each glass enclosure has a tent-like roof made of acrylic-coated polyester which contains the room's lighting and sprinkler systems.” Indeed, most of walls in the googolplex are made from glass which offer the transparency to the place and increase the interaction between outdoor and indoor spaces. On the other hand, there are “tech-talk” rooms, where lectures, conferences and group conversations could be placed there. Therefore, the workstations are arranged based on a certain scale of hot and cold diagram from more public area to the private or quiet zones. This indicates that Googlers have the right to choose their preferred place to do work along the day. Also, White boards in hallways for quick conversations or explanations. Besides this, the sound absorption system, appropriate lighting system and air conditioning are all studied very well through upholstered acoustic fabric.



Figure 57: Google Work Setting, Hot and Cold Workstations, adapted from Clive Wilkinson Architects, 2010, Retrieved from <https://clivewilkinson.com/case-studies-googleplex-a-new-campus-community/>. Copyright © 2010 Clive Wilkinson architects

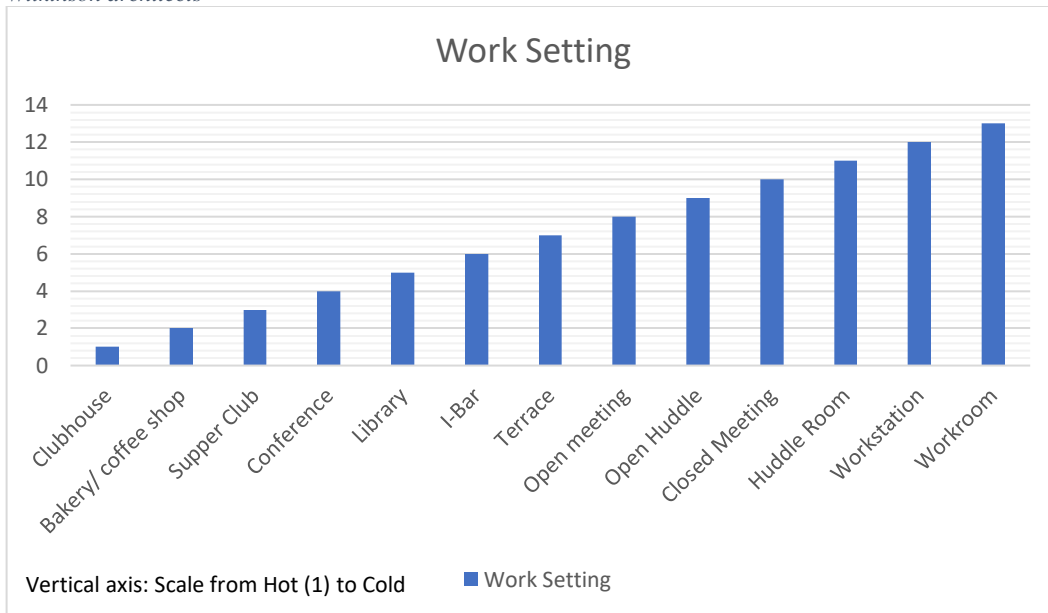


Figure 58: Chart clarification for the workstation types in Googolplex

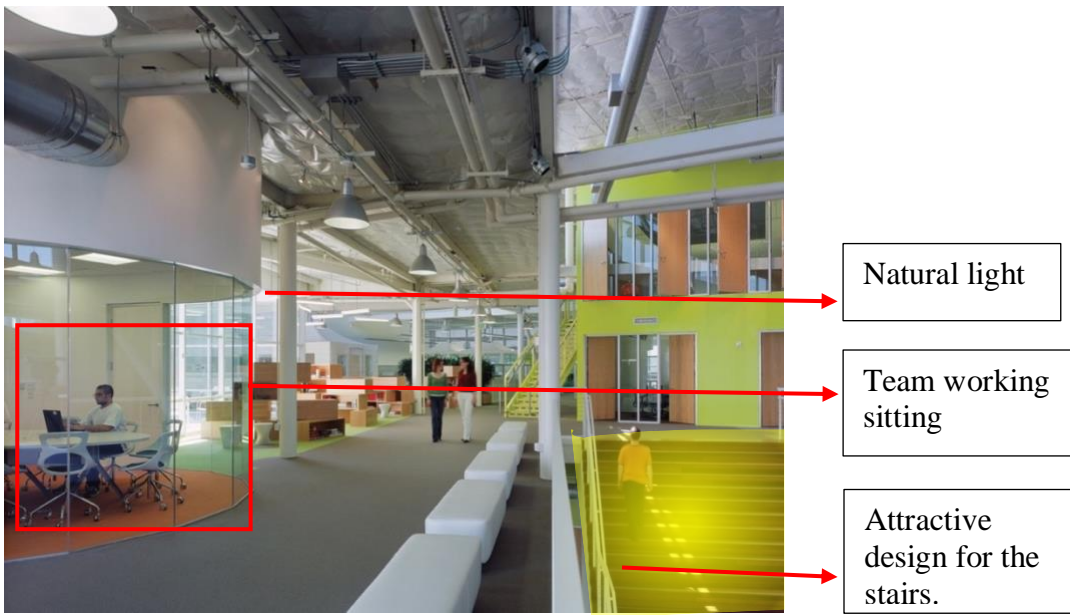


Figure 59: interior workspace, original photo adapted from Clive Wilkinson Architects, 2010, Retrieved from https://clivewilkinson.com/portfolio_page/google-headquarters/ Copyright © 2010 Clive Wilkinson architects



Figure 60: Workstations arrangement, original photo adapted from Clive Wilkinson Architects, 2010, Retrieved from https://clivewilkinson.com/portfolio_page/google-headquarters/ Copyright © 2010 Clive Wilkinson architects



Figure 61: colored glass wall in google workspace, adapted from Clive Wilkinson Architects, 2010, Retrieved from https://clivewilkinson.com/portfolio_page/google-headquarters/ Copyright © 2010 Clive Wilkinson architects



Figure 62: work conversation in the courtyard, adapted from fromthefoundationsup.wordpress.com, 2014, retrieved from <https://fromthefoundationsup.wordpress.com/2014/01/06/procrastination-or-productivity-some-of-the-worlds-coolest-offices/>

Workspaces at Adobe. In Adobe, workers have the ability to choose where, how, and when to work, therefore, the workspace environment supports this sense of freedom starting from the place planning to the company policies. On the other hand, it highlights

collaboration in work as the more important organizational behavior that embodies the company culture of innovation and creativity. This was made following of Adobe priority in work and workers' need to take advantages of sharing their ideas and concepts together to improve the efficiency as well as interact with stakeholders without restrictions.

Adobe, however, utilize open offices that only separated by transparent partitions and colorful panels that presents the company concept. This method of design provides a privacy to the space without creating physical boundaries. The opportunity of communicating with co-workers and interacting with ambient context of design objects during performing their work.

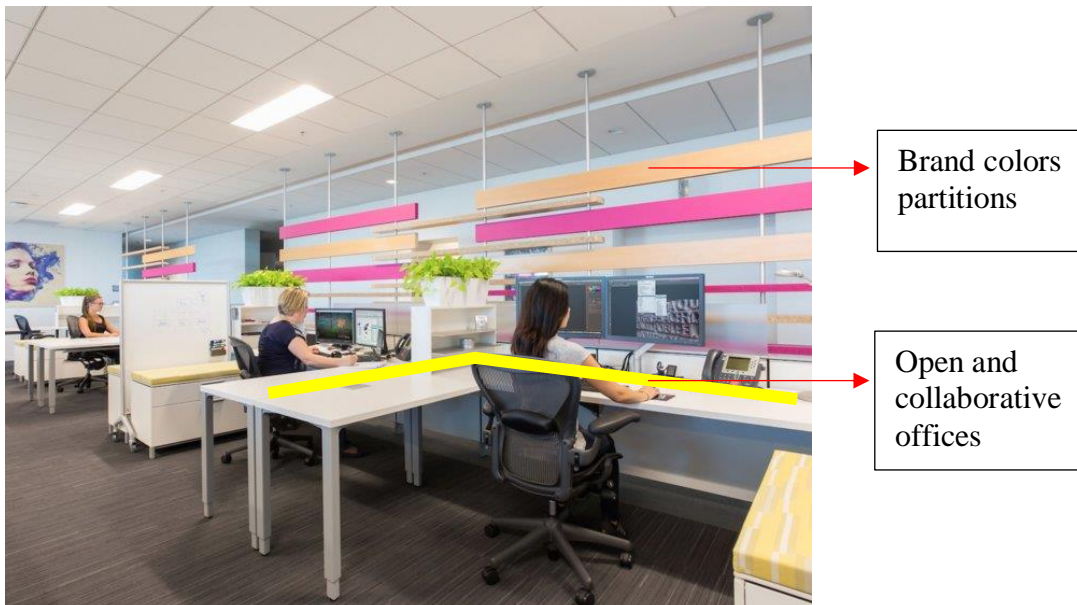


Figure 63: interior view for Adobe Offices, original photo adapted from [businessinsider.com](https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5), by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

Nonetheless, there are a few of workstations in the headquarter compared to the open and collaborative offices. As shown in figures 47,48,49 &50 below, some plans for some of the renovated floors proof that most of the working spaces are without boundaries. Workers can do their tasks any location any methods they desire. However, it

presents the wide hallways and most spaces are featured with no walls that enhance the feeling of freedom. The space labeled with number 1 in figure 47, the only methods that used to border the waiting area is to define it with the furniture arrangement as well as recognizably different floor pattern and color around the area. This Also repeated in the other sitting space in the right side of the plan.



Figure 64: First Floor Plan in East Tower, original photo adapted from [archdaily.com](https://www.archdaily.com) by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019

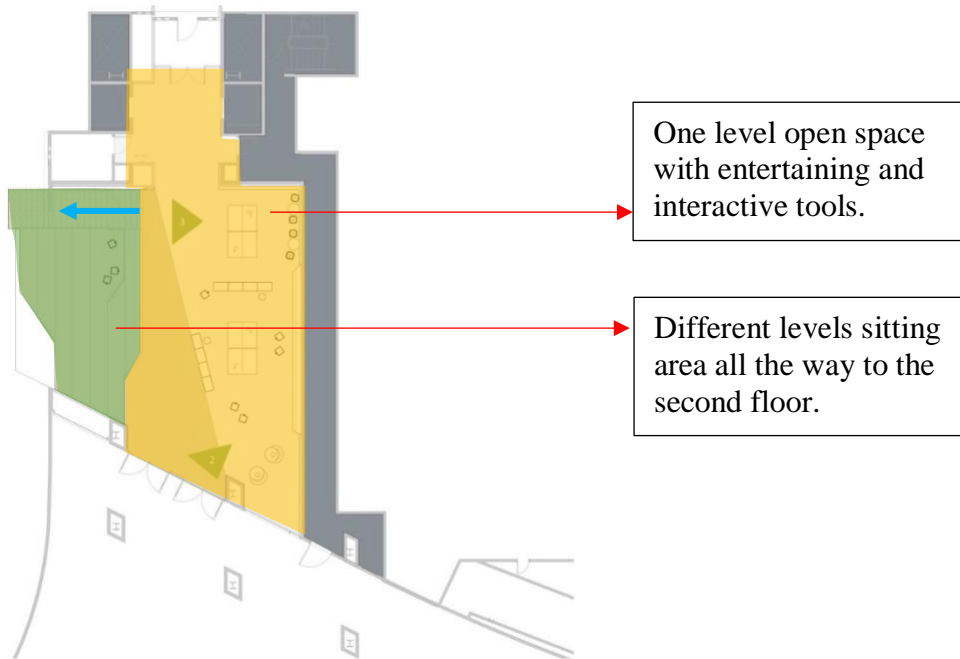


Figure 65: First Floor Plan in West Tower, original photo adapted from archdaily.com by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019



Figure 66: Second Floor Plan in West Tower, original photo adapted from archdaily.com by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019

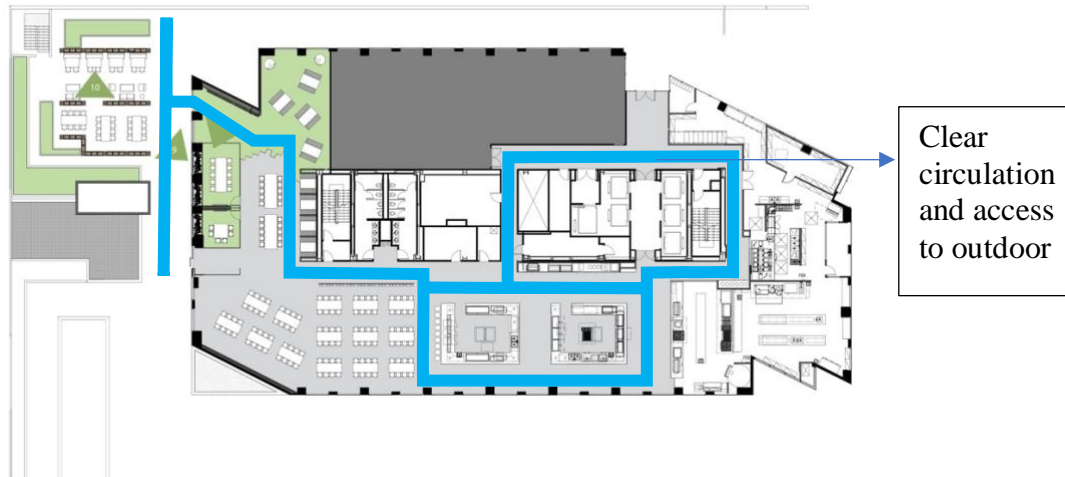


Figure 67: Sixth Floor Plan, original photo adapted from [archdaily.com](https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler) by Gensler firm, 2018, retrieved from <https://www.archdaily.com/889925/adobe-headquarters-renovation-gensler>. Copyright © All rights reserved. ArchDaily 2008-2019

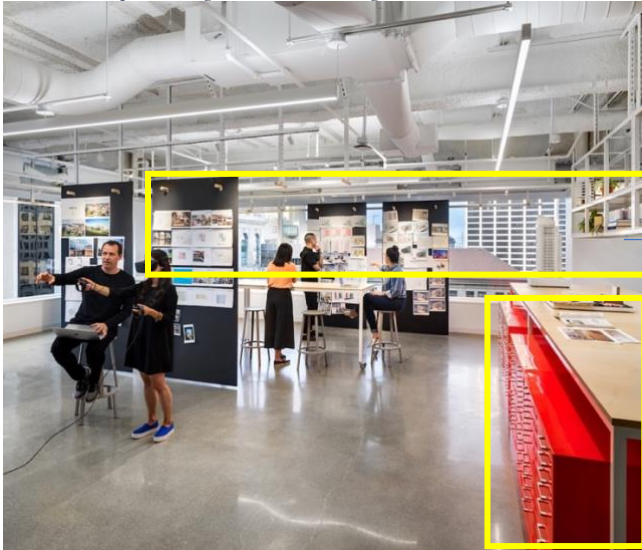
Working style at Gensler. In the working space, the windows are spread within the building from each direction, so the natural light can be diffused through these windows into the interior. “The workplace floors are conceived as design labs—workshop-like environments in which teams are seated at a variety of desks adjacent to meeting rooms. With a mix of programming on the middle floor, Dubisar aptly draws an analogy to an Oreo cookie when describing the office.” (Czarnecki, 2018). Bosanac (2018) explains “The outside is visible from almost any angle, but it does not distract from the inside, which is modern and hinges on elements that every Gensler employee will recognize. A system of filing cabinet frames hangs from the ceiling, painted in an updated but distinctive Gensler red.” In the other words, Gensler use red as a brand color for its firm, and it utilizes it in the logo, firm image, and interior as showed in the figures. 73, 74, and 75 below. However, Red meaning in the psychological aspects of the interior design is associated with the passion and increases of breathing speed, energy and excitement, and attention grabbing according to Lamancusa (2016).



Emphasize company color

Clear hallways

Figure 68. Daily work activities in Gensler, original photo adapted from *designmatters.iida*, by Rafael Gamo, 2018, retrieved <https://designmatters.iida.org/2018/09/18/a-visit-to-the-dynamic-new-gensler-san-francisco-workplace/>.



Natural light

Brand color

Figure 69. Group of designers analyzing and evaluating projects on partitions, original photo adapted from *designmatters.iida*, by Rafael Gamo, 2018, retrieved <https://designmatters.iida.org/2018/09/18/a-visit-to-the-dynamic-new-gensler-san-francisco-workplace/>.



Figure 70. Designing studio in Gensler, adapted from *designmatters.iida*, by Rafael Gamo, 2018, retrieved <https://designmatters.iida.org/2018/09/18/a-visit-to-the-dynamic-new-gensler-san-francisco-workplace/>.

Other Strategies.

Hallways design at Under Armour. Everywhere in the UA headquarter hallways, there are number of posters for famous athletes wearing Under Armour products during their championship matches. Also, some of motivating words are printed out in the walls in order to increase the employees' positivity and enthusiasm of working.



Figure 71: UA hallways design, Original photo adapted from Businessinsider by Leanna Garfield, Retrieved from <https://www.businessinsider.com/inside-photos-of-under-armours-headquarters-in-baltimore-2016-6#one-of-the-largest-areas-in-the-building-is-the-humble-and-hungry-caf-where-employees-can-buy-sandwiches-pizza-salads-and-smoothies-the-main-wall-features-living-leaves-and-vines-6>. Copyright © 2019 Insider Inc.



Red color boosting the energy and

Figure 72: UA hallways design 2, Original photo adapted from Businessinsider by Leanna Garfield, Retrieved from <https://www.businessinsider.com/inside-photos-of-under-armours-headquarters-in-baltimore-2016-6#one-of-the-largest-areas-in-the-building-is-the-humble-and-hungry-caf-where-employees-can-buy-sandwiches-pizza-salads-and-smoothies-the-main-wall-features-living-leaves-and-vines-6>. Copyright © 2019 Insider Inc.



Motivated words in the UA hallways

Figure 73: encouraging words in hallways of UA, Original photo adapted from Businessinsider by Leanna Garfield, Retrieved from <https://www.businessinsider.com/inside-photos-of-under-armours-headquarters-in-baltimore-2016-6#one-of-the-largest-areas-in-the-building-is-the-humble-and-hungry-caf-where-employees-can-buy-sandwiches-pizza-salads-and-smoothies-the-main-wall-features-living-leaves-and-vines-6>. Copyright © 2019 Insider Inc.

In Google Campus there are another benefit that are offered for free for staff although it is spent from the budget. Indeed, by comparing the money that services cost with the positive effects on employees' wellbeing and their ability to be productive, the output is more valuable. The Following are the last and not the least of google company amenities:

Daycare. Google offers a day care learning center for parent employees for their kids although the school is more expensive than other day care centers.

Laundry. Laundry facility for workers help them feel confident and comfortable to spend more hours in the office.

Decoration. In each lobby of googolplex, there are several attractive elements that contribute in engaging the occupants to their tasks and maximize the efficiency.

Everywhere in lobby walls there are numbers of screens that present google search engine results used by people all around the world. On the other hand, the hallway walls are filled of whiteboards for any quick sketches or idea to discuss, and some of encouraging sentences or jokes. “the lobby is decorated with a piano, lava lamps, old server clusters, and a projection of search queries on the wall. The hallways are full of exercise balls and bicycles.” (Chilton & Bloodgood, 2014, p. 302)

Free Haircut salon. Googlers can have their free in-site haircut any time they want.

Reading nooks with biophilic design. All around the headquarter, there are reading corners include book shelves, and comfy seats with natural source of light to reduce strain during reading.

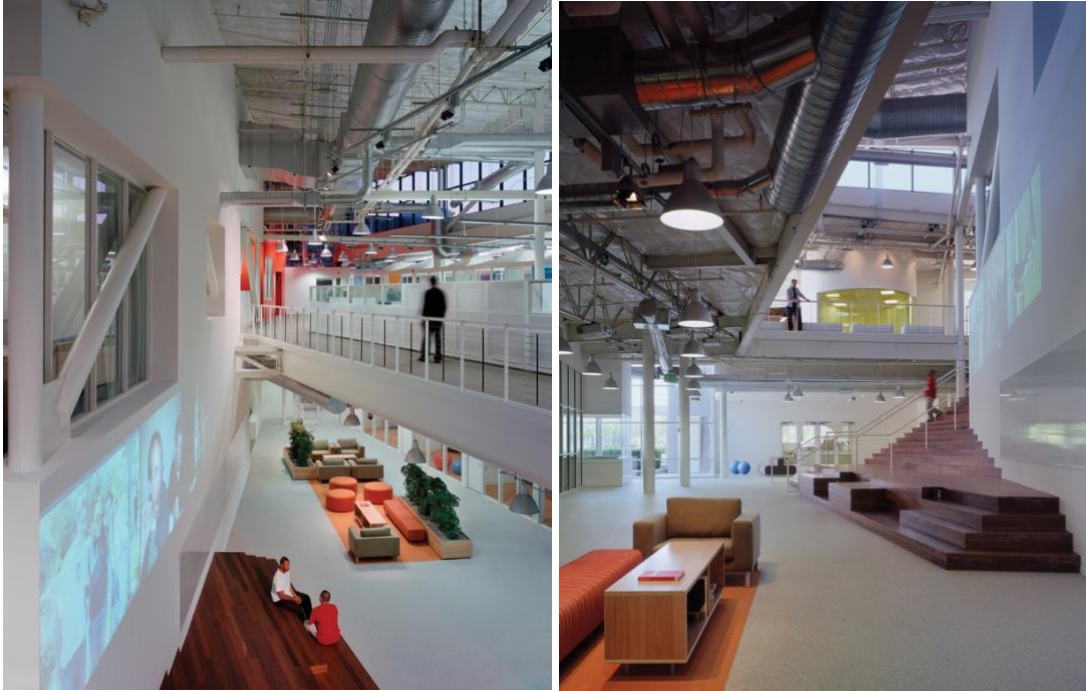


Figure 74: Lobby and Hallways wall decoration, attractive design for stairs 1-2, adapted from Clive Wilkinson Architects, 2010, Retrieved from https://clivewilkinson.com/portfolio_page/google-headquarters/ Copyright © 2010 Clive Wilkinson architects.



Figure 75: reading nooks in hallways, adapted from Clive Wilkinson Architects, 2010, Retrieved from https://clivewilkinson.com/portfolio_page/google-headquarters/ Copyright © 2010 Clive Wilkinson architects



Figure 76: applying biophilia principals by adding plants, natural light, and outside view, adapted from Clive Wilkinson Architects, 2010, Retrieved from https://clivewilkinson.com/portfolio_page/google-headquarters/ Copyright © 2010 Clive Wilkinson architects

Learning Kitchen at Adobe. In addition to the café's and restaurant, for those who are passionate about making their own food, there are opportunities to have the experience and cook by themselves or enroll in a cooking class. The space called Templates is an ideal example of a perk that stimulates the positive interaction between workers and raises the engagement to work. This kitchen is supplied with cooking books and tools, recipes, and ingredients.



Figure 77: Template learning kitchen at Adobe, adapted from [businessinsider.com](https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5), by Gensler photography, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.



Figure 78: An Employee practicing at Template Kitchen, adapted from [businessinsider.com](https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5), by Gensler photography, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.



Figure 79: Supplements at Template Kitchen, adapted from [businessinsider.com](https://www.businessinsider.com), by Gensler photography, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

Shopping Store at Adobe.



Figure 80: High Tech Shopping Store at Adobe, adapted from officesnapshots.com, by Emily Hagopian, retrieved from <https://officesnapshots.com/2017/08/24/adobe-headquarters-renovations-san-jose/>. Copyright © 2019 Office Snapshots, LLC

Outdoor Seats at Adobe



Figure 81: Terrace Lounge and tables at Adobe, adapted from *businessinsider.com*, by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.



Figure 82: Night Scene for Terrace, adapted from *businessinsider.com*, by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

Multipurpose Hall at Adobe



Figure 83: Multiple activities are involved in the multiple hall, adapted from *businessinsider.com*, by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

Visual arts at Adobe . In order to prioritize the concept of the creativity that the essence of the company stands behind and maximize the aesthetic visual aspects, several art works are installed all around the building. The pieces of art have the same theme of colors with pure bright colors, however, some of them have expressed the image of Adobe Company with different neutral materials and colors.

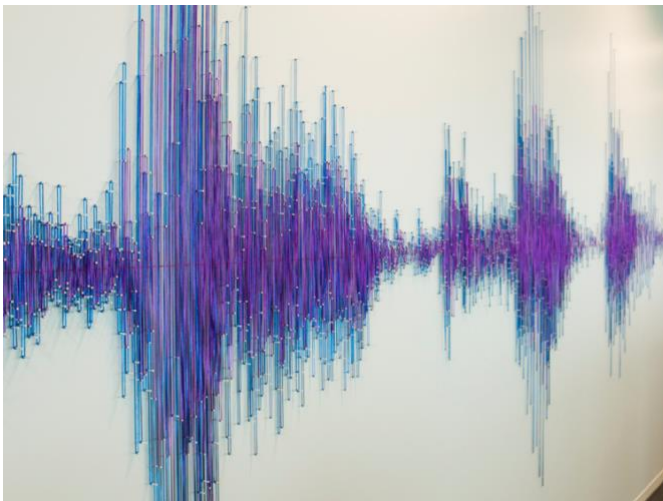


Figure 84: Art piece of a simulation for sound wave frequency of Adobe workers conversation, adapted from *businessinsider.com*, by Adobe photography, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

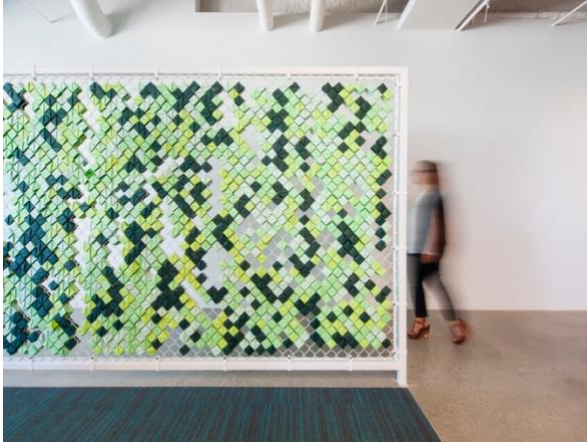


Figure 85: Art Installation at Adobe Headquarter, adapted from [architectmagazine.com](https://www.architectmagazine.com/project-gallery/adobe-headquarters-renovation_o), by gensler, retrieved from https://www.architectmagazine.com/project-gallery/adobe-headquarters-renovation_o. Copyright © 2019 Hanley Wood Media, Inc.

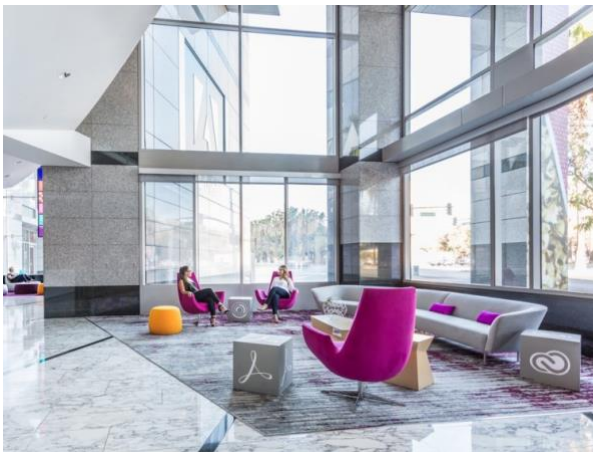


Figure 86: Highlighting the Company Products with Printed Logo on Side Tables, adapted from [businessinsider.com](https://www.businessinsider.com), by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.



Figure 87: Adobe (A) Logo with Natural Material Looking, adapted from [businessinsider.com](https://www.businessinsider.com), by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.



Figure 88: Mural with Vibrant Colors for Landmarks around the U.S, original photo adapted from [businessinsider.com](https://www.businessinsider.com), by Emily Hagopian, 2017, retrieved from <https://www.businessinsider.com/adobe-headquarters-office-tour-2017-5>. Copyright © 2019 Insider Inc.

Summary

Above, there are 6 case studies for 6 companies that considered as on the top of the best companies around the world, whether in the economic aspects or popularity among people. Most of freshly graduates put these names in their list of the places that they dream to work for. Under Armour, Googolplex, Facebook, Adobe, Gensler, and Fedex are all started from Zero, when their founders caught the idea integrated with high ambitious to be at the level that they are in currently. However, being in this stage of prosperity requires lot of strategies and techniques go through analyzing process to ensure approaching goals. Although it is important to have efficient working practices that improve employees' engagement to their work and create an effective positive workplace, interior environment design is also has a big role. Further, each company aiming to build the ideal place for its workers where they feel well and happy and boost their creativity to be productive. On the other hand, creating a family friendly place that uphold the organization vision and business image is also required.

Facebook is leading the list of the best companies to work for in 2018 according to Glassdoor while it took the seventh place in 2019 rating. While google is on the eight place, Under Armour is even not found in the same study according to Economy, 2018. Moreover, Adobe, Gensler, and FedEx are all listed in the Same list for best 100

workplaces within the north America and part of Europe.. in 2019 With the exception of Under Armour that has introduced in Stringer (2016) book as an ideal example for a workplace, the others companies have the following -in order- ratings:

- 7th rank for Facebook Company with review rating of 4.5
- 8th rank for Google Company with review rating of 4.4
- 30th rank for Adobe Company with review rating of 4.4
- 85th rank for FedEx Company with review rating of 4.2
- 91st rank for Gensler Firm with review rating of 4.2

Through the previous cases, the six companies have prioritized the concept of the optimal workplace in different ways. Although most of them have shared strategies that shift the level of wellbeing up, but each headquarter concentrates on an aspect of design or architecture. What Under Armour focuses on is the concept of being fit and healthy with athletic impression everywhere in its headquarter in the Baltimore, Maryland.

Comparing by Googolplex, the dream company, the case has the main information about the complex, and the efforts to make it effective. The new ideas that architects adapted are increasing movement for body wellness, supporting employees' entertainment and perks, and focusing on the educational collaborative work environment. However,

Facebook new buildings that designed by famed Canadian architect Frank Gehry advocate the concept of sustainable and healthy workplace via architectural solutions.

Facebook buildings had been environmentally friend and avoid harms by reducing the energy of electricity, water consumption and using natural resources of light and ventilation.

For Adobe Company, the concentration was on creating the aesthetic atmosphere in the company since it specializes in multimedia and creativity software and

products. They enhance their brand through Interior environment design, as well as building a collaborative and social workplace. On the other hand, Gensler Firm supports the concept of one-team firm. Increasing the connections and communication methods between employees even among different locations around the globe. Finally, FedEx Company has the same sustainability concentration of Facebook by having solution to reduce the consumption of artificial sources and using renewable ones instead.

However, analyzing each of six headquarters has led to find out the strategies that those popular companies made to appeal new employees and keep the current being satisfied to work for them. In order to achieve that, they focus more into employees' wellbeing and happiness in all aspects like socially, health, environment involvement, working style, and recreation or entertaining services that help to unwind and release stress that usually all employees suffer from.

Findings

Well-being and Productivity Findings. From the reviewed literature, it had categorized the factors that increase the well-being and lead to a high productivity level in the workplace onto four categories that was summarized in the chart below.

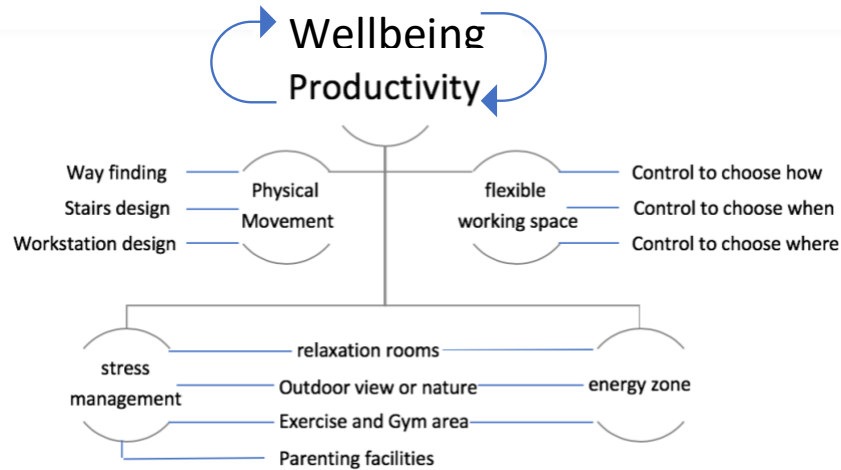


Figure 89. Well-being chart from literature review

Therefore, in order to have insight to the research necessity and find out the strategies that big companies use; it is important to get the results depending on these four categories. Then, going back to each question and have a clear explaining for them one by one. To clarify that, table.4 is a tool to understand the findings from the previous part that includes data and analysis. However, this table of summary uses the categories above and evaluates each case study based on the strategy that applied.

Table 4.

Findings of productivity and well-being factors

| | PM | FWs | SM | EZ |
|--------------|---------|---------|---------|-----------|
| Case Study 1 | Applied | Sort of | Applied | Applied |
| Case Study 2 | Applied | Applied | Applied | Applied |
| Case Study 3 | Applied | Applied | Applied | Applied |
| Case Study 4 | Sort of | Applied | Applied | Applied |
| Case Study 5 | Sort of | Applied | Applied | Not Found |
| Case Study 6 | Sort of | Sort of | Applied | Not Found |

■ Applied
■ Sort of
■ Not Found
■ Not applied

PM= Physical Movement
 FWs= Flexibility Workplace
 SM= Stress Management
 EZ= Energy Zones

For more clarification of the results, the chart below is comparing the summarized four categories to find out which category has more in implementation of the companies in the data and analysis part. In the figure. 91, the stress management application is technically superior to other categories. All the six case studies had addressed different strategies used to unwind for the workers. By sorting that, four case studies has applied the flexible workplaces and energy zones, while 3 of them found the physical movement is an important feature to be added in their buildings.

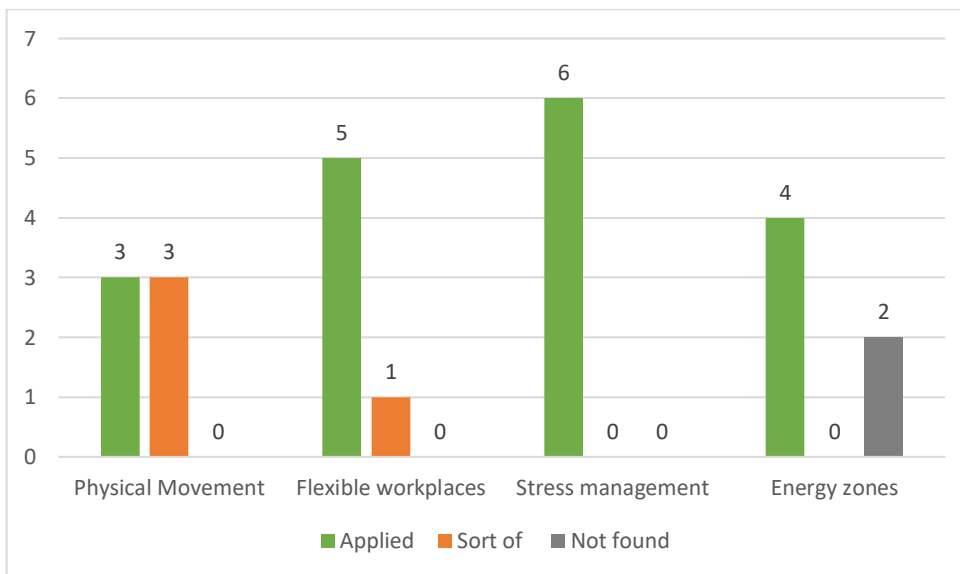


Figure 90. wellbeing and productivity factors comparison

Interior Design Strategies Findings. As stated before in the data and analysis part ‘see section Data and Analysis in this Chapter’, each case study had utilizes the wellbeing strategies in different design methods and procedures. In order to comprehend the hypothesis of the research and to answer the research questions that outline in section 1.6, table. 5 below has created. It includes the techniques of interior design that help to actualize a specific concept and support an idea, such as biophilic space, unwinding rooms, energetic spaces, etc.

Table 5

Design Methods for Well-being Factors

| Design Methods of Four Wellbeing Categories | | | | |
|---|---|---|---|---|
| | Physical Movement | Flexibility | Stress Management | Energy Zones |
| Case Study 1 | <ul style="list-style-type: none"> - Fitness spaces. - Designed outdoor sport space - Hallways inspirational designs. | For all cases, the flexible workplaces is achieved by realizing the way that employees like to work, when, and how. Creating | <ul style="list-style-type: none"> - Humble and Hunger Café with biophilic wall. - Outdoor space. - Yoga classes - Natural and biophilic elements | <ul style="list-style-type: none"> - Fitness space. - Basketball court. - Boxing space. - Outdoor training and working out. |
| Case Study 2 | <ul style="list-style-type: none"> - Bikes and scooters access. - Accesses between buildings for walking ways. - Open and central stairs with recognizable design and different color to distinguish it. - Clear and wide hallways and walking ways. - Encouraging zones to do exercises and working out. - Stand-up desk to have different posture of working. | electricity access for working everywhere in the building, providing good furniture that working-friendly any place, good designing of lighting and ventilation and natural views in the places like cafeteria, sitting area, outdoor spaces, and evoking the powerful feeling to work anywhere with inspirational atmosphere such as | <ul style="list-style-type: none"> - Outdoor amenities. - Game room - Spa. - Restaurants and cafés. - Functional arrangement of workspaces. - Healthcare services. - Reading nooks - Natural elements like plants and sunlight. - Inner courtyards for sitting. - Daycare facility. | <ul style="list-style-type: none"> - Indoor Gym. - Swimming pool - Outdoor Tennis fields. - Outdoor basketball court. |

| | | | | |
|---------------------|---|--|---|--|
| Case Study 3 | <ul style="list-style-type: none"> - Walking ways are accessed in the campus everywhere indoor and outdoor. - Visible entrances toward outdoor spaces and accesses with clear passages to walk through. - Outdoor stairs are clear, and easily recognizable, short height of stairs to encourage using it, - Bikes and skateboard are permitted. Social activities that support body movement like status wall. - Stand-up and high desks. | <p>posters, photos, words, etc. The open spaces and collaborative workplace for teamwork is achieved by creating open floor workspaces, partitions, transparent walls. It is not completely separated but there is no physical items that allow for individual working spaces with privacy and safety considerations, and the social connection between workers.</p> | <ul style="list-style-type: none"> - Biophilic architecture with roof garden that opened for sittings. - Biophilic interior design finishes like wood floor, indoor plants, and water elements. - The bowel courtyard. - Town square garden. - Link between outdoor and indoor with transparent windows. - Gaming room. - Group games like table games. - Learning kitchen. - Shopping store. - Wellness center. - Yoga classes. - Massage room. - Outdoor seats and gathering hall with interactive screen. - Using interior finishes that related to biophilic principles like wood floor. - Cold colors of walls and furniture. Comfortable and ergonomic furniture design. | <ul style="list-style-type: none"> - Fitness center outside the two buildings but has the access to all employees. - Bicycles and skateboard everywhere indoor and outdoor. - Wellness center with full equipped gym. - Multipurpose training hall that fit to be for individual activities or groups with fitness coach like working out classes, Zumba, dance, gymnastic, etc. |
| Case Study 4 | <ul style="list-style-type: none"> - Several sitting areas. - Clear hallways - Open floor with no restriction and limited walls evokes the feeling for movement and encourage to walk around. - The variety of workplaces furniture and location with no specific workstation for workers allows to transfer between them. | | | |

| | | | |
|---------------------|--|--|---|
| Case Study 5 | <ul style="list-style-type: none"> - For architecture and design firm, the spaces is more functional to be open, they need group working and peer feedback, so the workstations are close to the conversation sittings and projects display units which allows for moving around zones. - Clear and wide hallways. - Different level and type of working surfaces supports changing the postures during work. | <ul style="list-style-type: none"> - The wide transparent windows bring the natural light in and provide a view for outside. - The Bridge floor which includes all the amenities for relaxing, food facilities and gathering for events and social activities. | <p>Not enough information about energy zone in this case study.</p> |
| Case Study 6 | <ul style="list-style-type: none"> - The accesses in the campus indoor and outdoor increases the body movement. - Connections between buildings. - Central and visible stairs. - Clear and wide hallways. | <ul style="list-style-type: none"> - Biophilic Architecture. - Natural view to the well-designed landscape. - Access to outdoor spaces. - Natural light from any angle of the building. - Indoor air quality control | <p>Not enough information about energy zone in this case study.</p> |

Conclusion

This chapter presented the results of the six case studies and analysis. The data revealed the importance of the influence of interior environments on workers' wellbeing and productivity. The following Chapter will discuss the results and provide insight for the research questions.

CHAPTER 5

CONCLUSION

Introduction

This chapter discusses the significance of the collected and analyzed data. From the data, certain considerations can be made towards creating the optimal workplace design that enhance workers' wellbeing and raise the productivity levels. Implications of the study and the future research suggestions are also included.

Discussion of the Result

The purpose of this research is to understand the influence of the interior workplaces on the workers' wellbeing in order to increase their productivity in USA. While the chosen method was to collect data from big company headquarters, there are many factors that involved and played a part in the efficiency of the workplace. The function of the office buildings as a place of employment and performing work involves some considerations that are important for the well-being of the employees. The appropriate working spaces with working facilities is an example of these considerations. It should meet the human needs at the same time. As described in the literature review, the ability to choose the place and the way of work is one important factor that increases the workers' wellbeing. However, the physical movement during work, the stress management techniques, and re-energizing spaces are the other significant factors that lead to a productive company atmosphere as a result of the high employees' wellness. Moreover, the presented case studies add another factor which the inspirational encouragement within the working environment. This was accomplished by adding some

encouraging words and champions pictures like in Under Armour, and engagement to company goals like google searching screens, Facebook status wall, Adobe brand promoting, and Gensler lab design. These inspiring designs and brand image promoting, create strong connection between workers and the company they work for as one family.

On the other hand, the analyzed data revealed the strategies of the interior design that used to support the concept of the wellbeing. With a view to realize that, the following research questions will be answered.

Quality of Lighting and Research Question #1

Research question #1: How do big companies use quality of lighting in the workplace to increase prime working age workers' wellbeing?

As stated before in literature review about the importance of the good lighting in the workplaces 'see section Lighting in Chapter 2', the case studies support this premise and use different methods to adjust the lighting according to the workers' needs. The natural light plays the main part. Therefore, all the case studies had employed large windows in the working spaces to provide natural light inside the building, in any case, the analysis of sun direction is different following to the location of the building. These windows are usually located in-parallel along with workstations and sittings area. Some case studies, like Facebook Company HQ, used the skylight also. Nevertheless, the workers can take more benefits of the sunlight in outdoor facilities and amenities.

For the artificial light, it is quiet technical study that vary from case to another, but generally, most of the case studies avoid the direct light and use the diffused and

neutral light. This type of light mimics the sunlight which is more comfortable for eyes especially among the long working hours.

Air Quality and Thermal Comfort & Research Questions #2 & #3

Research question #2: How do big companies deal with the air quality and ventilation of the workplace to increase prime working age workers' wellbeing?

Research question #3: What are the strategies of thermal comfort that used to enhance the well-being of the office workers?

‘see sections Air quality & thermal Comfort in Chapter 2’ to review the importance of ventilation. In addition, the data has demonstrated that in some case studies. In section Indoor Environment Quality in Chapter 4, FedEx headquarter enhances the employees' thermal comfort by providing adjustable air diffuser can be controlled by employee for each workstation. However, in all cases the air quality is well-designed by building high ceiling in some spaces that helps to circulate warm and cool air within the space. Also, the open floor workplace in most of the cases is a solution to provide good ventilation. ‘for more information, see section of social wellbeing in table.4’ In fact, this question needs more investigation to have informative insight for it. Since it is related to the air quality, it requires more technical assessment and evaluation.

Physical Movement & Research Question #4

Research question #4: What are the strategies that big companies use to promote and increase physical activity of prime working age workers?

The data revealed the importance of body movement during working hours. Therefore, the big companies create some strategies to encourage workers' physical

movement. Google and Facebook involve the using of bicycles and skateboards in their campuses, while Under Armour has built different zones for working out and exercising. Another strategy is to avoid physical boundaries and allow working in all buildings zones like Adobe headquarter. Also, Google, Adobe and Gensler are recognizably distinct in the way of creating different working surfaces that help to change body posture in the work. On the other hand, there are spaces specialized to serve as a fitness and gym center that found in most of cases. ‘for more information look at the physical movement and energy zone sections in the table.5’.

Natural elements & Research Question #5

Research Question #5: What are the mechanisms to build connections with natural elements in order to enhance wellbeing?

In the reviewed literature, there are theories that talk about the significance of the connection with the nature, for more information about biophilic design ‘see section Healthy Building in Chapter 2’. Moreover, the case studies bring these theories to life by building a good landscaping and build the visual connection between outdoor and indoor with transparent windows. It is not only for the view, also there are accesses to move around the landscape like the cases of Google, Facebook, and FedEx. Some have indoor plants. In Adobe headquarter, in addition to the natural light and view through windows, they use finishes materials for furniture, wallpaper, ceilings and walls that evokes the feeling of nature and bring the inspiration of environment inside. Same strategies also used by Under Armour and Facebook. ‘see Environmental considerations in the table.4’

Stress Reducing & Research Question #6

Research Question #6: What strategies and physical environmental features do big companies use to help reduce stress and depression at work?

Rather than theoretical part that stated in the literature review for the influence of workplaces on the stress levels, the big companies has considered some techniques that help to manage stress within working spaces. Google has the most results for this feature. They created perks like daycare for parents workers, gaming rooms, hair salon, laundry, healthcare services and spa for relaxing. Facebook adopted the concept of green architecture that studies has proven its efficiency in reducing stress.

On the other hand, Adobe and Under Armour has classes for yoga and meditation to releasing stress out, while Adobe adds arts installation and interactive activities as an extra technique. Also, the designed gathering and meeting areas whether inside dining spaces or not are used to have a break and take the stress off. ‘see stress management in table.5’

Spatial Arrangement & Research Question #7

Research Question #7: In what way do big companies address the spatial arrangement of workspaces in order to optimize prime working age workers’ wellbeing?

Googolplex has the answer of this question. It designed the workstations following the importance and the function of the performed work. Between hot and cool workstation, the figures. 20 & 21 have the explanation of that.

Research Implication

The research revealed the relationship between interior environment of workplaces and workers wellbeing. It also presented the strategies that used to increase wellbeing, which help to identify the proposed optimality of the workplace according to the integration of these strategies in the building. The research intent is to gain a better understanding of the fact of positive influence of interior design on the workers that leads to boost their productivity.

In design, this research can be added to the existing knowledge that related to the workplace design. The insights can help to evaluate the workplaces if they fulfill workers wellbeing or not. It also can be referred by designers and architects for some strategies that expand the quality of their project.

Future Research

In the future research, this study is not exclusive to the U.S companies, neither the headquarters, it could be applied in any place that has a direct connection between a human subject and a built environment. On the other hand, if this research have the opportunity to be replicated or improved, it is good to study one case study for one company, and have site visiting to evaluate the case in deep with direct interaction with the workers and executives, which this study has lack of it. it could be conducted in different ways that involve a human subject like interview or survey to find out which strategy has more acceptance in the side of the workers than another. Or the observation of buildings to evaluate one of the interior design principle technically such as measuring light.

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APPENDIX A
DATA COLLECTED FOR ALL CASE STUDIES

For the six case studies, all the general information and data about the case (name, location, size, concept of the project, architect, awards, etc.) have been collected from the following multiple websites: company website, architect website, architecture magazines, certification programs websites, and other companies that contributed in building and designing each project.

Companies' Websites

<https://about.van.fedex.com/our-story/history-timeline/history/>

<https://www.gensler.com/2018-annual-report>

Architecture firms' Websites

<https://alliancearchitecture.com/project/under-armour/>

<http://www.lrk.com/projects/fedex-world-headquarters-building-i/>

<https://www.gensler.com/projects/facebook-headquarters>

https://clivewilkinson.com/portfolio_page/google-headquarters/

<https://clivewilkinson.com/case-studies-googleplex-a-new-campus-community/>

Architecture Magazines

<https://www.wallpaper.com/architecture/frank-gehry-office-facebook-menlo-park-hq-san-francisco-opens>

https://www.architectmagazine.com/design/facebook-reveals-frank-gehry-designed-hq-expansion_o

<https://www.archdaily.com/901572/facebook-expands-menlo-park-headquarters-with-mpk-21-building-by-gehry-partners>

<https://www.worldatlas.com/articles/where-is-the-headquarters-of-facebook-located.html>

<https://www.interiordesign.net/projects/9734-facebook-s-new-faces-gensler-designs-facebook-s-headquarters/>

http://www.architectureweek.com/2000/0607/news_5-1.html

<https://www.hbginc.com/projects/corporate-community/fedex-world-headquarters/>

<https://www.dezeen.com/2018/09/05/mpk21-frank-gehry-facebook-silicon-valley-headquarters-menlo-park-california-architecture/>

https://www.architectmagazine.com/project-gallery/adobe-headquarters-renovation_o

<https://www.businessinsider.com/inside-photos-of-under-armours-headquarters-in-baltimore-2016-6>

Online Reports

http://www.clivewilkinson.com/pdfs/CWACaseStudy_GoogleplexANewCampusCommunity.pdf

<https://computer.howstuffworks.com/googleplex1.htm>

<https://www.gensler.com/uploads/document/600/file/Gensler-2018-Annual-Report.pdf>

Certification Organization and awards Websites

<https://www.usgbc.org/projects/>

https://www.glassdoor.com/Award/Best-Places-to-Work-LST_KQ0,19.htm