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History Thesis

The architecture of the open office in the twentieth-century

*Exploring the spatial configurations of the open floor plan in offices
As example the Johnson Wax Headquarters and Centraal Beheer Office*

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Abstract

In this thesis the modern office typology will be the main object of this research. Giving an answer to the question: *how did the open floor plan in offices emerge in the twentieth century?* The buildings Johnson Wax Headquarters (1939) by Frank Lloyd Wright and Centraal Beheer Apeldoorn (1972) by Herman Hertzberger will be analysed to illustrate the principles and ideas of the before-mentioned architects. How these projects influenced office architecture and how the workspace has changed in the period from the beginning to the end of the twentieth century. The analysis of buildings will show how the ideas of the architects are visible in the design, relating to the historical and theoretical framework of that time. This research can be useful in understanding the means and functioning of open office spaces and could help with designing future offices.

Keywords: Office building history, open floor plan, co-working, workplace design, modern office, modernism, structuralism

Table of contents

Abstract

1.1 Introduction

1.2 Research questions

1.3 Methodology

1.4 Limitations and boundaries

2.1 The modern office in the twentieth-century

2.2 Concept of The Johnson Wax Headquarters by Frank Lloyd Wright

2.3 Concept of Centraal Beheer by Herman Hertzberger

3.1 Commentary on Wright by architects and critics

3.2 Commentary on Hertzberger by architects and critics

4 Conclusion

5 Discussion

Appendix

A. Reflection

B. Bibliography

1.1 Introduction

There is a shift in the use of offices and the layout at the moment, the past years due to the pandemic the view on the workspace and office has been forced to be reconsidered. In the most recent years, the mobile workspace already had become a standard and even before the pandemic, the need for a fixed work desk has become less of a necessity. This is due to the evolving technologies and most work can be done remotely. This gave the office space a new function and use, within the past couple of years putting an emphasis on knowledge sharing and collaborating. How did we get to this kind of use of the office space and its so-called interior landscape design? In this history thesis, an overview of the development of office design from the beginning of the 20th century to the current day will be given. Provides an insight into how as well as why the office took a certain shape/design, with a special focus on how the office has moved towards an open-plan design. As well as changes in technology will be discussed and relevant to the economical political and social shifts throughout history. Going back to the origins of the office might help with understanding how it has evolved and/or changed and what the positives and negatives of these designs are. This research can be useful in understanding the means of well-functioning working space and the influence of architecture. It can give a better understanding of the spatial configurations and could help in the future in designing and what to consider in a workspace. In this thesis the modern office as a typology will be the main object of this research. For this, the buildings Johnson Wax Headquarters (1939) by Frank Lloyd Wright and Centraal Beheer Apeldoorn (1972) by Herman Hertzberger will be analysed to better illustrate the principles the mentioned architects used. Analysing the historical context of office design and how the workspace has changed in the period from the beginning to the end of the twentieth century. The reason to select these buildings is that there will be enough information available as both buildings have known examples of offices that were different from the standard at that time.

1.2 Research questions

Main question

In order to create a coherent storyline for the previously mentioned topic of the open floor plan as typology, the overarching research question is: How did the open floor plan in offices emerge in the twentieth century?

The open-plan design as typology will be discussed with several variations. For example, the Johnson Wax headquarters 1939 by Frank Lloyd Wright will be analysed which was one of the first open-plan offices at the beginning of the 1900s. Although the building was considered a big change in architecture design and technology, the design of the open-plan did not take off until the introduction of the 'burolandschaft' by the Quickborner team in the 1960s (Pearson-Mims, et al. 2000; Gou, 2017). During this time when the open office became a growing trend, the architect Herman Hertzberger completed the Centraal Beheer office in the Netherlands in 1972 (Gou, 2017) although singular in building shape it became popular among the employers and heightened interest among office managers in the Netherlands (Rooy, 1974). It is interesting to compare the two buildings as both buildings were praised at the time of completion and are still considered icons to this day. The buildings unique in design at the time and different from each other will be compared to get a grip on what was in their architecture that made them popular and works in a practical sense. Because there is a gap in time between the completion of the two buildings, putting it in the context of that time and comparing it will show where the emphasis and considerations of the architect's design were put on.

Sub questions and structure

For a clear structure, the thesis is built-up into smaller chapters. In each of the chapters, a sub-question will be answered. Starting with a brief overview of the functional use of the office in the twentieth-century, and findings of previously researched open-plan offices.

The next chapter will be about the concepts and designs of the buildings by Wright and Hertzberger. Answering the following questions. As well as putting these cases in their respective social-economic and cultural context of that time.

What were the ideas of the open-plan by Frank Lloyd Wright?

What were the ideas of the open-plan by Herman Hertzberger?

What was the (socioeconomic and cultural) context of when these buildings were designed?

This will then be followed by a literature review on the buildings, pointing out the perception of the building at the time from historians and other architects, giving an answer to how it differed from a 'standard office' of that time. which will help understand the significance of the building at the time and how this might have changed over time.

1.3 Methodology

The methodology will be qualitative research, with a combination of ethnographical, phenomenological and narrative research. This combination of several research types gives flexibility in collecting information. Using literature study for a historical overview, archival material and previously done experiments, articles and books relating to the emergence of the open plan. Relating to experiments (ethnography), results on how the open office is perceived will give an overview of how the office building has changed in the twentieth century, regarding the physical design and experience of the users. This will help shape an image of the office building relating to the social context of that time, creating a theoretical framework.

After shaping the theoretical framework of open office design, regarding innovation and experience of those spaces two case studies will be done. The chosen buildings are The Johnson Wax Headquarters by Frank Lloyd Wright and the Centraal Beheer by Herman Hertzberger. After a short introduction of the buildings and architects to understand their ideas and ideals (narrative research). The analysis of the building will be done by a description and observations, accompanied by several images such as the building's plan, elevations, sections and other drawings found, using diagrams, photographs and sketches. Focussing on visibility, movement and flexibility of the spaces.

Handling the office space such as an urban or public space (phenomenological research). Showing in diagrams the main movements and mobility, similar to work done by Jan Gehl analysing public spaces By looking at floor plans/ layouts, dimensions, and ratios, will help with further defining the space and understand if there is a possible zoning plan or other was how the is space subdivided and defined.

Definition of terms

The open floor plan is defined by the open space, and therefore in practice will most often not be further divided into *spaces*. like a conventional room or simplified: box, which is defined by its four walls, floor and ceiling. However, this does not mean the workspace or office should not be completely undefined, in this paper these subdivisions will be called *zones*, and may or may not be defined by a physical border. In this paper, the office will refer to the building as a whole, the workplace or the open-plan to an entire floor. A space should always have a box, defined as mentioned before, when a space does not meet these requirements it will be called a zone.

In a study by Brennan (2002) offices are classified into five categories: (a) private closed, (b) private shared, (c) individual open, (d) shared open, or (e) bullpen, varying from the 'bürolandschaft', system furniture and panels that differ in heights to completely enclosed spaces.

1.4 Limitation/ boundaries

There is only so much that can be elaborated on in a thesis and therefore boundaries are set to limit the research given the time and amount of words. In this case, there will be a primary focus on office space in the twentieth century, reducing its relevance to present-day offices. As well that only two office buildings will be closely analysed, which will not represent the complete scoop of office buildings of that period The

analysis will only be focussing on the office space within the building and not so much on the interconnection with its context and architectural exterior expression of the building.

2.1 The modern office in the twentieth-century

Beginning of the modern office

The origins of the office, bringing workers together into space, had as aim to have control over the labour process. Referring to research done by Cowan et al., (1969) and Gou (2017) it was not the technological necessity that was a driving force for the office as offices were not capitalised at all. With the start of the Industrial Revolution, more clerks were needed resulting in the need for a place to accommodate those kinds of activities: the office (Gou, 2017). One of the founding and guiding forces behind the office is based on studies done by F. W. Talyor in the 19th century, resulting in a movement called Taylorism, which applied science to the management of the workplace to gain economic efficiency through labour productivity. A parallel can be made with a panopticon where in both cases the focus relies on supervision, surveillance and control, the difference is the level of control over the clerks versus the prisoners.

Taylorism is based on top-down control; the emphasis lies in optimising the efficiency of work and hierarchy. Due to the lack of social need and the individual in the Taylorism concept, there was a need for a different type of work organisation resulting in the German Quickborner Team. The design of an office landscape *Burolandschaft* by the team attempted to make the worker more sociable and provides a more flexible space with an emphasis on workflow and communication (Gou, 2017).

Architectural expression

The architectural expression of the office building before the open floor plan has much to do with the construction of the building and has a parallel with the rise of the skyscraper. The buildings had load-bearing walls and the floorplan was rooms connected by a hall, buildings of that time did not have any more than five or six storeys high. With the introduction of steel as well as the invention of the lift, it was possible to build higher as well as have a more flexible floor plan. The Home Insurance Building in Chicago is considered the first skyscraper in America with ten floors. The building uses a column construction, although the floorplan has a long corridor with small offices divided by walls, the walls are not load bearing (Condit, 1964).



Fig. XX. Unknown. (nd). *Home Insurance Building, Chicago*. [Photograph].

https://www.researchgate.net/figure/Home-Insurance-Building-Chicago_fig1_343537036.

Fig. XX. Unknown. (nd). *Floorplan, Home Insurance Building*. [Illustration].

<https://thearchitectureprofessor.com/2020/10/23/8-13-the-home-insurance-building/>.

In the mid-twentieth century, the majority of the American population was white-collar workers, also known as office workers. Middle-class offices were never meant to be icons but became an example of the American working dream (Saval, 2014). The office was designed for efficient and practical purposes, there was less physical danger in comparison to working in a factory and as an entry-level employee, there was a future perspective for growth and higher positions. This prospect was new for many of the middle class and working at an office had status. At the same time, the company wanted its building to be a figurehead for the company, portraying wealth and the symbol of prestige (Saval, 2014).

In the Workplace Design Revolution, Gou (2017) mentions a shift of the macroeconomics from a labour intensive work to knowledge-based work, making the workspace about enabling people to interact and collaborate and touches on the use of the term 'interior urbanism' describing the experience of public space within the building including the urban scale of elements. Questioning what makes a space feel urban. Gou (2017) refers to statements by Richard Rogers, who argues for 'meeting of people' and Norman Forster who argues for 'the change for encounter', defining the urban space for spontaneous encounter. These serendipitous social interactions should be reflected in the office buildings to keep the feel of urban space.



Fig. XX. Quickborner. (2022). *Quickborner reintroduced the partition, but in an appropriately mobile, Semperian form, with their 'Bürolandschaft'* [Illustration].

<https://www.architectural-review.com/essays/typology/typology-offices>.

https://cdn.ca.emap.com/wp-content/uploads/sites/12/2012/07/history_burolandschaft_plan_0_380.jpg

Burolandschaft

The German company Quickborner wanted to create a better workspace that organised a better working process. The team came up with a flexible open-plan office, which they called the *Burolandschaft*. It stood to promote the humanisation of the working environment, beyond the arrangement of walls and facilities. Caring about the needs of the individual employees (combine Consulting GmbH, n.d.). Proposing an open, partition-free space, interior walls were discarded and low movable partitions were sent to enhance the flow of information in the office, allowing for a variation in privacy and openness (Hookway, 2009). These rules would allow for varying degrees of privacy and openness through the control of sightlines and the use of partitions, most noticed for the lack of interior walls (Pearson-Mims, et al. 2000). "*People in Bürolandschaft are expected to organise their own time.*" (Duffy, 1964 in Hookway, 2009).

The Office Landscape was the beginning of office design not only optimising the work but it was also focused on how the well-being of the worker can be maintained. Making the workers part of a community by creating multiple small open spaces, with the change of spontaneous meetings and also visual connection throughout the whole building and between levels. These ideas were later stimulated in many office buildings (Gou, 2017).

The Quickborner model started to emerge in the United States in the early 1960s, it was initially perceived with scepticism as it was radically different from office design from that time and considered too restrictive with its rules (Pearson-Mims, et al. 2000). A major downside to this design is lack of privacy, mentioned in research done by Person-Mims (2000) the exact impact of open office design was unclear due to the lack of control groups, in the 1960s and 1970s, there were often case studies relying on anecdotal evidence and self-reported evaluations.

Commercialising the open floor plan

The open office started to become commercial in the 1950s and peaked at the beginning of the 1970s (Saval, 2014), the driving force was often that of reorganisation of management, aiming for an improvement of communication and productivity of the company. Around the 1960s theorisation of the office started to emerge and started a continuous shift of the need for workers to become creative and knowledge sharing (Saval, 2014). From an economic point of view, it was beneficial in terms of square metres per employer. However, at the same time, the employer's health was questioned and noise disturbance was reported with a 54% increase from a sample of more than 2000 offices in North America (Sundstrom, Town, Rice, Osborn, & Brill, 1994 in Brennan et al., 2002). The effects of the physical environment of the open office are often measured in dissatisfaction of the employees, relating to distraction and disturbances of noise (Brennan et al., 2002).

Collaboration and knowledge sharing

Once the open-plan had become popularised, many companies and institutions went to open-plan offices in order to encourage social interaction and relationships among workers (Pejtersen et al., 2006). It became apparent that the concept had its flaws, and researchers reported workers' complaints about problems regarding lack of privacy and noise from colleagues started to emerge (Hedge, 1982 in Pejtersen et al., 2006).

With a shift to the office becoming a place for collaboration, the interior of offices has often been transformed into an open and 'transparent-enhancing architecture' resulting in fewer physical boundaries such as walls and doors. The lack of spatial partitions makes individuals more physically proximate and in theory, should lead to more interaction. However, studies have shown that the removal of such boundaries has the opposite effect and decreases collaboration and collective intelligence. Research done by Bernstein and Turban (2018) shows that removing spatial boundaries after a redesign in an office reduced face-to-face interaction with employers, and an increase in electronic interaction of 20-50% was measured. Concluding from the research was that open architecture does not necessarily promote open interaction, these spaces can be overstimulating and thus decrease organisational productivity lastly it affects different channels of interaction, face-to-face versus electronic communication. Although there were no visual boundaries in the office for the employers, virtual interaction was more often used. Over fifteen days an increase of 20% in direct email and instant messaging and participants were 44% more cc'd in emails with no significant difference between gender. There were correlations between the distance of workstations and the number of face-to-face interactions (Bernstein & Turban, 2018). Similar results of research about open office design have shown that it is negatively related to workers' satisfaction with their physical environment and perceived productivity (Brennan et al., 2002).

The cubicle

As a solution to the previously mentioned problems of distractions and lack of privacy, Robert Propst designed office furniture in the 60s which is now known as the cubicle. He described the open office as "...the manager in the corner room and the majority of workers at open desks that were arranged in static lines, with very little consideration for any form of privacy, storage or intrusion from telephones." The cubicle

would make for a healthier, more innovative and more productive workforce."(Shanahan, 2022) After a failed first attempt the redesign in collaboration with Herman Miller of the Action Office, AO-II for short, was a success created in collaboration. Different from other office furniture was that these elements were part of a system, adaptable for the individual workers' needs and were one of the first to take ergonomics into consideration. The system furniture could define the space without walls but did have partitions between desks if there was a need for privacy. "Cubicle systems allow them to very quickly and easily create a range of spaces, from meeting areas to individual workspaces, with no building work needed" At first what was supposed to be a well-designed solution for employers soon got criticism. As George Nelson, an American industrial designer described the cubicle: "it is admirable for planners looking for ways of cramming in a maximum number of bodies" The design was easily copied but lacked the research and discarded the individual workers' needs, the Action office was reduced to a box, with as only goal to maximise office space (Shanahan, 2022).



Fig. XX. Pin-up. (2022). Action Office II, the modern cubicle. [Photograph].

<https://archive.pinupmagazine.org/articles/the-story-of-action-office-2-and-cubicle-inventor-robert-probst-herman-miller>

Defining the open office

What is meant by the open office, the term openness in some studies is defined as visual openness and is interchangeably used for visibility (Hua et al., 2010). However, mentioning an open office there is more than visibility and sightlines, the level of openness perceived by the user of the space has other parameters. Differing heights do make quite a difference in the sense of 'openness'. In some studies, the word 'openness', as in visual openness, has been used interchangeably with visibility. A significantly higher level of perceived support was associated with a shorter distance from the workstation to the meeting space, a lower level of floor-plan openness, and a higher percentage of floor space dedicated to meeting, service, and amenity spaces (Hua et al., 2010).

Perception and dissatisfaction with openness

A distinction can be made between several parameters on how to measure how the office can be perceived depending on: Workplace spatial parameters, Individual environmental experience, Interpersonal experience, Outcomes/ Job characteristics, and Personality (Hua et al., 2010).

In the 'preferred places for collaborative and interactive behaviour' question in the questionnaire, there is a clear preference for individual workstations as places for collaborative work and casual interaction. Based on distances between workstations and various collaborative spaces there are clear differences between layouts. The distribution and number of collaborative spaces in workplaces as indicated by the six new layout-scale variables impact occupants' perception of how a work environment's space supports or inhibits collaborative work. The empirical data provided strong and consistent evidence that the layout of various collaborative spaces in a workplace directly impacts office workers' perceptions of how well the work environment supports collaboration. Hypothesis 3 was supported by the results of the mixed-effects regression analysis. Layout-scale descriptors of how collaborative spaces are organised in floor plates were found to be more significant predictors than workstation-scale variables of how well occupants rate the capacity of a work environment to support collaborative work (Hua et al., 2010).

Other studies show the relation between indoor climate, psychosocial work environment and symptoms in open-plan offices that there is no strong association between psychosocial factors and office size, concluding that not all job types suit open-plan offices. A study by Duffy from 1974 however did not find a clear link between spatial differentiation and worker interaction (Hookway, 2009). Offices listed as 'non-bureaucratic' had often a high degree of spatial differentiation, besides it is questioned whether the levels of interactions between employees are not necessarily a good measure of workers' commitment to the company. For example, a law office, due to the nature of work, scores high in participation but has a low score in interactivity. At the same time, there is a high spatial differentiation but bureaucratic criteria are low.

(Hookway, 2009)

Interaction in practise

Within the last 10 years, more and more private companies and public institutions have replaced cellular offices with open-plan offices with a social relation approach and a sociotechnical approach to social relationships among employees, decreasing interpersonal problems, increasing supervision and feedback from colleagues and facilitating more intra- and interdepartmental interaction sociotechnical approach states that the absence of walls and partitions will decrease privacy and reduce workers experience of autonomy. Noise in the room was the most prevalent complaint in the open-plan offices and the noise had the strongest association with office size. In the review by Sundstrom (1986) five of 10 intervention studies found an increase in noise problems when changing offices to an open space layout, whereas only one study found a decrease in noise problems after the change. When considering the psychosocial risk factors – quantitative demands, emotional demands, job control, motivation, quality of leadership, and social support and feedback. This means that the psychosocial risk factors cannot explain the found associations between office size and, respectively, the environmental perceptions and symptoms.

In a survey by Steelcase (1997), 93 per cent of employees working in cubicles are dissatisfied. About fifteen years later little has changed as a study by the University of Sydney shows that people working in a cubicle are most unhappy with their work set-up. Best intentions of designers and architects, but often fall short of the psychological needs of the worker (Saval, 2014).

It is that propinquity, or proximity, predicts social interaction. 10% of communication occurred between employers with desks more than 500 metres apart, so to improve collaboration workers should be in close proximity to each other (E. Bernstein & Waber, 2021). A 2012 study showed that remote workers communicated 80% less about their assignments than colleagues in the office, even though 17% did not communicate at all. The design of the workspace depends on tasks, roles and culture. The open office made maintenance of the building easier and fewer square metres per person was needed (Brennan et al., 2002) To boost collaboration, increase the right kind of interaction and prevent distraction.

Understanding of the interaction pattern. The Mori Building in Japan conducted a study in 2016 for more

productive collaboration among teams. The data of wearable sensors and interaction tracking showed that most employees communicate only with their team. About 20% per cent of the space with an open seating area was rarely used (E. Bernstein & Waber, 2021). There was a rise in cross-team interaction, but the results were misleading, by bypassing the managers, but had consequences and a drop in quality. Less productivity and a rise in client complaints (E. Bernstein & Waber, 2021). Other experiments showed about 90% of interaction takes place at the desks, resulting in free-address seating to increase interaction, at the same time this destroys collaborations and is thus counterproductive for employers. *“Just as high-frequency A/B testing is common in marketing and sales, rapid experimentation is key to workplace design.”* (E. Bernstein & Waber, 2021).

Improving office productivity does not always have to do with changes in the physical structure, Mori experiments showed that the impact of events deliberately designed to achieve particular interactions was more valuable and precise than changes to the office space. Humanyze discovered that the location of its coffee machines significantly influences interactions.

“A single best physical or digital workspace architecture will never be found. That’s because more interaction is not necessarily better, nor is less. The goal should be to get the right people interacting with the right richness at the right times.” (E. Bernstein & Waber, 2021)

2.2 The Johnson Wax Headquarters by Frank Lloyd Wright

Although the Johnson Wax Headquarters office was designed in 1904 by Frank Lloyd Wright is considered by many to be the first open office (Brennan et al., 2002; Sundstrom, 1986 in Pejtersen et al., 2006; D'souza, 2022; Miller, 2021) there was a very strict spatial hierarchy, where the large open space was designated for the clerk workers and the managers were located on a level above and had their own private offices giving a view over the open workspace of the employers.

The open office space was organised in groups, to optimise the workflow and communication. After the completion of the Johnson Wax building, companies started copying this type of office design, the main motivation however was not that of optimising communication between workers but that of economic consideration and saving costs (Brennan et al., 2002)

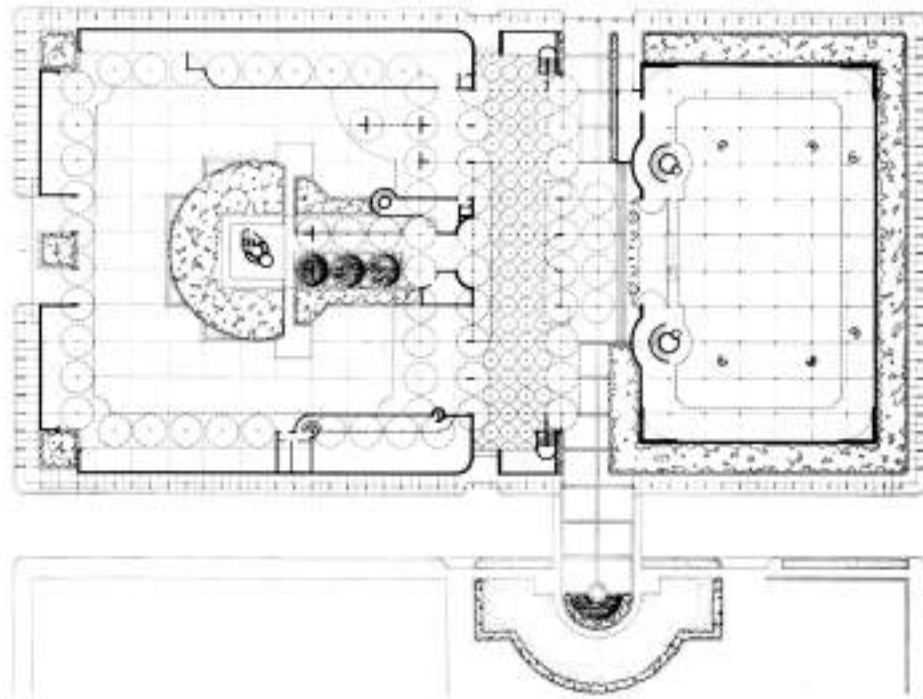


Fig. XX. MIT Libraries. (2022). *Floorplan, Johnson Wax Building* [Illustration].

<https://www.atlasofplaces.com/Architecture/Johnson-Wax-Headquarters/>.

https://www.atlasofplaces.com/atlas-of-places-images/_scaled/ATLAS-OF-PLACES-FRANK-LLOYD-WRIG

HT-JOHNSON-Wax-HEADQUARTERS-GPH-4.jpg

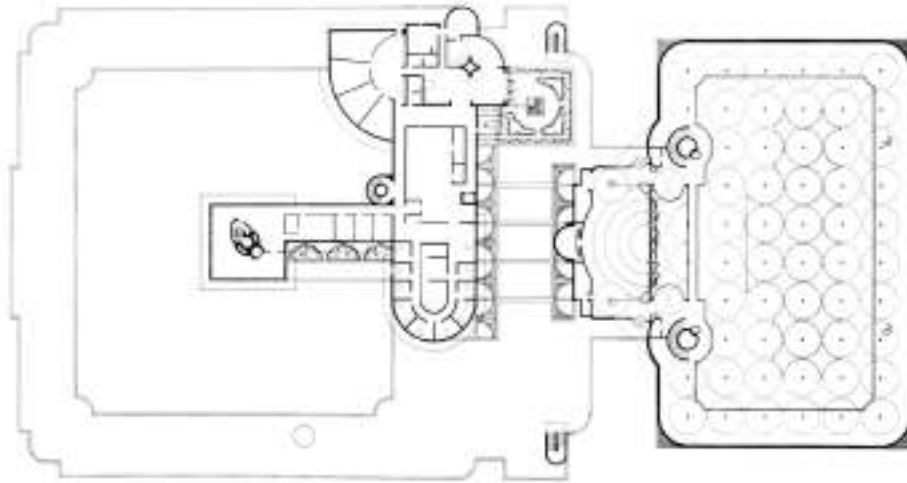


Fig. XX. MIT Libraries. (2022). *Floorplan, Johnson Wax Building* [Illustration].

<https://www.atlasofplaces.com/Architecture/Johnson-Wax-Headquarters/>.

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HT-JOHNSON-Wax-HEADQUARTERS-GPH-5.jpg

The Johnson Wax Headquarters were set in an industrial zone and Wright decided to create a sealed environment lit from above, similar to what he had done with the Larkin Administration Building. The building features Wright's interpretation of the streamlined Art Moderne style popular in the 1930s. The entrance is within the structure, penetrating the building on one side with a covered carport on the other. The carport is supported by short versions of the steel-reinforced dendriform (tree-like) concrete columns that appear in the Great Workroom. The low carport ceiling creates a compression of space that later expands when entering the main building where the dendriform columns rise over two stories tall. This rise in height as one enters the administration building makes the space seem much larger than it is. The use of contrasts to accentuate the change of spaces was typical for Wright's work, such as the playroom in his Oak Park Home and Studio, the Unity Temple in Oak Park, Illinois, the Solomon R. Guggenheim Museum in New York City, and many others. Moving from a low ceiling hall into a high open grand space, Wright called this 'compression and release' (Wilson & Puliatti, 2014).



Fig. XX. Unknown. (nd). *Interior Larkin Administration Building, using windows in the roof to natural light.* [Photograph]. http://wright-up.blogspot.com/2012_02_01_archive.html.
<http://3.bp.blogspot.com/-0WzNGsfBckU/T0aNLc1FzII/AAAAAAAAABIY/kx3NqL2bsZ0/s1600/Larkin+light+court.jpg>.

Previous work

The Johnson building was to overcome the contradiction of capitalism and the industrialised society, shaped by Taylorism. For Wright his transcendental ideas he often used the term organic architecture which emerged from European Romanticism in the eighteenth century, relating to romantic theories of that time (Uechi, 2013). Wright's first use of the open floor plan can be found in his designs for family houses he designed. The free-flowing plans had to 'break the box' principle, an example of this is the Robbie house in Hyde park, finished in 1909. Wright wanted to push residential homes into a different and new design. He was ambitious and experimental in his designs, which attracted clients.



Fig. XX. Highsmith, C. M. (2022). *Desk, Johnson Wax Building* [Photograph].

<https://www.atlasofplaces.com/Architecture/Johnson-Wax-Headquarters/>.

https://www.atlasofplaces.com/atlas-of-places-images/_scaled/ATLAS-OF-PLACES-FRANK-LLOYD-WRIGHT-JOHNSON-Wax-HEADQUARTERS-IMG-7.jpg

In a break with Wright's earlier Prairie School structures, the building features many curvilinear forms and subsequently required over 200 different curved "Cherokee red" bricks to create the sweeping curves of the interior and exterior. The mortar between the bricks is raked in traditional Wright-style to accentuate the horizontality of the building. The warm, reddish hue of the bricks was used in the polished concrete floor slab as well; the white stone trim and white dendriform columns create a subtle yet striking contrast. All of the furniture, manufactured by Steelcase, was designed for the building by Wright and it mirrored many of the building's unique design features.



Fig. XX. Highsmith, C. M. (2022). *Exterior, Johnson Wax Building* [Photograph].

<https://www.atlasofplaces.com/Architecture/Johnson-Wax-Headquarters/>.

https://www.atlasofplaces.com/atlas-of-places-images/_scaled/ATLAS-OF-PLACES-FRANK-LLOYD-WRIGHT-JOHNSON-Wax-HEADQUARTERS-IMG-5.jpg

Designing process

There was much correspondence between the head of the company, Herbert Johnson and Wright showing he was close in the designing process (*Johnson Wax Headquarters by Frank Lloyd Wright*, 2019). There is a clear distinction between work by Wright for private housing and the more urban and corporate

buildings, the former had a connection with its context and the latter was often introverted, illuminated from the ceiling. *'Honest labour needs no master; simple justice needs no slaves'* Wright wrote about his design for the Johnson Wax building. His design principle was that good architecture should be functional and not include any non-useful features (Wilson & Puliatti, 2014).

Daylight from ceiling

The design of the Johnson Wax building was completely different from what was before seen in the United States. Slim columns, wall system, glazing and all the detailing to the furniture were new technologies used in the building. The skylights in the ceiling made daylight part of the interior elements. Wright created a building that was organised and well composed and started a completely new spatial discourse of twentieth-century design. The Great workroom was described as *"among the pine trees, breathing fresh air and sunlight."* (Lipman & Frampton, 1986) despite none of these elements being there. All is possible because of the technological innovation of engineers. The rank high columns were first not believed to be rigid enough to hold the weight of the ceiling until after prototype testing proved to be right (*Johnson Wax Headquarters by Frank Lloyd Wright*, 2019).



Fig. XX. Highsmith, C. M. (2022). *Workers hall, Johnson Wax Building* [Photograph].

<https://www.atlasofplaces.com/Architecture/Johnson-Wax-Headquarters/>.

https://www.atlasofplaces.com/atlas-of-places-images/_scaled/ATLAS-OF-PLACES-FRANK-LLOYD-WRIGHT-JOHNSON-WAX-HEADQUARTERS-IMG-4.jpg

2.3 Centraal Beheer by Herman Hertzberger

"The key is to amplify everything you make with the sound of society as the basis; to make a poem with the commoner words; to intensify and inspire everything that happens in our surroundings as it should be expected of an architect"

(Hertzberger, 1960 as cited in Merino del Río, 2019)

Inspiration and concept

On November 1st, 1972 the Centraal Beheer Office in Apeldoorn opened, the building was described as a non-traditional office; *playful and will not bore you* (Trouw, 1972) for both the exterior and interior. Every block is supposed to be used by four people, four of these 'blocks' together form a space as a concatenation of islands. There are no separating walls, and embodies the opposite of monotonous with its many corners and edges (Trouw, 1972). A similar repetition of stacked cubes is seen in the proposal by Joop van Sijthoff for the Prix de Rome Children's village (1962). In between the modules, the spaces have public functions such as circulation and other facilities. The outer layer of the building is done with roof windows so natural light can enter the building and be seen from within. It makes the halls and corridors feel like streets.

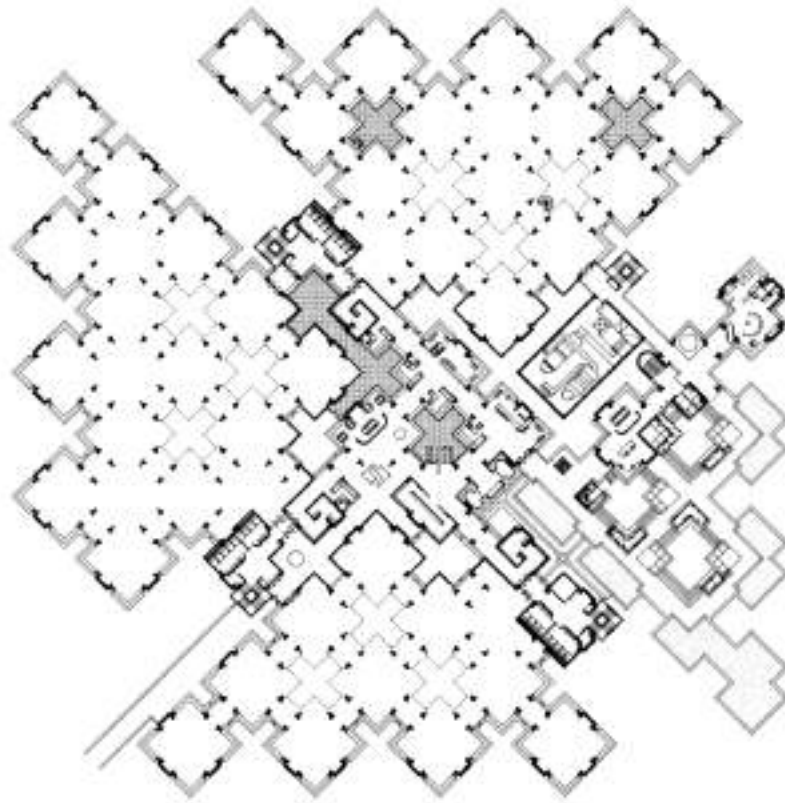
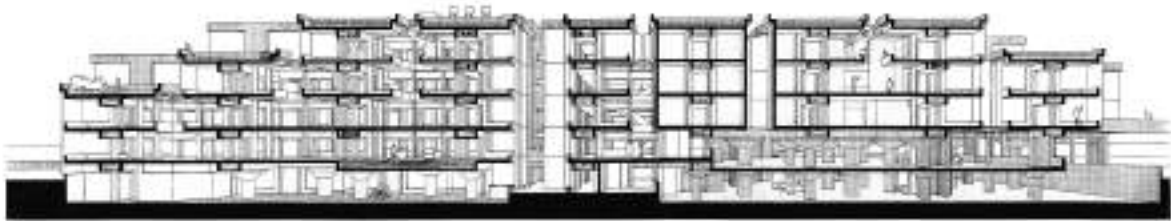


Fig. XX. AHH. (nd). *Floorplan, Centraal Beheer* [Illustration].

<https://Www.Ahh.Nl/Index.Php/En/Projects2/12-Utiliteitsbouw/85-Centraal-Beheer-Offices-Apeldoorn>.
<https://www.ahh.nl/images/projecten/utiliteitsbouw/CeBa/12.jpg>.



LANGSDOORSNEDE

Fig. XX. AHH. (nd). *Long section, Centraal Beheer. Showing vertical interaction between floors.* [Illustration].
<https://Www.Ahh.Nl/Index.Php/En/Projects2/12-Utiliteitsbouw/85-Centraal-Beheer-Offices-Apeldoorn>.
<https://www.ahh.nl/images/projecten/utiliteitsbouw/CeBa/14.jpg>.

J.W. Ruiters, the president of Centraal Beheer got inspired by the Bürolandschaft in Germany, he found the current office boring and sterile, the Bürolandschaft added colour to the dated work society. The dynamic of the Centraal Beheer can be compared to that of a city, there is some flexibility in working hours and the possibility to work with colleagues or more privately. To prevent the building too much of a mass forming each of the workspaces is well defined. The interior spaces are free to furniture in whatever way is preferred (Kroon, 1972).

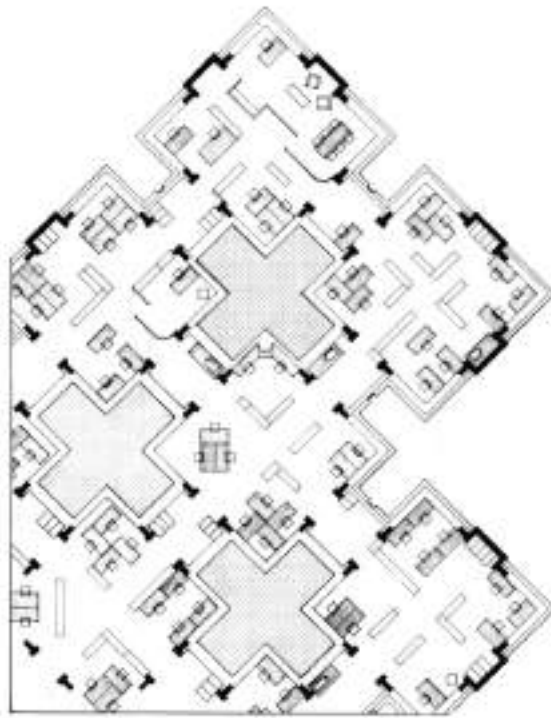


Fig. XX. AHH. (nd). *Part of floorplan, Centraal Beheer* [Illustration].

<https://www.ahh.nl/index.php/en/projects2/12-utiliteitsbouw/85-centraal-beheer-offices-apeldoorn>.

<https://www.ahh.nl/images/projecten/utiliteitsbouw/CeBa/15.jpg>



Fig. XX. AHH. (nd). *Interior Centraal Beheer* [Photograph].

<https://www.ahh.nl/index.php/en/projects2/12-utiliteitsbouw/85-centraal-beheer-offices-apeldoorn>.

<https://www.ahh.nl/images/projecten/utiliteitsbouw/CeBa/7.jpg>

A first concept of the Centraal Beheer Office might be seen in the issue 'Threshold and encounter' dealing with the problem of post-war society going from a collective to a more individual approach. Herzberger uses stacked matchboxes as a metaphor for a repeating cell, putting an emphasis on how architecture can help with expressing one's individual identity, taking note of Aldo van Eyck's work.



Fig. XX. Hertzberger, H. (1959). *Repeating housing units*. [Photograph].
<http://schatkamer.nai.nl/nl/projecten/herhaalde-wooneenheden>.

http://schatkamer.nai.nl/system/cropped_pictures/578/original/MAQV_754-c_409px.jpg?1351242920.



Fig. XX. Luber. (1949). *CIAM Poster*. [Poster].

<https://zoeken.hetnieuweinstituut.nl/nl/objecten/detail?q=CIAM&rows=90&page=1&asset=680b9b11-9fbb-fbd9-709f-5d0fbe8e07de>.

<https://images.memorix.nl/nai/thumb/640x480/680b9b11-9fbb-fbd9-709f-5d0fbe8e07de.jpg>.

Dutch Structuralism

The structuralism movement was an opposing reaction to the CIAM functionalism that arose in the 1960s. Where functionalism ideals were about discarding the aesthetic and designing based on scientific analysis, hierarchy focussed on and neglected the individual (Söderqvist, 2011). The structuralism movement took ideas from multiple disciplines other than architecture, such as art, anthropology and philosophy, trying to get an understanding of the world and find the original state of the human being. The relationship between factors was considered more valuable than the individual elements, going back to fundamental forms and recovering the human value (Söderqvist, 2011).

Democratic architecture

For democratic architecture, the floor plan should be decentralised. To provide for the free use of the space, the order is generated using a grid; this way there are clear fundamental rules, and within these boundaries and limitations the users are free in making their interpretations. Hertzberger emphasised

that space should never be completely open without any rules, this gives the user too much freedom and unclarity of the function of the space, linking the unlimited flexibility as neutral and lack of responsibility.

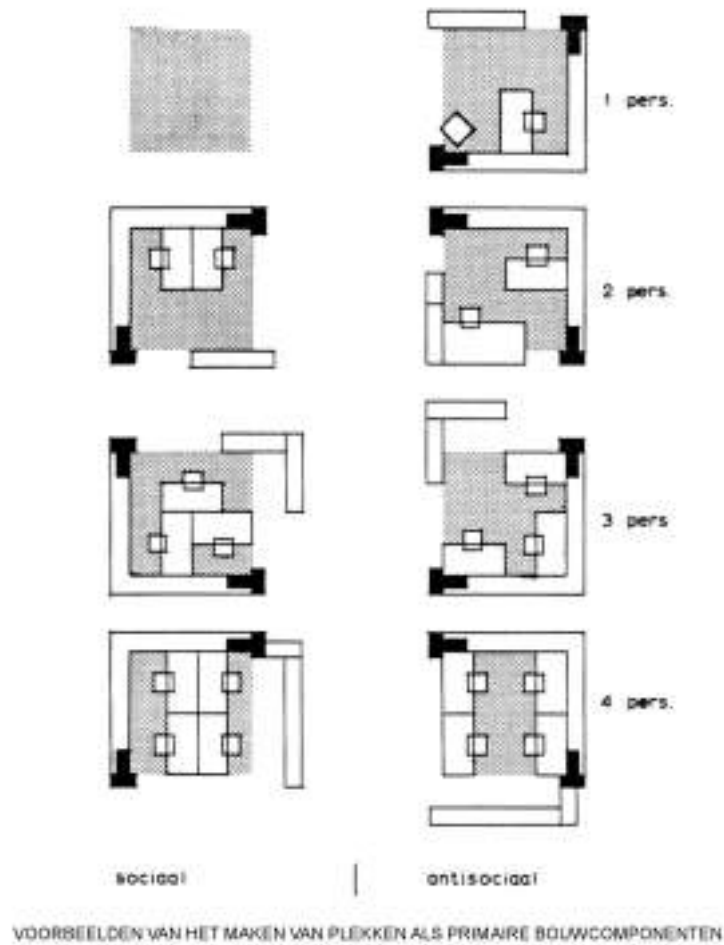


Fig. XX. AHH. (nd). *Examples to create places as building components, Centraal Beheer* [Illustration].
<https://www.ahh.nl/index.php/en/projects/12-utiliteitsbouw/85-centraal-beheer-offices-apeldoorn>.
<https://www.ahh.nl/images/projecten/utiliteitsbouw/CeBa/16.jpg>.

Centraal Beheer

The idea behind the building was to have an 'everything is possible' mentality, where 'forgotten' corners can be used by individuals who need some calm. According to Hertzberger, the building should feel like home with opportunities for informal interactions and seating areas. Unlike the typical 60s office layout, with the peak of office gardens, a bordered territory with all control for the employer. Centraal Beheer can be better described as a building that from the outside has many huts forming a little village (Huisman, 1991). Hertzberger was an advocate of the importance of the individual user and having the possibility of personalising one's workspace. In his opinion, people interpret every architectural space in their way. To find the fundamental structure all human beings share: find human value.



Fig. XX. AHH. (nd). *Interior Centraal Beheer. Finding human value* [Photograph].

<https://www.ahh.nl/index.php/en/projects2/12-utiliteitsbouw/85-centraal-beheer-offices-apeldoorn>.

<https://www.ahh.nl/images/projecten/utiliteitsbouw/CeBa/3.jpg>.

Adding to the multiplicity of the building, multiple functions are placed in the building. All spaces create a whole without creating a feeling of working in a massive train hall. On every floor, a coffee bar is found and is facilitated by a children's daycare and restaurant that is open for visitors or families to have lunch together. (Kroon, 1972).

Context of Apeldoorn

From a social point of the building, it should not be limited to its user, by creating open visual connections and intermediate spaces, it should interact with its context, the user is an essential part of the architectural design. All this together makes a structural and spatial system, creating a relationship between the user and the architectural space which blurs the line between individuals (Söderqvist, 2011). To blend in with the context and create a variation from the outside, the building varies in height and amount of 'stacking' of the module. Centraal Beheer proposed to connect it to the planned station, linking it with the infrastructure of the city, however, this station was never realised and thus the office building never became as integrated with the city as initially was hoped for (Kroon, 1972).

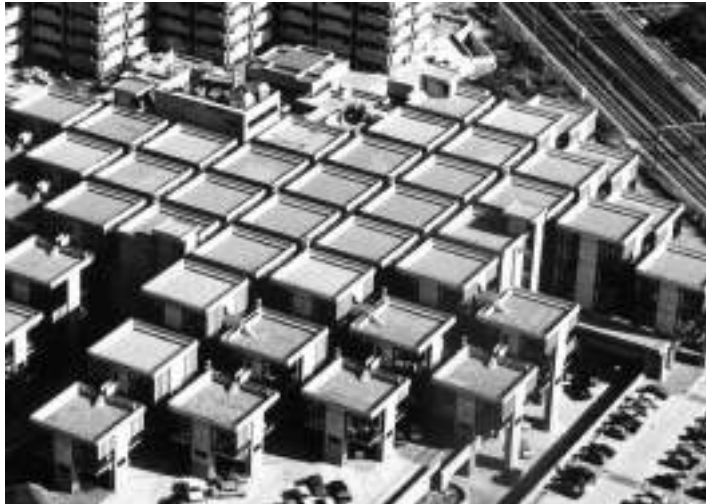


Fig. XX. AHH. (nd). *Exterior Centraal Beheer* [Photograph].

<https://www.ahh.nl/index.php/en/projects2/12-utiliteitsbouw/85-centraal-beheer-offices-apeldoorn>.

<https://www.ahh.nl/images/projecten/utiliteitsbouw/CeBa/1.jpg>.

Materiality

The materials in the building are significant to Hertzberger architecture, simple and few materials are used, often left exposed as the material without any paint and minimal treatment. The floors and walls were done in concrete and concrete blocks with aluminium window frames and wood interior accents.



Fig. XX. Hertzberger, H. (nd). *Concrete bricks are often used in Hertzberger's buildings, Montessori School Delft*. [Photograph].

<https://www.ahh.nl/index.php/en/projects2/9-onderwijs/114-montessori-school-delft>.

<https://www.ahh.nl/images/projecten/onderwijs/DeM/4.jpg>.



Fig. XX. Hertzberger, H. (nd). *Use of wood and brick, Hertzberger's buildings, Montessori School Amsterdam.* [Photograph]. <https://www.ahh.nl/index.php/en/projects2/9-onderwijs/114-montessori-school-delft>.
<https://www.ahh.nl/images/slides/slide9.jpg>.

Hertzberger said about the building that he respected the people, it should not be a regular glass in concrete construction and should not be described as a *kantoortuin*; office garden (Kroon, 1972). An unusual and remarkable way to express the workplace democracy of Centraal Beheer is the display of provoking images and quotes on the wall, described as flower power mentality. *'They can, in my humble opinion, overgrow it with plants, if that is what is asked by the building'* thus Hertzberger (Kroon, 1972). He fought for bare and grey walls, so the building would be played as an instrument and not be used as a device. It opposes the average, in the general, conservative idea of insurance companies: old-fashioned offices, grand marble entrances and stark contrasts between management and employers (Kroon, 1972).



Fig. XX. AHH. (nd). *Interior Centraal Beheer* [Photograph].

<https://www.ahh.nl/Index.php/En/Projects2/12-Utiliteitsbouw/85-Centraal-Beheer-Offices-Apeldoorn>.

<https://www.ahh.nl/images/projecten/utiliteitsbouw/CeBa/5.jpg>

3.1 Commentary on Wright by architects and critics

One of the main concerns with the Wax Building was regarding the slim columns. At first, the contractor did not believe in the building by Wright, they thought the columns were too slim and unable to hold the construction, only after testing 1:1 prototypes the design was approved (*Johnson Wax Headquarters by Frank Lloyd Wright*, 2019). Besides that Wright pursued a new stature in American and international architecture, and with that came a new design language which was something critics took over. "Give something truly streamlines simply and sincerely an interpretation of modern business conditions, to live and work in a cathedral." (Roy, 2005)

3.2 Commentary on Hertzberger by architects and critics

Critique from the users is that the interior is very grey and they are advocating for more plants (Trouw, 1972).

The plan for the building was to be part of the urban network of the city, a good connection to the station and shopping mall, however, this was never realised, which results in the building being an island of its own.

As for users, it is hard to understand the layout of the building at first sight: there is no main entrance resulting in multiple, somewhat hidden, entries to the building.

The building was praised at the time but at the same time raised concerns about its longevity. "Although the building has been praised by many, it is hard to say if this is the future of offices. As the company moved from Amsterdam to Apeldoorn, the difference in context should not be neglected, as such a building has not been seen in the middle of the capital's city centre" (Kroon, 1972).

After fifteen years of intense use of the Centraal Beheer Office, the building required a renovation. Softening the sharp edges, mirrors were placed on the columns of the cafe, creating a more spacious feel. And the bright TL-lights were replaced by indirect light armatures. As for the street tiles, they were partly replaced with parquet. To create a less massive interior, furniture is replaced by a transparent variant (Huisman, 1991).

In the article ' *Een kantoorpark als een spijkerpak* ' (1991) it is mentioned that the building is slowly going from denim suit to shirt with tie, suggesting the building is starting to look like a more conventional office.

4 Conclusion

At the beginning of the twentieth century, the open floorplan emerged in office buildings. The Johnson Wax Headquarters by Frank Lloyd Wright is known as the first open-plan office. The open plan itself was nothing new and had been implemented in residential housing by architects such as Wright. The development of building technologies, especially the steel frame structure, made it possible for large open floors and load-bearing walls not needed. Popularisation of the open floor plan had mainly to do with economic benefits, for the employer, as well as the growth of the middle class and office workers. Society shifted from labour focused to knowledge-sharing work. With many open-plan offices emerging, disadvantages of the concept came to light. Most of the cons evolved around the well-being of the workers and a lack of privacy. The *burolandschaft* and the *cubicle* were possible solutions to these problems, but these also had disadvantages of their own.

Many types of research about the efficiency of the open-plan mention the need for a balance between collaborative spaces and places for concentration. An open plan creates a visual open office, but in practice does not improve collaboration between workers and sometimes even does the opposite.

Both designs come from a collaboration between the architect and the client, where the architects realise an idea of the work environment, trying to push for a new and modern work environment.. The workers at Centraal Beheer were outspokenly positive about the atmosphere and the building as well and that multiple other companies came to visit the building. For the Wax buildings, this is less well known and probably more well known within the architecture network to be outstanding and seen as unique architecture and with less focus on how the company cares for their employers.

The entry to the main hall in the Wax building was clear and there was a natural understanding of how to move through the building and used to create a big contrast going from a low dark entrance to the highlighted hall, whereas Centraal Beheer did not have a clear entrance, but multiple small ones. creating a maze-like feeling and creating difficulty orienting on the first visit.

Hertzberger attempts to balance public and private in Centraal Beheer, creating both visual open spaces as well as places to work alone, using a grid plan. Hertzberger is different from Wright in that he encouraged the users of the building to personalise the space to their space, whereas Wright orchestrated the whole building to the desks and chairs of the workers. Hertzberger also gives options on how to arrange the space in multiple ways, in the Johnson Wax Headquarters the layout of the floor was set. Both use the height of ceilings to distinguish between 'private' and 'public' spaces, the workroom in the Wax Headquarters and the street in Centraal Beheer, with the use of the ceiling for natural daylight

5 Discussion

The emergence of the open plan was mainly based on economic considerations but does not give further insight into other influences that could have been of relevance such as politics and changes in society in general. The architecture of the building and plan affects the productivity of workers. Pushing for a workplace that differs from the norm, a company wants to portray the image of being progressive. Research revealed how experimenting with the design of the office space has an impact on the workers' well-being and productivity and showed the downsides of the open floor plan. There is a correlation between the openness of the space and how much a person can concentrate on their work; the more open the space, the more distractions there are.

This research was limited to revealing how the open plan of the Johnson Wax Building and Centraal Beheer was experienced by the users. There was a lack of available sources regarding this topic if there were any.

Both Hertzberger and Wright associate the most public and open parts of the building with the amount of (natural day)light and incorporate the ceiling as an important element for this.

A surprising find during this research is that Hertzberger did not like the open-plan concept, saying users need to have a certain degree of limitation, although Centraal Beheer was commissioned by J.W. Ruiters who wanted a new office building after being inspired by the *Burolandschaft*.

The open plan is a generalised term, when starting the research the chosen case studies were the first that came to mind. As this project developed it is debatable if Centraal Beheer can be considered an open-plan office as it is subdivided into smaller spaces and Hertzberger was not an advocate of the open-plan as it was defined in his time.

In the current day and age with fast-developing technologies, the relevance of office building itself can be questioned. The access to online platforms and work done remotely leaves the use of the office up for different uses and how architecture deals with these ways of working.

As mentioned in the introduction there are limitations to the research done and thus the research done above does not cover the complete history of the open plan office. The case studies are located in different parts of the world and completed at different moments in time, it will therefore not represent the complete overview of the open plan office and might generalise certain elements.

Appendix

A. Reflection

This course has been a struggle, to say the least. This has to do with my general disinterest in writing courses, and my organisational skills which also relate to having other projects going on at the same time. During the whole semester, I would say I have done research consistently, collecting material and articles. I liked reading and learning about the topic regarding offices and architects. It was however hard to get started on writing, this also had to do with me being abroad for the semester. It was taking very little effort to completely ignore the course and not have to think about it, making this history thesis no priority. Because I did not feel a need to submit anything it also made not meeting a deadline easier, resulting in a downward spiralling effect of regret later in the process and not wanting to stress about it. What motivated me to keep on going was not having to do this again and that it was a topic that did interest me. I think for this course, it would have helped me if I had been at the university so I felt obligated to attend the group meetings which forced me to start writing. At the end of the day sometimes you just have to put yourself through some things which you do not enjoy but have to be done.

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