CORPORATIONS AND CITIES

Designer's intentions and user perceptions of the interaction between *corporate office building* and *the city*

Master Graduation Thesis
Ponlawat Trakulwattanakit
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TU Delft
BK Bouwkunde

Corporations and Cities

Designer's intentions and user perceptions of the interaction between corporate office building and the city

Ponlawat Trakulwattanakit
4940938 /

Graduation Laboratory
Management in the Built Environment
Delft University of Technology

P5 Report
January 26, 2021

First mentor: Herman Vande Putte
Second mentor: Yawei Chen

Colofon

Personal Information

Name: Ponlawat Trakulwattanakit
Student Number: : 4940938
R

University

Institution: Delft University of Technology
Master Program: Address: Architecture, Urbanism and Building Sciences
Julianalaan 134, 2628 SL, Delft
Master Track: Management in the Built Environment (MBE)

Graduation

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Supervisor team

First Mentor: Herman Vande Putte
Second Mentor: Yawei Chen

Delegate of the board of examiners: Koen Mulder

TU Delft
BK Bouwkunde

Preface

The report represents the thesis “Corporations and cities: Designer’s intentions and user perceptions of the interaction between corporate office building and the city”. It is written to present my graduation research of the master track Management in the Built Environment, Faculty of Architecture, Urbanism and Building Sciences at the Delft University of Technology. The topic is inspired by the research theme “corporations and cities” by Vande Putte (2009a). There are several reasons for me to choose this topic as my thesis. Firstly, I have been working as an architect for five years, and I always have been interested in the transformation of cities and urban development. Secondly, I have the goal of pursuing corporate real estate for my future career. Therefore, I am curious about how corporate real estate is developed. The topic of corporations and cities is an overlapped topic between the two themes: corporate real estate management and urban area development. The research aims to examine the crucial variables that encourage the interaction between the corporate office building and the city from the users’ perspectives and the designer’s ideas. The research is divided into two main parts. The first part is a literature review to establish a theoretical framework for the later part of the research. The second part is the empirical research based on the three case studies: CIRCL, The Edge and Groot Handelsgebouw. During the empirical research, several data collection methods are conducted, including documental study, semi-structured interviews, direct observation on the real estate object and people in public area, and user perception survey. All of the collected data are used for the cross-case analysis and evaluation in order to determine the answers to the main research question. In this graduation research, four online interviews were conducted with the representatives of De Architekten Cie, PLP Architecture, the municipality of Amsterdam, and the municipality of Rotterdam. Besides, the survey was carried out on 52 samples across the three cases.

The graduation research started in September 2019, and it has been a long journey of a year and a half. Studying on this topic has been a big challenge for me. I could have never accomplished it without the support from the people around me. I would like to take this opportunity to express my appreciation and gratitude for the support. Firstly, I would like to thank my mentors, Herman Vande Putte and Yawei Chen, for their commitment and contribution to the thesis. You guidances have steered my thesis through the whole processes of the research. Secondly, I would like to thank the interviewees and participants in the survey. Your opinions and insights from your field of expertise proved to be valuable for my research. Special thanks to my TU Delft friends for the precious time we shared together over the past two years. Thanks to my family for long-distance unconditionally support over the past two years. And lastly, thanks to all readers. I really appreciate you spending your valuable time reading this report. I hope you enjoy reading it.

Best regards,
Ponlawat Trakulwattanakit

Abstract

The city area is dense with business activities, public amenities, transport hubs and high-skilled people. Corporations prefer to be located in the city area to gain benefits from the location. However, annoyance occurs because of the real estate decisions of organisations as they neglect urban planning and context and results in inefficient, inflexible, closed and leads to the mono-function problems. The research aims to examine the important variables that encourage the interaction between the corporate office building and the city from the users’ perspectives and the designer’s ideas. The research is divided into two parts, which are the theoretical study and empirical research. A literature review is conducted in the first part to establish a theoretical framework, which will be the guideline for empirical research. Empirical research is carried out based on the three case studies: CIRCL, The Edge and Groot Handelsgebouw. The methods for case studies are documental study, semistructured interviews, user surveys, and direct observation on the real estate objects and people’s behaviour in public space. Results from the theoretical study and empirical research are gathered to conduct a cross-case analysis. The findings of the research determine eight essential variables to enhance the interaction between corporate office building and the city from the user’s perceptions and the designer’s intentions. The eight variables are accessibility, flexibility, function and activity, inclusiveness, aesthetics, openness and transparency, human scale, and sustainability. The findings of the research benefit the three fields. Firstly, the research can be used as a guideline of the corporate real estate development by the real estate manager. Secondly, the research provides knowledge of factors for the interaction in the design field. Lastly, the findings of the research can be included in the urban development plan of the municipalities.

Keywords: corporations and cities, corporate real estate management, urban area development, interaction, CIRCL, The Edge, Groot Handelsgebouw, accessibility, flexibility, function and activity, inclusiveness, aesthetics, openness and transparency, human scale,sustainability.

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01
Introduction

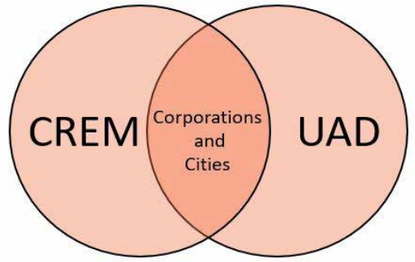
1. Introduction

The first chapter of the graduation research thesis introduces the problem statement to identify the gaps that need to be filled and to address the importance of interaction between corporate office buildings and the cities in both scientific and social aspects. It also explains my own motivation to engage the research and how should it be utilised in a practical way and further research. After that, the main research question is identified to focus the path through the processes of the research, while several sub-research questions are raised to specify the area of study. Next, sample and research scope explain the relevant aspects of the research and address the main contexts of the research. Cases are briefly introduced in this section. The introduction ends with the research output.

1.1 Research Theme

“Corporations and Cities” is a research program of the Management in the Built Environment program, Faculty of Architecture and the Built Environment of the Delft University of Technology which this thesis is a part of it. The topic is in the theme of Real Estate Management and partly overlaps with Urban Area Development (figure 1.1). It mainly focuses on the study of the interaction between corporate accommodation and urban planning by combining the three concepts: user, context and portfolio (figure 1.2). The concept of the research involves relevant stakeholders in the built environment, including real estate managers, urban planners, investors, developers, asset managers, facility managers, architects and engineers. It can be said that it includes every profession that is connected to the field of this sector (Vande Putte, 2009a). The research clarifies how corporate office buildings interact with the cities and how they influence each other. In other words, the research is a study of how corporate office building influence the city and how the city contribute to the building as well as finding out the value they can add to each other. Figure 1.3 shows that there are three types of requirement in realising corporate accommodation which are requirements of the corporations, requirements of the city and requirements for the intervention. The research is conducted mainly focusing on the overlapped part of the corporation and the city, which were considered by the designers, corporations and the city representatives.

Figure 1.1
Theme of Corporations and Cities
(own illustration).



A corporation is a group of people or organisations working together as a society to achieve certain goals. By gathering together, it is expected that the group would be more efficient, which leads to economies of scale, learning effect, flexibility and synergies (Nadin, 2008). The goal of the corporation is to sustain their competitive advantages in their businesses which results in an increase of productivity and be able to deliver products and services the market demanded (Porter 2004, Singer et al., 2007) Corporations consists of multi-national organisations, multi-departments of larger organisations, public hold organisations and a mixed of companies.

Activities are concentrated in a certain location within the urban areas; several types of economic agglomerations are acknowledged to be in the city. Corporations have a strong preference to be located in the inner city and urban fabric area in which the particular area is diverse by activities, well-connected to public transport and a good resource of high-skilled people (McDonald & McMillen, 2011; Jong-Hun, 1993; Dube et al., 2016). Companies position themselves in the cities area to gain benefits, take advantage of gathering resources from the cities, and situates close to public transport nodes to be easily accessed. In the meantime, the corporate buildings also contribute and add value back to the city (Vande Putte, 2009a).

1.2 Problem Statement

The great driver for the research is that the characteristics of the cities change constantly, but the change of the contemporary cities are not positively perceived by the people especially a transformation of the appearances over the recent years (Lynch, 1960). There is a great number of office buildings that have been built for the past decades, and their number is rising significantly. There are many reasons behind the construction of office buildings, such as economic influences, business space needs, densification, demands and encouragement to be the landmarks of the cities. However, office buildings are essential, but there is a strong need for office buildings to be better connected to the cities on the ground plane and contribute to the wider fabric of the cities (Sims, 2016). In other words, buildings should contribute enough public and green spaces, and they are meant to be for not only users of the buildings, but also for people in the cities. Plinths are considered to be the most important part of the building from the point of view of people on the street. It is crucial for the people's experience and attractiveness of the city. The ground floor area is only 10% of the total area of the building, but it defines 90% of the building's contribution to the city (Karssenberg & Laven, 2016). Annoyance occurs because of the real estate decisions of organisations as they neglect urban planning and context (Vande Putte, 2016) as well as for the plinths. They are overlooked by the owners since the ground floor area does not generate major revenues for office buildings (Vande Putte, 2016; Karssenberg & Laven, 2016).

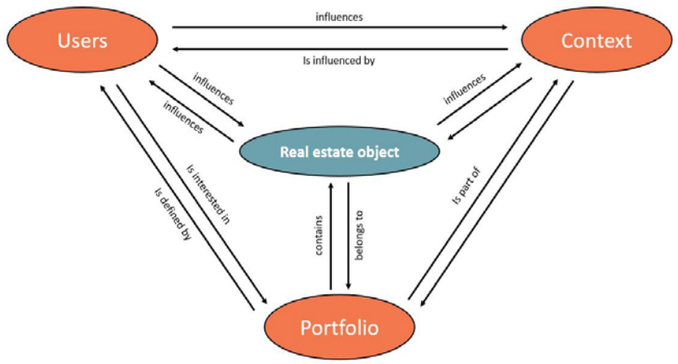


Figure 1.2
Concept of corporations and cities
(Vande Putte, 2016).

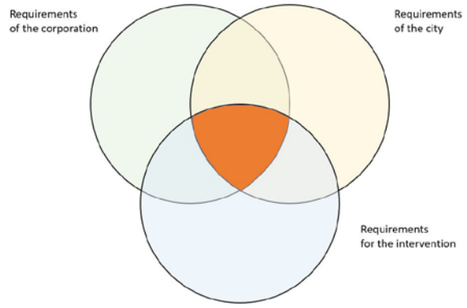


Figure 1.3
The three types of requirement (Vande Putte, 2016).

These result in a failure of corporations in which their accommodations do not enhance their business activities as well as becoming inefficient, inflexible and do not represent companies' characteristics. Most of the office buildings tend to be introverted and do not provide public access to the building because of their security issues and vulnerability of the companies (Vande Putte, 2009b). In addition, the function of the plinth is limited for only the company itself and leads to the problem of monofunctional area and monopolisation of the businesses. This contradicts the idea of Sennett (2017) that cities should encourage for new opportunities and help to connect people to new people. This results in a lack of diverse activities in the urban area where there is no interaction between buildings and people in the city while overlooked plinths lead to a lack of quality and attractiveness of the area around the building. To prevent the emergent of mono-function area and closed city in the future of the built environment, these kinds of self-centre development need to be stopped, it is necessary to come up with social-oriented approaches and long-term solutions. These raise a curiousity of the research if it is possible to capture the relation between the city and office buildings and emphasize the interaction in the built environment field.

There are gaps to be filled within the field of Corporations and Cities. Firstly, there are several theories of corporate real estate strategies and development of cities being stated by the literature, but they lack connection and understanding between the two groups of theories, especially in the practical perspectives. Secondly, there are vast arrays of assessment tools and evaluation techniques to measure the quality and performance of the building, but, most of them do not include societal aspects in the criteria. It is impossible to find a single tool that measures how the building interacts with people and the city. Thirdly, there is a lack of assessment criteria for real estate managers, public authorities and desingers to evaluate and assess their buildings to the extent of how the corporate office buildings should gain benefit and contribute to the city since the relationship between the building and the city can be a win-win situation. The study would support decision-making processes in the corporate real estate development and encourage stakeholders to take social interaction into account for the development.

1.2.1 Goals and Objectives

According to the problems and gaps in the field of Corporations and Cities, the main goal of the research is identified:

"The research aims to identify relevant variables that encourage the interaction between the corporate office building and the city from the users' perspectives and the designer's ideas."

Apart from the main goal, several objectives are also identified in this study.

- To understand corporate real estate strategies and urban area development.
- To understand the tools and techniques that are used to measure the building in various aspects.
- To examine the requirements of the corporations, requirements of the cities and the intervention ideas of the designers.
- To investigate the impacts of the corporate office building on the users from both corporation and city sides.

It is expected that the findings of the research will bridge the gaps in the field of Corporations and Cities. Specifically, the factors, criteria and variables are taken into consideration regarding interaction between office building and the city. Besides, it is expected to create more understanding between the corporate real estate and urban development theories as well as bridging the theory part an practical part to find the relation between two sides.

1.2.2 Scientific Relevance

The main purpose of “Corporations and Cities” is a study of the relationship between corporate office buildings and cities. Not only companies influence the structure and the form of the cities, but the city context also has impacts on accommodation strategies and location choices regarding economic, political and cultural aspects (Nadin & Rocco, 2008). The corporations consist of large-scale organisation, multi-national company, private company and publicity department.

Over the past decade, several pieces of research on the topic of “Corporations and Cities” have been published. It is started by the 3-day conference in Brussels from the collaboration of the Delft University of Technology and the Berlage Institute (Rotterdam). The conference resulted in the further publication of 11 Corporations and Cities journals (Vande Putte, 2009-2010). Apart from that, the following theses conducted by students are part of Corporations and Cities research.

- Organisations’ location choices. The demand drivers for clustering and dispersal of functions across geographical area (Singh, 2010)
- oBenelux location choice in Breda (Dekker, 2011)
- The special economic zone of Batam affected by the global economic crisis (Nita, 2013)
- The effects of controls on corporate housing behaviour of large-scale companies in The Hague (Pors, 2013)
- The history of the accommodation of BNP Paribas in Paris (Georgiadou, 2012) and
- Corporate accommodation of Siemens in The Hague (Scheuerman, 2014).
- And others.

In total, there are five different themes of the study of Corporations and Cities.

- Organisational Strategies and Urban Planning Goals
- The past and the Future
- Agglomeration Strategies and Location Choices
- Image, Branding and Representativeness
- Synergy Management

Therefore, this thesis is a combined exploration of the three themes of “Organisational Strategies and Urban Planning Goals”, “Image, Branding and Representativeness” and “Synergy Management”. Besides, this study provides descriptive knowledge of the relationship between corporate office building and the city regarding desinger’s intentions and user’s perspectives. The findings will be the foundation for the further development of social-driven assessment tools for office building.

1.2.3 Societal Relevance

Many companies in the world were more “financial” driven, which can be seen mostly in annual reports. In 1993, only 12% of the 100 largest companies in the world, according to the KPMG published sustainability reports while it significantly increased to 75% in 2017. However, it is difficult for decision-makers to transcribe those reports into financial. New tools are needed to measure the costs of the company to the world in order to convert societal impacts into a concrete amount of money (van der Heijden, 2019). There are several existing research studies conducted on the social approaches for th built environment. Harvard University develops a tool to measure the social impact of the companies (van der Heijden, 2019) while Karssenberg & Levainen (2016), together with 200 co-authors, initiate the explorative research focusing on the city transformation, plinth strategies, street coalition, and places management of several existing areas.

This research provides valuable insights to corporations, desingers and public authorities. Firstly, corporations are encouraged from the findings from the research to take social interaction into account and re-think corporate real estate strategies to be more social-driven. Secondly, the designers are guided by essential factors and variables that could encourage the interaction between corporate office building and the city. It facilitates designers to consider those variables in the design processes of the real estate object. Lastly, results from the research emphasise the opinions of the public users in the city, which benefit municipalities to initiate people-approached development plan for the areas.

1.2.5 Personal Motivation

I graduated from the Faculty of Architecture, Chulalongkorn University, in Bangkok and worked as an architect for 4 years. My frustration and motivation arise because of all the experiences in the design and construction sector. Having seen the only skyscraper next to the river while the rest of the surroundings are either historical or monumental buildings. The question was raised whether the building generates any better beneficial effects or destroys the skyline of the city. Some office buildings were built with such a gigantic footprint and did not provide any public space or interact with pedestrians. Moreover, it is difficult to find reasons to support the fact that investors choose to build more department store even though there are so many of them in the city of Bangkok. These resulted in the increasing of several mono-function area in Bangkok which do not support local businesses and diverse activities. The City is slowly becoming less lively every single day. As an architect, the perspective of the designers is familiar, but it is so interesting to investigate from the corporations’ side and the city aspects. These are the reasons for studying the master program of Management in the Built Environment. Especially, the field of corporate real estate management and urban area development would be the answers I have been seeking for. They would greatly expand the overview not only from designers’ side but also other relevant stakeholders in the study.

For my personal aim, it is expected to acquire a better understanding of the relationship between corporate real estate and the city context. Essential influences, factors, values and criteria need to be examined to find the relation between the real estate object, desinger’s intentions, and user’s perceptions. Buildings take some benefits from the cities and give something back to it and, on the other hand, the cities give advantages to the buildings and take something for the public. It is also expected to see office buildings in the future not introvertly-constructed for the corporation only, but also contribute features to the urban fabric of the city. Lastly, for this thesis, I want to improve my scientific research skills as I contribute the research for Corporations and Cities. This is the first step of the working environment in the corporate real estate management which would significantly benefit my future career.

1.3 Research Questions

In this section, the main research question and sub-questions for the research. Sub questions are divided into several categories to address an area of the research. The main research question based on the mentioned research goal and objectives from the previous section. Following, the main research question is defined:

"How do corporate office buildings interact with the city from the development team's intentions and users' perceptions, and to what extent how do they relate each other?"

There are several aspects of the interaction between the building and the city including financial, design value, use value, societal, environmental and cultural. The research aims to find the relevant variables to enhance the interaction between building and the city from both theoretical part and practical part. A literature review is carried out to acquire a better understanding of the main theories and existing assessment techniques while the empirical research is conducted to assess the theoretical concepts in practice. The following sub-questions are raised to support the main research questions, corresponding with the objectives.

SQ 1: *What are the existing theories of the corporate real estate and the city in accordance with the interaction between them?*

The purpose of this sub question is to establish strong knowledge foundation of the theoretical part on the main research concepts, leading to the realization of the empirical research.

Method: Literature review
Outcome: Theoretical framework

SQ 2: *What are the existing assessment tools and techniques being used to measure the quality and performance of the building?*

The purpose of this sub question is to identify the key factors, criteria and variables that being measured in the existing assessment tools and to what extent how do they relate with the interaction.

Method: Literature review
Outcome: Theoretical framework

SQ 3: *What are the corporation's requirements, city's requirements and the designer's motives for the development of the real estate object?*

This question aims to examine the requirements and motive of the stakeholders before the intervention that affect the outcome of the real estate object after the intervention.

Method: Documental study, semi-structured interview
Outcome: Requirements and motives for the real estate development

SQ 4: *What are the outcomes of the physical characteristics of the building(s) and its surroundings?*

The purpose of the question is to observe the physical characteristics of the building(s) as the outcomes of the requirements and design motives and explore the condition of the surroundings in the area.

Method: Direct observation
Outcome: Physical characteristics of the real estate object and condition of the surroundings

SQ 5: *How does the real estate object influence the users from both corporation and city sides and how do users interact with the building?*

The question examines the relationship between the building and the users from both corporation and city users' perspectives. It also investigates how people feel with the real estate object in real life.

Method: Surveys, direct observation
Outcome: Users' opinion on the real estate object after the intervention and people's behaviour regarding interaction with the building

1.4 Conceptual Model

Figure 1.4 illustrates the conceptual model of the research. It explains the relationship between the research concepts in accordance with the research goal and research questions. The conceptual model acts as a framework to steer the whole research. Firstly, the extensive literature study is carried out in order to build background knowledge for the author about corporate real estate strategies, urban development strategies, the concept of interaction and assessment technique. This part is the strong foundation which guides the other parts of the research. Secondly, qualitative research from the core case studies is conducted. This phase includes a documental study and in-depth interviews with stakeholders, such as corporations, designers and public authorities. It aims to investigate the requirements of the corporation and the city, and the designer' motives on the development of the corporate office building before the intervention. Thirdly, information is collected quantitatively.

Surveys are conducted with people from the public area of the case buildings, as well as exploring the opinions on the real estate object from the corporate users' perspectives after the intervention. Overall, this will lead back to the beginning, identifying the relationship between the corporate office building and the city linking before and after the intervention.

After collecting the information, it is analysed to answer sub-research questions of each part. It should explain how the corporate office building interacts with the city while the author should understand the three points of view of the research: user, context and portfolio. Eventually, the outcomes as the important factors, values and criteria are carefully synthesised to connect and compare the theories and the practical results.

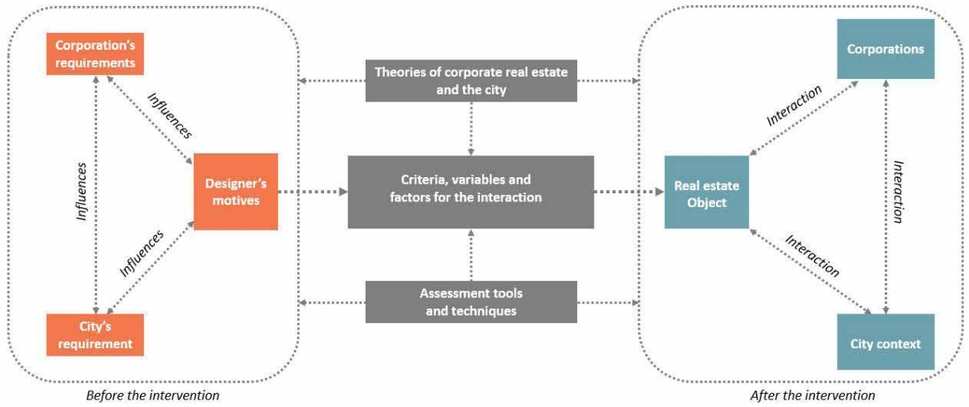


Figure 1.4
The conceptual model (own illustration).

1.5 Research Arena

The research arena of the thesis is shown in the matrix (figure1.5) In the matrix, the city is presented in three levels: *polis*, the political arena, *civitas*, the community, *urbs*, physical infrastructure. On the other hand, corporation is introduced in three different meanings as well: *oikos*, the economic, organisation, group of people of the firm, *plant/building*, accommodation of the organisation. The research focuses on the organisation and the accommodation on the corporation side, and community and urban infrastructure on the city side. With the crossing over from the two dimensions in the matrix, four highlighted cells in figure 1.5, four interactions are investigated: The interaction between *organisation* and *public community, organisation* and *urban infrastructure*, *accommodation* and *public community, accommodation* and *urban infrastructure* (figure 1.6).

This research is not limited to any particular type of corporations, but it will focus more on the physical and spatial setting of the real estate object. Different types of corporations would be a great variable to compare cases. However, the main criteria the research focus is on buildings in the urban fabric area. Especially, the buildings with the plinth designed to interact with the streets and buildings with a variety of activities for the public.

Initially, on the side of the city, the values to be investigated are the impacts the buildings have caused, including physical impact, economic impact, socio-cultural impact and environmental impact (Gorter, 2019). For my research, the focus of the research will be the investigation of the three main aspects, which are **the physical characteristics, users' value and social interaction.**

For the corporations' side, it is also important to investigate real estate strategies of corporations, such as core business performance level, real estate strategy level and real estate decision making and operation level. In addition, the added value from corporate real estate management will be considered to support the corporate side (Lindholm & Gibler, 2005). All of this research area will be described in detail in the second chapter.

Three selected cases will be used as samples including cases from Rotterdam and Amsterdam. Comparing the cases would acquire different results due to different contexts and conditions. Furthermore, corporations and local authorities in each city may not share the same variables and this could lead to more diverse answers to the research. Initially, the **ABN AMRO CIRCL** in Amsterdam South, **Deloitte The Edge** in Amsterdam South and **Groot Handelsgebouw** in Rotterdam are assigned to be core cases of the research. In-depth interviews with stakeholders and users' surveys will be conducted in the context of the cases.

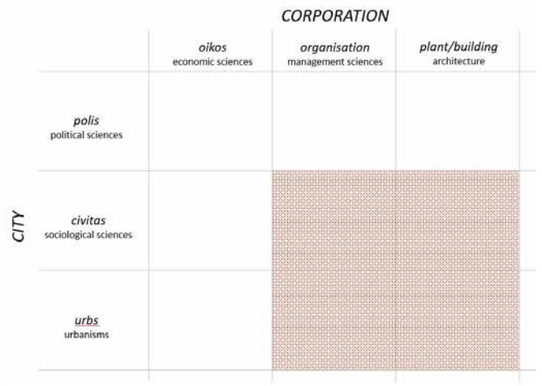


Figure 1.5
The matrix crosses the three meanings of corporation with the three meanings of city, research arena of the thesis. (Vande Putte, 2016).

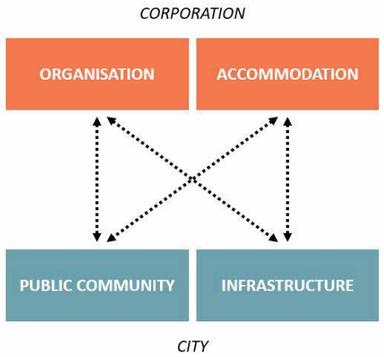


Figure 1.6
The interaction of each level of the corporation and the city (own illustration).

1.6 Research Output

In the empirical research part, the answers of the research will be results of the cases, combined with insights from interviews with organisations, to see how those cases positioned themselves in the city context. It also includes the benefits that the corporates office buildings gained from their location and, on the other hand, what do they contribute to the public in the values, factors and criteria. Furthermore, results from surveys will validate if the intentions from the stakeholders for the development of the real estate object significantly relate with the theories. They are destined to broaden the views of the study to see if the variables changed, the outcomes were proved to be reliable and tangible.

The results should address several important variables and factors that the users from both corporation and the city valued. Those variables will be discussed in accordance with the opinions from the practices and theories. The outcomes are guidelines that can be developed into the assessment tools and should be capable to measure if the buildings sufficiently contribute to the public. The criteria should not be too subjective and could be compared by numeric figures and evidence.

In the further stages, the answers and final outcomes of the research are expected to be developed into the assessment criteria or the evaluation standard for the local authorities or the municipalities to evaluate the buildings during the building permit processes. On the other hand, the research aims to draw more social attention on how corporate office building interacts with the city and further develop assessment criteria to study or measure the building by comparing synergy and conflict to the urban context.

"How do corporate office buildings interact with the city from the development team's intentions and users' perceptions, and to what extent how do they relate each other?"

02
Literature Review

2. Literature Review

In this chapter, the literature review is conducted to create background knowledge to support the research. It also provides an overview of theoretical parts of the thesis and identifies the framework to collect the data. The theoretical framework enables the operationalisation of the conceptual model in the research which provide the guidelines to conduct the empirical research through case study, in-depth interviews and surveys.

2.1 Literature concept

Before conducting the literature study, it is important to identify the concept of the literature topic to create more overview and scope of the literature study. It also facilitates the later processes and prevents the research from confusion. Figure 2.1 explains the literature study concept of the thesis.

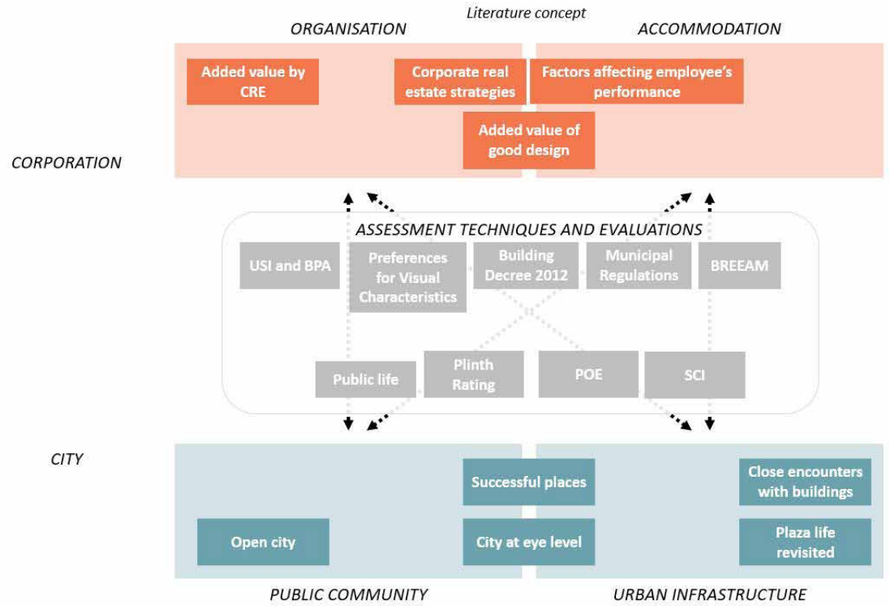


Figure 2.1
The three main literature study concepts (Own illustration).

The matrix from figure 1.5 is used to construct the literature concept. Two levels from both sides are taken to determine the concept, organisation and accommodation for the corporation, public community and urban infrastructure for the city. The literature on the topic of added value by corporate real estate (Lindholm & Levainen, 2006) is in the group of organisations. It mainly demonstrates the strategies for the corporation to enhance its productivity and business performance. On the other hand, corporate real estate strategies (Lindholm & Levainen, 2006) and added value of good design (Macmillan,

2006) are categorised in both organisation and accommodation since both topics clearly show the connection between architecture and the strategies of the organisation. The factors affecting employee's performance (Naseem et al., 2012) focuses on the working environment and office design to motivate employees to perform better. It involves the real estate object of the corporation and the organisation.

Moving onto the city side, close encounters with buildings (Gehl, Kaefer & Reigstad, 2006) topic focuses on creating good interaction of the building for the public space. Therefore, it falls to the urban infrastructure. Successful places (Adam & Tiesdell, 2012) and city at eye level (Karssenberg & Laven, 2016) elaborate on the needs of good urban design for the people. Both overlap the topic of community and urban infrastructure. Sennett (2018), describes the idea of the open city system in which he emphasises for a system which is open socially to different voices of the people instead of being isolated. This is categorised in the field of public community. Next, the research of "Plaza life revisited" (Schlickman & Domlesky, 2019) investigates how the public spaces have changed, how people use the public spaces and what makes well-used spaces. It is placed in the urban infrastructure category.

In order to understand how each aspect of the buildings and the people are being assessed, the literature review also studies existing assessment tools and techniques that measure the building in different aspects. These evaluation tools are the keys to linking the four quadrants of the matrix together and establishes the key factors for the interaction between the building and the city, which will be developed into the assessment tool later. There are 12 techniques being discussed in this research which will be elaborated further in section 2.1.3.

Lastly, the literature review section will give the answers to the two aforementioned sub-questions:

1. What are the existing theories of the corporate real estate and the city in accordance with the interaction between them?
2. What are the existing assessment tools and techniques being used to measure the quality and performance of the building?

2.2 Corporate factors that influence the real estate outcomes

In this section, a literature review on the corporation side is conducted to partly answer the first sub-question of 'what are the existing theories of the corporate real estate?'. Based on the added-value of good design (Macmillan, 2006), the factors are categorised into three different groups: functionality and use value, physical characteristics, and social interaction.

2.2.1 Functionality

The first factor is the flexibility to adapt for changes in an organisation. O'Mara (1999) introduces an incremental strategy, one out of three real estate strategies, which symbolises a company's flexibility to adds up random various of real estate portfolio due to the uncertainty of the future. An incremental strategy results in an ambiguous style of organisation's portfolio (Singer et al., 2007). The idea of flexibility is also supported by the increase flexibility strategy of the added value by corporate real estate (Lindholm & Levainen, 2006). Increasing flexibility strategy includes both the physical setting and financial aspects. Financially, the firm may choose to lease the workplace instead of owning it and negotiating for short-term leases. This increases the flexibility and ability to change for an uncertain future. Physically, the company provides a flexible workplace and multiple-use facilities. The aforementioned real estate strategies create use-value of the built environment, in which the contribution of the building affects the organisational outcomes. For instance, flexibility leads to better productivity and profitability, better working environment, well being and satisfaction, teamwork and communication (Macmillan, 2006).

The second factor that influences the real estate outcomes is accessibility and locational choice. Not only the location of the real estate affects the accessibility to the building, but also influences the asset value. The real estate at the excellent location tends to have a higher value of the property and higher rental rate, which is essential for the property's exchange value (Lindholm & Levainen, 2006; Macmillan, 2006). Moreover, promoting marketing and sale strategy focuses on promoting the image of the company and attracting customers by using physical characteristic and accessibility (Lindholm & Levainen, 2006).

The next factor is facilities to support productivity of the organisation. The facilities of the office building enhance user satisfaction, which results in a better performance of business activities, productivity and profitability. Both increase employee satisfaction and increase productivity strategies involve this factor. Increase productivity leads to better profitability by maintaining accommodated facilities to enhance business activities and providing a working environment that supports productivity. At the same time, employee satisfaction is influenced by the workplace design, amenities and support facilities. By providing a pleasant working environment, desired amenities, and responding to real estate requests, it can be expected to indirectly increase financial return (Lindholm & Levainen, 2006). The two strategies create use-value for the real estate portfolio. The building facilitates the productivity of the organisation to maintain competitiveness of the company and keep a good working environment (Macmillan, 2006).

Moving on to the next factor, there is no apparent corporate real estate strategy that supports the idea of sustainability. However, the real estate object provides environmental value with the appropriate building attribute. Environmental value can be added from a concern for intergenerational equity, the protection of biodiversity and the precautionary principle of resources consumption. Environmental value focuses on adaptability, flexibility, robustness, operating and low maintenance, as well as taking the whole-life cycle into consideration and reducing environmental impact (Macmillan, 2006).

The next factor is innovations and technology. In a highly competitive business, the increasing innovations strategy facilitates the company to differentiate other competitors. A workplace that supports innovative working and thinking is needed. The core idea of this strategy is to encourage the participation of the users in the design phase, which, in turn, will increase revenues (Lindholm & Levainen, 2006). The strategy adds use-value and image value of the real estate object. Regarding use-value, the strategy greatly supports business activities and performance of the work environment. On the other hand, innovation also reflects corporate identity, vision and brand image of the company (Macmillan, 2006).

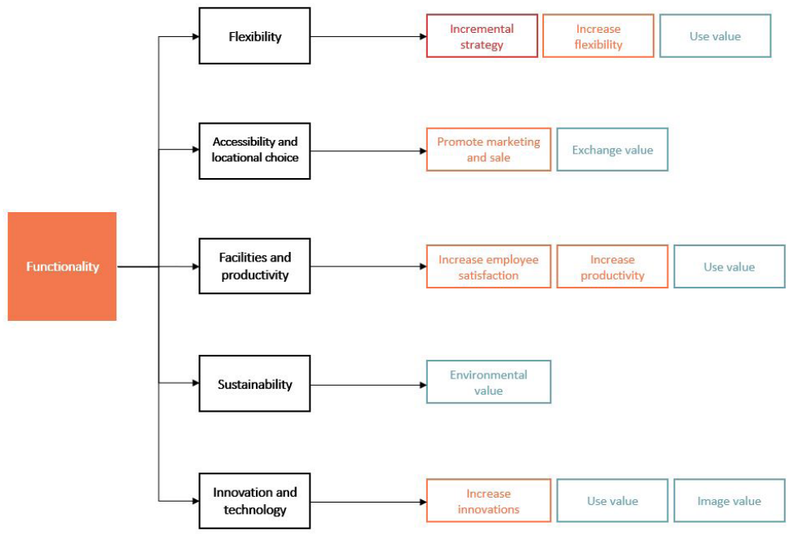


Figure 2.2
The functionality category of the corporate factors (own illustration).

2.2.2 Physical characteristics

The first physical characteristics factor that influences the outcome of the real estate object is a locational context. It involves the attractiveness of the area and surroundings of the property. The real estate strategy, promoting marketing and sale, focuses on attracting customer by using advantages of the physical characteristic of the building and selecting an attractive location or can be easily accessed (Lindholm & Levainen, 2006). For example, Student Hotels are located close to the main transport hubs all around the Netherlands, such as the Student Hotel in Delft. The strategy creates image value as the location can be the brand image of the company. Besides, it also produces use-value, in which users are more convenient to travel and access office building (Macmillan, 2006).

The second factor for the physical characteristics is the aesthetics of the company's property and brand image. O'Mara (1999) introduces a value-based strategy, which mainly focuses on the organisation's values and strategic direction. It uses the building's design to shape users' behaviour, which is mainly emphasised on both function and symbolic meaning. The value-based strategy steers the portfolio to represent an organisation's image, identity and objective. The strategy tightens up various types of the user, including employers, employees, customers and community. A value-based strategy's drawback is the high consumption of time and resources and trading off between functionality and aesthetics (Singer et al., 2007). The strategy of promoting marketing and sale uses the property's physical characteristics to represent the company's image. This affects much decision-making at the operation level, such as selecting an attractive location, providing space to attract customers, using the building's symbolic design and providing brand-supportive workplace (Lindholm & Levainen, 2006). The two strategies lead to the real estate object's outcome that adds image value to the corporation. It enhances corporate identity, prestige, design excellency and reputation. Image value can be measured by several indicators, such as public relation opportunities, brand awareness, prestige, and 'wow' factor (Macmillan, 2006).

The last corporate factor for physical characteristics is workplace design. According to Naseem et al. (2012), people spend half of their lives in the workplace, which considerably influences their mental status, actions and performance (Sundstrom, 1994). The better physical environment of the office means the better well-being and better performance of employees. On the other hand, the dissatisfaction of the employees in the workplace significantly drops their performance for the company (Carnevale, 1992). Five factors for office design are identified.

1. Furniture: Furniture should fit with the activities and working styles of the employees. It involves employees' performance, motivation, satisfaction and health.
2. Noise: the office should protect employees from noise disturbance during the working time such as noises from traffic, construction site and airport. Concentration while working is the key to maintain their efficiency and performance.
3. Light: Lighting has considerable effects on the employees' health, alertness, concentration and task performance. Insufficient lighting leads to an uncomfortable workplace.
4. Temperature: It is suggested that the proper temperature for the working environment is between 16 and 24 degree Celsius (Al-Anzi N.M., 2009).
5. Spatial arrangements: Physical layout of the office plays an important role in an increase in productivity. Employees' satisfaction towards the working space has a direct effect on everyday performance.

The real estate strategies that influence workplace design increase employee satisfaction and increase productivity. Both strategies provide good visual workplace environment, amenities and facilities to support employees for their business activities. In return, good productivity from the appropriate workplace design increase profitability and financial return of the company (Lindholm & Levainen, 2006). According to Macmillan (2006), the real estate outcome adds use-value for the corporation, in which it creates a visually better work environment, well-being, job satisfaction, recruitment and retention while reducing absenteeism.

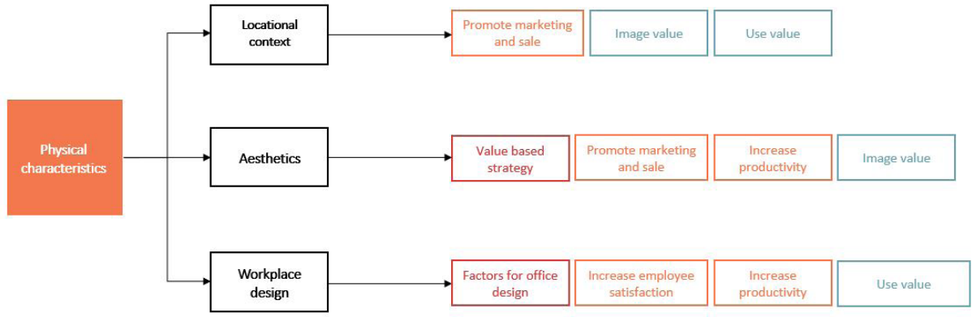


Figure 2.3
The physical characteristics category of the corporate factors (own illustration).

2.2.3 Social interaction

Since corporate real estate strategies mainly focus on the corporation level, the strategies lack approaches to interact with the public and the city. However, the real estate object could create added value regarding social aspects, according to Macmillan (2006).

The first social factor that influences the outcome of the property is a connection with the public. Macmillan (2006) explains the social value that the property could contribute to the city. The ideas of social value are buildings and environments that make connections between people, creating or enhancing opportunities for positive social interaction as well as encouraging social inclusion. The indicators to measure social value are a sense of community, civic pride and neighbourly behaviour

Corporate office building requires privacy, safety, and security to ensure their safe working environment and maintain satisfactory. Increased employee satisfaction strategy focuses on the facilities, amenities, and pleasant working environment and emphasises the safety and security of the building (Lindholm & Levainen, 2006). According to Macmillan (2006), safe corporate office building creates use value and social value of the built environment. For use-value aspect, privacy, safety, and security ensure consistent productivity and good working environment to maximise business activity performances. On the other hand, safe and secure corporate office building maintain the safety of the street, which facilitates crime and vandalism reduction.

Moving on to the factor of user satisfaction, Lindholm & Levainen (2006) identify the increase employee satisfaction strategy to emphasise workplace design, facilities and amenities of the corporate office building. In order to create a working environment that fit the demand of the users, it is required to focus on the user participation to realise the facilities and activities of the workplace (Macmillan, 2006). The strategy aims to create use-value to the corporation, in which it maintains well-being, satisfaction, teamwork and communication across the organisation. Besides, the user's participation creates an ownership feeling of the users toward the property as they are involved in the processes.

The next social interaction factor that affects the outcome of the real estate object is the environmental impact. Not only sustainable building creates a better working environment, adaptability, flexibility, robustness and low maintenance, but also reduce the amount of energy consumption, pollution and waste production from the business activities. This creates environmental value not only for the corporation itself but also provides a better public environment of the city (Macmillan, 2006).

The last social interaction factor is local identity. Macmillan (2006) introduces cultural value, which contributes to the rich tapestry of a town or city and concerns location, context, historical development and a sense of place, cultural value, symbolism, inspiration and aesthetics. The cultural value of the property can be measured by press coverage, monumental status, public opinions and reviews.

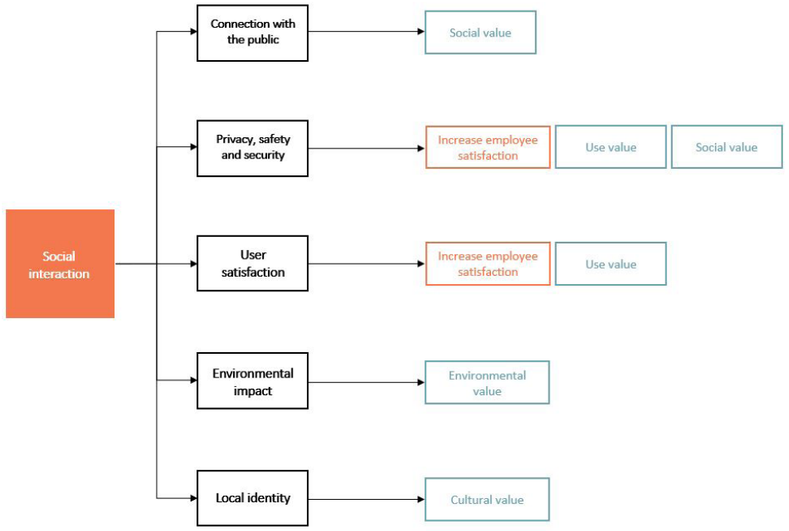


Figure 2.4
The social interaction category of the corporate factors (own illustration).

2.3 City factors that influence the real estate outcomes

In this part, the theories from the city side are discussed to answer a part of sub-question 'what are the existing theories of a good city?'. The factors are divided into three categories based on Macmillan (2006): functionality and use value, physical characteristics, and social interaction.

2.3.1 Functionality

The first functionality factor that influences the outcome of the real estate object is function and activity. According to Sennett (2013; 2018), Open City creates a system that opens for social voices to interact with another rather than being isolated. This also includes seeing many activities happening on the street at the same time. Therefore, the idea of "Open city" stimulates diverse and dynamic character of the city, including disorder, noise and unpredictable. One of the three ingredients of the opened city is the ambiguous edge, in which it encourages the city to be built with many borders to stimulate a mix of functions, street life, provisions for walking and soft transition between the building and the public street. Adam & Tiesdell (2012) supports the idea and explains that places meant for people should provide activities to draw people to occupy places, and it is better to have more diverse and complex activities. The more varied a place, the more active it is likely to be. According to Jane Jacobs (1961): 'overlapping and interweaving of activities crucially impacts on the vitality of urban neighbourhoods. To encourage what she calls 'exuberant diversity', a district must serve at least two primary functions, of which residential places and employment places are the most important. There are two ways to change the mono-function development culture. Firstly, making the development process more competitive by opening opportunities for what Guy et al. (2002) identify as locally based independent developers who can make smaller lot sizes, multiple tenancies and mixed uses work to their advantage. Secondly, implement mixed-use also in the development form, tenure, market segments and density. Karssenberg & Laven (2016) supports that there should be a new function every 10 metres on the street since a variety of functions is key. Ground floor function should be occupied by shops, small businesses, co-working spaces, food and restaurants, care, leisure, fashion, schools and housing, should be included as well. Besides, the market is the best places in the city for people to meet and it enhances the experience in the city. It is also important for small-scale vendors and supports the local community. To support Karssenberg & Laven (2016), the research by Schlickman & Domlesky (2019) finds that modern public spaces in New York are occupied by a variety of programs such as a kiosk, outdoor market, food truck, local businesses, and street food carts. Lastly, apart from having rich variation of functions in the building, exchange functions between the building and the street also lead to a better close encounter with the building (Gehl, Kaefer & Reigstad, 2006).

Next, the second factor is flexibility and capability to adapt for future changes. Sennett (2013; 2018) introduces the second main ingredient that supports the design of Open City, which is incompleteness. An incomplete form of the city leaves some spaces to be added by inhabitants and provides opportunities to adapt in case the needs of habitation change. The incomplete form also stimulates creativeness of occupiers to express their lifestyles, individual characteristics and flexibility. For instance, old warehouses are refurbished into loft-style buildings with other purposes due to the new requirement of activities. However, modern buildings have complex systems like lighting, heating, sanitary, structure and electricity. It is difficult for those buildings to change or adapt for new purposes. Since various elements, including buildings, people, neighbourhoods, change through time, the opened system is the solution to support the dynamic requirement of the city. Karssenberg & Laven (2016) also support the idea of flexibility by focusing on the good quality of plinth. The plinth of the building should be designed for mixed-use, multi-purposes and non-specific to support many functions over time and encourage flexibility. Moreover, flexibility also involves the concept of sustainable, resilient and robust places (Adam & Tiesdell, 2012). It focuses more on the city level than the building level. Sustainable, resilient and robust places are one of the characteristics of successful places. Robustness and resilient are the ability of a place to 'bounce back' from unexpected external change, while the latter concerns its internal flexibility to accommodate change without excessive physical disruption and adapt to future change to have better sustainable prospects.

Moving on to the next factor, the term of 'hybrid space' is introduced in the research (Karssenberg & Laven, 2016), which is the space to interact with users. A clear distinction between public and private space is not preferable but purposing blurry edge instead. Shops can consider putting products outside, next to the facade while cafe and restaurant can add some seats and tables outside to create a hybrid area. The idea is to connect the street and the building and generate diverse activities in this space. Barrier on the ground floor should be re-designed into public space with markets, parks, playground, commercial and cultural plinths. Soft transition and blurry edges are also supported by Sennett (2013; 2018) to stimulate soft transition between building and street, diverse functions and street life. However, Adam & Tiesdell (2012) argues that to create well-connected and permeable places, the street-oriented block is required, which creates a dense urban fabric that creates a clear boundary between public and private zone.

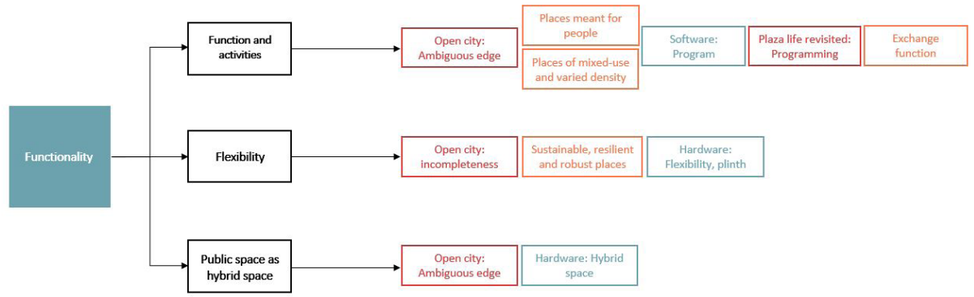


Figure 2.5
The functionality category of the city factors (own illustration).

2.3.2 Physical characteristics

The first physical characteristics factor that affects the outcome of the real estate object is the plinth. Karssenberg & Laven (2016) introduce the approach to develop quality plinth, in which the idea is to diversify facade surfaces, rhythms and functions help to keep eyes' attention. Corner plinths should have both high and open facade. Sudden setback, large scale columns and closed facade should be avoided. Another research that supports the idea of the quality plinth to improve the connection between building and street is conducted by Gehl, Kaefer & Reigstad (2006). The main concept to design plinth and façade is transparency. The plinth and façade should be transparent to provide visual contact between inside and outside increases the street space as well as opportunities for interaction with buildings. The facades of the building should be active to maintain interesting window displays and opportunities to observe ground floor activities. Gehl, Kaefer & Reigstad (2006) suggest that 60% of the facade surface must be transparent glass, edge zone between 0.7 to 2 metre for stopping and activities, providing good lighting during the night-time, shop and food service must have display window at least 80% of the facade plane area. There should be no gap in the row of facades to keep the façade in line with the other facades on the street. Doorsteps, edges to sit on or stand next to, benches, niches and columns enrich sensory impression and enhance opportunities for stopping and staying. Lastly, the building should provide night lighting to maintain transparency during the night-time and keep the street look safe.

The second physical characteristics are human scale. The successful place attracts people and encourages them to linger and return as well as taking human scale into account since places are designed for human (Adam & Tiesdell, 2012). In order to enhance the connection between people on the street and buildings, there should be minimum of 10 doors per 100 metres of the façade (Karssenberg & Laven, 2016). The scale idea is also supported by Gehl, Kaefer & Reigstad (2006), in which many units and vertical divisions of façade are preferable. Maximum 10 units per 100 m provide an interesting façade and a vertical façade expression that shortens the perception of distance. For the rhythm, Narrow units, many doors and a wide mix of functions provide a dynamic rhythm in the streetscape. The ground floor height should be at least 4 metres to provide sufficient height for public activities and be flexible to change functions (Karssenberg & Laven, 2016; Gehl, Kaefer & Reigstad, 2006). In addition, the realisation of the building height should take space scale into account. The width of the street relative to surrounding buildings, for example, a scale of 2:1, 1:1 or 1:2 (Gehl, Kaefer & Reigstad, 2006).

The last physical characteristics factor is materials and details. Both buildings and public spaces should be constructed with the quality of materials with a wealth of details to offer good sensory experiences for both users of the building and people on the street (Gehl, Kaefer & Reigstad, 2006). According to the research by Schlickman & Domlesky (2019), newer public plazas tend to have more unclearly defined or polygonal shapes. Variety of public materials are invested, such as movable lawn chairs, tended soft landscape and granite hardscape.

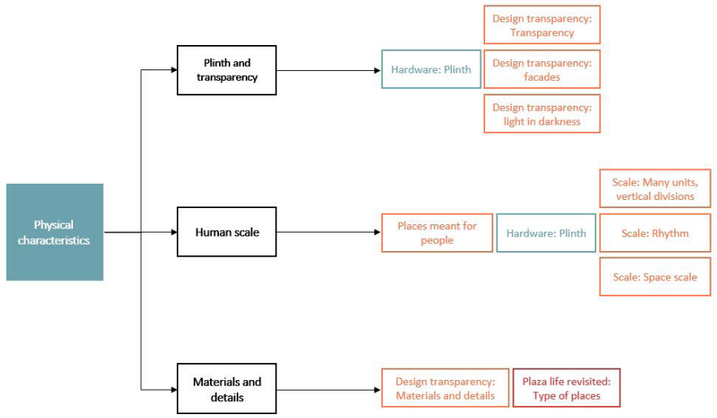


Figure 2.6
The physical characteristics category of the city factors (own illustration).

2.3.3 Social interaction

The first factor for social interaction is social interaction. According to Sennett (2013), cities in the modern world tend to be closed, which leads to inequality, restrict opportunity, homogeneous of class and isolation. Cities should offer opportunities for people to connect and interact with people. Adam & Tiesdell (2012), introduces places of mixed-use and varied density, one of the five characteristics of successful places. It mentions that the mixed-use development results in greater opportunities for social interaction. It includes mixed-use function, smaller lot sizes and multiple tenancies. In order to create a good experience in the city, sense of place and good plinths design are essential. It focuses on the life between buildings, making a distinctive area and improve connectivity (Karssenberg & Laven, 2016). Besides, buildings are built for everyone, not some groups of people. Public life should rather be prioritised than private interest. It is important to include people in the development phase since the goal is to create street life (Karssenberg & Laven, 2016). The street coalition is informal self-organised cooperation of the community, which can enhance the processes. The idea is to offer the community to take bigger challenges and invite new ideas activities and type of management to stimulate the use of human scale, variety, high density and flexibility (Karssenberg & Laven, 2016). According to Schlickman & Domlesky (2019), semi-permanent installations and tactical urbanist interventions were presents in the public space to keep the public informed and gain support from the public. This facilitates the interaction between the city or the corporation with the people in the public area.

The second factor is street life and activities on the street. Sennett (2018) states that urban planners should refuse the idea of designing many boundaries in the city since they only diminish a mix of races, classes, ethnics and communities. Instead, the city should be built with many borders to stimulate a mix of functions and street life. Another idea suggested by Karssenberg & Laven (2016) is to make the street as places. There should be a balance between fast and slow transport, including pedestrians, motorised and bicycle. Lighting, trees, street furniture and artistic cement paving could create intimate street. Barrier on the ground floor should be re-designed into public space with markets, parks, playground, commercial and cultural plinths. Great streets should provide good variation, complexity and acoustic balance of sound. Three important principles to design the sound in the public space are absorbance, diffusion and masking. Terrace, workshop, open plinths can generate rich soundscape on the ground floor. According to Schlickman & Domlesky (2019), undesignated activities also enrich the activities on the street and encourage street life. The undesignated activities include temporary installation, food vendors, food trucks, street performers or skateboarding.

Moving on to the next factor, successful places can move in and through them easily either on foot, by bicycle or public transport. In order to achieve urban vitality, connectivity across the city need to be improved (Adam & Tiesdell, 2012). There are six main points to achieve connectivity and permeable, which are creating a grid to maximise connectivity, designing street-oriented urban block to create a dense urban fabric, designing a variety of block sizes, creating mesh hierarchy, guiding building height in accordance with the street width, and removing physical barriers on the street. Karssenberg & Laven (2016) explains that the experience of users in the city is essential, which focuses on the life between buildings, making a distinctive area and improve connectivity. For the pedestrian flow aspect, the buildings should link new plinths to the urban circulation as well as creating accessible open plinths. Entrances of the buildings should be semi-public space and safe from the pedestrian perspective. These help to maintain the connectivity experience in the urban fabric (Karssenberg & Laven, 2016). Schlickman & Domlesky (2019) also support the idea of connectivity by suggesting removing physical barricades in the public area. Lastly, in order to keep a good traffic flow of pedestrians, the street should provide wide sidewalks that have few breaks and are accessible to all user groups (Gehl, Kaefer & Reigstad, 2006)

The next social interaction factor is local identity. The incompleteness of the city allows inhabitants to adapt their lifestyles to fit in the city. It encourages inhabitants to be creative and express individual characteristics, which lead

to local identity (Sennett, 2018). For instance, local and small businesses help to create the distinctive identity of the area. Adam & Tiesdell (2012) also explains the idea of distinctive places in order to develop a successful urban area. Because the real estate development sector is driven by the economy of scale. The initiation of the development is realised from the top-down or national level. However, successful places display a significant distinctive character in which it emphasises local identity and authenticity. Five key components for the distinctive places are presented: paths, edges, districts, nodes and landmarks. Successful place-making is about creating urban experiences to be savoured and remembered, rather than readily forgotten as indistinguishable from the formulaic repetition so beloved of global capital. Wayfinding is also the idea to emphasise the local identity of the area. It is the easiest and most effective way to encourage people to the destination. Use of local heritage, personalities, and characteristics of places to design wayfinding symbol helps to enhance the character of the place (Karssenberg & Laven, 2016). Lastly, the market is the best places in the city for people to meet and it enhances the experience in the city. It is also important for small-scale vendors and supports the local community (Karssenberg & Laven, 2016).

The last factor for social interaction is the safety of the street. Successful places should be designed to ease people, make people feel safe, and encourage them to return (Adam & Tiesdell, 2012). Besides, places should be inclusive and make people feel comfortable to linger. Comfort includes thermal comfort, light comfort and wind comfort (Adam & Tiesdell, 2012). Entrances and plinths of buildings should be assigned for semi-public use, visually transparent and safe from the pedestrian perspective (Karssenberg & Laven, 2016; Gehl, Kaefer & Reigstad, 2006). Additional variables to provide safe street is active facades where there are many entrances, and light in the darkness, providing night illumination to maintain transparency at night (Gehl, Kaefer & Reigstad, 2006).

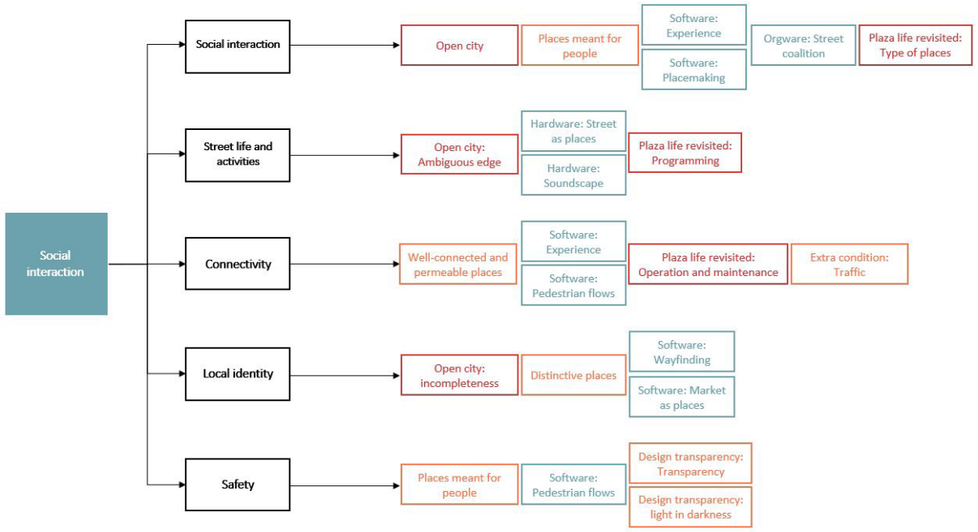


Figure 2.7
The social interaction category of the city factors (own illustration).

2.4 Assessment techniques

In this section, the assessment techniques to measure the impacts of the corporate office building and the city are presented. Several existing techniques are gathered from the literature and discussed in terms of their concepts, purposes, main feathers, relevant variables and how the techniques are implemented in the research.

2.4.1 Preferences for Visual Characteristics in urban streetscapes

Gjerde (2011) explores the preferences for visual characteristics in urban streetscapes among the three different types of respondent: architects, town planner, and lay public by using six scenes of the two-dimensional photographic image. In order to correlate people's perception and characteristics of the scene, Gjerde (2011) developed a tool to measure the characteristics of the scene. A 10-point scale of rating is used to measure the numeric value of a particular scene. The research uses five main variables as

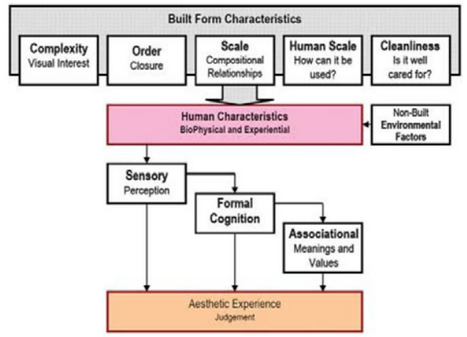


Figure 2.8
The framework around which the research methodology revolved, these design characteristics that influence aesthetic perception inform the survey questionnaire and the streetscape analysis tool (Gjerde, 2011).

the analytical framework, which are order, visual, scale, human scale and cleanliness (figure 2.8). The researcher emphasises the first two as the main variables. Many components of the building were used to ask the respondents such as building colour, heights and the harmony of the whole scene. They were asked to rate the overall preference for the certain design attribute.

The technique of preferences for visual characteristics in urban streetscapes is used in the direct observation on the buildings to identify the outcome of the real estate objects. The five main variables are the main interest points during the data collection to examine the physical characteristics of the three cases.

2.4.2 Plinth rating and eye level game

Plinth rating and eye level game were initiated by STRIPO (Karssenberg & Wezenberg, 2016). They are tools to observe plinths of buildings and to map public interaction of buildings from the experience of public people. They aim to raise more awareness to assure that the principle of the high-quality plinth is taken into account in urban development.

For the plinth rating tool, tt observes the quality of the plinth and put the rating on the map to see the flow and connection of urban street. Plinth rating tool investigates how a building interacts with public space, functions, attractiveness, ambience and human scale. The following ratings shown in table 2.1 are used to assess the quality of plinth. Figure 2.9 demonstrates plinth rating that being put on the map of the area.

Figure 2.9
Mapping of plinth ratings (Karssenberg & Wezenberg, 2016).

Rating	Description	Characteristics	Visual image
A	Good ground floor, good physical structure, good use	Enough activity, an inviting function, a comfortable ambience. It is an example of good plinth for the rest of the street or area.	
B	Ground floor with potential, good physical structure, use improvement needed	The plinth has potential, but it is not used appropriately. Physical condition is well maintained and open. Need some improvement for its use, function, or purpose.	
C	Ground floor with potential, Minor physical, investment needed	Need transformation like extra paint, upgraded façade materials, improved transparency as well as looking for the new opportunities for its purposes.	
D	Bad ground floor, major physical investment needed	Require major transformation and investment to transform physical structure and acquire competent hardware operations	
E	Bad ground floor, no transformation possible	Only few actions can be carried out. For example, wall paintings, artistic graffiti or vertical gardens. In long-term, the building needs to be demolished and build a new one with proper functions.	

Table 2.1
Plinth ratings (Karssenberg & Wezenberg, 2016).

For the eye level game, it includes the survey that explores more explicitly criteria for the streets and buildings as well as observing how many passers-by are there within the hour and how they behave on the street. In order to understand the context better, the scoring spider card is developed and can be scored to specifically on each criterion for both street and buildings. Range of scoring is from 0 (extremely bad) to 10 (extremely good) as shown in figure2.10.

Plinth rating and eye level game techniques are adapted for the data collection of direct observation on the buildings. The techniques aim to identify the additional range of physical characteristics of the real estate objects, but more focus on the plinths of the buildings and the streets in front of the buildings. The variables for the plinth are functions and small units, flexibility, hybrid zone, visual quality, and vertical orientation. On the other hand, the variables to measure the quality of the street are pleasure, management, height and width, places and activities, and physical comfort.

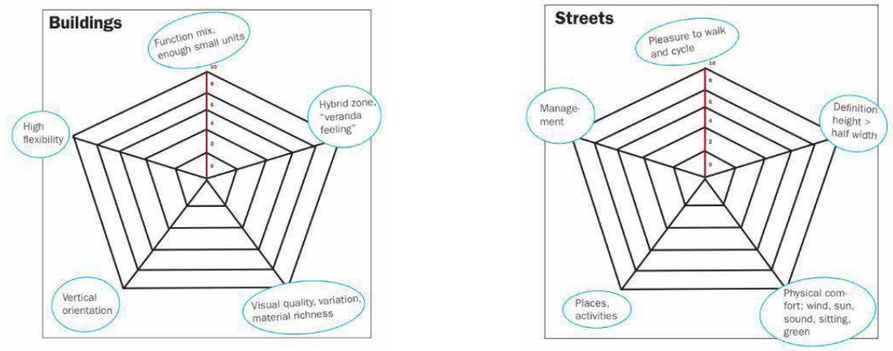


Figure 2.10
The scoring spider graph (Karssenberg & Wezenberg, 2016).

2.4.3 Public life studies

Public life studies are tools introduced by Gehl & Svarre (2013) as a tool to acquire information of human behaviour in the built environment. One of the main methods to observe people behaviour in public space is direct observation. The method may acquire information which is hard to obtain from questionnaires, surveys or interviews. It could be behaviours the users often overlook to mention when being asked about the behaviour in public space, for example: people tend to stay at the edge of public space longer regarding possibilities of public seating or shelter. Practically, public life studies can facilitate decision making processes of how people use public spaces. In order to determine of the intervention was effective or not, the public life studies can be conducted before and after the completion of the project to identify a clear distinction. In addition, there are eight different methods can be carried out in the public life studies: counting, mapping, tracing, tracking, looking for traces, photographing, keeping a diary, and test walks (table 2.2).

The techniques of Public Life studies are implemented for the data collection of direct observation on people's behavior in public area. The goal is to identify how people behave in such public area and in the buildings as well as investigating the density of people in the area. The techniques include counting, mapping, tracing, tracking and photographing.

Method	Contents
Counting	Pedestrian flow, stationary activities, number of people, gender division, people talking to each other, people smiling, people walking in groups, active people, people talking on phones. Counting needs to be carried out at least 10-minute interval to have sufficient sample to be repeated to reduce inaccuracies.
Mapping	Mapping what happen on the plan of the area: location of people sitting and standing. It is important to acquire several samples of layers of activities to form momentary pictures during the day.
Tracing	Movement patterns, walking sequence, choice of direction, flow, preferable entrances. Tracing can be done by simply drawing movement lines on the map of the area.
Tracking	Follow selected people to track their movements, turning head action, stopping, making detour. Observers must keep distance to ensure that followed persons do not feel uncomfortable.
Looking for traces	Recording footprints on snow, grass, trampled path, gravel. Traces of people occupying public spaces like chairs bench. Trances of street performers, skateboarding.
Photographing	Frequently used to illustrate situation. Showing interaction between urban form and life. Evidence of fast freezing situations, emphasize on the situation of the public life and public space, aesthetics are no the main focus.
Keeping a diary	Noting details of human behaviour in the public space. List of activities, population information, aspects of the street activity.
Test walks	To find the differences between estimated walking time and the actual walking time from point A to B. how many times the walking have to be stopped due to the traffic light and other hindrances.

Table 2.2
Methods use in the public life studies (Gehl & Svarre, 2013).

2.4.4 The Post Occupancy Evaluation (POE)

The Post Occupancy Evaluation (POE) it the tool or process being used to evaluate buildings systematically after their construction completed and being occupied for a period (Preiser, 1999). It raises questions regarding the activities, goals of the organisation using the real estate object. The criteria include a functional program and technical performance specifications. In addition, there are several measures, regarding the use of the building, are incorporated in the POEs such as organisation's values, image, user satisfaction, productivity, profitability, efficiency, safety and security. Not only the measures of organisation and occupant performance are considered, but also includes building performance measures. For example: aesthetics, spatial comfort, air quality, thermal comfort, privacy, lighting, noise, and ergonomics (National Academy Press, 2001).

The POEs do not fix variables to be assessed only in certain groups. They can be adjusted accordingly with the building type, organisation goals and cycle life period of the building. One of the examples of POEs is the Balanced Scorecard which is used to assess financial asset portfolio. The Balanced Scorecard categorizes performance measures into four groups: financial, business process, customer relations, and learning and growth of employees (National Academy Press, 2001).

In this research, the assessment techniques of POEs were adapted to collect the data from users of the three cases. It is conducted to examine the opinions of the users who occupied the buildings based on their experiences. User survey is created based on POEs to measure user satisfaction on the functionality and use value, physical characteristics and social interaction.

Table 2.3
Variables being assessed in the Post Occupancy Evaluation (National Academy Press, 2001).

The Post Occupancy Evaluation (POE)	
Use of building	**Building performance**
Organisation's goals and values	Visual aesthetics
Image and customer relations	Spatial comfort
Increase productivity	Air quality
Increase profitability	Thermal comfort
Increase efficiency	Privacy
Safety and security	Lighting
	Ergonomic
	Noise

2.4.5 The Sense of Community Index (SCI)

The sense of Community Index or SCI is the measurement tool to gauge a sense of community in the area. The development of the tool is based on the theory of McMillan and Chavis (1986). The tool is capable of measuring a wide range of project types such as workplaces, schools, universities, and urban area. There are four elements of sense of community: membership, influence, meeting needs, and a shared emotional connection. Table 2.4 summaries the main variables of the tool being assessed. The techniques used in this assessment are simply questionnaires and surveys forms in which it asks samples to give a score on each of the variables simply.

SCI is also adapted in the user survey to acquire data of the opinion of users on the corporate office buildings, especially on the social interaction aspects.

Table 2.4
Elements and variables of Sense of Community (Community Science, 2020).

Elements	variables
Membership	Recognition of people in the area Sense of belonging Presence
Influence	Acknowledge of actions Influences over the area Self-efficient
Meeting needs	Quality of area Area's values from people's perspective Goals and requirements
A shared emotional connection	Relationship of people in the area Liveability Uniqueness of the block, local identity

2.5 Theoretical framework

In this section, the theoretical framework is constructed from the synthesis of the results from the literature review. The purpose of the framework is to show which part of theories need to be further researched in the empirical and operations phases. The framework is used to answer the following two sub-questions:

1. What are the existing theories of the corporate real estate and the city in accordance with the interaction between them?

2.5.1 Corporate variables

The corporation's requirements and the users' experience expectation are discussed to identify which variables influence the outcomes of the real estate object. Firstly, the three real estate strategies (O'Mara, 1999) have a direct impact on the characteristics of the building. They represent the company's visions, goals and organisation structure. Besides, real estate strategies also visualise how the company cope with adaptation and changes as well as illustrating an investment orientation. Secondly, Lindholm & Levainen (2006) also mentions different types of real estate strategies. The seven real estate strategies directly support two main corporate strategies which they also demonstrate the company's vision, goals and main focus resulting in the value-added that the real estate object provides for the corporation. Thirdly, Macmillan (2006), explains that corporation's expectation of the real estate outcomes plays an important role for the corporation to make the decision regarding real estate strategies. There are six types of value created by the real estate object, and each company has different expectation due to the differences of the company's vision, goals and activities. Lastly, Naseem et al. (2012) address three types of factor that influence employee's performance in the workplace. Operationalisation of the theoretical model is shown in figure 2.11.

2.5.2 The city's variables

Moving onto the urban theories, firstly, Sennett (2018) states that to open for opportunities for people to interact, the idea of Open City needs to be implemented based on the three principles: ambiguous edge, incompleteness and narrative of development. Secondly, Adam & Tiesdell (2012) supports the idea and emphasizes that the area (smaller scale of the city) is meant to be occupied by people and initial social interactions. Five characteristics of successful places are identified. Thirdly, The City at Eye Level movement (Karssenberg & Laven, 2016) takes smaller approaches engaging a vast array of small urban experimental projects. The findings show that there are three different approaches to improve streets and plinths in the urban area: software, hardware and orgware. Fourthly, the research by SWA (Schlickman & Domlesky, 2019) explores how public people behave in modern public spaces and how public spaces shape people behaviour. The changes of the public spaces are divided into three categories, and the social life is categorized into four main variables. Lastly, Gehl, Kaefer & Reigstad (2006) mention the important factors for buildings to bridge the connection between buildings and people regarding functions and physical characteristics. Operationalisation of the theoretical model is demonstrated in figure 2.11.

2.5.3 Designer's motives

In a broader view, architectural companies, in general, would want to ensure that they have strong financial status by increasing their workloads and repeating transaction from reliable clients as short-term value. In the long run, most of the architectural firms' goal is to enhance and maintain their reputation (Macmillan, 2006). In a more specific view, goals of architectural companies in projects development can be varied depending on the project type, client, requirements, context, and users. The design of the real estate building is influenced by three main factors: the corporate requirements, the city's requirements and inputs from the designer (Vande Putte, 2016). However, motivations of the designer are often ambiguous and cannot be pre-determined without the context. It would be more explicit about answering this by investigating it directly from the practices. The three interviews with three architectural companies based on the three cases will be conducted to find the answers and fill in this gap.

Next, the second sub-question is answered through the extensive research of the existing assessment tools that being used to measure various aspects of the connection between building and people. The sub-question is:

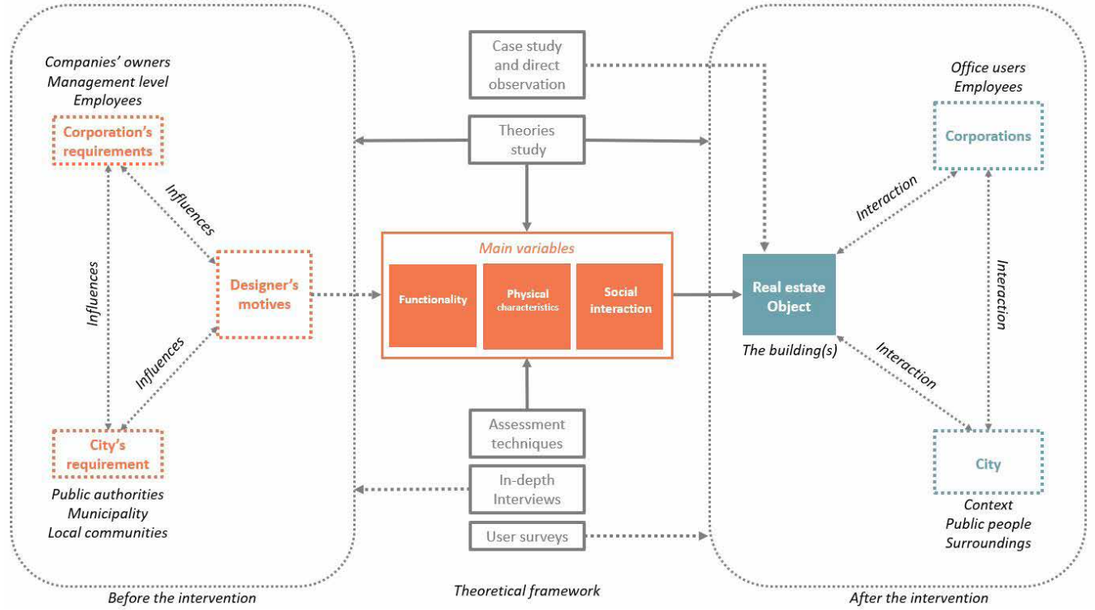
2. What are the existing assessment tools and techniques being used to measure the quality and performance of the building?

2.5.4 Assessment techniques

A vast array of assessment tools exists in both theoretical and practical world, and those tools cover a wide range area of the variables. The variables from the theory part are used to be a guideline to identify of which variables are being assessed by those tools and techniques. This process is essential for empirical research in the later stage.

Gjerde (2011) investigates preferences on aesthetics and physical features of the building frontage in the streetscapes. It can be used in the direct observation on physical characteristics of buildings to identify the outcome of the real estate objects. Public Life Studies(Gehl & Svarre, 2013) introduces several tools and techniques to measure and collect data of people behaviour in the public area. The techniques are used to to identify how people behave in such public area and in the buildings as well as investigating the density of people in the area. Plinth rating game (Karssenberg & Wezenberg, 2016) offers tools and measurement of observa physical quality and activities of plinths by scoring technique. The techniques can be adapted to identify additional range of physical characteristics of the real estate objects, but more focus on the plinths of the buildings and the streets in front of the buildings. Post Occupancy Evaluation (Preiser, 1999) examines the user experience on the building after occupying the facilities for a period as well as measuring parts of social impact. POE is adapted to collect data from users of the building by user survey. Lastly, SCI (Community Science, 2020) explores a sense of community in the designated field. SCI is also adapted in the user survey to acquire data of the opinion of users on the corporate office buildings, especially on the social interaction aspect in the particular area, neighbourhood and buildings.

There are additional assessment tools and techniques that are irrevent to this research, but can be valuable data for the future research. USI and BPA (Seshadri & Paul, 2018) mostly cover the area of functionality and social aspect while Preference for visual characteristics of urbanscape. Building Decree 2012 (Housing Act, 2012) controls the quality of functions, safety, security, and part of environmental impacts. On the other hand, municipal building regulation specifically emphasizes building height, public spaces, ground floor, façade, a setback of the building, and influences on surroundings. BREEAM (Building Research Establishment Limited, 2018) mainly assesses the quality of functions, usage of the building, concerns of context, energy usage, and sustainability. The mentioned additional tools and techniques are explained in details in Appendix E.



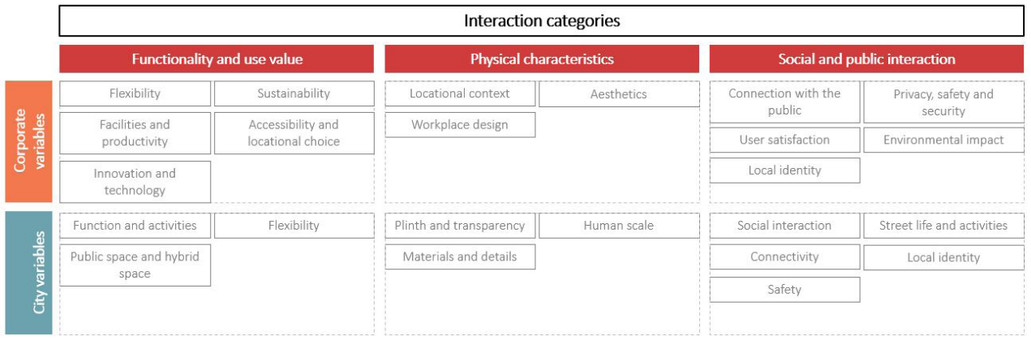


Figure 2.11
Operationalisation of the theoretical model (Own illustration).

03
Research Method

3. Research Method

Chapter two describes the rationale of the research methodology of the graduation thesis. Several techniques and methods are conducted in the research, both qualitative and quantitative, which are further explained in the chapter. A selection of the case study for the research is also discussed to identify the criteria for the selection and propose the cases for the next steps of the investigation. The chapter ends with an elaboration of the data collection approaches and the ethical consideration of the data.

3.1 Research Rationale

Figure 3.1 demonstrates research process scheme of the thesis. Overall, the research is divided into two major parts: theoretical study and empirical research. The theoretical study consists of a literature study of corporate real estate strategies, urban area development, and assessment techniques. The result of the literature study is a theoretical framework, which acts as the guideline for the empirical research. For the second part of the research, empirical research is based on the three case studies, in which the methods are documental study, direct observation, semi-structure interviews, and user surveys. The preliminary result from the theories and practical result from the three cases are used to formulate the lesson learned of the research, which are interaction between corporate office building and the city, and disigner's intentions and user's perceptions on the real estate object(s).

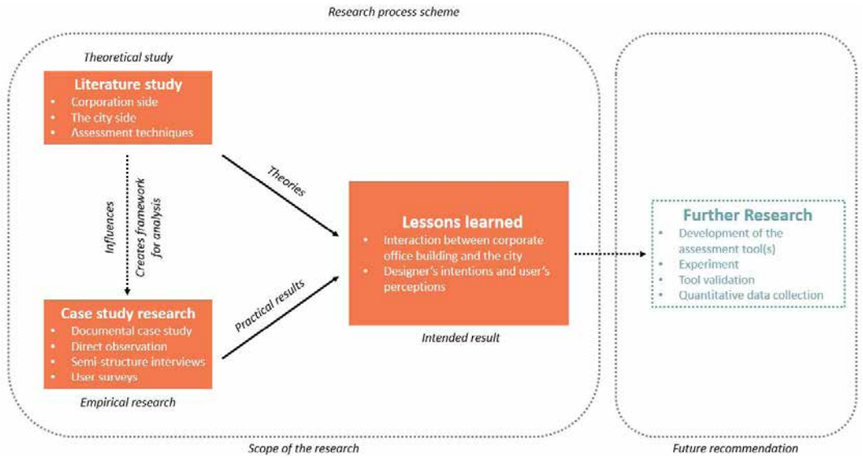


Figure 3.1
The implementation of the research methods and techniques in the research. (own illustration).

3.1.1 Literature Review

The purposes of the literature review are to construct theoretical prepositions and to link the data and the criteria for interpreting findings (Yin, 2002). However, after the literature study, unexpected knowledge could refine a research problem and sharpen research questions (Merriam, 1998). In other words, the first chapter should be refined after the literature review.

In order to create a strong foundation of the knowledge background for the research, the literature study is conducted. It also helps to better understand the connection between related literature, empirical research, and operational research. The literature study's main concepts are to find the connection between corporate real estate theories and the city theories and to identify approaches to improve the interaction between corporations and cities. Since the research gaps and research questions were identified in chapter one, the literature review part aims to answer those theory sub-question number 1 and 2 and be able to establish a theoretical framework which is used to support the further empirical research on case studies (figure 2.1). Apart from linking the knowledge between phases and constructing validity, the findings of the research will be relevant to scientific literature and partly fill the knowledge gaps of the research.

3.1.2 Case Studies

Because the connection between the theories and real-life context is ambiguous, case studies are conducted to investigate the insights from the practical view (Yin, 2002). It is also mentioned by Merriam (1998) that the case is a single entity which can be a person, a program, a group, a specific social unit and the case is bound with context. For this thesis, the cases are office buildings, and the involved contexts are corporations, cities, users, corporate real estate strategies, urban planning, regulation and so on. Three qualitative case studies of the corporate office buildings in the Netherlands are carried out to gain insights from the corporations, the cities and designers. Throughout the case studies, there are four sources of evidence to be collected, which are documentation, in-depth interviews, direct observations, and users survey. Case studies are carried out to find the answers for case study sub-question 3, 4 and 5. The answers of these sub-questions will be parts of the findings of the main research questions in which chapter four will elaborate on the analysis of the individual cases.

3.1.3 Case Study Scope

The processes of case study consist of an analysis of the building, analysis of the corporation(s), analysis of urban planning and the city's infrastructure, and analysis of the public community. Semi-structured interviews will be conducted with representatives from corporations, designers and public authorities. At the same time, quantitative surveys will be carried out with the people from the public area or surroundings, and users of the building(s).

Analysis of the building

An analysis of the building is carried out by collecting data about the development of the building and outcome of the design as well as examining impacts of the building on the corporation(s), public community and city's infrastructure. It is conducted by documental study and interviews with representatives of the designers. The findings will be used to link with the theories to create validity of the results or counterargument with insights from practices.

Analysis of the corporations

The aim is to investigate the motives of the corporation(s) to initiate the development of the accommodation, the companies' vision and corporate real estate strategies. Moreover, it also includes an exploration of the corporate real estate the corporations' value for their accommodation and how it relates to the city and public community. This step will be carried out by documental study and interviews with representatives from the corporation(s).

Analysis of urban planning and the city's infrastructure

The purpose of this analysis is to identify the urban development, planning and strategies that had been implemented during the development of the building. It also aims to find physical settings of the area that could affect the location choice of the corporation(s) and the realisation of the accommodation. This can be done by studying documents from the municipality and urban planning department of the particular area and a semi-structured interview with the representatives from the municipalities or urban planners.

Analysis of public community

The analysis will be conducted to include voices of the people in the city. This aims to investigate the influences of the corporations and their accommodation on the public community. For instance, if there are any informal coalition and collaboration between the organisations and public community or if there are sufficient activities to draw people to the area. This process can be done by launching surveys to measure the voices of the people. The target groups would be pedestrians, people who work for a surrounding cafe', neighbours of the building, and employees of the corporations.

3.1.4 Case Study Selection Criteria

In this section, criteria for the case selection is elaborated. By implementing the data from the literature review and theoretical framework, factors from the contexts, organisations, physical conditions and community requirements are considered to broaden the area of the case studies and make the results comparable. The criteria for case study selection is explained in the following section.

Must be a corporate office building

The research focuses on the investigation of office buildings that are mainly constructed to be occupied by corporations. The primary function of the buildings must be office area for corporations, although other mixe-used functions are also preferable. Home offices, small offices and offices that are part of the factory or warehouses are not taken into consideration to make sure that the focus of the study is on track.

Users of the building must be a corporation, corporations

Professional corporations, multinational corporations, governmental corporations and non-profit corporations are included in the field of the research. Different types of corporations are selected to get varied and valid results. However, small scale companies are excluded in the research since the buildings' impacts are less significant to the city, such as start-ups, entrepreneurs and small local businesses.

The building must be located in one of the four major cities in the Netherlands

The focused area of the research is big cities in the Netherlands to keep the contextual similarities in the aspects of policy, economics, politics and society. The cities are limited to be in Amsterdam, Rotterdam, The Hague and Utrecht since many office corporations concentrate those cities, people, public transport connections and public activities. Besides, there are clear boundaries of the central business district, city centre, inner-city, residential area and industrial area in big cities, which is more appropriate to be analysed compared to smaller cities.

The building must be situated in either central business district, city centre or inner-city

Corporations have strong preferences to be located in the central business district, city centre and inner-city. Corporate office buildings that are located in the urban fabric area, close to the pedestrian street and public transport system are preferable. Buildings situated individually in the large field, industrial area or outskirts of the city are not qualified for case studies since they are difficult to be compared and the interaction to the city is unobservable and ambiguous.

The building must be at least one new built project and one refurbishment project

Many corporate office buildings have been constructed for years. The requirements, conditions and contexts have changed over time. Buildings can no longer serve their purposes with full potential. Interventions have been made such as redevelopment, refurbishment and renovation. At least one refurbishment project is needed to investigate how the buildings adapted through these changes and how it affects the relationship between the building and the city. On the contrary, at least one new built project must be selected to differentiate the results of the cases.

The building must provide public space on the ground floor or hybrid space between the building and public area

In order to identify the relationship between the corporate office building and the city, the building of the case must have public functions on the ground floor or plinth such as retails, cafe', restaurants, leisure, creative spaces and public working spaces. In addition, the building from the case must provide hybrid space to attract people from public space. The hybrid space includes a public park, plaza, public passages, garden, outdoor seats from the cafe' and restaurants and creative spaces

3.1.5 Case study selection

According to the selection criteria, three buildings are selected for the case studies, which are the ABN AMRO CIRCL in Amsterdam South, The Edge of Deloitte in Amsterdam South, and Groot Handelsgebouw in Rotterdam Central. Table 3.1 demonstrates an overview of the three selected cases.

Table 3.1
An overview of the three selected cases.

The building	CIRCL	The Edge	Groot Handelsgebouw
City	Amsterdam	Amsterdam	Rotterdam
Location	South	South	Central district
Area	3,350 sqm	40,000 sqm	128,000 sqm
Complete year	2016	2015	2005
Construction type	New construction	New construction	Renovation
Owner	ABN AMRO	OVG Real Estate	GHG BV
User	ABN AMRO Reservation users	Deloitte, AKD, Henkel, Sandvik, Edelman	500 small companies, Cambridge Innovation Center (CIC), and Kleinhandel
Architect	De Architekten Cie	PLP Architecture	Architectenbureau, J. van Stigt BV
Municipality	Amsterdam	Amsterdam	Rotterdam

3.2 Data collection

The research focuses on acquiring a better understanding of the interaction between the corporate office building and the city through the four levels of interaction, design solutions and non-design solutions. Although a literature review demonstrates the main variables that being considered in terms of interaction, the interaction between the building and the city in each case will be examined to identify the insights from real situations and practices. Insights from the perspectives of corporations, designers, public authorities and people in the public area will be acquired and match the similarities or conflicts with theories. Table 3.2 shows the topics that will be elaborated.

Data collection approaches are based on the theoretical framework and operationalisation of the theoretical framework, which is carried out in the literature review. To construct validity of the research, multiple sources of data are required. Table 3.3 demonstrates different data collection methods, potential sources to obtain the data and the topics related to each method.

Table 3.2
Data collection topics for the research.

Case study topics	
1	Introduction and case description
2	Corporation's requirements
3	City's requirement and urban planning goals
4	Designer's ideas and motives
5	Real estate object
6	People behaviour in the public area
7	Users' reflection on the real estate object

Method: Direct observation on the building	
Purpose	Direct observation is conducted to understand the physical characteristics of the real estate object and its surroundings. The techniques used in this method are sketching and photography.
Source	The building site and its surroundings of each case.
Topic	5. Real estate object
Method: Direct observation of people behaviour in public area	
Purpose	The purpose of direct observation is to observe how people behave in the different form of public area and ground floor area in each case. Counting, tracking and trancing are the techniques used in this method.
Source	The public area and ground floor area of the building of each case.
Topic	6. People behaviour in the public area.
Method: Semi-structured interviews with involved stakeholders	
Purpose	Semi-structured interviews are conducted to acquire the corporation's requirements on the building, the city's constraints and controls, urban planning goals, and designer's ideas and motives on the development of the real estate object.
Source	Representatives of the corporation, architectural practice, and municipality.
Topic	2. Corporation's requirements 3. City's requirements and urban planning goals 4. Designer's ideas and motives
Method: Users and building interaction survey	
Purpose	Surveys aim to ask people in the public area, such as pedestrians, waitresses of the neighbour shop, shopkeepers as well as asking main users of the real estate object, such as employees. The idea is to identify how they think about the interaction between the building and people in the public area.
Source	Users of the building and people around the designated building.
Topic	7. Users' reflections on the real estate object.
Method: Documental study of the development of the project	
Purpose	Firstly, purposes of the documental study are to explore the organisation's goals, visions, values, and corporate real estate strategies, which lead to the realisation of the real estate portfolio requirement. Secondly, it also examines the evidence of the design, ideas, concepts and reasons behind the design outcome of the building. Lastly, it aims to acquire area development evidence, such as the masterplan of the area, the municipality's goals of the development.
Source	Annual reports, vision reports, drawings, diagrams, design concept documents, zoning plans, masterplan drawing, land-use plan, and urban planning booklet.
Topic	1. Introduction and case description 2. Corporation's requirements 3. City's requirements and urban planning goals 4. Designer's ideas and motives

Table 3.3
An overview of data collection method, possible sources, and related topics

3.2.1 Interview

In each case, the interview will be conducted with three different interviewees: representative of the corporation, representative of the designer and representative of the municipality. Semi-structured interviews are used as the method in which the topic of the interview is fixed, the formulation of the question is set but can be adapted to the circumstances, question sequence is free, and the behaviour of the interview is more like an informal conversation.

Purpose

The purpose of the interview is to acquire ideas and insights from the perspectives of the corporation, designer and public authority about the interaction between the building and the city. This includes the crucial factors, variables and criteria to enhance the connection between the building and the city as well as to find out the solutions they implemented to achieve a better connection physically and non-physically. The reason that three interviewers are included is that to cover the interview in all four levels of the interaction: organisation - public community, organisation - urban infrastructure, accommodation-public community, accommodation- urban infrastructure.

Technique

The interviews are preferably in face-to-face conversation. If it were not possible, video-call interviews would be set-up. The interviews will be recorded for the transcription later. Before the interviews, separated sections and questions are pre-defined to be the main guideline of the interview. This prevents confusion and derails

from the topic during the interviews. Therefore, the interview protocol will be developed to reduce the risks of not getting the expected answers. Although the interview questions are realised before the interviews, interviewees are welcomed to answer the questions the way they prefer as well as adding details and opinions on the problems. If interviewee paused after giving a short answer or not the answer the question expected, probes would be used to encourage the interviewee to provide more precise answers. Probes are also used in case the interviewee does not understand the questions. Since the three interviewees are from different backgrounds and expertise, the questions set will be developed specifically for each interview.

Interview protocol	
1.	**Introduction**
1.1	Research summary
1.2	Structure of the interview
2.	**Participant and project information**
3.	**Interview questions**
3.1	Project development
3.2	Functionality and use value
3.3	Physical characteristics
3.4	Social interaction
4	**Open discussion**
5.	**Consent form**

Table 3.4
Components of the interview protocol.

Protocol

In this section, the interview protocol set-up is explained in which the protocol will be provided to the interviewees for their preparation before the interviews. An example of the interview protocol can be found in Appendix A. Table 3.4 demonstrates the components of the interview protocol. In total, the interview protocol is divided into five following sections:

1. Introduction - In this part, the overview of the research is presented to the interviewees, including the research goal and main research question. It also informs the participant about the structure of the interview, interview duration, and terms of the interview. For instance, the interview will be recorded, and the interviewee needs to sign a release form to accept the terms. This part can also provide the purpose and implication of the interview.

2. Participant and project information – In this section, an overview of the interviewee and project information is presented. Participant information includes the name of the participant, stakeholder type, company's name, position, and working experience. The project information shows building name, type of the building, location, project area, project owner, functions and amenities, designated municipality, and year of completion.

3. Interview questions – The section of interview questions is divided into the following four sub-sections:
3.1 Project development – The interview starts with the questions about the project background, how the project was developed, project initiators, and relevant requirements.
3.2 Functions and amenities – This section includes a set of questions about the functionality and use of the real estate building. The questions are developed based on the essential variables from the theoretical framework.
3.3 Physical characteristics – The set of questions aims to acquire insights from the stakeholders how the particular features of the real estate object were realised, the ideas behind it, the controls from the municipality, and how it reflects the corporation's visions. The questions are also determined based on the theoretical framework.
3.4 Social interaction – The last set of questions involves the social aspects of the real estate object. For instance: how local communities involved in the design processes, how the building represents the local identity, and how the building opens to the public. Likewise, the questions refer to the theoretical framework.

4. Open discussion – This is a closing section of the interview. The participant can freely talk with the interviewee on any possible topics regarding the project or related societal issues. For example: due to the epidemic crisis in early 2020, there could be changes in people behaviour in public rea.

5. Consent form - The form is for the interviewee to consent of taking part in the interview and the use of information. The interviewee can choose or choose not to cooperate in agreements of the interview. For example, the interviewee can decide to keep interviewee's name confidential or researcher can quote the name in the research.

Analysis

After the interviews are conducted, the collected data will be analysed through transcription and sorted the interviews upon in the related variables. The arrangement of data with relate variables allows the researcher to identify patterns of data within the topics and variables. They will subsequently be compared among the different cases. These set of patterns clarifies crucial clues to the researcher of the interviewees' concerns on significant issues.

3.2.2 Survey

Apart from the interviews, users and building interaction surveys will also be carried out on each case. Samples of the surveys are users of the building, employees, waitress, receptionists, visitors, or passing by people. The technique used in the surveys is numeric scoring on each assessing variable. The surveys can be conducted on-site and through an online form.

Purpose

The survey aims to gauge users' opinions on the particular aspects of the real estate object. The main variables consist of how the building support main activities, how the building interacts with people, how the visual elements characterize the environment of the building, etc. The reasons that many types of user are included in the survey is to broaden user's perspectives and include a vast array of experiences in occupying the building.

Technique

The survey uses the numeric scoring technique to gauge how the users agree or satisfy with statements given on each aspect of the variable. The scoring ranges from one to five. One stands for strongly disagree, and five stands for strongly agree in which participant can check their preferable rating that suits best. If the participant does not know about any particular variables, he or she can check the box to declare that he or she does not know this aspect of the real estate object. After finishing the numeric scoring, the participant can leave additional comments if he or she wants to express ideas of opinion on the variables that did not mention in the survey. The survey requires at least 30 participants to construct valid results and generate the mean score for each variable. This creates opportunities for the research to capture the variables that have a substantial effect on the experience of users.

Survey form

The survey form is established to be given to the participants or to facilitate research while asking questions during the survey. An example of the survey form is demonstrated in Appendix B. As shown in table 3.5, the structure of the survey form is divided into three following parts:

Survey form	
1.	**Introduction**
1.1	Research summary
1.2	Structure of the survey
2.	**Building and participant information**
3.	**User and building interaction survey**
3.1	Functionality and use value
3.2	Physical characteristics
3.3	Social interaction

Table 3.5
Components of the survey form.

1. Introduction – Similar to the interview protocol, a summary of the research is shown to the interviewees as well as presenting research goals and main research questions. Moreover, the survey form demonstrates an overall content and structure of the survey.

2. Building and participant information – This section is left blank for the participant to fill their information, including building name, location of the building, occupation, and participant's relationship to the building.

3. User and building interaction survey – All the questions in the survey are formulated from the theoretical framework. The questionnaire of the survey is divided into three following sub-sections.
3.1 Functionality and use-value – The questionnaire starts with a set of questions about the connection, workplace, productivity, flexibility, safety, functions, activities, small businesses, and public space.
3.2 Physical characteristics – The second set of questions ask participant about the location, aesthetics, harmony, ground floor height, transparency, plinth, accessible doors, building height, and street width.

3.3 Social interaction – The last set of questions try to acquire information from a participant about user involvement, user satisfaction, safety, lively, iconic status, ground floor activities, street activities, local communities, and wayfinding.

Analysis

After conducting the surveys, the researcher takes the data to analyse in the Excel spread sheet mathematically in order to find an average score on each variable. Higher average scored variable indicates that users feel connected to the building in a particular aspect. In comparison, the lower average scored variable shows that users do not feel satisfied with the current situation of this aspect of the building. Those scored variables will be late compared with results from practice and other findings to identify match and mismatch between these variables. The cross-cased analysis will be explained in detail in chapter 5.

3.2.3 Documental study

Documental study is conducted to find evidence of the project development processes on each case. It aims to investigate the findings of corporation goals, requirements from the municipalities, designer's ideas on each project, the outcomes of the real estate objects, and people behaviour in the public area regarding the interaction between office building and the city. The documents include development reports of the projects, drawings of the buildings, urban development plan of the municipalities, photos of the buildings, and photos of people occupying the building. Documental study supports the findings from interviews with stakeholders, direct observation on the real estate object and people's behaviour.

3.2.4 Direct observation on the real estate object

Direct observation on the real estate object allows the researcher to observe and inspect the physical characteristics and conditions of the real estate object(s). The variables of the observation are based on the theoretical framework from the literature study while the opinions of the direct observation are based on the experiences and knowledge of the researcher. The observation includes accessibility of the building, colour, texture, material, plinths, transparency of façade, ground floor height, building height, access doors, public spaces, and vegetations.

The technique used for the direct observation on the real estate object is photographing, which is introduced by Gehl & Svarre (2013) in Public Life Studies. Photographing captures the physical condition of the building that can be reached and accessed by the researcher. However, documental study is carried out for the area that can not be accessed for the observation, such as photos and videos of the buildings

3.2.5 Direct observation on people's behaviour

Direct observation on people's behaviour is conducted to acquire information that is difficult to acquire during survey and interview or information that is not widely spoken, such as people behaviour. This facilitates the research to clarify how people behave in the certain types of public space and how they interact with the buildings. The observation investigate density of people in the area, number of enegagement with the buildings, activities in the area in accordance with the building elements. Consequently, the observation determines whether the intervention of the corporation or the designer is significantly effective or not.

There are four techniques to collect the data for direct observation on people's behaviour, which are couting, mapping, tracing, and photographing (Gehl & Svarre, 2013). The couting is used to collect the number of people passing the street in front of the building, number of people stopping and number of people sitting. Mapping is carried out to mark the area of which activities occur in the area. For example, the area of people sitting, the area of people eating. Tracing examines the walking sequences and movement patterns of people on the street. Lastly, photographing captures fast freezing situations to illustrate interaction between urban form and urban life.

3.3 Ethical considerations

For qualitative research, there is an ethical challenge communicating between the participants and the researcher since the findings from qualitative research will be analysed, synthesised and interpreted by the researcher. Consequently, this section explains ethical guidelines regarding interviewees' safety and privacy, and interpretation of the results. An informed consent guarantees interviews' privacy, including interview participation terms, use of the information in the interview, and future use and reuse of the information by others. The consent form is presented in Appendix A. The following agreements had been made with the participants before the interviews:

1. The interviewees are informed that the conversation between the researcher and participants will be audio-recorded to facilitate note-taking. The recorded files of the interviews will remain confidential. The files can be accessed only by the researcher and will be used for academic purposes only.
2. The recorded files will be deleted after the research is complete, and the transcription of the interview will be deleted one year after the graduation.
3. The answers from the interview will remain confidential. Personal information such as name and address will not be stated in the research, but only the organisation of the interviewees will be mentioned.
4. The results of the interview will be used for academic purposes only.
5. Participants can withdraw their consent anytime without stating any reasons in which all the data from the interview will be then destroyed.

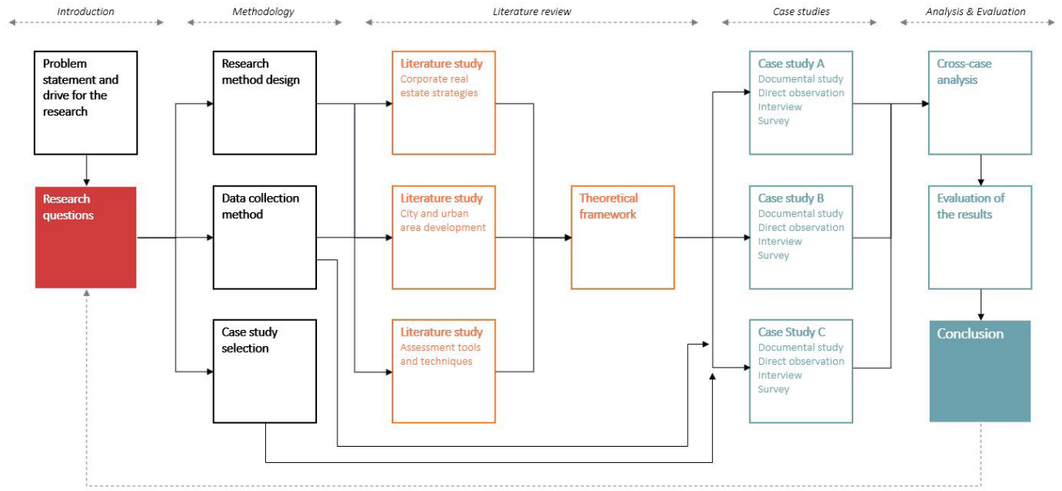


Figure 3.2
An overview of the research method (own illustration).

04
Case Studies

4. Case Studies

In this chapter, three case studies are conducted to acquire insights from Dutch practices regarding the interaction between the corporate office buildings and cities: The Rijnstraat 8 in The Hague, Circle in Amsterdam, and The Edge in Amsterdam. On each case, the case study begins with the introduction of the case and case description in section to explain how the building was developed. Then, the corporation's requirements on the real estate object are elaborated, after which city's requirements and urban planning goals, architect's ideas and motives, real estate object outcomes, people behaviour in the public areas, and users' reflections on the real estate object. Findings of the case studies are from the documental research, direct observation of the building, direct observation of people's behaviour in the public area, semi-structured interviews, and user surveys. Therefore, this chapter aims to acquire answers for the following sub-questions:

SQ3. *What are the corporation's requirements, the city's requirements, and the designer's motives for the development of the real estate object?*

SQ4. *What are the outcomes of the real estate object and its surroundings? And how do people behave in the building and public area?*

SQ5. *How does the real estate object influence the users from both the corporation and city sides, and how do they interact with the building?*

Amsterdam South District (Zuidas)

Since two of the cases are located in the same area, Amsterdam Zuidas or Amsterdam South District, the city's requirements and urban planning goals of the particular area are discussed first before the research specify on each case variables.

Amsterdam has been the city for living, working, leisure for centuries. The city gradually changes and develops over the years. However, due to a concentration of activities and people in Amsterdam, the city lacks space and capacity becomes limited. There was an idea of creating new urban environments with a mixture of functions and connect to the transport hub. This leads to the development of Amsterdam Zuidas or Amsterdam South District (De Architekten Cie., 2009).

City's requirements and urban planning goals

Figure 4.1
Amsterdam Zuidas in 1970 (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009).

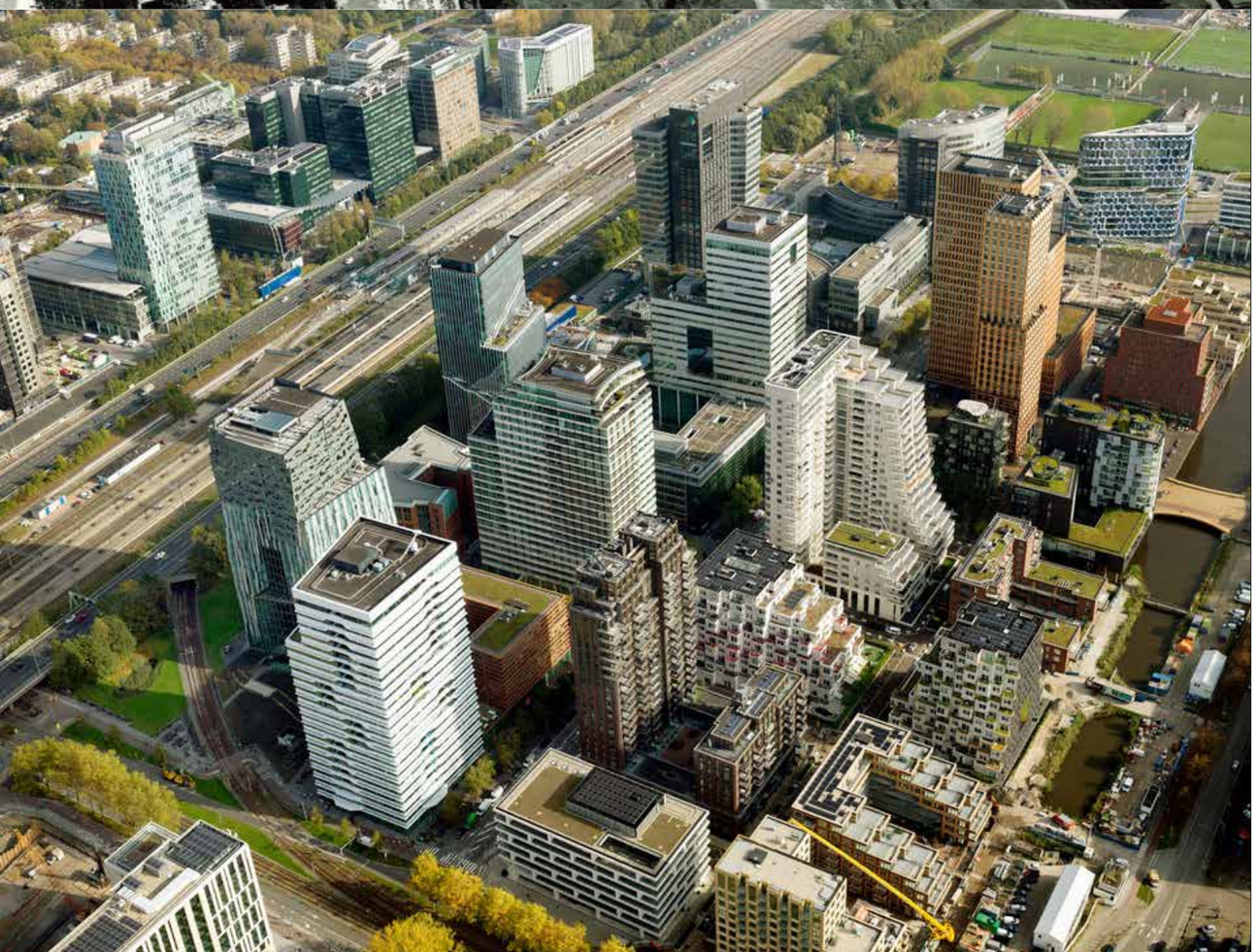


Figure 4.2
Amsterdam Zuidas in 2007 (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009).

Amsterdam South districted was a dull area occupied by residential functions, office functions, and academic facilities separately. There were insufficient green areas and accessible public spaces and the connection between buildings and the public area was lacking (De Architekten Cie, interview, October 2, 2020). However, many reasons are supporting that Amsterdam South District has the potential to be transformed into the new hyper-urban centre of an urban conglomeration (de Bruijn, 2005). The Amsterdam South District has excellent accessibility trait. The area can be accessed 7 minutes by train from Schiphol airport, 10 minutes by tram from Museumplein, metro from Amsterdam Central, and 10 minutes by bicycle from Amstelscheg. Besides, the area is considered to be a rich setting and occupied by divers inhabitants (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009).

Figure 4.3
Masterplan version 1998 by Urban Planning Council, Pi de Bruijn, and urban planner (De Architekten Cie., 2009).

It all started by the initiation of the Financial sector of Amsterdam. They were looking for a new business district between the airport and Amsterdam city. Around 20 years ago, there were more housing functions. The municipality required that Amsterdam South District would transform into a more mixed area of residential functions, working functions, and leisure (Municipality of Amsterdam, interview, October 11, 2020). Urban Planning Council, Pi de Bruijn, and urban planner were appointed to develop Amsterdam South District masterplan in 1998 (figure 4.3). The goals of this version of the masterplan are

to improve the connection between Zuidplein and Gustav Mahlerplein, to mixed residential functions and offices, and to increase the density of the area by encouraging the development of highrise buildings (De Architekten Cie., 2009). To achieve these goals, the infrastructure, such as a motorway, metro, and railway, will be channelled underground in phases through the integration of dock model (figure 4.4 and 4.5).

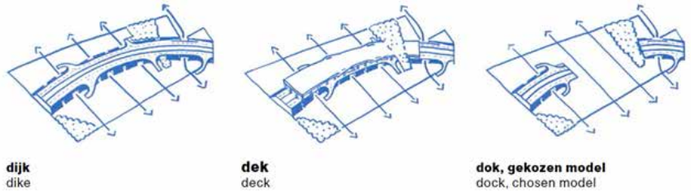


Figure 4.4
The three models for the integration of the ring road (De Architekten Cie., 2009).

Figure 4.5
Cross section of dock concept (de Bruijn, 2005)

In 2007, the municipality published vision document of Amsterdam South District development (figure 4.6), which further developed from the original masterplan in 1998. The goal of the transformation of Zuidas stated in the report is to develop Zuidas into "A sustainable and successful urban environment of inter-national allure, but with tradi¬tional Amsterdam qualities" (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009). In order to achieve this ambition, the three concepts are realised: The Dok, layered project structure, and sustainability.

Nowadays, several changes from the original plan have been made. Firstly, the idea building tunnel over the urban infrastructure is cancelled. The A10 highway and Amsterdam Zuid station will be kept above the ground (Municipality of Amsterdam, interview, October 11, 2020). Secondly, the municipality plans to add two more functions to mix in Amsterdam South District, which are shops and academic facilities. The area needs more of those two functions due to an increase of residence in Amsterdam South (Municipality of Amsterdam, interview, October 11, 2020).

Next, we will discuss the requirements of Amsterdam South District and regarding CIRCL pavilion. The first requirement is to have a mix and variety of functions in the area. The goal is that the overall area of Zuidas should have 29% of residential functions, 38% of offices, and 33% of public amenities. Besides, the city demands that each construction zone must consist of office, housing, and public amenities. The mentioned public amenities include health and welfare, educational facilities, sport, retails, food and beverage, science, art and culture (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009).

The second requirement is that Zuidas must facilitate flexibility and can be dynamically adapted in response to economic and social development and changes. Significantly, the ground floor of the buildings should be flexible and easy to be adapted for other functions (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009; Municipality of Amsterdam, interview, October 11, 2020). Next, the demand for open spaces focuses on the quality of public spaces rather than quantity in which they

emphasise allure, warmth, unity, comfort, many different forms of use, and also the importance of the interaction between plinth functions and public spaces. In addition, the use of quality public material and use of trees are also important factors to achieve quality open spaces in Zuidas. The following five different components of open spaces are required in Zuidas: squares, neighbourhood squares, parks, sports fields, and communal gardens as shown in figure 4.7 (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009; de Bruijn, 2005)

The requirement to incorporate small businesses in the area is significant to create a better connection between plinth functions and public space. It also provides the Amsterdam city vibe in the area, which the small businesses seem to be closer to people (Municipality of Amsterdam, interview, October 11, 2020). For the ground floor and other floor to floor height, there are municipal building regulation specifically focuses on the area of Amsterdam South District. The height of floor to floor must be at least 4.5 metres, which is higher than the restriction in Amsterdam city (Municipality of Amsterdam, interview, October 11, 2020).

For the building height, the maximum height of the building is 30 metres. Not only it ensures that the inner courtyard receives natural light, but also ensures that buildings are below the flight path to and from Schiphol Airport (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009). However, there are some exceptions made for buildings in the centre of Zuidas to reach up to 105 metres. They are considered case by case. For connectivity and inclusiveness, the municipality aims to maximise the efficiency of connectivity between the transport network. This includes the linkage between transport hubs, and improvement and widening of pedestrian walkways and bike lanes. It is also essential to include sounds of the local community to create the best scenario use of Zuidas's position. For the local identity concerns, even though Zuidas aims to embrace the international business environment, the municipality makes it clear that must preserve the local 'root' and become a distinctive part of Amsterdam city by supporting local businesses and activities. However, the identity is never fixed but always dynamically changes through time to response economic and social demands (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009; Municipality of Amsterdam, interview, October 11, 2020).

For aesthetical aspect, there are no specific or controls from the municipality on this aspect. Generally, the design of the building is assessed by architectural aesthetics committee, which many design experts are parts of the team. For the safety aspect, there are no criteria or regulations regarding the safety of the neighbourhood yet since Amsterdam is considered a safe city (Municipality of Amsterdam, interview, October 11, 2020).

Figure 4.6
Zuidas vision in 2007
(Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009).

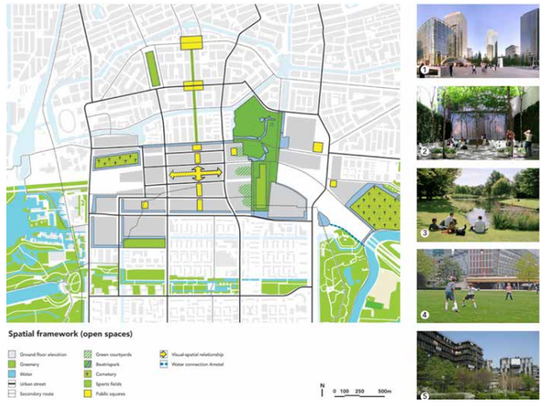


Figure 4.7
Spatial framework of open spaces in Zuidas (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009).

Figure 4.8
ABN AMRO CIRCL building (photo by van Duivenbode, O.)

Case 1: ABN AMRO CIRCL Pavilion

Introduction

Case description

Building type:	Pavilion, circular office building
Location:	Amsterdam South District
Project area:	3,350 sqm
Owner:	ABN AMRO
User:	ABN AMRO, reserved users, small businesses, entrepreneurs
Architect:	De Architekten Cie.
Municipality:	Amsterdam
Year of completion:	2016

CIRCL is an office pavilion owned by Dutch bank corporation, ABN AMRO. The pavilion is located right in front of ABN AMRO headquarter on the Berlage Axis, Gustav Mahlerplein, Amsterdam South District (figure 4.9). The building is 150 metres away from Amsterdam Zuid train station, which can be accessed by feet or bicycles. The location of the building is the business district concentrated on office buildings and work facilities. Amsterdam South District was the dull and mono-function area before being transformed into a more vibrant area. The primary acknowledged features of CIRCL are that CIRCL was designed based

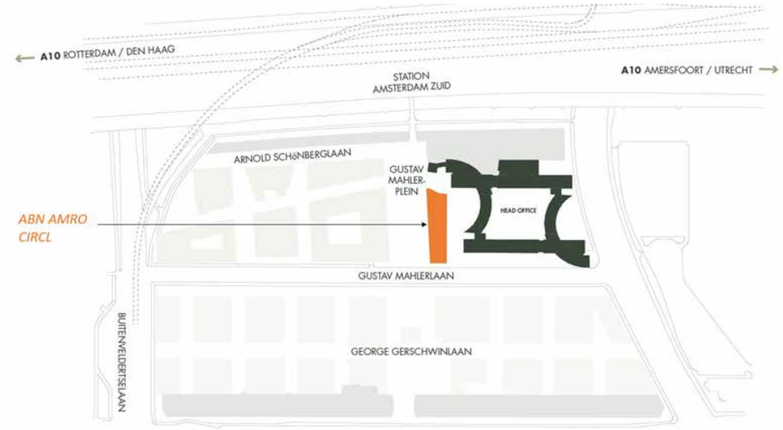


Figure 4.9
CIRCL location in Amsterdam South District (Circl, 2017)

on the principles of sustainability and circularity, considering many circular ideas. For example, reduction of resources consumption, waste-free, recyclability, and resilience (De Architekten Cie, 2017). The main function of CIRCL is to provide an extensive flexible meeting facility for ABN AMRO. This case is selected due to its positioning in the urban fabric and its public space on the terrace, which has a potential connection to the public flow.

Corporation's requirements

ABN AMRO is the third-largest bank in the Netherlands, founded in 1991 from the merging of ABN and AMRO (Marketswiki, 2020). The bank offers full financial services to private, retail, and coporate clients. According to the ABN AMRO annual report 2019 (ABN AMRO Bank N.V., 2019), the primary purpose of ABN AMRO is to "banking for better, for generations to come." To achieve this purpose, the bank strategically operates based on the three pillars: support clients' transition to sustainability, reinvent the customer experience, and build a future-proof bank (figure 4.10). The bank's main goal and strategy are not only financial value but also on "accelerating the transition to sustainability.". To set an example of leading in sustainability, ABN AMRO decided to build the pavilion in front of their headquarter.

The pavilion plan began in 2013, which aimed to add more green area, few small restaurants, and planned to transform Amsterdam South District into the next New York's Central Park (Circl, 2017). At first, due to a shortage of meeting space in the headquarter, the pavilion was planned to provide meeting spaces to receive guests, host events, hold meetings, and flourish with cafes, bars, and restaurants. By De Architekten Cie, the initial design was realized. The pavilion was meant to be the beautiful conventional, concrete, pavilion for the corporate environment (figure 4.11). However, during the construction of the basement of the building, the project was temporarily stopped as ABN AMRO saw that the design of the Pavilion at that time did not reflect the corporation's image and goals (Circl, 2017; De Architekten Cie, interview, October 2, 2020).

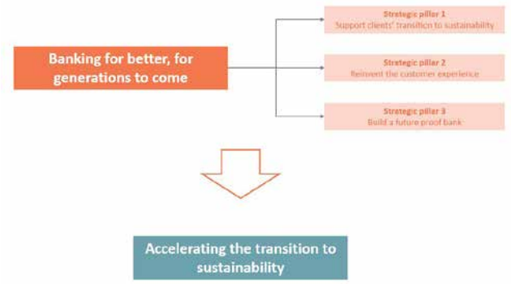


Figure 4.10
ABN AMRO's value creation topics (ABN AMRO Bank N.V., 2019).

Figure 4.11
The initial design of the Pavilion (Wax Architectural Visualization, 2016).

Consequently, the new idea of the building had been proposed by De Architekten Cie, shifting from a conventional building into a fully circular building. The ideas of circularity of the pavilion include reduction of energy consumption, easy to disassemble, use of recycled materials in every component of the building, fully sustainability, and flexibility (Circl, 2017; De Architekten Cie, 2017; De Architekten Cie, interview, October 2, 2020). It also means that the corporation requires the building to be a good working environment and can be adapted for changes in the future as well as providing multi-use facilities. Besides, the workplace in the building is required to be mostly shared-working space, and reservable meeting facilities in which anyone can book meeting spaces and use them (De Architekten Cie, interview, October 2, 2020). Later on, the building was given a name after its main concept, CIRCL.

For the physical requirement, ABN AMRO demands that the pavilion should be located right in front of the headquarter to connect the headquarter building and Gustav Mahlerplein. However, the corporation does not demand the new pavilion to block the view of the headquarter completely, in which the appropriate height of the new pavilion must be realized. For aesthetical aspects, there is no specific requirement for building characteristics apart from the building should be adequately beautiful and represent the corporation's image (De Architekten Cie, interview, October 2, 2020).

For the social aspect, ABN requires that the "living lab" space in the building would provide spaces for presenting new sustainable innovations and experiments. This means that the corporation tends to seek connection with small businesses, start-ups, and entrepreneurs for new innovative ideas. There was an involvement of the Delft University of Technology from the beginning of the processes, and they intend to remain in the living lab to monitor experiments or start a new one (De Architekten Cie, 2017; De Architekten Cie, interview, October 2, 2020).

Designer's ideas and motives

The outcomes of the real estate object are defined from the three components: the corporation's requirements, the city's requirements, and inputs from the architect (Vane Putte, 2016). During the design process, there was no area and function requirement from the client as they intended to give freedom to the architect to propose the idea without restriction. Only the main concept of circularity was being concerned in a broader view (De Architekten Cie., interview, October 2, 2020). Although the main requirement for CIRCL from ABN AMRO is the most sustainable and circular building, De Architekten Cie also inputs additional ideas for the pavilion.

For the location choice, the reason behind building separated pavilion from the headquarter is that the architect intends in connect ABM AMRO to the public. Still, at the same time, the architect tries not to obstruct the main approach of the main quarter. However, the pavilion is directly connected to the headquarter on the basement floor (De Architekten Cie., interview, October 2, 2020). The main functions of CIRCL are 1,800 sqm of meeting spaces and 1,200 sqm of flexible workspace, meeting rooms, and restaurant. Therefore, there are activities such as multi-use function, meeting, flexible working, eating, presenting ideas of circular innovations in which all activities are informal and open to the public. This results in the design of many accessible doors on the ground floor (figure 4.12 and 4.13). Not only many accessible helps the building to open and connect to the public, but also downsize of the façade plane to be closer to human scale. Many accessible doors make the ground floor flexible and able to be sub-divided the unit into smaller units or other purposes (De Architekten Cie., interview, October 2, 2020).

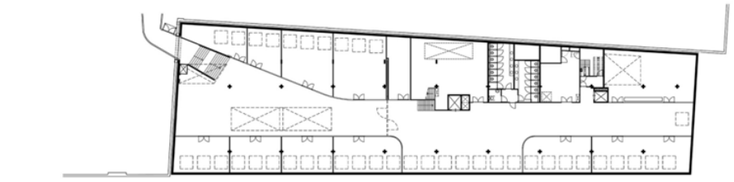


Figure 4.12
Basement plan, meeting room function and a connection to the headquarter (De Architekten Cie., 2017)

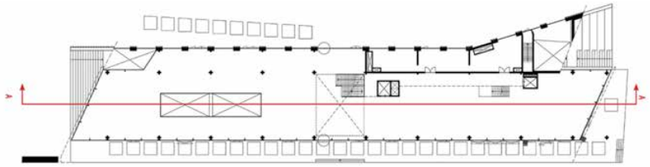


Figure 4.13
Ground floor plan, multi-purpose space, (De Architekten Cie., 2017)

The reason that meeting rooms are allocated to the basement is the ground floor is meant to fully open to the public, which can host exhibition events, café and restaurant. However, the meeting rooms on the basement floor are designed to have high ceiling space, and there are void spaces to lead natural light to the basement (figure 4.14). Besides, light tubes are installed to enhance daylight intensity on the basement floor (De Architekten Cie., interview, October 2, 2020). These are the inputs from the architect without requirements from the client.

The architect has designed the ground floor height of CIRCL to be 5.50 metres. Apart from improving interaction with public people, higher ground floor is flexible to transform to other function as well as adding mezzanine floor. The mezzanine offers flexibility to the ground floor and provides informality to space. The building height is determined to be an excellent spatial boundary for Mahlerplein square. At the same time, the architect does not want CIRCL to obstruct the view of the headquarter. Therefore, CIRCL has only two floors of the total height of 10 metres. The public space is located on the terrace of the second floor, which fully invites public people to access and occupy the space (De Architekten Cie., interview, October 2, 2020).

Figure 4.14
Cross-section of CIRCL, demonstrating allocation of functions and void spaces leading natural light to the basement floor (De Architekten Cie., 2017).

Initially, the idea of corporate feeling was proposed, such as using stucco and marble as the primary interior materials. Since ABN AMRO changed the concept of the pavilion to be fully circular, the architect shifts the concept of material to be warmth corporate vibe, decorating with re-used woods, even using wood structure (figure 4.15). Most area of the ceiling is not covered with finished material but to show engineering system on the ceiling. This was carried out because of the fact that CIRCL requires to be easily disassembled. The building provides nightlight to maintain transparency during the night time only at the restaurant part while the multi-purpose space remains dark due to the reason of reducing energy consumption (De Architekten Cie., interview, October 2, 2020).

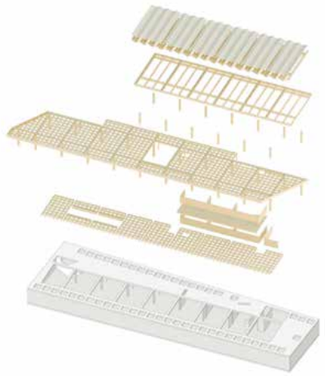


Figure 4.15
Wood structure and decoration of CIRCL
(De Architekten Cie., 2017).

In terms of social interaction, there was no involvement of local communities in the design processes of CIRCL since it is not the public development project. However, local people, such as representatives from the academic institution, were invited to brainstorm activities that could possibly happen at CIRCL. Consequently, many local-related activities take place at CIRCL occasionally, such as movies night and conferences. During the realisation of material selection of CIRCL, small scale suppliers, start-up companies were invited to involve in the design processes and presented their ideas to ABN AMRO (De Architekten Cie., interview, October 2, 2020). According to the urban planner (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009; Municipality of Amsterdam, interview, October 11, 2020)., Amsterdam South District aims to be the next New York city's Central Park. The architect responses this by designing green terrace space and providing green wall area to integrated with the concept (De Architekten Cie., interview, October 2, 2020). Lastly, the architect states that the role of corporate office buildings that could help to maintain the safety and security of the neighbourhood is to provide a variety of functions and avoid mono-function at all cost (De Architekten Cie., interview, October 2, 2020).

Real estate object outcome

This section explains the characteristics of the real estate object through direct observation by the researcher. All the experts' inputs are excluded in this section, but the researcher will describe the experience of occupying the building from the architect's point of view as the researcher was an architect for four years. The variables from the physical characteristics (figure 2.9) will be the guidelines for an assessment.

The first variable is the location of CIRCL. The building is located at Amsterdam South right in front of ABN AMRO headquarter, which can be clearly seen after getting out of the Amsterdam Zuid station (figure 4.16). CIRCL is directly connected to the street without any boundary, and almost all accesses are on the same level as the street. There is a garden in front of ABN AMRO, which can be accessed through the big gate next to CIRCL. Inside the garden, there is a staircase leading to the terrace garden. There is no entry control; therefore, everyone can access to the garden and terrace of CIRCL.

Secondly, the characteristics of public space are examined. The green space in the middle of Mahlerplein offers free form diagonal shape of plantings and 7-8 metres tall trees. The pavement pattern is defined similarly as the form of plantings into two shades of granite paver. The edge of the plantings provides a hard surface for seating. The terrace is designed to have a similar shape to the garden in Mahlerplein, but the materials and trees are more diverse. It also offers a variety of street furniture such as benches, coffee tables offering more alternative activities. The garden in front of the headquarter also has free form diagonal shape of landscape design with more diversity of landscape materials and vegetation (figure 4.17, 4.18 and 4.19).

Figure 4.16
CIRCL building from Gustav Mahlerplein's perspective
(own photography)

Figure 4.17
Green area in Mahlerplein
(own photography).

Figure 4.18
The garden on CIRCL's terrace
(own photography).

Figure 4.19
The garden of the Headquatre
(own photography).

Figure 4.20 (right)
Plinth of CIRCL from the headquartre (own photography).

Figure 4.21 (upper left)
Plinth of CIRCL from Mahlerplein side (own photography).

Figure 4.22 (lower left)
Plinth of CIRCL from Mahlerplein side (own photography).

For the plinth of CIRCL, the plinth façade is transparent and continuity for a whole 80 metres length of the façade. However, it is difficult to see activities inside the building if the lights are turned off due to the reflection of glass windows. The façade glass plane is divided into smaller units, which matches the human scale better. There are eight accessible doors on the street-side façade, which offer better flexibility to adapt the functions of the building (figure 4.20, 4.21 and 4.22). Moreover, there is restaurant function spreading to the street area. For instance, the restaurant provides seats and tables on the street in front of the building.

For the ground floor height concern, the ground floor height of CIRCL is 5.50 metres. The height is sufficient to host many public activities, such as conferences and presentations. Some of the areas are even designed to have an atrium space offering a higher volume of the interior environment (figure 4.23 and 4.24). On the basement floor, the meeting room facilities fully support business activities and offer quality space with natural light from the light tubes and double volume spaces (figure 4.25 and 4.26).

The ratio between CIRCL's height and the street width is approximately 1:3, which is relatively low compared to other buildings in Amsterdam South District. With this certain height, the building is better connected to the street and inviting people to the building or public spaces of the building. During the night time, CIRCL only provides night light at the restaurant and café function (figure 4.27 and 4.28). However, the lighting is sufficient to maintain transparency of the plinth. At least for the researcher, it feels safe to pass the building during the night time.

Figure 4.23
Interior space of CIRCLE (De Architekten Cie., 2017).

Figure 4.24
Academic meeting activities (own photography).

Figure 4.25 (left)
Double volume space (De Architekten Cie., 2017).

Figure 4.26 (right)
Light tubes to provide natural light to meeting rooms on the basement floor
(own photography).

Figure 4.27
Night light during the night time (De Architekten Cie., 2017).

Figure 4.28
Night light during the night time (De Architekten Cie., 2017).

Lastly, the building is outstanding and unidentical to any other buildings in the surroundings regarding harmony of colour, texture, and material. Most buildings around Gustav Mahlerplein have formal corporate characteristics and have more rigid order. On the other hand, CIRCL is decorated with re-used woods to express informal warmth atmosphere. The building also tries to convey that everyone is welcomed to the building. Especially, comparing CIRCL to the ABN AMRO headquarter, the two buildings seem to contrast completely.

People behaviour in the public area

In this section, direct observation of people's behaviour in the public area is conducted to see how the building interact with people. Due to the crisis of covid-19 in the Netherlands, CIRCL has been temporarily closed. This results in fewer people passing Gustav Mahlerplein than the usual situation. Since all activities in the CIRCL are missing, there is a lack of interaction and connection between the building and people. Figure 4.29 demonstrates the heat map and how people behave in the public spaces according to the initial direct observation. The technique used for the heat map is mapping, counting, and tracking (Gehl & Svarre, 2013).

According to the counting technique, there are 138 people passed the street in front of CIRCL per hour. People tend to walk on the street next to CIRCL than walking right through the park in the middle of Gustav Mahlerplein. Few people would stop in front of CIRCL since there are no activities at all. Only two people stopped for phone calls, three people stopped for smoking, and one person stopped for taking a photo of ABN AMRO's garden. There are 22 people went in or came out from the ABN AMRO headquarter per hour. Most of them came out to get coffees, make phone calls, and smoke cigarettes. On the other side of the street, in front of Houthoff building, more people are standing there since there is a kiosk selling food on the street. In addition, the café at the ground floor of De Nieuw Poort building still opens, in which many people hang out there or buy take-out coffee (eating at the café is not allowed at the moment).

The street bench in front of Amsterdam Zuid station is the most popular area for people on the street to sit for a while before continuing their journeys. Eighteen people stopped for sitting at this bench in an hour. Five people occupied the seatings at the plantings in the garden of Mahlerplein per hour. Only one person was seen sitting on the bench in the terrace of CIRCL, two were seen sitting on a seat in front of CIRCL, and one was seen sitting in the ABN AMRO headquarter garden in one hour period.

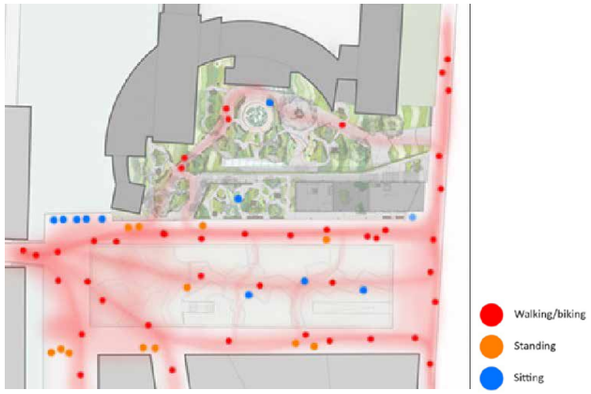


Figure 4.29
Heat map and people's behaviour in the public area (own illustration).

Users' reflection on the real estate object.

The survey of users' reflection on the real estate object was conducted through a questionnaire asking 16 samples to rate numeric scores on each question. The respondents consist of employees who work for ABN AMRO, people who organised the event, people who attended events at CIRCL, people who passed the building, and people who maintain the building. The occupation of respondents includes architects, banker, delivery man, electrician, financial analyst, real estate developers, students, and sustainability consultant. Appendix C presents the raw survey results of this case. Three sections of the questionnaire were asked for each respondent.

No.	Functionality and use value variables	Score
1	Accessibility	4.88
2	Workplace and business activities	4.14
3	Increase in productivity	3.80
4	Workplace flexibility for changes	4.25
5	Safety and security	4.40
6	Operating and maintenance	4.57
7	Technology implementation	4.00
8	Mix and variety of functions on ground floor	4.13
9	The flexibility of ground floor functions	4.31
10	Inclusion of small businesses	3.63
11	Opened public space	4.44
12	Exchange functions	4.15
Average score		4.23

Table 4.1
Score summary of functionality and use-value variables of CIRCL (own illustration).

For the first section of functionality and use value, the score summary is explained in table 4.1 Most of the respondents see that CIRCL can be easily accessed and connected to transport hubs, which rates 4.88 for accessibility. The building is well maintained and in good condition, being rated 4.57 for maintenance and operating. The users also think that the building has public spaces that are opened to the public and feel safe to occupy the building, which opened public space and security are scored 4.44 and 4.40, respectively. The two lowest scored variables are an increase in productivity and the inclusion of small businesses. Although CIRCL tries to incorporate new innovative start-ups companies, hosting experiments and workshops in the building, this variable is rated at 3.63. For an increase in productivity, it is being scored at 3.80. There is an issue that needs to be mentioned. Most of the pedestrians do not know whether CIRCL facilitates the inclusiveness of small businesses or support the productivity of the occupants of the building. Only samples of people who have been inside the building would have this insight. The average score for functionality and use-value variables is 4.23.

No.	Physical characteristics variables	Score
1	The liveliness of the location	4.50
2	Aesthetical excellency	4.31
3	Harmony of colour, texture, and materials with surroundings	3.44
4	Sufficient ground floor height	4.50
5	Transparency of ground floor	4.71
6	Diverse activities on the ground floor	3.56
7	Night light to maintain transparency	3.20
8	Small scale units	3.73
9	Sufficient accessible doors	4.20
10	Building height and street width	4.38
11	No physical boundary public space	3.20
12	Lively plaza with a variety of materials	3.93
Average score		3.97

Table 4.2
Score summary of physical characteristics variables of CIRCL (own illustration).

The second section is the score of physical characteristics variables. Table 4.2 demonstrates score summary of CIRCL for this section. The highest scored physical characteristics variable is the transparency of the ground floor, in which respondents rated this variable for and an average of 4.71. The other two outstanding variables are the liveliness of the location and sufficient ground floor height, both being scored at 4.50. The users give 4.38 and 4.31 for building height and street width and aesthetical, respectively. The score implies that users see the aesthetical values and feel that the building is constructed with an appropriate size. The two lowest scored variables of physical characteristics are night light to maintain transparency and no physical boundary public space, which both of them being scored at 3.20. For the night light, due to the sustainability and circular concerns, the building turns on the light only at the restaurant. This results in the moderate satisfaction of the users on the illumination of CIRCL. For the boundary of public space, both the garden on the terrace and the garden in front of the headquarter are enclosed by CIRCL and designed walls. Users need to enter the gate inside to access to those public spaces. 3.97 is the average score for the physical characteristics variables.

No.	Social interaction variables	Score
1	Involvement of users	3.20
2	Users' satisfaction	4.19
3	Visiting of public people	3.17
4	Safety and security of the street	4.38
5	No pollution	4.15
6	Sense of belonging	3.20
7	The liveliness of the street	4.63
8	Connection with transport hubs	5.00
9	Local identity	3.81
10	Use of facilities by the public	3.13
11	Diverse activities on the street	3.43
12	Wayfinding	3.31
13	Local communities involvement	3.33
14	Market at the public space	1.33
15	Public installation, workshop, and activities	3.75
Average score		3.60

Table 4.3
Score summary of social interaction variables of CIRCL (own illustration).

Lastly, the summary of social interaction scores is explained in table 4.3. All of the respondents agree that CIRCL has good connectivity to all kinds of transport hubs, being rated for 5.00. The liveliness of the street is scored 4.63, in which the users see that many activities are happening on the street in front of the building. Both users' satisfaction and sustainability scores are remarkable, which are given 4.19 and 4.15, respectively. Due to the fact that there has been no free market on the street around this area, this variable is scored only 1.33. The users also expect to witness more public people occupying CIRCL. Use of CIRCL's facilities variable is rated at 3.13 while the building visit by public people is scored at 3.17. The average score of social interaction variables is 3.60.

Results

This section summarises results from the data collection of CIRCL case. Table 4.4 presents an overview of results for functionality variables, while table 4.5 explains an overview of results physical characteristics variables. Lastly, the result summary of social interaction variables is shown in table 4.6.

No.	Functionality variables	City Req.	Corp. Req.	Arch Intentions	Outcomes	People's behaviour	Score	Tool/technique
1	Accessibility	Improvement of connectivity	Connect HQ and the street	Opened building for the public	easy to be accessed	22 people access the building per hour	4.88	USI, BPA, Building Decree, BREEAM, Plinth Rating
2	Workplace and business activities	Offices	Shared working space, meeting facilities	1,800 sq m meeting spaces 1,200 sq m workplaces, meeting rooms and restaurant	Meeting space on the ground floor, meeting room at basement, shared working space on first floor	People use the spaces for working and meeting, currently close due to Covid-19	4.14	USI, BPA, POE
3	Increase in productivity		good woking environment	high quality meeting rooms			3.80	POE
4	Workplace, flexibility for changes	Flexibility for changes	flexibility, multi-use facility	shared-working space	Informal shared working space on the first floor		4.25	Plinth Rating
5	Safety and security					Approached by receptionist when enter the building	4.40	USI, BPA, Building Decree, BREEAM, Plinth Rating, POE
6	Operating and maintenance			easy to be disassembled	Well maintained building		4.57	USI, BPA, Building Decree, POE
7	Technology implementation						4.00	BREEAM
8	Mix functions on the ground floor	Mix functions; residential, offices, shops, academic	meeting space, café, bar and restaurant	meeting spaces, restaurant	Meeting space, reception, restaurant, café on mezzzanine		4.13	USI, BPA, Building Decree, Municipal reg., BREEAM, POE
9	Flexibility of ground floor functions	Flexibility for changes	flexibility, multi-use facility	many access doors, high ground floor hieght	Meeting space can be adapted to other functions		4.31	Plinth Rating
10	Inclusion of small businesses	small businesses	Living lab	Small suppliers, start-ups	Living lab is used for introducing new innovative ideas		3.63	Plinth Rating
11	Opened public space	Allure public space			everyone can access the area	1 person sits in the HQ garden, 1 person sits on the terrace per hour	4.44	Municipal reg., Public Life, Plinth Rating
12	Exchange functions				Many seatings and tables extended from restaurant	2 people sits at the seatings in front of CIRCL	4.15	Plinth Rating

Table 4.4
Overview of results for functionality variables of ABN AMRO CIRCL (own illustration).

No.	Phy. characteristics variables	City Req.	Corp. Req.	Arch Intentions	Outcomes	People's behaviour	Score	Tool/technique
1	The liveliness of the location	Increase density				138 pedestrians per hour	4.50	Municipal reg., Public Life
2	Aesthetical excellency		Beautiful and represent corporation's image	Warm corporate look	woods and timbers are the main material. No ceiling finishing		4.31	Pref. for vis., BREEAM, POE
3	Harmony of colour, texture, and materials with surroundings				Different from other surrounded buildings		3.44	Pref. for vis.
4	Sufficient ground floor height	4.50 m.		5.50 m.	5.50 m is sufficient for public activities. Also higher volume space		4.50	Municipal reg., Plinth Rating
5	Transparency of ground floor			Open to the public	Transparent glass	No apparent interaction with the plinth, 5 people stop in front of CIRCL per hour	4.71	Plinth Rating
6	Diverse activities on the ground floor	Mix functions; residential, offices, shops, academic	meeting, conference, eat and drink, event	meeting, eating	Meeting, working, eating and drinking, exhibiting, conferencing		3.56	BPA, USI, Public Life, Plinth Rating
7	Night light to maintain transparency			Only at restaurant	Apart from the restaurant, dark during the night time		3.20	USI, BPA, BREEAM
8	Small scale units			Many access doors	Many window frames and door frames divide glass plane		3.73	Pref. for vis., Plinth Rating
9	Sufficient accessible doors			many access doors	eight access doors along the 80 m façade length	People enter the man entrance	4.20	Plinth Rating
10	Building height and street width	105 m. for Zuidas centre	Do not block HQ view	Spatial boundary, keep view of HQ	approximately 1:3 ratio		4.38	Municipal reg., Plinth Rating
11	No physical boundary public space	Connection between public space and plinth		Terrace on roof top	Access through opened gate, staircase lead to the terrace	People prefer garden on Gustav Mahlerplein	3.20	Public Life
12	Lively plaza with a variety of materials	Quality material and vegetation			Diagonal shapes, seatings, coffee tables, diverse plants, diverse materials		3.93	Plinth Rating

Table 4.5
Overview of results for physical characteristics of ABN AMRO CIRCL (own illustration).

No.	Social interaction variables	City Req.	Corp. Req.	Arch Intentions	Outcomes	People's behaviour	Score	Tool/technique
1	Involvement of users		TU Delft, living lab				3.20	USI, BPA, SCI
2	Users' satisfaction						4.19	USI, BPA, Public Life, POE, SCI
3	Visiting of public people		reinvent customer experience	open to the public	Building tour events	The building was closed due to Covid-19	3.17	USI, BPA, Public Life, Plinth Rating
4	Safety and security of the street			provide variety of functions avoid mono function	The street looks safe	18 people sit on the public benches per hour, people spend time in Gustav Mahlerplein	4.38	Building Decree, BREEAM, Public Life, Plinth Rating, SCI
5	No pollution	Sustainable urban environment	Transition to sustainability	Circularity, sustainability	Neutral energy building, reused-material		4.15	Building decree, BREEAM, SCI
6	Sense of belonging						3.20	Public Life, SCI
7	The livelness of the street	Quality public space		Green terrace space and green wall design	The building makes street more lively		4.63	Public Life, Plinth Rating, SCI
8	Connection with transport hubs	Connectivity			100 m. away from Amsterdam Zuid station, 200 m. away from Amsterdam Zuid Metro station	Most of people travel to/from Amsterdam Zuid Station	5.00	USI, BPA, Municipal reg., BREEAM, Public Life, Plinth Rating, SCI
9	Local identity	Traditional Amsterdam qualities					3.81	SCI
10	Use of facilities by the public			Movie night, conference	Meeting spaces for innovative presentations	The building was closed due to Covid-19	3.13	Public Life, Plinth Rating, POE, SCI
11	Diverse activities on the street	Mix functions			No apparent social activities	Activities are walking, cycling, sitting, chatting, eating, smoking, making phone calls	3.43	BPA, USI, Public Life, Plinth Rating
12	Wayfinding				Easy to recognise		3.31	Public Life
13	Local communities involvement	Voices of local community		academic actors			3.33	SCI
14	Market at the public space				No evidence of free-market		1.33	SCI
15	Public installation, workshop, and activities				Photo exhibition		3.75	SCI

Table 4.6
Overview of results for social interaction of ABN AMRO CIRCL (own illustration).

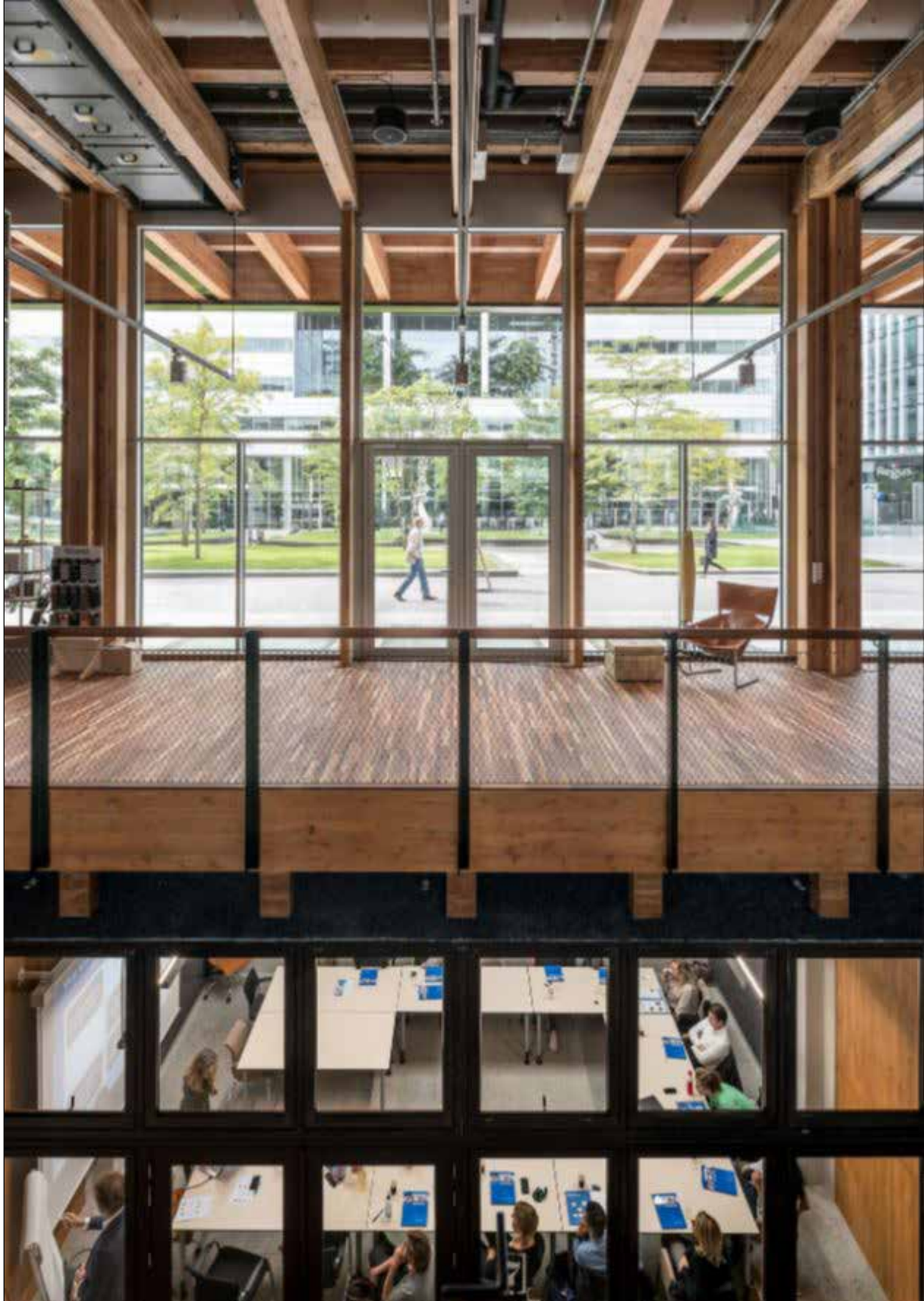


Figure 4.30
The Edge, Deloitte's office building in Amsterdam South
(photo by Tilleman, R).

Case 2: Deloitte - The Edge

Introduction

Case description

Building type:	Smart office building
Location:	Amsterdam South District
Project area:	40,000 sqm
Owner:	OVG Real Estate
User:	Deloitte, AKD, Henkel, Sandvik, Edelman
Architect:	PLP Architecture
Municipality:	Amsterdam
Year of completion:	2014

OVG Real Estate commissioned PLP Architecture to design Deloitte's office building in Amsterdam South business area after PLP won the first prize in the opened competition. The location of the building is on Gustav Mahlerlaan, Amsterdam South District, which is 800 metres away from the Amsterdam Zuid station, Mahlerplein side (figure 4.31). The building can be accessed from several public transport hubs; for example, Amstelveenseweg Metro station, VU Medisch Centrum and Parnassusweg tram stations. The Edge is surrounded by many academic institution buildings such as Academic Center for Dentistry Amsterdam, Academic Medical Center University of Amsterdam, Hogeschool

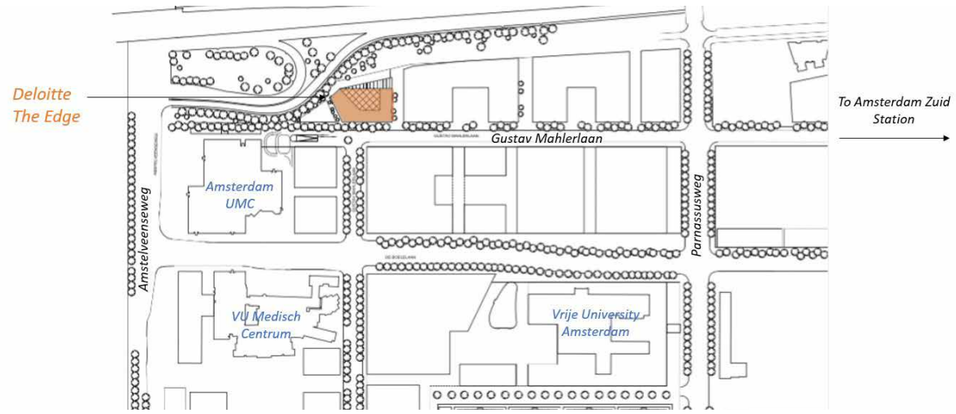


Figure 4.31
The Edge location in Amsterdam South District (PLP Architecture, 2016)

inholland Amsterdam, and Vrije University Amsterdam. There are also parts of undeveloped land and sports facilities open spaces. However, there are a few office facilities around The Edge, which imply that this location derails from the central business district of Zuidas. The Edge is one of the most sustainable buildings in the Netherlands, generating more energy than consumption and providing a pleasant workplace for users. The reasons that The Edge is selected as the case are that the building tries to open up for the building and the implementation of technology for better space allocation.

Deloitte is a global professional services network, found in 1845 in London, offering services such as audit and assurance, consulting, audit, financial and risk advisory, tax and legal services (Deloitte, 2020; Clark, 2010). Deloitte is operated based on three pillars: people, performance, and planet (Deloitte, 2020). For the people, the corporation focuses on supporting its all in diversity and inclusion strategy as well as enhancing flexibility. For the performance aspect, Deloitte runs the business activities with the concepts of resilience, flexibility, and digital transformation. Lastly, Deloitte's goal for the planet is to influence and responsibility of climate change and environmental impact (figure 4.32). The initial purposes of the project are to gather employees who were spreading around multiple buildings in Amsterdam into one building and to construct 'smart building' to support the transition to digital transformation.

For functionality and use-value aspect, the first requirement for the building is to focus on the social gathering in the building while the follow up second requirement is sustainability (PLP Architecture, 2020; PLP Architecture, interview, October 14, 2020). Deloitte required that the location of The Edge be visible to part of Amsterdam city, but not in the middle of the city centre. It is required that The Edge should be clearly seen from the primary traffic or transport. Besides, Deloitte wants to disengage from other business functions but be closer to academic functions as they aim to incorporate with educational institutions (PLP Architecture, 2020; PLP Architecture, interview, October 14, 2020). For the workplace, Deloitte requires shared working spaces where other tenants can meet up in this area. The shared space benefits for network extension with other companies in the building as well as providing more flexibility to grow or shrink down the size of companies (PLP Architecture, interview, October 14, 2020). In order to response the goal of digital age transformation, it is required that the building should implement technology to help allocation the use of space in a more efficient way. Since the head of the IT and head of the workplace of Deloitte is the same person, Deloitte aims to use a digital system to connect people, needs, communication, machines, energy system together. This requirement seeks to enhance the productivity of employees and focus on wellness in the building (PLP Architecture, interview, October 14, 2020).

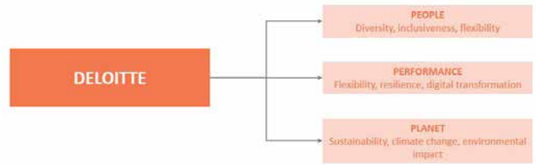


Figure 4.32
Deloitte's goals and strategic pillars (Deloitte, 2020).

For physical characteristics, the corporation requires The Edge. to be stand out and noticeable from the highway and trains. It is also essential that the building should be sufficiently transparent so the public could see activities inside the building, which makes the building look active and lively. There are no other additional requirements regarding colour, texture, material, and aesthetics (PLP Architecture, interview, October 14, 2020).

For the social aspect, the building is required to positively focus on user satisfaction with the implementation of the digital system to support users' needs. Different working atmosphere and new patterns of working are the ideas to satisfy users of the building as well as enhancing user comfort. Apart from the informal collaboration space, Deloitte also requires the building to broaden the multiplicity of social encounters to the city (PLP Architecture, 2020; PLP Architecture, 2016; PLP Architecture, interview, October 14, 2020). The requirement of sustainability leads to the aim that The Edge must be one of the most sustainable buildings in the Netherlands, setting a goal at an outstanding level (BREEAM, 2016). Nonetheless, there are no specific requirements from the corporation regarding safety, security, and user participation.

Designer's ideas and motives

After PLP Architecture won the competition and as commissioned to be responsible for the design of The Edge, two main questions were raised for the design process. *"What is the role of architecture when the workplace is permeated by layers of technology that fundamentally alter the way that we interact with our environment? "* and *"How can design augment these virtual frameworks to create places that encourage spontaneous sociability?"* (PLP Architecture, 2020). This was when the architect poured ideas for the design of the building.

OVG Real Estate and PLP Architecture proposed to the client of The Edge's location to be on Gustav Mahlerlaan since Amsterdam South District possesses with advance energy network, excellent digital structure, and can be accessed by many transport hubs (PLP Architecture, interview, October 14, 2020). To fulfil the demands of the corporation, the architect proposed the building that symbolic displays flexibility and social, physically and virtually connectivity. The Edge emphasizes informal collaboration, different working atmosphere and new patterns of working. This leads to the design of social condenser or a nucleus for the building. A nucleus of the building is presented as an atrium design connecting both vertical and horizontal space and illustrates the contemporary work environment together with the breaking area. The architect designs step bridges, which act as a stage and is visible from surroundings (PLP Architecture, 2020; PLP Architecture, 2016; PLP Architecture, interview, October 14, 2020). Therefore, the concept of the workplace design was based on the connection between workspaces and breakout spaces. The atrium connects breakout spaces with workspaces both vertically and horizontally (figure x). The workplace is designed to be an open layout for more flexibility.

At first, The Edge was planned that there would be 3,300 users occupied the building. However, the building was designed to have the capacity of 1,100 people since not all spaces are occupied all the time. Besides, this allows the building to be more flexible, easy to be allocated, and look active (PLP Architecture, interview, October 14, 2020). Mapiq was responsible for developing a digital platform to connect with all building systems, 23,000 sensors, and iBeacons. Due to the fact that The Edge is equipped with several meeting rooms, open workspaces and short-stay desks to support mobile working, the collected data is used to create an interactive 3D map (figure 4.34), which allows the users to find available workspaces and colleagues. This results in better efficiency of space usage and also encourages more number of talented people to apply for a job at The Edge (Mapiq, n.a.)

The shape of the Edge was defined to achieve climatic and energy performance goals of the building. The 15-storey height atrium with transparent façade faces the north side to allow daylight to reach almost all office spaces. On the other hand, the south side is faced with the load-bearing and smaller opening to provide thermal mass and shading (figure 4.35 and 4.36). The Atrium also works as the buffer with the exterior space and provide ventilation to the office space,

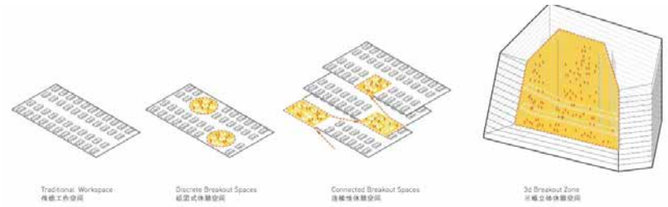


Figure 4.33
Concept of workspaces and breakout spaces (PLP Architecture, 2016).

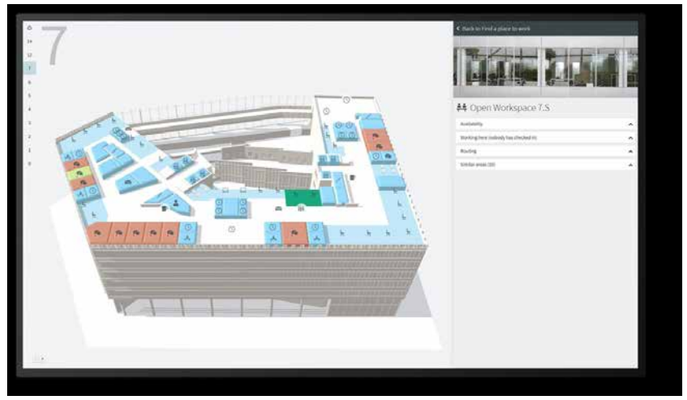


Figure 4.34
Interactive 3D map of The Edge (Mapiq, n.a.)

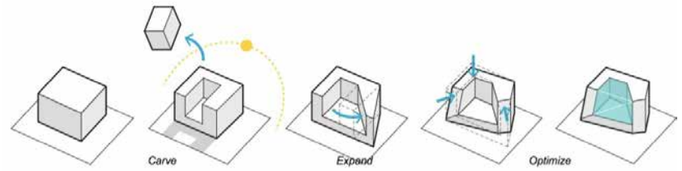


Figure 4.35
Shape concept of the Edge (PLP Architecture, 2020)

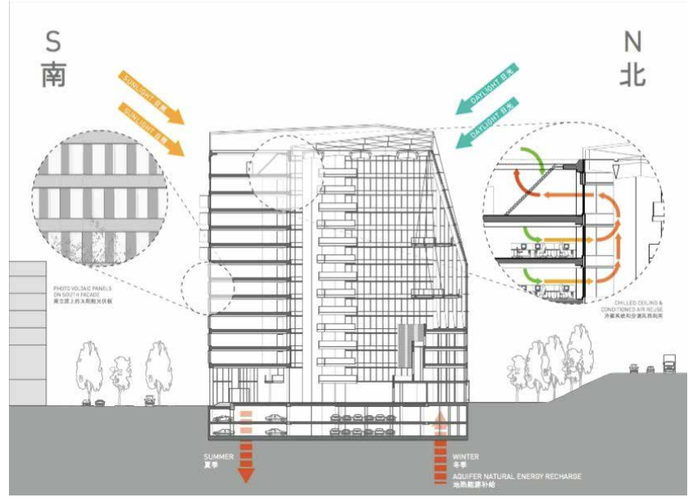


Figure 4.36
Cross-section of the Edge (PLP Architecture, 2020).

which results in a reduction of energy consumption in both summer and winter (PLP Architecture, 2020; Edgetech, 2020; PLP Architecture, 2016).

The functions on the ground floor level are shared-atrium space, restaurant, café, gym, and conference facilities. The ground floor area is optimised to be reached by daylight for a whole day. Apart from emergency doors, the building is designed to have three accessible doors on the ground floor, the main entrance on the south side, the restaurant entrance on the south side, and the entrance on the north side (figure 4.37). The ground floor height is designed to be 4.50 metres, in which the architect stated that the height is sufficient for ground floor activities, such as restaurant and gym, due to the surprising space of the 15-storey height atrium (PLP Architecture, interview, October 14, 2020). The building height is defined due to the height constraint from the flight path of planes. Since the area around The Edge is not fully developed yet, the realisation of building colour and material did not relate to any context. (PLP Architecture, interview, October 14, 2020). The Architectural Aesthetics Committee assessed the aesthetical aspects of The Edge. During the design process, there were a few involvements from the users of the building. For instance, the team discussed with universities in the surroundings for the possible activities that could be included in the atrium of The Edge. Lastly, the architecture mentioned the roles of office buildings that contribute to the neighbourhood to achieve safety and security ambitions. The buildings are required to be always opened, having active frontage, and longer opening hours (PLP Architecture, interview, October 14, 2020).

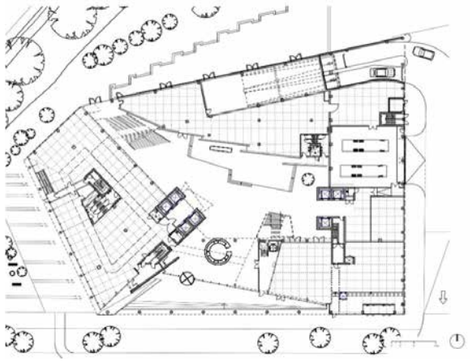


Figure 4.37
Ground floor plan of The Edge (PLP Architecture, 2020).

Real estate object outcome

This section explains the physical characteristics of The Edge from the experience of the researcher. Figure 2.9 guides the process with relevant variables for an assessment.

The first variable is the location of the building. The Edge is located on Gustav Mahlerlaan, close to the train line and A10 highway, which can be visually seen from the train (figure 4.38). However, the building can only be accessed through Gustav Mahlerlaan. There are multiple ways to reach The Edge: walking from Amstel Veenseweg metro station, tram and bus stop, walking from VUmc tram and bus stop, walking from Parnussusweg tram stop, and walking De Boelelaan tram and bus stop. Even though the building is 700 metres away from Amsterdam Zuid station, it is reachable by walking within 10 minutes (figure 4.39). The bicycle lane infrastructure around the area is excellent, and it is very convenient to travel to the building by bike. For the approaches, the frontage of The Edge is visible if the path from VU Medisch Centrum tram and bus stop was taken. On the other hand, the route from Amsterdam Zuid Station and Parnassusweg tram stop presents the side view of the building (figure 4.40 and 4.41).

Secondly, the characteristics of the public spaces are investigated. There are two significant public spaces, the walkway in front of The Edge, and the small plaza on the west side of the building (figure 4.42 and 4.43). The walkway in front of the building is occupied with a series of 5-6 metre-tall trees. Besides, there are seatings and tables extended from the restaurant, which expands eating activities from inside the building to the public space. Two materials are used for the paving, and the paving patterned was simply designed into rectangular shapes. For the plaza, diagonal-shaped wood deck situates at the plaza, surrounded by trees, grass and stone pavement. The plaza seems to be used for a public gathering or even the performance gathering like an amphitheatre. The plaza is connected to the conference area of the building on the ground floor, which allows the building to be more flexible to adapt to the use of spaces.

Figure 4.38
View of The Edge from A10 highway (Google map, 2020).

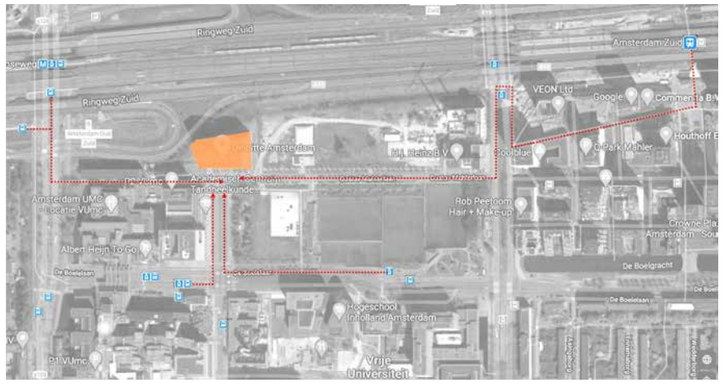


Figure 4.39
Accessibility of The Edge (Own illustration).

Figure 4.40 (left)
Front view of the Edge from VU Medisch Centrum (Own photography).

Figure 4.41 (right)
Side view of the Edge from the Amsterdam Zuid route (Own photography).

Figure 4.42 (left)
The plaza on the west side of The Edge (own photography).

Figure 4.43 (right)
The walkway in front of The Edge (own photography).

For the plinth of The Edge (figure 4.44, 4.45 and 4.46), even though the architect mentioned that the groundfloor height of the functions like restaurant and gym are 4.5 metres, the height of the plinth façade is visually around 5.50 – 6.00 metres including mezzanine. The plinth façade is transparent, and activities inside the building can be clearly seen. The scale of the façade is divided by aluminium frames, but the size of the frames is relatively small, which allow the majority of the façade to be glass plane. Apart from the emergency exits, there are three accessible entrances to the ground floor, the front entrance, the entrance of the restaurant, and the entrance on the north side of the building. The main entrance is four steps higher than the public street, and the entrance is recessed inside the colonnade of columns.

For the ground floor, figure 4.47 and 4.48 demonstrate the atrium space of The Edge, which is the heart of activities of the building. At first, the researcher concerned that 4.50-metre height of the ground floor would be sufficient to support public activities. However, the atrium space solves these issues and provides all kinds of activities on the ground floor, as well as allowing daylight to reach the ground floor for a whole day. The café area at the centre of the atrium on the ground floor invites occupants to work, take a break or have a conversation between people in this area. This emphasizes the informality and flexibility of the space occupation. Not only the atrium space connects the people and activities on the ground floor, but it also spreads the flow of the space to the vertical volume. For instance, there are several shared-workspaces on the bridge within the atrium space (figure 4.49 and 4.50).

For the overall of the façade, the north façade is transparent and visible to the A10 highway. On the other hand, the other facades are not as transparent as the north side. Approaching from both Amsterdam Zuid station or VU Medisch Centrum allow pedestrians to see more solid facades (figure 4.51). The next variable is the harmony of colour and materials. The Edge has white aluminium cladding façade strips, and blue gazed glass windows, which are similar to the characteristics of Academic Center for Dentistry and Ol2 Labgebouw. The colours and materials are considered to be harmony for this area.

Figure 4.44 (upper left)
Plinth at the east side of The Edge (own photography).

Figure 4.45 (upper right)
Plinth at the west side of The Edge (own photography).

Figure 4.46 (lower right)
Plinth at the south side of The Edge (own photography).

Figure 4.47 (left)
Atrium of The Edge (PLP Architecture, 2020).

Figure 4.48 (right)
Atrium of The Edge (PLP Architecture, 2020).

Figure 4.49
Bridge area in the atrium (PLP Architecture, 2020).

Figure 4.50
Shared working space in the bridge area (PLP Architecture, 2020).

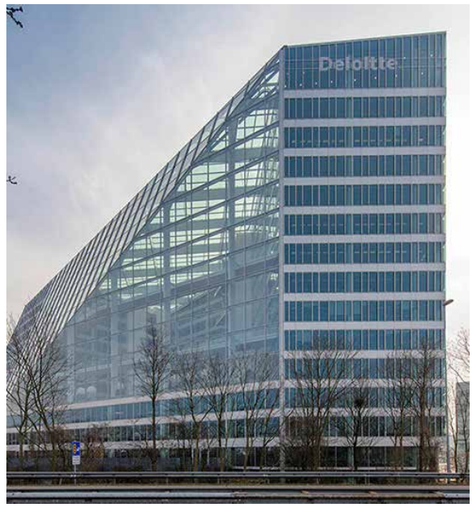


Figure 4.51
Façade and transparency at the north side of The Edge (PLP Architecture, 2020).

Figure 4.52
Nightlight at the atrium of The Edge (PLP Architecture, 2020).

Figure 4.53
Nightlight at the plinth of The Edge (PLP Architecture, 2020).

Lastly, the variable of visual transparency during night time is discussed. According to figure 4.52 and 4.53, The lighting of The Edge is prominent during night time, especially for the atrium space. The restaurant activities and groundfloor café also help to maintain transparency with illumination at night. However, the surroundings are not sufficiently illuminated due to a lack of public amenities or office facilities around the area.

Figure 4.54
Heat map and people's behaviour in the public area of The Edge (Own illustration).

People behaviour in the public area

In this section, an observation of people's behaviour in the public area is carried out to identify how people behave and interact with the building. Due to the epidemic in the Netherlands, a significant number of employees work from home, and fewer people come to The Edge to work. Grand Mahler Café, the restaurant on the ground floor, closed for a short period and reopened with the new Covid-19 measures. In order to dine at the restaurant, prior reservation needs to be done. The heat map of people behaviour in the public area is shown in figure 4.54.

Figure 4.55
Grand Café Mahler during the normal situation (New Duivendrecht, 2020).

Mapping, counting and tracking techniques (Gehl & Svarre, 2013) are conducted to collect the data. During one hour period, 43 people passed Mahler Laan street in front of The Edge, including pedestrians and bicycles. The routes of pedestrians and bicycles are separated. People tend to stop walking right at the two specific spots: In front of the restaurant entrance, and front of the main entrance. In one hour, the researcher witnessed six people stood in front of the restaurant before being invited inside. Apart from that, three people stopped in front of the main entrance of the building per hour to make phone calls. There are six people entered the building, and four people came out of the building per hour. From the street perspective, people sitting in the restaurant can be seen from outside but not full capacity due to the Covid-19 measures (figure 4.55). The restaurant seats in front of the restaurant make the area becomes more vibrant and create activities on the street. Six people are seen sitting at the seats during an hour. This helps the people outside the building to better connect to the building. There is no activity in the plaza at the west side of The Edge resulting in the vacancy of the public space. However, some people are working at their station in the conference area, close to the plaza on the west side.

When entering the building, two people are working as receptionists of the building at the round table near the entrance. For the atrium space, there are not many people in this area due to the Covid-19 situation. Five people are seen sitting at Edge Espresso (figure 4.56) in the middle of the atrium space per hour.

Figure 4.56
Edge Espresso Café during the normal situation (PLP Architecture, 2020).

Users' reflection on the real estate object.

In this case, the users' reflection survey was carried out with 15 respondents. Eleven of the respondents are people who work at The Edge, while the other four respondents are people who passed the building. The occupations of the samples vary from auditors, brand consultants, communication team, financial advisors, tax advisors, and real estate developers. The raw survey results are presented in Appendix C. The survey is divided into three separated sections.

No.	Functionality and use value variables	Score
1	Accessibility	3.40
2	Workplace and business activities	4.73
3	Increase in productivity	3.85
4	Workplace flexibility for changes	4.00
5	Safety and security	4.73
6	Operating and maintenance	4.67
7	Technology implementation	4.27
8	Mix and variety of functions on ground floor	3.87
9	The flexibility of ground floor functions	4.00
10	Inclusion of small businesses	2.10
11	Opened public space	3.07
12	Exchange functions	3.60
Average score		3.86

Table 4.7
Score summary of functionality and use-value variables of The Edge (own illustration).

The first section is the variables of functionality and use-value of The Edge. Table 4.7 shows an overview of the score of this section. The building focuses on enhancing workplaces and introduces new standards of working. This results in the highest scores at 4.73 of the two variables, workplace and business activities, and safety and security. Users also feel satisfied with the operation and maintenance of The Edge, which is rated at 4.67. Since the architect mentioned that there had been an implementation of digital space allocation in the building, the variable of technology implementation is rated remarkably at 4.27. However, most of the respondents feel that The Edge could have included more small companies or start-ups in the building, giving 2.10 for this variable. Besides, the public spaces, including the atrium, is opened for the public but physically enclosed by the shell of the building. Therefore, the opened public space variable is rated at 3.07. The average score of the variables in this section is 3.86.

No.	Physical characteristics variables	Score
1	The liveliness of the location	3.07
2	Aesthetical excellency	4.40
3	Harmony of colour, texture, and materials with surroundings	4.27
4	Sufficient ground floor height	4.40
5	Transparency of ground floor	4.21
6	Diverse activities on the ground floor	3.46
7	Night light to maintain transparency	4.29
8	Small scale units	3.33
9	Sufficient accessible doors	2.73
10	Building height and street width	4.33
11	No physical boundary public space	3.93
12	Lively plaza with a variety of materials	3.40
Average score		3.82

Table 4.8
Score summary of physical characteristics variables of The Edge (own illustration).

Moving onto the second section, the score summary of physical characteristics variables is presented in table 4.8. Both aesthetical excellency and sufficient ground floor height are the highest scores at 4.40, respectively. The appropriation of the building height compared to street width is significantly rated at 4.33. Since the atrium of The Edge provides illumination during the night time, this variable was given 4.29 by the users. Since The Edge has only three accessible doors on the ground floor, the respondents rate this variable at 2.73. In addition, the building locates away from the business functions area. This results in the score at 3.07 for the liveliness of the location variable. Overall, the users rate this section for an average score of 3.82.

No.	Social interaction variables	Score
1	Involvement of users	2.00
2	Users' satisfaction	4.13
3	Visiting of public people	2.80
4	Safety and security of the street	4.27
5	No pollution	4.50
6	Sense of belonging	3.40
7	The liveliness of the street	3.07
8	Connection with transport hubs	4.07
9	Local identity	4.33
10	Use of facilities by the public	2.50
11	Diverse activities on the street	2.40
12	Wayfinding	3.87
13	Local communities involvement	2.00
14	Market at the public space	1.43
15	Public installation, workshop, and activities	2.29
Average score		3.13

Table 4.9
Score summary of social interaction variables of The Edge (own illustration).

For the last section, results from the survey of social interaction variables are discussed (table 4.9). The Edge was designed to be one of the most sustainable buildings in the Netherlands. Therefore, the pollution variable is rated the highest in this section at 4.50. Respondents rate the local identity variable at 4.33 since the

building becomes the icon of the area. The respondents also give 4.27 for safety and security of the street variable due to the commitment to the illumination of The Edge during night time. For the users' satisfaction, respondents rate this variable at 4.13. On the contrary, market at public space variable is scored only at 1.43 , the lowest score of this section, since there is no free market around the area. Both involvements of users and local communities variables are rated at 2.00, respectively. It implies that the users are willing to involve in the design processes of the building. Many respondents do not know whether any public installation and workshop are being hosted at The Edge. Only a few samples from the communication team can answer this question. The variable is rated at 2.29. Use of facilities by the public and diverse activities on the street are also under 3.00, in which they are placed at 2.50 and 2.40, respectively. An average score for the variables of this section is 3.13.

Results

The overview of the results for functionality, physical characteristics, social interaction of The Edge is demonstrated in table 4.10, 4.11 and 4.12.

No.	Functionality variables	City Req.	Corp. Req.	Arch Intentions	Outcomes	People's behaviour	Score
1	Accessibility	Improvement of connectivity	Can be seen from highway and railway	Propose Gustav Mahlerlaan, visble building for the public	Access through only Gustav Mahlerlaan, 700 metres away from Amsterdam Zuid station, excellent bicycle lane infrastructure	10 people enter and come out of the building per hour	3.40
2	Workplace and business activities	Offices	Shared-working space	New patterns of working, new working atmosphere	Open workplaces, connecting with atrium	Currently work from home due to Covid-19	4.73
3	Increase in productivity		Digital system to enhance productivity	Better space allocation increases productivity			3.85
4	Workplace, flexibility for changes	Flexibility for changes	Resilience and flexibility	Informal collaboration, flexible shared working spaces, connection between workplaces and breakout area, 3,300 users with 1,100 capacity idea	Atrium design connecting both horizontal and vertical spaces, open layout workplaces	Remote working, mobile working, work from home	4.00
5	Safety and security				Scan to enter the lift lobby		4.73
6	Operating and maintenance				well maintained building		4.67
7	Technology implementation		Digital transformation, smart building, space allocation	Mapiq creates digital platform, interactive 3D map	Digital platform, application on smartphones, interactive 3D map, 20,000 sensors, Beacon	Employees have application for digital platform to connect with the building	4.27
8	Mix functions on the ground floor	Mix functions; residential, offices, shops, academic		Conference, breakout, gym, café, restaurant	Conference, working area, breakout, gym, café, restaurant		3.87
9	Flexibility of ground floor functions	Flexibility for changes		Digital platform helps for better space allocation, support mobile working	connectivity between conference area and plaza, can be adapted to other functions		4.00
10	Inclusion of small businesses	small businesses					2.10
11	Opened public space	Allure public space		Social, physical and virtual connectivity, Social condenser or nucleus of the building	Walkway in front of the building, plaza at the west side, atrium on the ground floor	Nobody occupies the plaza at the west side. 5 people sat in the atrium per hour.	3.07
12	Exchange functions				Expansion of restaurant, tables and seats are placed on the street	6 people sat at restaurant seatings on the street per hour	3.60

Table 4.10
Overview of results for functionality variables of The Edge (own illustration).

No.	Phy. characteristics variables	City Req.	Corp. Req.	Arch Intentions	Outcomes	People's behaviour	Score	Tool/technique
1	The liveliness of the location	Increase density	Visible to part of Amsterdam, away from the business functions	3,300 useers, design 1,100 capacity, the building is active	Despite the building is active, overall area is still under developed	43 pedestrians and cyclists per hour	3.07	Municipal reg., Public Life
2	Aesthetical excellency		Outstanding	Allow more daylight into the building	Transparent at the highway side, more solid at Gustav Mahlerlaan side		4.40	Pref. for vis., BREEAM, POE
3	Harmony of colour, texture, and materials with surroundings				Harmony with surroundings, colour and materials are similar to other buildigns		4.27	Pref. for vis.
4	Sufficient ground floor height	4.50 m.		4.50 m.	Gym and restaurant height are 4.50 m, general plinth height is 5.50 - 6.00 m., atrium creates surprising space		4.40	Municipal reg., Plinth Rating
5	Transparency of ground floor		Transparent fo public		Façade is transparent, activities inside the building can be seen	3 people stopped at the entrance per hour, 6 people waited to sit in front of the restaurant during one hour	4.21	Plinth Rating
6	Diverse activities on the ground floor	Mix functions; residential, offices, shops, academic			Sitting, walking, working, eating are seen o nthe ground floor		3.46	BPA, USI, Public Life, Plinth Rating
7	Night light to maintain transparency				Atrium space provides night light, restaurant activities keeps up until late		4.29	USI, BPA, BREEAM
8	Small scale units				Aluminium frames divide glass plane into smaller scales		3.33	Pref. for vis., Plinth Rating
9	Sufficient accessible doors				three accessible entrances,one at the north side and two at the south side	People who enter the building use the main entrance, people who were here to dine enter the restaurant entrance	2.73	Plinth Rating
10	Building height and street width	105 m. for Zuidas centre		Constraint from flight path of planes	Ratio is 3:1. The height is similar to other buildings		4.33	Municipal reg., Plinth Rating
11	No physical boundary public space	Connection between public space and plinth			Open plaza, atrium in the building	public people do not enter the atrium nor occupying plaza on the west side	3.53	Public Life
12	Lively plaza with a variety of materials	Quality material and vegetation			5 - 6 m. tall trees, two materials pavement, diagonal-shaped wood deck, grass		3.40	Plinth Rating

Table 4.11
Overview of results for physical characteristics variables of The Edge (own illustration).

No.	Social interaction variables	City Req.	Corp. Req.	Arch Intentions	Outcomes	People's behaviour	Score	Tool/technique
1	Involvement of users						2.00	USI, BPA, SCI
2	Users' satisfaction		Digital system to connect people needs to the building system	Mapiq develops digital platform to connect users' needs with building system			4.13	USI, BPA, Public Life, POE, SCI
3	Visiting of public people		Enhance social encounters		Academic visit	Not many people visit the building	2.80	USI, BPA, Public Life, Plinth Rating
4	Safety and security of the street			building always open, have active frontage, longer opening hours	The building provide sufficient illumination although the area lack public amenities		4.27	Building Decree, BREEAM, Public Life, Plinth Rating, SCI
5	No pollution	Sustainable urban environment	Sustainable building, aim BREEAM outstanding	Smart building, sustainable building, digital system utilises energy consumption	BREEAM score outstanding 98.30 %		4.50	Building decree, BREEAM, SCI
6	Sense of belonging						3.40	Public Life, SCI
7	The liveliness of the street	Quality public space			The area is still dull		3.07	Public Life, Plinth Rating, SCI
8	Connection with transport hubs	Connectivity		The building is located at some distances from public transports	Takes time to transit to the transport hubs eg: 10 mins to Amsterdam Zuid	No apparent evidence	4.07	USI, BPA, Municipal reg., BREEAM, Public Life, Plinth Rating, SCI
9	Local identity	Traditional Amsterdam qualities					4.33	SCI
10	Use of facilities by the public				no apparent evidence		2.50	Public Life, Plinth Rating, POE, SCI
11	Diverse activities on the street	Mix functions			walking, commuting and sitting	Activities are walking, cycling sitting, chatting, eating	2.40	BPA, USI, Public Life, Plinth Rating
12	Wayfinding				Easy to recognise		3.87	Public Life
13	Local communities involvement	Voices of local community	Incorporate with Academic functions	Involvement with universities in the surroundings	The company is well known in academic field		2.00	SCI
14	Market at the public space				No evidence of free-market		1.43	SCI
15	Public installation, workshop, and activities				No public activities		2.29	SCI

Table 4.12
Overview of results for social interaction variables of The Edge (own illustration).

Figure 4.57
Groot Handelsgebouw (photo by van Beek, M.).

Case 3: Groot Handelsgebouw

Introduction

Case description

Building type:	Multi-tenant office building
Location:	Rotterdam Centre District
Project area:	128,000 sqm
Owner:	GHG BV
User:	Cambridge Innovation Centre (CIC), Kleinhandel, and 500 small companies
Architect:	Van Tijen en Maaskant (original), J. van Stigt (renovation and restoration)
Municipality:	Rotterdam
Year of completion:	2005

In 1940, Rotterdam inner city suffered from World War II, resulting in losing approximately 388,00 sq m of the commercial function. The first idea of the eleven storeys office building began when there was a desperate need for office spaces during that time. Frits pot initiated the concept of the multi-business building, offering no fewer than 445,000 sqm of space. Van Tijen en Maaskant was appointed to design Groot Handelsgebouw after World War II, in which the construction began on 17 May 1947 and was completed in 1953. Later that year, Queen Juliana was honoured to open Groot Handelsgebouw on 3 June 1953 (GHG B.V., 2020a; W Post-war reconstruction community Rotterdam, n.a.a).

During that time, Groot Handelsgebouw was one of the largest buildings in the Netherlands. Groot Handelsgebouw offered stocks, showrooms and offices to the wholesaler and capable of installing forklifts. Apart from that, the building also provided spaces for restaurants, cafes and retails on the ground floor. Groot Handelsgebouw significantly became the heart of the urban fabric of Rotterdam (GHG B.V., 2020a)

Since Groot Handelsgebouw is located on the Stationsplein, in the city centre of Rotterdam, the urban development of Rotterdam Central District is discussed in the next section.

Rotterdam Central District

According to the W Post-war reconstruction community Rotterdam (n.a.b), Rotterdam central district started in late 1940s as an undeveloped area before commercial and office buildings began to appear around the area. The first phase of Bouwcentrum was constructed in 1949, Groothhandelsgebouw was completed in 1953. Further, in 1957, several buildings emerged around the area, including Central station, railway post office, and Shell building. Later in 1960, the block between Delftsestraat and Schiestraat was developed. The block is called Schiekadeblok, which consisted of a commercial building, several office buildings, Esveha, Metro Hotel, and Freemason building. The construction of the metro line slowed down the development of buildings during 1960 until the metro line was completed in 1968. After that, Worstbos park was developed.

The development plan of Rotterdam Central District became more concrete in 1977 when the competition for the strip park in Rotterdam Central District was held (figure 4.58). In 1978, the City Development Department proposed an entertainment centre park called Weena-Tivoli. However, the city council decided to develop housing and recreational functions instead of entertainment facilities in 1979. The first completed building was a residential building on the corner of Hofplein in 1984 and followed by office buildings for Nationale Nederlanden and Unilever.

In 1994, an introduction of high-speed railway incentivized the council to consider the plan of the re-development of the station and the area around. Groothandelsgebouw and Railway Post Office were enlisted as monuments building and were planned to be renovated. On the other hand, Centraal Station was marked to be demolished to provide opportunities for the new artistic designed station. The first official vision for Rotterdam Central District was announced in 1997, which is a mix of urban functions: living, working, and entertainment. British architect, Will Alsop, initiated the masterplan called “Champagne Glasses” in 2001. The plan was to create a gigantic glass structure covering the area from Groothandelsgebouw, Shell building and Kruisplein. The entire Schieblok would be demolished and replaced the block with a 200-metre height office building, next to the Shell building (figure 4.59 and 4.60). However, the plan was never realized due to financial issues.

Figure 4.58
Competition idea for Weena in 1977 (W Post-war reconstruction community Rotterdam, n.a.b).

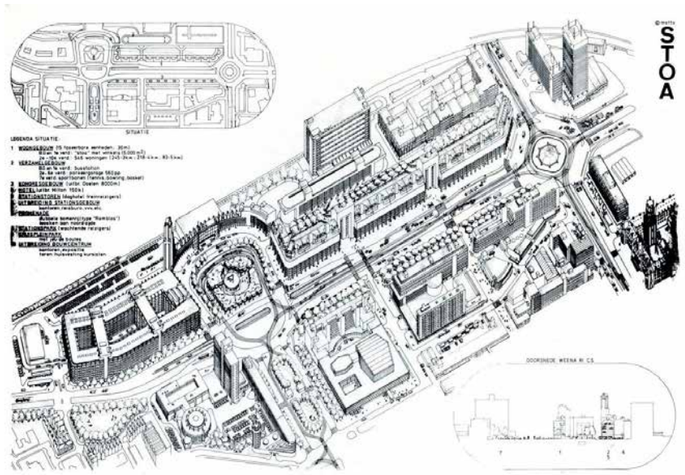


Figure 4.59
Visualisation of the new Central Station in 2001 by Alsop
(W Post-war reconstruction community Rotterdam, n.a.b).

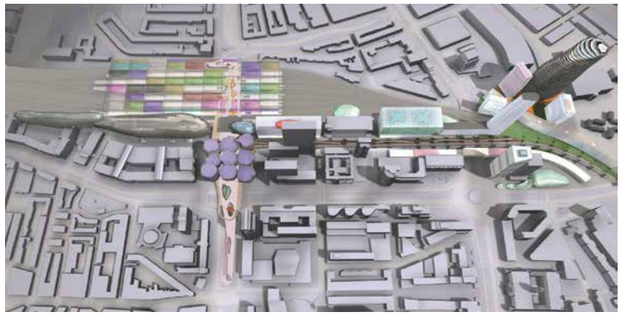


Figure 4.60
Rotterdam Central District masterplan in 2001 by Alsop
(W Post-war reconstruction community Rotterdam, n.a.b).

City's requirements and urban planning goals

The Rotterdam Central District Association (RCD) is a public-private partnership found in 2009. The association consists of the municipality of Rotterdam, property owners, companies, and social organisations. The collaboration aims to involve in the area development as well as encourage branding and monitoring the Rotterdam Central District (O Team, 2018). They have collected the data since 2007 to establish the new development plan for Rotterdam Central District. During that time, the new development plan was initiated. The goals of the plan are to increase the density of the area, connect the east and the west side of Rotterdam Central District, and to develop good plinths (Municipality of Rotterdam, interview, October 16, 2020). The municipality also aims to preserve and transform existing monument buildings and add more activities to create a mix function area. Besides, mix functions should not involve only area level, but also include the building level. It means that in one building can combine working, living and leisure functions to stimulate twenty four-seven life (Municipality of Rotterdam, interview, October 16, 2020). Skyscrapers are not required for the area but demand buildings to integrate with the green area (Municipality of Rotterdam, interview, October 16, 2020).

In 2018, O team identified the three design direction for Rotterdam Central District, which are Sense of Place, Urban Healthy Living, and Innovation Centre (O Team, 2018).

The design research on the theme of "Sense of Place" was conducted by STIPO. The study focuses on plinths development of buildings and enhances activities on the street (figure 4.61, 4.62 and 4.63). The research has identified the three following principles: integration of an innovation district into Rotterdam Central, the transformation of Rotterdam Central District from the mono-function area into a vibrant area, enhancement of the orgware for the area (O Team, 2018; Municipality of Rotterdam, interview, October 16, 2020). The research also determines eight requirements for an innovation district: Identity, diversity, continuity, network, proximity, mobility, flexibility, and inclusiveness (Karssenberg et al., 2019).

In addition to the STIPO research, the municipality also closely monitors the development of plinths of buildings in Rotterdam Central District. Several requirements are identified to monitor plinths (Municipality of Rotterdam, interview, October 16, 2020). Firstly, the ground floor height of the building must not be lower than 5.00 metres; the height between the canopy and the floor must not be lower than 7.00 metres. The height constraints allow the building to be better connected to the public and flexible to be adapted. Secondly, to facilitate interaction between buildings and the people, the façade of plinths need to be transparent as much as possible. For the access doors, the municipality tries to control buildings to include two accessible doors every thirteen metres length of the building. However, there are no requirements regarding colour, materials and texture yet. The building is only required to be assessed by aesthetical committees.

Figure 4.61
Quality of plinths in the area
(Karssenberg et al., 2019).

Figure 4.62
Heat map of the area
(Karssenberg et al., 2019).

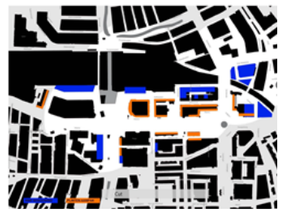


Figure 4.63
The development plan of plinths and buildings in the area (Karssenberg et al., 2019).

For the theme of "Urban Healthy Living", DELVA, landscape architectural firm, was responsible for the research. The study concludes four main findings to develop a healthy urban area (figure 4.64, 4.65. 4.66 and 4.67):

1.*Solve greenery in public space* – this can be carried out by adding green area in the public spaces as much as possible. The plan demonstrates that to add more trees and micro parks.

2.*Involve the buildings* – Since Rotterdam Central District lacks space for extension, the buildings are included in the green area plan. The plan proposes to add more green roofs and green interior spaces.

3.*Search for collective for buildings and public space* – In order to increase greenery ambition, it is essential to start considering and working collectively in Rotterdam Central District.

4.*Provide permanent green area spaces in urban development* – This can be done by incentivizing users to motivate or involve in the green public programme.

Lastly, "Innovation Centre" design research was carried out by DONA urbanism. The analysis compares Rotterdam Central District with other innovation campuses in the Netherlands, such as Maastricht Health Campus. The study concludes two main findings.

1.*This area is not yet an innovation campus, and should it be one?* – Rotterdam Central District has a dynamic business image and occupied by many businesses, start-ups, freelancers, and supporting services. Clustering of innovation only occurs within the individual buildings, not at the area level. The connection between urban fabric in terms of dynamics and experiences does not exist yet. These lead to the consideration of creating an innovation district in RCD.

2.*Turn this area into a Rotterdam cluster with its profile.* – Rotterdam Central District has 100,000 visitors per day and concentrated with vibrant urban economic activities. However, the many plinths are in closed forms and used for driveways resulting in unattractiveness of the area. In order to distinguish Rotterdam Central District from others, seven magnets are identified for the implementation plan. The seven magnets are top institute, university, companies, technology centre, housing and public spaces, incubators, and student accommodation (figure 4.68).

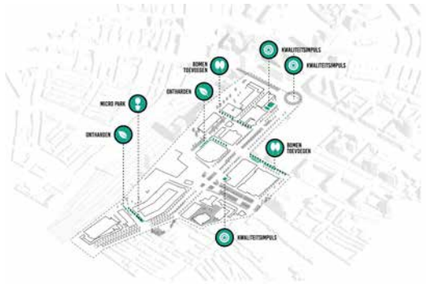


Figure 4.64
Concept of maximizing green area on the ground (Delva, 2019).

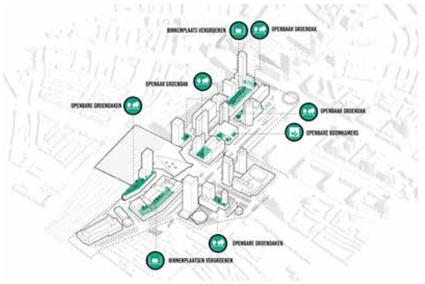


Figure 4.65
Concept of adding green spaces in the urban structures (Delva, 2019).

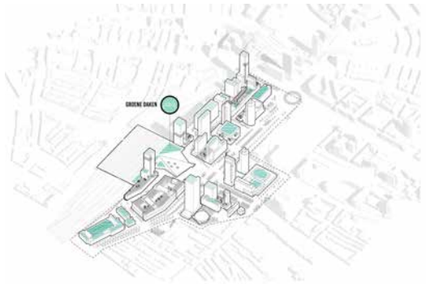


Figure 4.66
Roofs as part of the urban jungle (Delva, 2019).

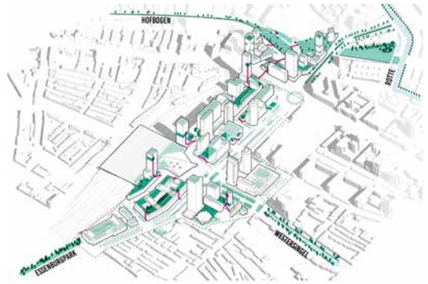


Figure 4.67
The urban jungle of Rotterdam Central District (Delva, 2019).

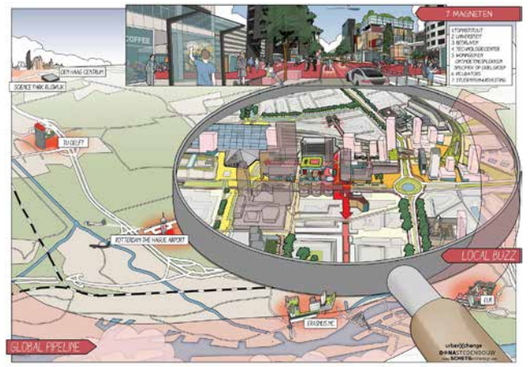


Figure 4.68
The seven magnets concept for RCD (Dona, 2019).

Corporation's requirements

Due to the bombing on 14, 1940, Rotterdam lost 388,000 sq m of commercial space. Therefore, there was a strong need for commercial spaces for start-ups and wholesalers (Kalk, 2007; W Post-war reconstruction community Rotterdam, n.a.a). Frits Pot was a wholesaler of appliances and installation for electricity, gas, coal, and sanitary wares. The company initiated the idea to build a multi-company building in the centre of Rotterdam with the collaboration of the Chamber of Commerce (Kalk, 2007). Since the building was planned for multi-tenants, processes of acquiring requirements of each company were problematic. Overall, the wholesalers required spaces to display their products to attract customers and also spaces to store them. The building was required to capable of storing supply and removing goods without being obstructed. Besides, the wholesalers needed the building to be internally connected to optimise collaboration between many wholesalers (Kalk, 2007).

At the beginning of 1980s, the tenants who occupied Groot Handelsgebouw for a long time became shareholders of Groothandelsgebouw N.V. (a non-profit organisation). Shareholders were obliged to contribute to the repair of the building. In return, they paid relatively low rent for the spaces. The unity of Groothandelsgebouw's residents remained over the years (Kalk, 2007). Later in the 1990s, there had been significant development of industrial clusters in the outskirt of Rotterdam. This resulted in the move out of the wholesalers to the industrial estates. Groothandelsgebouw radically changed and lost its unity over time. Many unnecessary renovations were carried out. For instance; walls were randomly broken and rebuilt, façade was covered with five layers of paint. The building was in overexploited condition at that time. Therefore, structural interventions are required to transform the large-scale multi-tenant building into the modern office building (Kalk, 2007). In the late 1990s, the buildings became more obsolete and required major renovation.

Figure 4.69
Groot Handelsgebouw in 1953
(W Post-war reconstruction community Rotterdam, n.a.a).

The management of the Groothandelsgebouw pointed out that fashionable intervention did not suit the classic structure. It was required qualities and excellency of functions deep in all fundamentals. In 2001, the team approached Bureau van Stigt to come up with solutions (Kalk, 2007).

Designer's ideas and motives

When the building was designed in the 1940s, Maaskant predicted the economic life of the building ahead for 50 at least years. Therefore, the building was designed for the future, not the present. It was foreseen that the economic activities in Rotterdam Central District would amazingly grow, especially for small businesses (Kalk, 2007). The dimension of Groothandelsgebouw is 220 by 85 metres, consisting of 7 to 9 floors and 45 metres height in total (figure 4.70).

There are three internal courtyards surrounded by warehouses and corridors, in which the courtyards can be accessed by internal circulation on the first three levels. In total, there are five accessible entrances for visitors and staff. Apart from that, there are two separated entrances for the service area and parking area in the basement. On the seventh floor, a central corridor runs across the entire building where daylight can reach the internal space of the building. The rooftop was designed to use as a viewpoint over the whole city of Rotterdam.

Concrete is the main material for the whole building. In order to prevent bulky gigantic look, several dynamic elements on the façade were designed such as rounded corners and bent

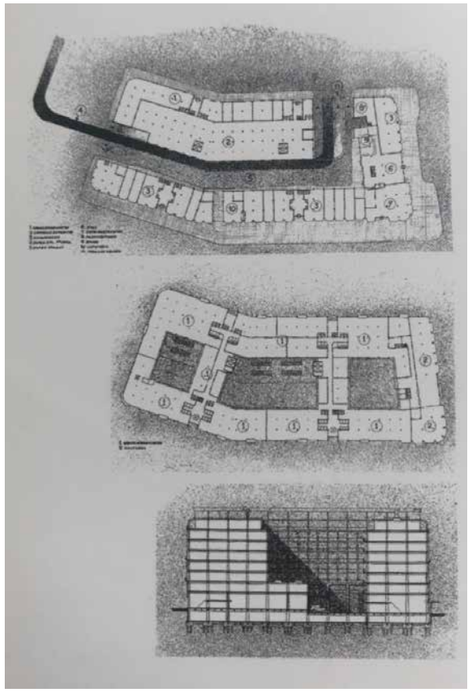


Figure 4.70
Old drawings of Groot Handelsgebouw (Kalk, 2007).

façade. The entire structure is supported by concrete columns that are thicker at the bottom and thinner at the top. The 45 metres length spaces between columns are created, which are very flexible to adapt.

In July 2001, Bureau van Stigt was asked to draw up vision and plan of action for the renovation of Groot Handelsgebouw. The ideas of the renovation plan are to bring back forgotten qualities of its origin, emphasise the monument value, and return the building to the city as the

social monument(Kalk, 2007; Architectenbureau J. van Stigt BV, n.a.). It means that the architect tends to restore Groot Handelsgebouw back to its original design, including texture cleaning, window frame repairing, old colours and materials recovering. There were many processes trying to solve how to gather people from different companies together in such a large building. This includes the idea of transforming closed building into opened building again (Kalk, 2007). The architect started the work based on the following four principles (Kalk, 2007; Architectenbureau J. van Stigt BV, n.a.):

1. The intervention aims to restore the building to the original characteristics as much as possible.

2. The intervention searches for the new functions that are more appropriate for the building. For instance: define the new concepts of office spaces, create more flexible spaces, and divide spaces into smaller units.

3. The urban attributes have changed over the past years. Therefore, the intervention aims to create a good connection between the building and new urban plans. In other words, the building would be adapted to be high-quality public-oriented spaces. The warehouse on the ground floor of the building is re-purposed due to a change of logistics. Accessibility and pedestrian circulation are improved.

4. Lastly, the intervention aims to restore open functions such as shops, cafés and restaurants on the street level to improve the interaction between the building and the public.

Figure 4.71
Renovation floor plans of Groot Handelsgebouw (Kalk, 2007).

Real estate object outcome

Direct observation is conducted to clarify the characteristics of the real estate object in this section. The building characteristics are described based on the experience of the researcher. The variables from figure 2.9 will be the guidelines for the observation.

Firstly, the location of the building is discussed. Groot Handelsgebouw is situated between Weena and Conradstraat. It is also directly connected to the south exit of Rotterdam Central station. Groot Handelsgebouw can be visually seen on the right side of taking the south exit from the station. From this viewpoint, the main entrance of Groot Handelsgebouw can be seen from Stationsplein (figure 4.72). There are several ways to travel to Groot Handelsgebouw, including by foot, private car, bicycle, bus, tram, metro and train. As mentioned before, the building is connected to the south exit of the train station (figure 4.73). For the tram, the tram stops are located on the east side of Stationsplein, which is approximately 100 metres away from Groot Handelsgebouw. Besides, the bus stops (figure 4.74) are situated on the north side of the building. Figure 4.75 explains the accessibility of Groot Handelsgebouw.

Figure 4.72
The main entrance of Groot Handelsgebouw. A view from Stationsplein (Own photography).

Figure 4.73
Rotterdam Central station, a view from Groot Handelsgebouw (own photography).

Figure 4.74
Rotterdam Central bus stops, a view from Groot Handelsgebouw (own photography)

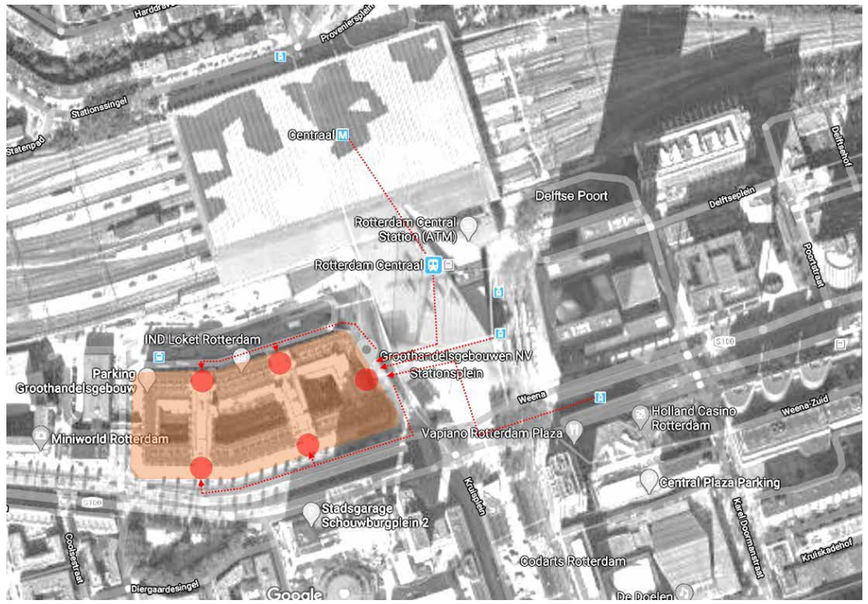


Figure 4.75
Accessibility of Groot Handelsgebouw (Own illustration).

The second variable is the characteristic of public spaces. Groot Handelsgebouw has three internal courtyards, which can be accessed from the internal circulations. The courtyards are used from some car parking, car circulation, and there are green and seatings area on the rooftop of the ground floor (figure 4.76 and 4.77). Mostly, the materials of the courtyards are red asphalt, red pavements, and grass on the green area. Several benches are placed on the rooftop, in which the rooftop is designed as a break area. Apart from the internal public space, walkways around the building are also considered as the external public spaces for Groot Handelsgebouw. The walkways are paved with grey stones in simple pattern.

Next, the variable of the plinth is examined. In total, Groot Handelsgebouw has five entrances for employees and visitors to access into the building. The main entrance is located at Stationsplein side. Two sub-entrances are located at Weena side, and the other two sub-entrances are at the north side of the building. In addition, there are two service entrances for cars and trucks. One is located on the north side, and the other one is located on the west side of the building. Underground car park can be accessed from the service entrances. Since Groot Handelsgebouw has many shops, cafes and restaurants on the ground floor, most of the plinth façade is transparent and is used for display windows to show products. The height of the plinth façade is 3.50 metres at the Weena and Conradstraat sides (figure 4.78 and 4.79). On the other hand, the height of plinth at the main entrance at Stationsplein side is 10.00 metres (figure 4.80). Besides, the height of A Mac shop plinth at Stationsplein side is 7.00 metres (figure 4.81). Apart from the main entrance and large space such as the gym, the space on the ground floor is divided into small units for every single space between columns. Moreover, every single unit has its access door resulting in a large number of entries on the ground floor. The characteristic of the window and door frames is preserved to be identical to the original design, which the scale of the frames is designed relating to the human scale. Only the main entrance at Stationsplein side is designed with a large glass plane plinth. Above the plinth, the walkways on the street are covered by canopies to provide shading and shelter.

Figure 4.76
Internal courtyards of Groot Handelsgebouw (Kokon, 2020).

Figure 4.77
Internal courtyards of Groot Handelsgebouw (Kokon, 2020).

Figure 4.78
General plinth of Groot Handelsgebouw at Weena side (own photography).

Figure 4.79
Plinth at the north side of Groot Handelsgebouw (own photography).

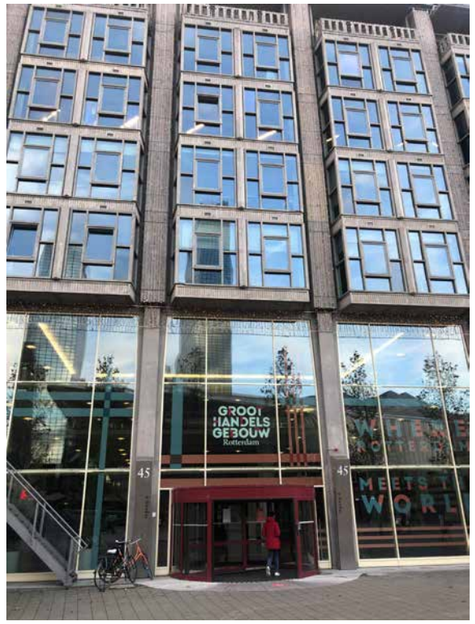


Figure 4.80
Plinth of the main entrance (own photography).

Figure 4.81
Plinth of Amac shop (own photography).

For the ground floor of Groot Handelsgebouw, the building consists of diverse activities on the ground floor such as retailer shops, gym, cafés, restaurants, bike rental service, small businesses, and municipality office. Many activities can be seen at the windows on the ground floor. There are several exchanged functions extending to the walkways around the building. Seatings and tables of cafés and restaurants are placed in front of the shops providing more activities on the street (figure 4.82). This results in a more vibrant and lively street. Specifically for the Engels restaurant, seatings and tables are being placed on the balconies above the restaurant, which offers more connection from the street to the vertical level (figure 4.83). Also, there is a café on the rooftop of the building. However, it is excluded for this variable since the rooftop does not connect to the ground plane of the city, especially for the eye level.

Figure 4.82
Seating and tables are placed in front of cafés and restaurants (own photography).

Figure 4.83
The exchange function of Engels restaurant (Starink, 2018).

For the overall façade of Groot Handelsgebouw, the façade pattern is kept as the original design. Glass planes are divided by a classic window frame pattern. Since reflective glass is used as the material for windows, activities inside the offices above the ground floor can not be seen from outside. The façade at Weena side offers horizontal shadings to protect direct sunlight reaching inside offices, which could potentially interrupt business activities (figure 4.84). The colour of the building is a grey concrete colour without any decorative painted, expressing the real concrete texture. Compared to surroundings, Groot Handelsgebouw fits well in the context in terms of harmony (figure 4.85).

The last variable is transparency during the night time. Even though office spaces above the ground floor do not provide much night light due to the downtime, the building still provides illumination during the night time mostly at plinths (figure 4.86). Functions that operate at night still provide a lively and secured street such as cafés, bars, and restaurants. The main lobby also opens for 24 hours, which provides illumination the whole night. However, Groot Handelsgebouw is decorated with more lighting during the Christmas period, offering a festive vibe to the area of Rotterdam Central District (Figure 4.87).

Figure 4.84
The façade at Weena side (own photography).

Figure 4.85
The reflective glass is used for the material of the windows (own photography).

Figure 4.86
Groot Handelsgebouw during the night time (GHG, 2020).

Figure 4.87
Groot Handelsgebouw in the Christmas period (ANP, 2018).

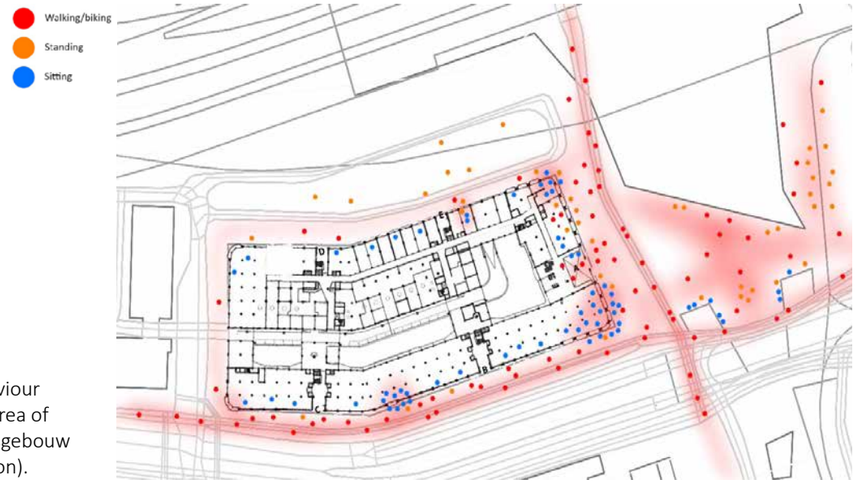


Figure 4.88
Heat map and people's behaviour in the public area of Groot Handelsgebouw (own illustration).

In order to identify people's behaviour and interaction with the building, direct observation is conducted in this section. The corona crisis has a significant impact on the users' behaviour in the public area of Groot Handelsgebouw. Many offices and shops close at the moment. In order to acquire accurate data, both data from the past and the situation in the present are taken into account for the observation. The techniques for the observation are based on the research of Gehl & Svarre (2013), including counting, tracking, and mapping.

Figure 4.88 present the heat map of people's behaviour in the public area of Groot Handelsgebouw. Apparently, Rotterdam Central District is a bustling area. Between an hour, 318 people cycled through the bike lane at Stationsplein side while the bike lane on Weena had 282 cycling passers. For the pedestrians, 138 people passed the building at Stationsplein side per hour while 167 passed the building at Weena side per hour (figure 4.89). On the other hand, few people were passing the building at the north side and the west side since both sides locate service entrances. The number of passing pedestrians at the north side and the west side were only 30 and 19 people per hour, respectively.

Due to the Covid-19, most of the shops on the ground floor are closed. The interaction between people and the building can be hardly seen. However, a considerable number of people were seen entering the main entrance of Groot Handelsgebouw at Stationsplein side, approximately 36 people per hour. Some of them left their bicycles in front of the building before entering. During an hour, six people stopped at the main entrance to make phone calls and wait for someone they know. Two people were witnessed working as receptionists in the main lobby of the building. Between an hour, twelve people stopped in front of Amac shop to have a look at products on the display windows (figure 4.90). At the north-east side of the building, only two shops opened on the day of the observation, which are Lebkov and Subway. There were some people in the shops, and some stood in front of the shops. At the north-west side of the building, a minimal number of people were working out in the gym during that time. For the internal courtyards, there was no one occupied the space (figure 4.91 and 4.92). Even in a normal situation, people are rarely seen hanging out in that area.

During the normal situation, many activities happen on the ground floor of the building. There are several cafés and restaurants such as Altijd in de Buurt, De Nieuw Poort and Engels (figure 4.93 and 4.94). All of those shops place seatings and tables on the street, allowing a vast array of people to sit and eat outside the building. This makes the street look vibrant and connect to the building.

Figure 4.89
Many people were travelling around the area (own photography).

Figure 4.90
A man was looking at products on the display window (own photography).

Figure 4.91
Internal courtyards of Groot Handelsgebouw (own photography).

Figure 4.92
Internal courtyards of Groot Handelsgebouw (own photography).

Figure 4.93
People sit at the seatings on the street in front of Altijd in de Buurt (BySam, 2016).

Figure 4.94
People sit at the seatings on the street in front of Engels (Kramer, 2020).

Users' reflection on the real estate object.

For the case of Groot Handelsgebouw, the survey is conducted with 21 samples which are people who work at the building, people who work for retail and merchandise, people who rent office space, and people who pass the building. The samples of the survey consist of application developers, business developers, CTO, general manager, landscape architects, managing directors, programmers, receptionist, and students. The detail of raw survey data is shown in Appendix C. The survey result is divided into the three following section.

No.	Functionality and use value variables	Score
1	Accessibility	4.38
2	Workplace and business activities	4.00
3	Increase in productivity	3.29
4	Workplace flexibility for changes	3.38
5	Safety and security	4.19
6	Operating and maintenance	3.90
7	Technology implementation	3.27
8	Mix and variety of functions on ground floor	4.00
9	The flexibility of ground floor functions	3.47
10	Inclusion of small businesses	4.76
11	Opened public space	3.95
12	Exchange functions	3.86
Average score		3.87

Table 4.13
Score summary of functionality and use-value variables of Groot Handelsgebouw (own illustration).

Firstly, the survey results of functionality and use-value variables are examined in this section. Table 4.13 demonstrates a score summary of the variables for Groot Handelsgebouw. The building consists of 400 tenants occupying office spaces, including small businesses, start-ups and entrepreneurs. Consequently, the inclusion of small businesses is rated at 4.76, the highest among this section. The respondents also score accessibility variable at 4.38 since Groot Handelsgebouw is located next to the Stationsplein, Rotterdam Central. Users feel safe to occupy the building as they remarkably rate this variable at 4.19. Both business activities and mix functions on the ground floor are given at 4.00, respectively. There is no single variable being rated lower than 3.00 in this section. However, technology implementation has the lowest score at 3.27 and followed by an increase in productivity, being scored at 3.29. For the flexibility aspects, both flexible workplace and flexible ground floor functions are given 3.38 and 3.47, respectively. An average score for the variables in the first section is 3.87.

No.	Physical characteristics variables	Score
1	The liveliness of the location	4.81
2	Aesthetical excellency	4.29
3	Harmony of colour, texture, and materials with surroundings	4.05
4	Sufficient ground floor height	4.15
5	Transparency of ground floor	4.29
6	Diverse activities on the ground floor	3.81
7	Night light to maintain transparency	3.85
8	Small scale units	4.05
9	Sufficient accessible doors	4.29
10	Building height and street width	4.14
11	No physical boundary public space	3.43
12	Lively plaza with a variety of materials	3.29
Average score		4.04

Table 4.14
Score summary of physical characteristics variables of Groot Handelsgebouw (own illustration).

Next, survey results of physical characteristics variables are discussed. Table 4.14 shows the score summary of the variables of Groot Handelsgebouw. All of the variables in this section are rated higher than 3.00 by the users. The building is located in the heart of Rotterdam city, Stationsplein, in which the users score the liveliness of the location variable the highest of this section at 4.81. It is followed by Aesthetical excellency, transparency of ground floor, and sufficient accessible doors, which are scored equally at 4.29. The users also give 4.15 and 4.14 for sufficient ground floor height and appropriate building height, respectively. For the lowest score variable, variety of plaza material variable is given 3.29 by the respondents while the users give no physical boundary variable 3.43. The average score for physical characteristics variables is 4.04.

No.	Social interaction variables	Score
1	Involvement of users	2.31
2	Users' satisfaction	3.67
3	Visiting of public people	3.35
4	Safety and security of the street	4.10
5	No pollution	3.45
6	Sense of belonging	4.38
7	The liveliness of the street	4.62
8	Connection with transport hubs	4.86
9	Local identity	4.90
10	Use of facilities by the public	3.57
11	Diverse activities on the street	4.05
12	Wayfinding	4.57
13	Local communities involvement	3.00
14	Market at the public space	1.89
15	Public installation, workshop, and activities	3.37
Average score		3.74

Table 4.15
Score summary of social interaction variables of Groot Handelsgebouw (own illustration).

For the last section, survey results of social interaction variables are discussed. The score summary of the variables of Groot Handelsgebouw is shown in table 4.15. Groot Handels was firstly built in 1947 and became the

icon of Rotterdam Central. This leads to the highest score of local identity at 4.90. Besides. Groot Handelsgebouw is located in the city centre, capable of connecting public people to transport hubs. The users give 4.86 for connectivity variable. The other two variables to mention are liveliness of the street and wayfinding, which is rated at 4.62 and 4.57, respectively. The only two variables that being scored lower than 3.00 are involvement of users and market at the public space. For the involvement of users, the building is the multi-tenant building, which is difficult to incorporate tenants in the design processes. The respondents give 2.31 score for this variable. Like the two other cases, there is no evidence of the emergence of free-market around the area. Therefore, it is rated only at 1.89. The average score of social interaction variables is 3.74.

Results

The results of the case study of Groot Handelsgebouw are shown in this section. Table 4.16 presents an overview of results for functionality variables, table 4.17 shows an overview of results for physical characteristics variables, and table 4.18 demonstrates an overview of results for social interaction variables.

No.	Functionality variables	City Req.	Corp. Req.	Arch Intentions	Outcomes	People's behaviour	Score	Tool/technique
1	Accessibility	Connect the east and the west side of RCD, mobility		Transform closed building into opened building, good connection between building and urban plans, improve accessibility	Access through Stationsplein, Weena and Conradstraat. Connected to Rotterdam Central Station	36 people enter and come out of the building per hour	4.38	USI, BPA, Building Decree, BREEAM, Plinth Rating
2	Workplace and business activities	Offices	Transform wholesale spaces to modern office spaces	New concepts of office space	Free planning workplaces, dobule volume offices	Many companies, small businesses, start-ups, entrepreneurs occupy the building. Not fully oeprated due to Covid -19	4.00	USI, BPA, POE
3	Increase in productivity	Innovation district, campus					3.29	POE
4	Workplace, flexibility for changes	Flexibility		Flexible spaces	Separated mechanical and system floor, more flexible office spaces		3.38	Plinth Rating
5	Safety and security				Access control to internal circulation	Two receptionists at the main lobby	4.15	USI, BPA, Building Decree, BREEAM, Plinth Rating, POE
6	Operating and maintenance	Keep monument buildings	Major renovation, excellent function	Restoration, recovering, cleaning, reparing	The building is in good condition, some vacant units, GHG operates the building		3.90	USI, BPA, Building Decree, POE
7	Technology implementation						3.27	BREEAM
8	Mix functions on the ground floor	Mix living, working and entertainment. Develop good plinths. Diversity		Opened functions such as shops, cafes, restaurants	Diverse businesses on the ground floor such as, offices, municipal offices, businesses, services, gym, cafes, restaurants		4.00	USI, BPA, Building Decree, Municipal reg., BREEAM, POE
9	Flexibility of ground floor functions	Develop good plinths, flexibility		Divide spaces into smaller units	Small units can be adapted into larger units		3.47	Plinth Rating
10	Inclusion of small businesses	Innovation district, campus	Spaces for small businesses	Smaller units for small businesses	Many small businesses occupy the building		4.76	Plinth Rating
11	Opened public space	Add more green area		Opened building, high quality public oreinted spaces	Functions are opened, Courtyards are closed to the public	Nobody occupies the inner courtyards	3.95	Municipal reg., Public Life, Plinth Rating
12	Exchange functions	include green area in buildings, more interaction between building and public			Restaurants and cafes expand their functions. Tables and seating are placed on the street	Lack of people due to Covid-19. Many people sat and ate in front of café's and restaurant	3.86	Plinth Rating

Table 4.16
Overview of results for functionality variables of Groot Handelsgebouw (own illustration).

No.	Phy. characteristics variables	City Req.	Corp. Req.	Arch Intentions	Outcomes	People's behaviour	Score	Tool/technique
1	The liveliness of the location	Increase density, transform RCD into vibrant area			The building is active and create a lively vibe around the area	During one hour, 318 cycled at Stationsplein side 282 cycled at Weena side 138 pedestrians at Stationsplein side and 167 pedestrians at Weena side.	4.81	Municipal reg., Public Life
2	Aesthetical excellency		Restore classic qualities	Restore building to original design	The building is well preseved as its classic design		4.29	Pref. for vis., BREEAM, POE
3	Harmony of colour, texture, and materials with surroundings		Restore unity of the building	Recover old colours and materials	Concrete colour, unity is restored, fit in the surroundings		4.05	Pref. for vis.
4	Sufficient ground floor height	5.00 m., with canopy 7.00 m.			Some parts are 3.50 m. The main lobby is 10.00 m and plinth at Stationsplein side is 7.00 m.		4.15	Municipal reg., Plinth Rating
5	Transparency of ground floor	Transparency facilitates interaction		Opened building	Façade is transparent, activities inside the building can be seen	During one hour, 6 people stopped in front of main entrance, 12 people looked at the displayed products in front of Amac	4.29	Plinth Rating
6	Diverse activities on the ground floor	Add more activities, diversity		Working, shopping, eating and drinking	Sitting, walking, working, eating, drinking and shopping		3.81	BPA, USI, Public Life, Plinth Rating
7	Night light to maintain transparency				Mostly, functions that operate during the night time		3.85	USI, BPA, BREEAM
8	Small scale units			Smaller units	Diverse scales are seen, from smaller shops upto larger function like the gym and restuarants		4.05	Pref. for vis., Plinth Rating
9	Sufficient accessible doors	2 access doors for every 13 m.			5 visitor entrances, every single unit has access door to the space	Mostly, people enter main entrance. Employees enter sub-entrance. Vistors use shops' entrances	4.29	Plinth Rating
10	Building height and street width	No skyscrapers needed, intergration with green area			The building height is 45 m The ratio to Weena is 1:1, ratio to Stationsplein is 3:1		4.14	Municipal reg., Plinth Rating
11	No physical boundary public space			Quality public oreinted space	The building encloses three courtyards	Many people spend time on the street in front of the building	3.43	Public Life
12	Lively plaza with a variety of materials	Add more green area		Quality public oreinted space	Few materials are used, the plaza lacks trees		3.29	Plinth Rating

Table 4.17
Overview of results for physical characteristics variables of Groot Handelsgebouw (own illustration).

No.	Social interaction variables	City Req.	Corp. Req.	Arch Intentions	Outcomes	People's behaviour	Score	Tool/technique
1	Involvement of users						2.31	USI, BPA, SCI
2	Users' satisfaction		Quality functions for users	Bring back forgotten qualities			3.67	USI, BPA, Public Life, POE, SCI
3	Visiting of public people			Open for the public	People visit the building for business enquiries, eating, drinking, services, and shopping	Lack people due to Covid-19. In normal situation, many people visit the building for services, shopping and eating	3.35	USI, BPA, Public Life, Plinth Rating
4	Safety and security of the street	24/7 life			Weena and Stationsplein sides feel safe, Conradstraat sides are isolated		4.10	Building Decree, BREEAM, Public Life, Plinth Rating, SCI
5	No pollution	Sustainable					3.45	Building decree, BREEAM, SCI
6	Sense of belonging			Return the building to the city as social monument			4.38	Public Life, SCI
7	The liveliness of the street	Transform RCD into vibrant area			The streets are lively with many pedestrians		4.62	Public Life, Plinth Rating, SCI
8	Connection with transport hubs	Connect the east and the west side of RCD, mobility			Connected to all kinds of transit	People use a variety of public transports. Eg, train, tram, bus, bicycle	4.86	USI, BPA, Municipal reg., BREEAM, Public Life, Plinth Rating, SCI
9	Local identity	Identity	Post war monument	Emphasise monument value	Post war construction monument		4.90	SCI
10	Use of facilities by the public			Open for the public	Use for services, leisure and entertainment		3.57	Public Life, Plinth Rating, POE, SCI
11	Diverse activities on the street	Add more activities, diversity, magnets		Add more opened activities and functions	Many activities are seen around the building	Activities are walking, cycling sitting, chatting, eating, and public gathering at Stationsplein	4.05	BPA, USI, Public Life, Plinth Rating
12	Wayfinding				Easy to recognise		4.57	Public Life
13	Local communities involvement	Innovation district, campus					3.00	SCI
14	Market at the public space				No evidence of free-market		1.89	SCI
15	Public installation, workshop, and activities						3.37	SCI

Table 4.18
Overview of results for social interaction variables of Groot Handelsgebouw (own illustration).

05
Results and Analysis

5. Results and analysis

Chapter five is the results and analysis of the research. This chapter examines the research results from the case studies in order to identify an overview of findings. The cross-case analysis is conducted to determine findings across the three cases and develop the relevant variables as the lesson learned. Similarities and differences of each case in each variable are discussed. Lastly, the relevant variables for the interaction between the corporate office building and the city are evaluated and emphasised as the answers to the research. This chapter aims to answer these following sub-questions:

SQ3. *What are the corporation's requirements, the city's requirements, and the designer's motives for the development of the real estate object?*

SQ4. *What are the outcomes of the real estate object and its surroundings? And how do people behave in the building and public area?*

SQ5. *How does the real estate object influence the users from both the corporation and city sides, and how do they interact with the building?*

5.1 Cross-case analysis

In order to conduct the cross-case analysis, findings from each source of the three cases are assessed based on the variables from the theoretical framework. City's requirements and corporation's requirements lead to the idea inputs of the architect. The architect's intentions result in the outcomes of the real estate object. Outcomes of the building affect people's behaviour and users perceptions of the building. Those data from different sources of each case are compared to find similarities and differences between the cases. The framework from figure 5.1 is used for the comparison. Firstly, many variables are overlapped on similar topics. Therefore, these elements are filtered to find the variables that matter to the interaction between the corporate office building and the city. The variables are established into eight following findings: accessibility, flexibility, function and activity, inclusiveness, aesthetical excellency, openness, human scale, and sustainability.

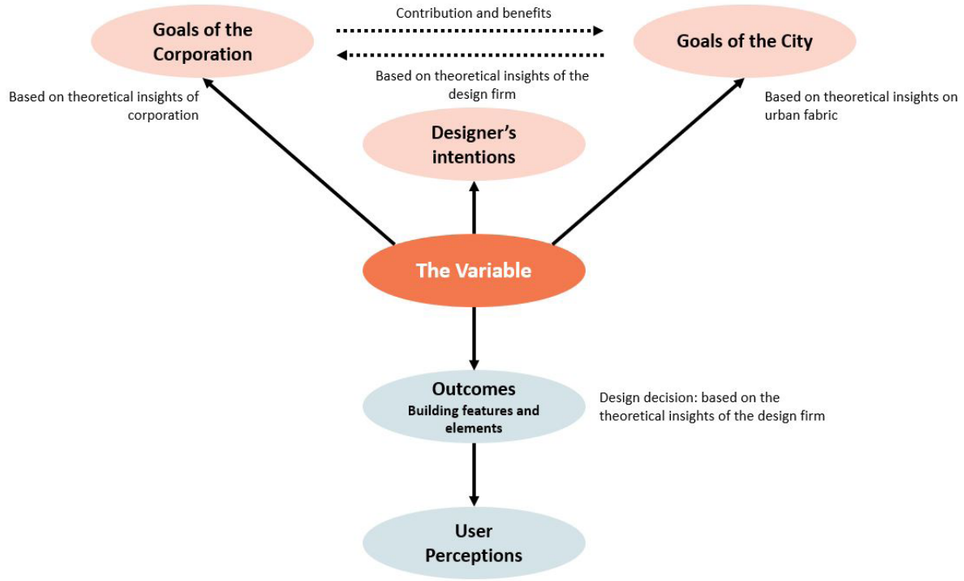


Figure 5.1
Cross-case analysis framework for the comparison between cases (own illustration).

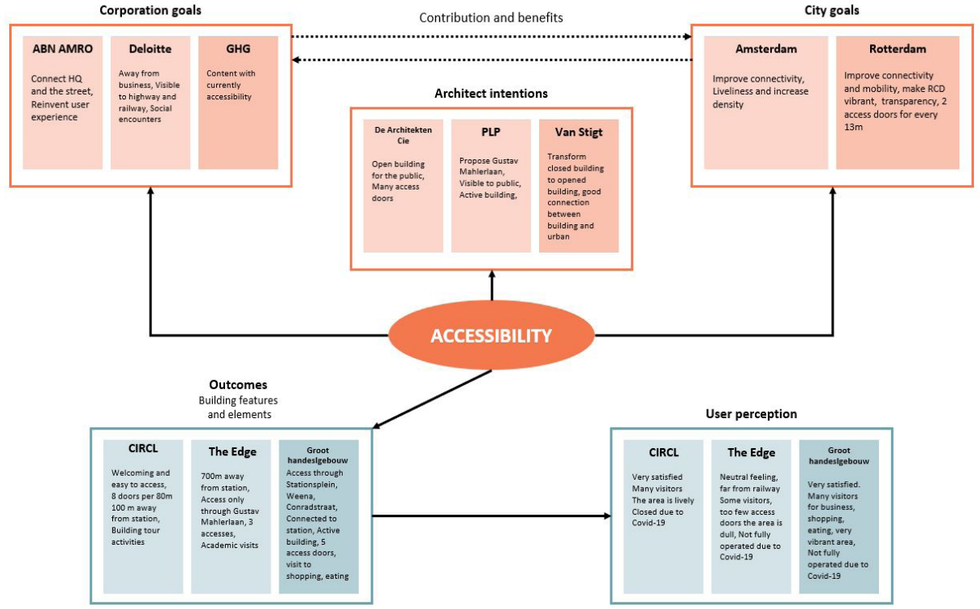


Figure 5.2
The cross-case analysis between the three cases for accessibility variables (own illustration).

5.1.1 Accessibility

The first variable is accessibility, which involves some other sub-variables, such as liveliness of the location, sufficient access doors, connection with the transport hubs, and visiting of public people (figure 5.2).

Firstly, the goals of the Municipality for Amsterdam South District are to improve connectivity between the north and the south, to enhance the liveliness of the area, and to increase the density. This is supported by Adam & Tiesdell (2012), stating that places are meant for people and should be easy to access, and places should be well connected. Karssenberg & Laven (2016) also mention that connectivity and pedestrian flows are part of the software concept of The City at Eye Level.

The goals of ABN AMRO for accessibility are to be located in front of the headquarter building to connect the headquarter to the street, and to re-invent use experience of the building. These are related to location choices and accessibility of promote marketing and sales strategy (Lindholm & Levainen, 2006), and connection of the social value (Macmillan, 2006). Therefore, De Architekten Cie intended to design the building that is opened to the public and having many accessible doors on the ground floor. As the results, CIRCL is located on the main circulation of Gustav Mahlerplein, 100 metres away from Amsterdam Zuid Station, and directly connect to the street. There are 8 flexible doors on the ground floor along the 80 metres façade length, which matches the theories of Gehl, Kaefer & Reigstad (2006). The users are very satisfied with the accessibility aspect of CIRCL. The area is lively, and many pedestrians can freely access the building in normal circumstance.

For the case of The Edge, Deloitte demands the building to be located away from the business functions, but closer to educational facilities. Besides, the corporation requires the building to be physically visible to A10 highway and the railway line to enhance social encounter. This conflicts the theories of location choices and accessibility but matches the strategy of promoting the image of the corporation and physical characteristics of the building (Lindholm & Levainen, 2006). Therefore, PLP architecture proposes Gustav Mahlerlaan to be the location

of the building, which can be clearly seen from the highway and railway. As the results, The Edge is 700 metres away from Amsterdam Zuid Station and some distances away from other multiple transits. Walking, cycling and private car are the alternative choices of commuting. The building consists of three access doors, in which there are some doubts in terms of supporting public accessibility. The users feel neutral regarding the accessibility of the building, while many voices that there are too few accessible entrances to the building.

For Rotterdam Central District, the municipality Rotterdam aims to improve connectivity and mobility, and make Rotterdam Central District vibrant. The area requires transparency of plinths for buildings, and needs two access doors for every 13 metres length of the façade. Apart from the theories of Adam & Tiesdell (2012), and Karssenberg & Laven (2016), the requirements relate to the theories of Close encounters with buildings (Gehl, Kaefer & Reigstad, 2006), in which requires transparency of the plinth and one access doors for every 10 metres.

GHG feels content with the current accessibility of Groot Handelsgebouw. Therefore, there is no new specific requirement regarding this variable. However, van Stigt has the design intentions to open the building for the public and improve the connection between the building and urban plans. This matches the requirements of the municipality and relates to the idea of well-connected and permeable places (Adam & Tiesdell, 2012). Due to the excellency of Groot Handelsgebouw's location, the building can be accessed by all kinds of transport, directly connected to Rotterdam Central station, tram platforms, and bus terminal. The building has five entrances to access to the internal area of the building, and one door for every 6 metres. The number of access door matches both requirements of the municipality and theory of Gehl, Kaefer & Reigstad (2006). Consequently, many people can access the building for all kinds of activities at ease. The users are very satisfied with the number of public visitors, the accessibility, and the vibrancy of the area.

5.1.2 Flexibility

The second variable is the flexibility, in which it considers flexibility of workplace, flexibility of the ground floor function, sufficient ground floor height, and small scale units. Figure 5.3 demonstrates an overview of the cross-case analysis for this variable.

The urban objective of Amsterdam South District regarding this variable is to create a flexible urban environment for economic and social changes as well as adapting to other functions. This idea is supported by Sennett (2018), in which flexibility is the attribute of incompleteness of Open City.

Regarding this variable, the goal of ABN AMRO is to develop the building with flexible spaces and multi-use facilities. The requirement is based on an incremental strategy (O'Mara, 1999) and increase flexibility of corporate real estate added value (Lindholm & Levainen, 2006). The ideas of De Architekten Cie are to design a multi-purpose space for multi-use, shared-working space, rental meeting rooms, high ground floor height, and many access doors. These lead to the design decision and outcomes of CIRCL, in which the building has adaptive multi-purpose space on the ground floor, shared-working space on the first floor, 5.50 metres ground floor height with several higher volume spaces, and eight adjustable doors on the ground floor. The users are very satisfied with the flexibility of CIRCL as the spaces can be adjusted for a variety of activities accordingly, such as conference, meeting, building tour, exhibition, and movie night. This matches the hardware of City at Eye Level, in which it requires 4.00 metres of the ground floor height to create flexible plinth (Karssenberg & Laven, 2016).

Moving onto the case of The Edge, the goal of Deloitte regarding flexibility is to develop office building with resilient and flexible workplaces. The requirement also matches with the goals of the municipality and the theories of O'Mara (1999) and Lindholm & Levainen (2006). In order to respond to the needs of the corporation, PLP Architecture proposes the concepts of the building, which are creating informal workplaces, connecting workplaces and break area, reduction of user capacity, enhancing active frontage, and implementing a digital platform for a better space allocation. These are both an incremental strategy and a value-based strategy as the architect tries to use technology to shape the

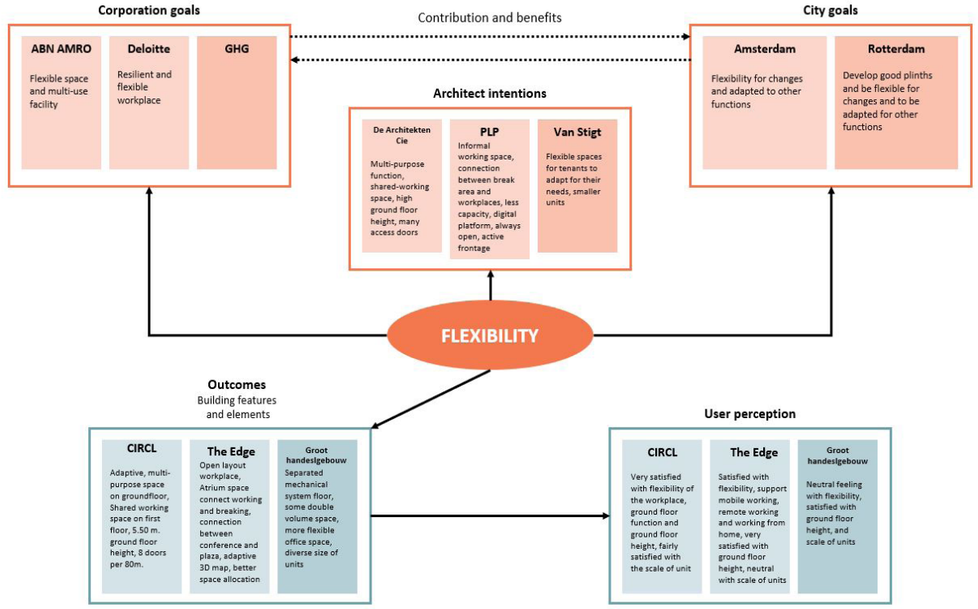


Figure 5.3
The cross-case analysis between the three cases for flexibility variables (own illustration).

behaviour of the users (O'Mara, 1999). The design also adds the image value of the corporation, which emphasizes flexibility and technology (Macmillan, 2006). Consequently, The Edge is equipped with opened layout workplaces, the atrium space to connect working and recreation area, and the square on the west side connected with conference area. Apart from the atrium space, the ground floor height of The Edge is 4.50 metres. Besides, Mapiq developed adaptive 3D map and digital system for a flexible working environment and better allocation of the space. The users of The Edge are relatively satisfied with the flexibility of the building, in which it supports mobile working, remote working and working from home. The Edge has less disruption from the Covid-19 since the building is resilience to the epidemic. This matches to one of the variables of Successful Places, which is the resilient place (Adam & Tiesdell, 2012).

For Rotterdam Central District, the municipality aims to develop good flexible plinths that can be adapt to other purposes. The requirement relates to the incompleteness from the Open City theory (Sennett, 2018) and flexible plinths from the hardware of City at Eye Level (Karssenberg & Laven, 2016).

The management team of GHG did not provide any goal or requirement regarding the flexibility of the building. Nevertheless, van Stigt intends to include flexibility in the design concept. The architect proposes that the renovation of Groot Handelsgebouw will provide flexible spaces for tenants to adjust for their own needs and divide the area into smaller units. The idea of flexible workplaces match the concept of an incremental strategy and increase flexibility value (O'Mara, 1999; Lindholm & Levainen, 2006). These result in the rental office spaces with separated mechanical system floor to offer flexibility to the tenants. There are also some rental office spaces with duplex or double volume spaces. The area that used to be a warehouse is divided into smaller scale spaces and transformed into shops. The general ground floor height is 3.50 metre, which is lower than the requirement of the municipality and the theories (Karssenberg & Laven, 2016; Gehl, Kaefer & Reigstad, 2006). However, the users of the building feel neutral with the flexibility of the workplaces and ground floor functions, which are the consequences of low ground floor height.

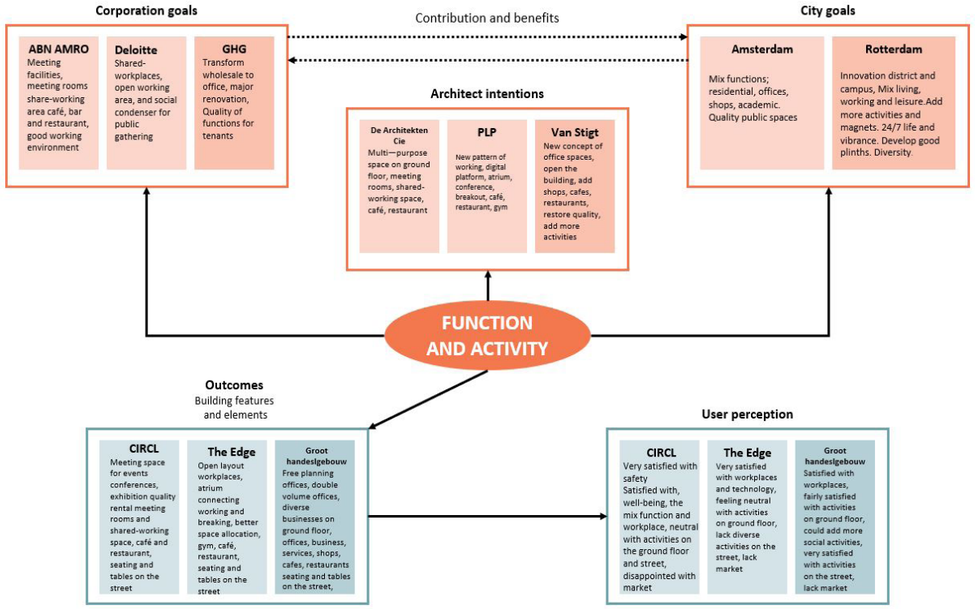


Figure 5.4
The cross-case analysis between the three cases for function and activity variables (own illustration).

5.1.3 Function and activity

The third variable is function and activity, in which it includes the following sub-variables: workplace, productivity, mix functions on the ground floor, diverse activities on the ground floor, user satisfaction, safety and security of the building, diverse activities on the street, and market as places. Figure 5.4 demonstrates an overview of the cross-case analysis for this variable.

Firstly, the goals of the municipality for Amsterdam South District are quality public spaces and to mix residential, office, commercial, leisure, and academic functions in the area. The idea of mix functions is supported in the theories of ambiguous edges in Open City, places meant for people and places of mixed-use and varied density in successful places, and software The City at Eye Level (Sennett, 2018; Adam & Tiesdell, 2012; Karssenberg & Laven).

ABN AMRO requires meeting facilities, working area, café, bar, and restaurant for the new pavilion as well as having a good working environment. These are the corporate real estate strategies of promote marketing and sales, increase employee satisfaction, and increase productivity (Lindholm & Levainen, 2006). De Architekten Cie planned to add functions like multi-purpose space, meeting rooms, shared-working space, café, and restaurant. As a result, CIRCL has multi-purpose meeting space on the ground floor, which is used for event, conference, and exhibition. Quality meeting rooms are located on the basement floor, shared-working spaces are on the first floor, café is at the mezzanine, and the restaurant is on the ground floor at the south side. There are several seating and tables of the restaurant placing on the terrace in front of the building. Which directly connect to the street. The users of CIRCL are very satisfied with the safety of the building while they feel satisfied with the mix of functions of the building, well-being, and workplace. They also feel neutral with the diverse activities on the ground floor and the street. Lastly, they are disappointed with the emergent of public market, in which market could provide more activities on the street life (Sennett, 2018; Karssenberg & Levan, 2016)

Deloitte requires the functions in the office building to be shared-workplaces, opened working area, and social condenser for social

gathering in the building. These relate to promote marketing and sales strategy, increase employee satisfaction strategy, and increase productivity strategy(Lindholm & Levainen, 2006). PLP proposed the functions of the building to be new patterns of working, digital platform to support mobile working and remote working, atrium, conference, breakout, café and restaurant. For the outcomes of the building, The Edge has opened layout offices, informal shared-working area, the atrium to connect working and breaking activities. These elements match with factors that affect performance of the users regarding workplace environment and office design(Naseem et al., 2012). Functions like gym, café, conference and restaurant are located on the ground floor. All these elements support the use value of the real estate (Macmillan, 2006). Consequently, the users of The Edge are extremely satisfied with workplaces and technology implementation of the building. They also feel neutral with the diverse activities on the ground floor. However, the users are disappointed with a lack of activities on the street, even though there are restaurant's seating and tables being placed in front of the building. There is no evidence of public market around the area.

The main goal of the municipality for Rotterdam Central District is to develop the area with innovation district and campus concept. It consists of mixing working and leisure functions, adding more activities and magnets for the area, developing good plinths, and supporting twenty-four-seven life. These are also suggested in the theories of ambiguous edges in Open City, places meant for people and places of mixed-use and varied density in successful places, and software The City at Eye Level (Sennett, 2018; Adam & Tiesdell, 2012; Karssenberg & Laven).

The goals of GHG are to transform Groot Handelsgebouw from the wholesaler building into the modern office, a major renovation of the building, and providing quality functions for tenants. These are an incremental strategy (O'Mara, 1999), increase employee satisfaction strategy (Lindholm & Levainen, 2006), and add use value for the real estate building (Macmillan, 2006). Van Stigt proposed the idea of transforming the building into the new concept of office spaces, adding appropriate functions and new activities on the ground floor, and restore original qualities of the building. Groot Handelsgebouw has free planning offices with some double volumes spaces. A variety of business, shops, services, cafes, and restaurants are located on the ground floors providing diverse activities. Many exchanged functions are spreading from inside to outside, such as seats and tables of cafés and restaurants. Therefore, the users of Groot Handelsgebouw are very satisfied with diverse activities on the street, satisfied with workplaces, and feel fairly satisfied with diverse activities on the ground floor. However, the area lacks emergent of public market, in which the municipality of Rotterdam agrees that public market could offer more diverse activities on the street and support local businesses.

5.1.4 Inclusiveness

This section conducts the cross-case analysis of inclusiveness variable between the three cases, which is summarised in figure 5.5. It includes the inclusion of small businesses, involvement of the users, sense of belonging, local identity, local communities involvement, and public activities.

Regarding inclusiveness, the city goals of the municipality of Amsterdam are to include voices of the local community, emphasize Amsterdam local qualities, and drive the area with small businesses to create uniqueness. Local identity is mentioned in the incompleteness of Open City and distinctive places in Successful places (Sennett, 2018; Adam & Tiesdell, 2012) while the emphasize of local businesses is part of places of mixed-use and varied density theories (Adam & Tiesdell, 2012)

ABN AMRO planned to provide living lab in the building, which is the space for innovators, start-ups and entrepreneurs to present innovative ideas of circularity. The plan also includes the representatives of TU Delft team to occupy the space. This adds social value, which supports the idea of social inclusiveness in the building (Macmillan, 2006). During the design processes, De Architekten Cie collaborated with small suppliers and start-ups for the realisation of building materials. In addition, the architect discussed with academic organisations to determine activities on the ground floor of the building. As the results, the multi-purpose space on the ground floor is used for the living lab, in which conferences and meetings are hosted there occasionally. Some other public events are also hosted here, such as public exhibition and movie night. Consequently, the users are fairly satisfied with the inclusiveness of CIRCL.

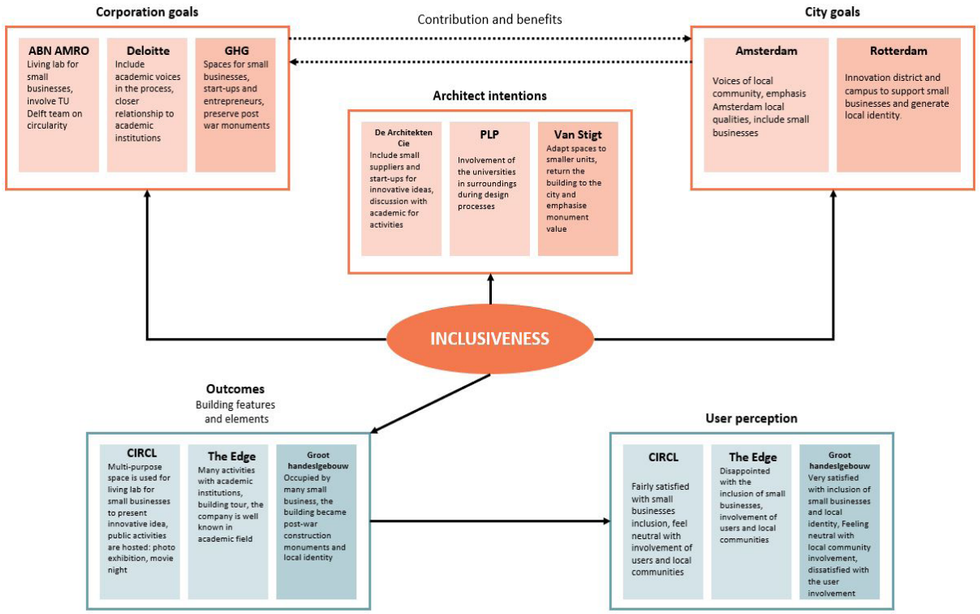


Figure 5.5
The cross-case analysis between the three cases for inclusiveness variables (own illustration).

However, the area lacks emergent of the public market, in which market as places is a part of Software variable of The City at Eye Level (Karssenberg & Laven, 2016).

Moving onto the case of The Edge, the goal of Deloitte regarding inclusiveness is to include the academic institutions in processes to improve the relationship with those academic organisations. This aspect is the social value as the corporation tries to have a good connection with the academic field (Macmillan, 2006). During the design processes, PLP Architecture discussed with the academic representatives to determine possible activities. Therefore, The Edge and Deloitte are well-acknowledge in the academic field. Many involved activities occur, such as open house day and building tour. This results in many students demanded to work with Deloitte and involved companies, which is the marketing and sales strategy to promote the corporation's image (Karssenberg & Laven, 2016). However, the users feel dissatisfied with the inclusion of small businesses and public activities in the building. On the positive side, The Edge has become the local identity of the area due to its visibility and physical characteristics.

For Rotterdam Central District, the municipality of Rotterdam initiated the idea of an innovation district and campus to support small businesses and generate local identity. Similar to Amsterdam South District, the requirements relate to the theories of Sennett (2018) and Adam & Tiesdell (2012) in terms of local identity and small businesses.

For the third case, GHG profoundly focuses on the inclusion of small businesses, start-ups and entrepreneurs in Groot Handelsgebouw as well as preserving post-war monument identity. These strategies relate to social value, specifically on social identity and social inclusion (Macmillan, 2006). Due to the requirements, van Stigt planned to adapt spaces into smaller units and return the building to the public to emphasize monumental value. Therefore, most of the tenants of Groot Handelsgebouw are small companies, innovative businesses, start-ups and entrepreneurs, which matches both goals of the corporation and the city. According to the survey, the users of Groot Handelsgebouw are overwhelmingly satisfied with the inclusion of small businesses and local identity status of the building. At the same time, they feel neutral with local community involvement. Nonetheless, the users are dissatisfied with user involvement in the renovation processes.

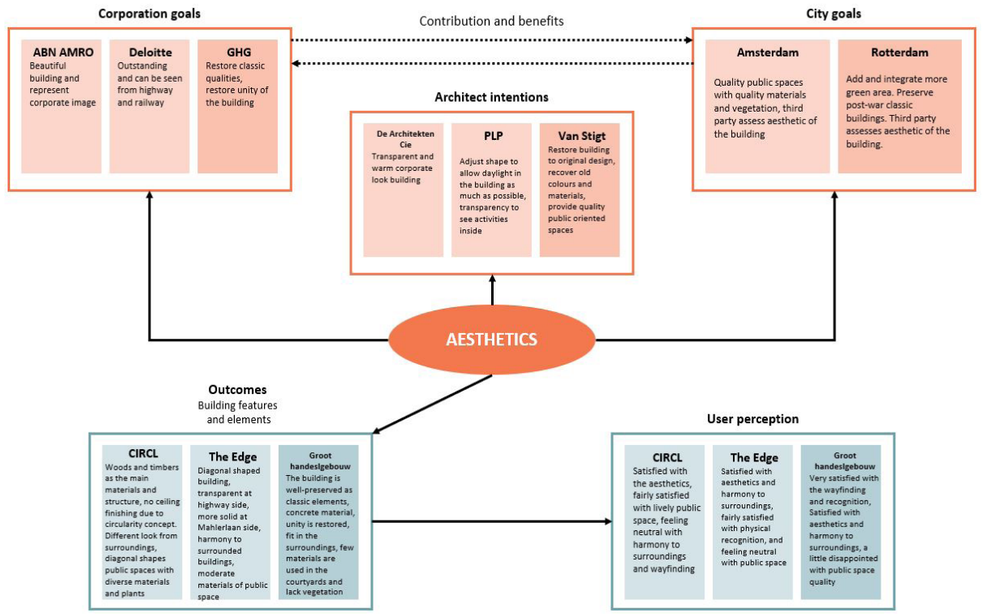


Figure 5.6
The cross-case analysis between the three cases for aesthetics variables (own illustration).

5.1.5 Aesthetical excellency

The variable of aesthetics consists of harmony of texture, colour and materials, vibrancy and variety of public materials, and wayfinding. The cross-case analysis of aesthetics is summarised in figure 5.6.

The municipality of Amsterdam set the goal for Amsterdam South District regarding aesthetics, which is the urban area with quality public spaces, quality materials and vegetation. However, there is no goal regarding the aesthetics of buildings, which are assessed by the third party.
For the corporation side, ABN AMRO demands a beautiful pavilion that represents the corporation's image. This is related to the three corporate real estate strategies: a value-based strategy (O'Mara, 1999), which expresses the corporate culture and image, promote marketing and sales (Lindholm & Levainen, 2006), and image value of the corporation (Macmillan, 2006). The design intentions of De Architekten Cie for CIRCL are transparency and warm corporate look building. Therefore, re-used woods and timbers are used for the main structure and materials of CIRCL. There is no ceiling finishing due to the circularity reasons. The shapes of the public spaces are a diagonal form, and diverse materials and vegetation are designed in the public area. In terms of harmony, the physical characteristic of CIRCL is different from the surrounded buildings. The users of CIRCL are satisfied with the aesthetics of the building and feel fairly satisfied with the liveliness of the public spaces. However, they feel neutral with the harmony of texture, colour and material compared to the surroundings.

For the case of The Edge, Deloitte demanded an outstanding office building and visible to the highway and the railway. This reflects the image of promoting marketing and sales strategy (Lindholm & Levainen, 2006), and the corporate identity of the image value (Macmillan, 2006). PLP architecture intends to design the building with transparency to the north side to show activities inside the building. Moreover, the shape of the building is realized to maximise the daylight in the building. The design ideas are base on a value-based strategy (O'Mara, 1999). As the results, The Edge has a diagonal shape allowing daylight inside the building for an entire day. The Edge is transparent at the north side and more solid at the south side to reduce the amount of daylight at the office area. The building colour

and materials are harmonies to the surrounded buildings. As the consequences, the users are satisfied with the aesthetics and harmony of The Edge. They are also fairly satisfied with physical recognition. Nonetheless, they feel neutral with the liveliness of the public space.

For Rotterdam Central District, the municipality planned to add and integrate more green functions in the urban area and buildings. Besides, another goal of the municipality is to preserve post-war and monument buildings in the area.

For the case of Groot Handelsgebouw, the goals of GHG are to restore classic qualities of Groot Handelsgebouw and unity of the building. These relate to promoting marketing and sales strategy, specifically on the characteristics of the building (Lindholm & Levainen, 2006), and also link to locational context and historical development of cultural value (Macmillan, 2006). Van Stigt intended to restore the building to its original design and provide quality public-oriented spaces as well as recovering old colours and materials. The outcomes of Groot Handelsgebouw show that the building is well-restored, preserving classic elements, colour and materials, and the unity of the building is restored. The characteristic of the building fits in the surrounding of Rotterdam Central District. However, few materials are used in the courtyards and lack of vegetation. From the reflections of the users, Groot Handelsgebouw acts as an excellent wayfinding in the area and is easy to recognize. The users also feel satisfied with the aesthetics of the building and harmony to surroundings. However, the users are disappointed with the quality of public spaces, such as courtyards.

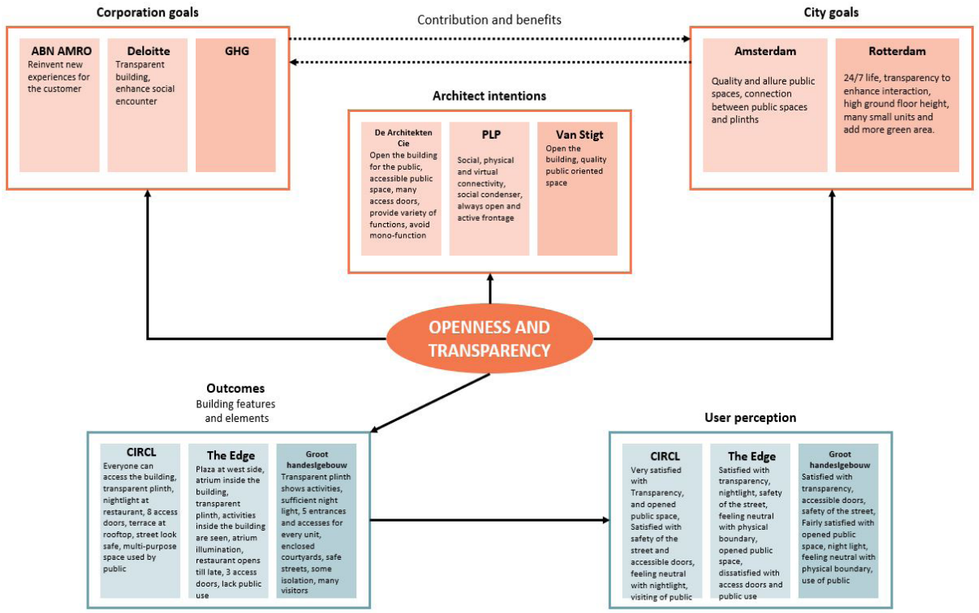


Figure 5.7
The cross-case analysis between the three cases for openness and transparency variables (own illustration).

5.1.6 Openness and transparency

For this section, the cross-case analysis between the three cases for openness and transparency is conducted. An overview of the analysis is shown in figure 5.8. The variable of openness and transparency consists of several sub-variables, including open for the public, opened public space, sufficient ground floor height, transparency of the plinth, night light to maintain transparency, sufficient accessible doors, no boundary public space, visiting of public people, safety and security of the street, and facilities used by the public.

Amsterdam South District has the goals regarding openness and transparency, which are creating quality and allure public space, and connection between public spaces and plinths. Karssenberg & Laven (2016) supports that plinths should be opened and high to enhance the interaction with the street.

ABN AMRO has the goal of providing new experiences to the users of the pavilion. De Architekten Cie proposed that the pavilion should be opened for the public, and pedestrians can access the public space of the pavilion. Besides, the pavilion should provide a variety of functions and avoid mono-function at all cause to create safety and security of the street. This relates to the theories of successful places, specifically, on the places meant for people and places of mixed-use a varied density (Adams & Tiesdell, 2012). For the outcomes of CIRCL, the building has two accessible public spaces, which are the garden in the inner court and the rooftop garden. The plinth is high and sufficiently transparency to see activities inside. Access doors can be adapted to be opened or closed relatively with the function adjustment. CIRCL provides nightlight only at the restaurant area due to circularity and sustainability reasons. The multi-purpose space is used for public activities occasionally. According to the survey, the users of CIRCL are very satisfied with the openness and transparency of the building. They also feel satisfied with the safety of the street and number of access doors. On the other hand, the users feel neutral with the sufficiency of the night illumination.

For the case of The Edge, the goal of Deloitte for the building is to develop a transparent building that enhances social encounters, which adds social value for the real estate object (Macmillan, 2006). The inputs of PLP Architecture are to emphasize social, physical and virtual connectivity, and create social condenser area in the building. The additional ideas are to develop the building that is always opened and have an active frontage. As a result, The Edge is transparent at the north side and solid at the south side. The plinth is sufficiently transparent, in which the activities inside the building can be seen from the street. The atrium is enclosed by the building shells and office functions, while the external public plaza of The Edge is at the west side. There is a restaurant to make an active frontage. The building provides a significant level of illumination during the night time, especially from the atrium. Consequently, the users of The Edge are satisfied with the transparency, nightlight and safety of the street, and feel neutral with the openness of the public space. Nonetheless, the users are disappointed with the public activities in the building and number of access doors.

The main goal of the municipality for Rotterdam Central District is to generate twenty-four-seven life in the area, which consists of transparency of the plinth to enhance interaction, high ground floor height, many small units, and adding more green area. This relates to the theory of The City at Eye Level, specifically on the plinth(Karssenberg & Laven, 2016) and design transparency of plinths (Gehl, Kaefer & Reigstad, 2006).

The management team of GHG does not have any specific goal for Groot Hanelsgebouw regarding openness and transparency. Van Stigt proposes to open the building to the public and provide quality public-oriented space. Therefore, Groot Handelsgebouw's plinths are transparent to show activities inside the building. The building provides sufficient illumination during the night time. There is also every single access door for each unit. The street of Weena and at Stationsplein side is lively and safe, while Conradstraat is dull and isolated. The inner courtyards do not open for the public and can be accessed from the inner circulation of the building only. Consequently, the users of Groot Handelsgebouw are satisfied with transparency and the number of accessible doors and safety on the street. They also feel fairly satisfied with openness and night light. However, they are disappointed with the accessibility of the inner courtyards.

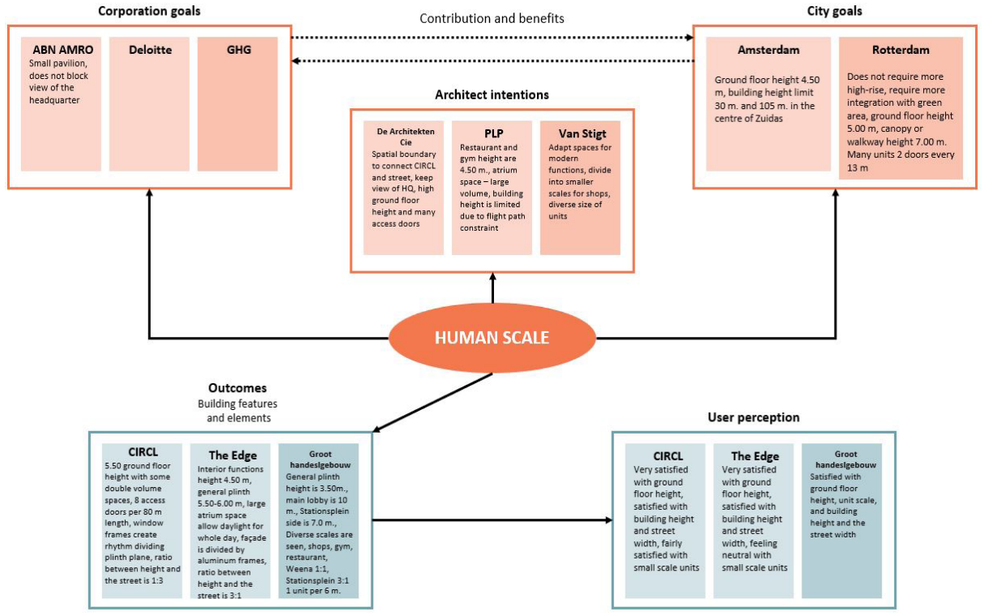


Figure 5.8
The cross-case analysis between the three cases for human scale variables (own illustration).

The cross-case analysis between the three cases for the human scale is discussed in this section (figure 5.8). Human scale consists of three sub-variables, including small scale units, building height and street width, and sufficient ground floor height.

Firstly, the municipality of Amsterdam requires that office buildings in Amsterdam South District must have ground floor height exceed than 4.50 metres. Besides, the building height limit for the overall area of Zuidas is 30 metres and 105 metres for the centre of Zuidas. However, the assessment of the building height is considered case by case. Due to the Hardware, recommended ground floor height is at least 4.00 metres (Karssenberg & Laven, 2016).

ABN AMRO requires the building to be a small pavilion and does not want to block the view of the headquarter building. The designer intends to create a spatial boundary that connects the pavilion and the street while keeping the visibility of the headquarter building at the same time. The architect also wants to include many access door on the ground floor to enhance social accessibility and flexibility of the pavilion. For the outcomes of the building, CIRCL has 5.50-metre ground floor height with some higher volume spaces, which matches the requirement of the municipality. The ground floor has eight adjustable access doors along the 80-metre façade, in which the window frames and door frames divide the plinth into smaller units. This matches the recommended number of access doors by Gehl, Kaefer & Reigstad (2006). The height of CIRCL is approximately 11 metres while the width of Gustav Mahlerplein is 30 metres. Therefore, the ratio between the building height and the street width is 1:3 while the recommended ratios are 1:2, 1:1 and 2:1 (Gehl, Kaefer & Reigstad, 2006). The users of CIRCL are very satisfied with the ground floor height, satisfied with the ratio of building height and street width, and reasonably satisfied with the scale of the units.

For the second case, Deloitte does not have any specific goal regarding the scale of the units. PLP architecture designed the ground floor height of restaurant, gym and conference area to be 4.50 metres and connect all the spaces with the atrium. The building height is limited due to the constraint of the flight path to Schiphol Airport. As the results, the ground floor height of interior functions is 4.50 metres while the height of the plinth façade is 5.50-6.00 metres. These heights match the requirements of the municipality and recommended height by Karssenberg & Laven (2016). The height of The Edge is 58 metres, which follows the control of the city. The width of Gustav Mahlerlaan is approximately 20 metres. Therefore, the ratio of the building height and the street width is 3:1, which minimally derails from the recommended ratio (Gehl, Kaefer & Reigstad, 2006). The users of The Edge are extremely satisfied with the ground floor height, and satisfied with the ratio of building height and street width. However, the users feel neutral with the scale of units.

For Rotterdam Central District, the municipality requires that office building must have ground floor height exceed than 5.00 metres, the height of canopy must exceed that 7.00 metres, and have two access doors for every 13 metres. The height requirement of the ground floor height for quality plinth is 4.00 metres (Karssenberg & Laven, 2016). In addition, the area does not require more high-rise building due to the vision plan, but demands the integration between buildings and green urban area.

For the last case, GHG does not have any specific goal regarding human scale. Van Stigt, the architect, wanted to adapt spaces for modern functions and transform warehouse spaces into commercial functions. This includes dividing space into smaller units and creating the diverse size of commercial space. For the outcomes of the building, general ground floor height is 3.50 metres while the main lobby height is 10 metres and plinth height at Stationsplein side is 7.00 metres. The general plinth does not match the requirement of the city and recommended height by Karssenberg & Laven (2016). There is a variety size of commercial space on the ground floor. They are used for offices, shops, cafes and restaurants. The width of the single unit shop is 6.00 metres, and each shop has its own access door. The number of units matches the requirement of the city and the theory of Gehl, Kaefer & Reigstad (2006), in which states that the building should have one unit for every 10 metres. The height of Groot Handelsgebouw is 43 metres. Therefore, the ratio of the building height and the street width is 1:1 at Weena side, and 3:1 at Stationsplein side. It partly matches the theory of Gehl, Kaefer & Reigstad (2006). According to the survey, the users of Groot Handelsgebouw are satisfied with the ground floor height, the scale of units, and the ratio of building height and street width.

5.1.8 Sustainability

The last variable is the sustainability of the building. Figure 5.9 summarises the cross-case analysis of the variable between the three cases. The sustainability consists of four sub-variables, which are no pollution, user satisfaction, operating and maintenance, and flexibility.
The city goals of Amsterdam South District are to create a sustainable urban environment and flexible for economic and social changes. The sustainability is mentioned in Successful Places, in which urban area needs to be compact, self-sufficient, resilience and sustainable (Adam & Tiesdell, 2012). On the other hand, flexibility is a part of incompleteness in Open City, and Hardware of The City at Eye Level (Sennett, 2018; Karssenberg & Laven, 2016).

For the first case, the main goal of ABN AMRO is to facilitate the transition to sustainability and circularity while flexibility is the minor requirement for the development of pavilion. The goal relates to increase employee satisfaction of the corporate real estate strategy, and adds image value and environmental value regarding sustainability (Lindholm & Levainen, 2006; Macmillan, 2006). De Architekten Cie proposed the design of circular pavilion to respond to the requirements of ABN AMRO. For the outcomes of the building, CIRCL becomes the fully circular building, reaching outstanding BREEAM score of 85%. The building is constructed by re-used materials, sustainable, neutral energy, easy to disassembled and easy to maintain. As the consequences, the users of CIRCL are very satisfied with the operating and maintenance, and feel satisfied with sustainability, well-being, building environment and flexibility.

Moving on to the second case, the goals of Deloitte to develop The Edge are smart, sustainable office building, which aims for BREEAM outstanding, and digital implementation for efficiency, resilience, and flexibility. These are the strategies of increase employee satisfaction, increase productivity (Lindholm & Levainen, 2006), and adds use value, image value and environmental value (Macmillan, 2006). PLP Architecture proposed the idea of a smart sustainable building with the implementation of a digital system to utilize energy consumption and space allocation. The Edge qualified BREEAM outstanding score of

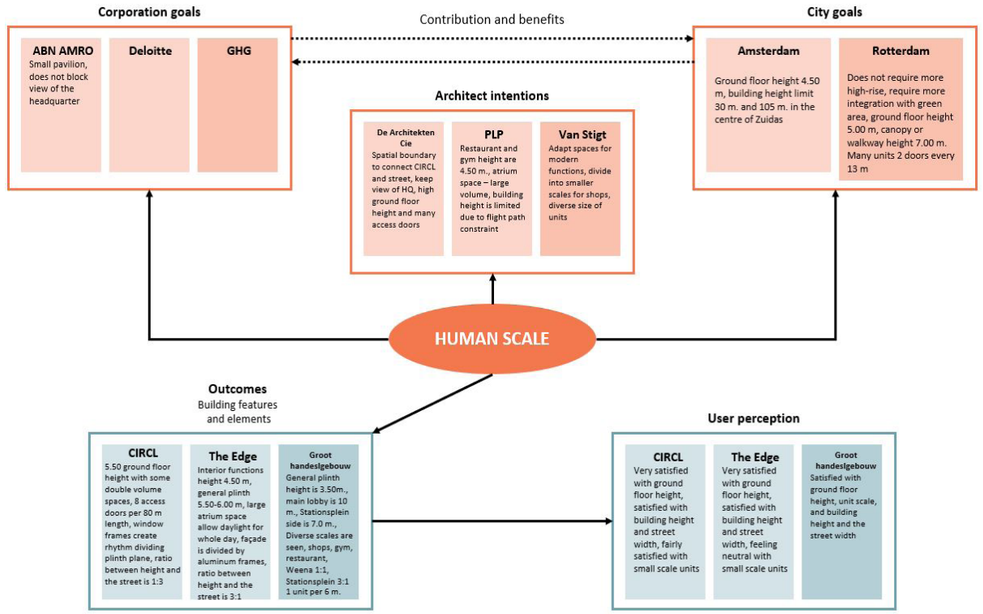


Figure 5.9
The cross-case analysis between the three cases for sustainability variables (own illustration).

98.30%. The atrium space is the design decision to connect the whole building. The interactive 3D map was developed to be used by office users while more than 20,000 sensors were installed to monitor motions of people and reduce energy consumption. Therefore, the users of The Edge are extremely satisfied with all aspects of the sustainability of the building. The outcomes of the building match the goals of the city, the goals of the corporation, and satisfy the office users.
For Rotterdam Central District, the goals of the area are to implement RCD with the sustainable green urban plan, restoration of post-war monument buildings, and improve flexibility, especially at plinths. Apart from sustainable, resilient and robust places (Adam & Tiesdell, 2012), the incompleteness of Open City (Sennett, 2018), and flexible plinth of The City At Eye Level (Karssenberg & Laven, 2016).

Lastly, The main goal of GHG management team for the renovation of Groot Handelsgebouw is to restore quality functions for the users of the building. The goal involves increase employee satisfaction strategy, and adds use value of the corporate real estate (Lindholm & Levainen, 2006; Macmillan, 2006). The intentions of van Stigt are to restore forgotten qualities of Groot Handelsgebouw, including repairing, recovering and cleaning building's elements, colour and materials. The architect also intended to add more flexible spaces in the building. For the outcomes of the building, Groot Handelsgebouw reaches A level of Green Building score. The condition of the building is improved, and office spaces are refurbished to be more flexible. For the perceptions of the users, they feel fairly satisfied with the operating and maintenances of the building. However, the users feel neutral regarding sustainability, flexibility and technology implementation.

5.2 Evaluation

From the cross-case analysis, the evaluation of the results is conducted regarding the interaction between the corporate office building and the city, including the intentions of the designer and the user perceptions on the real estate outcomes. An evaluation is based on the aforementioned eight variables to identify how these variables influence the intervention and how those variables influence users of the buildings. Table 5.1 demonstrates an overview of the evaluation of the case studies and the cross-case analysis.

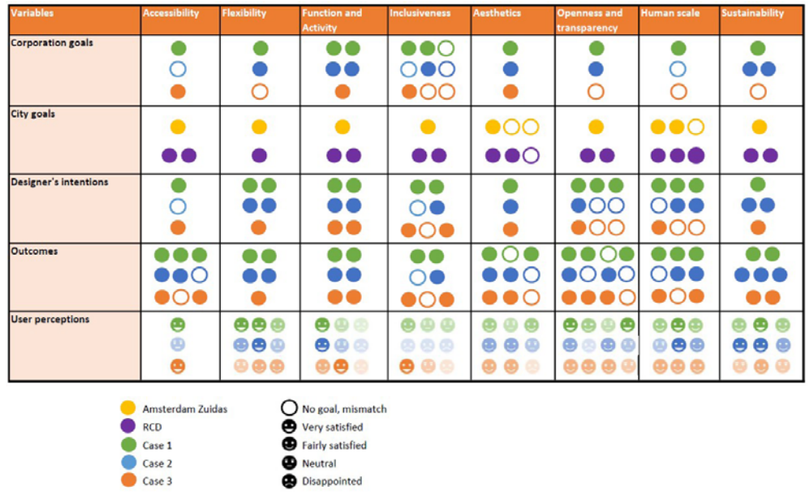


Table 5.1
An overview of the evaluation of the case studies (Own illustration).

1. Accessibility

- ABN AMRO and GHG prefers to locate the buildings in the business agglomeration and connect to the main streets. Deloitte differentiates by locating away from the business functions but visible to the highway and railway line.
- Both Amsterdam Zuidas and RCD have the goals of improving connectivity, mobility, and vibrancy of the area. However, RCD is more specific on a number of access doors for a certain number of façade length.
- All of the architects of the three cases intended to open the buildings to the public. However, PLP Architecture proposed Gustav Mahlerlaan to be the location for The Edge for the visibility to the highway.
- CIRCL and Groot Handelsgebouw are closed to the main public transports and walking street, and provide many access doors on the ground floor as well as offering transparency of the plinth. Even though The Edge provides transparency and clear visibility to the highway, pedestrians can only access from Gustav Mahlerlaan, which is far away from the Amsterdam Zuid Station. Compare with the other two cases, Gustav Mahlerlaan is less lively than Gustav Mahlerplein and Stationsplein. Besides, the pedestrians' view to the building from the street is solid. The Edge also provides a few access doors on the ground floor.

- According to the survey, both users of CIRCL and Groot Handelsgebouw are very satisfied with the accessibility of the buildings. On the other hand, The Edge does not impress the users regarding accessibility.
- The evidence from the cases points out that location selection, transparency, access doors and liveliness of the location have a significant impact on the user's behaviour and perception. Firstly, people can access the building that connected to the main public transport and the main walking street easier. Secondly, transparency provides visibility to the public. However, it is more effective to engage people's eye level that the vehicles. Thirdly, many access doors facilitate the engagement of the pedestrians and accessibility to the building. Lastly, the more liveliness of the area, the more number of people is, which increase the opportunity for people to engage and access the building.

2. Flexibility

- ABN AMRO and Deloitte require flexible and resilient workplace for the multi-use. On the other hand, GHG does not have any goal regarding flexibility.
- Both Amsterdam Zuidas and RCD emphasize the flexibility and adaptability of the urban area for changes. Nonetheless, RCD includes developing quality plinth in the urban plan.
- The ideas of De Architekten Cie and PLP Architecture are providing flexible workplaces, shared-working space. De Architekten Cie focuses on the high ground floor height and many access doors. At the same time, PLP emphasizes the reduction of user capacity in the building and the implementation of the digital platform. Van Stigt's ideas are providing flexible office spaces for tenants and dividing space into smaller units.
- Both CIRCL and The Edge have shared-working spaces and connect the facilities with multi-function space (CIRCL) and the atrium (The Edge). Both CIRCL and The Edge provide sufficient ground floor height for flexibility, but CIRCL offers more access doors on the ground floor. For Groot Handelsgebouw, the building provides flexible office spaces with separated mechanical system floors, and some of the offices are double volume spaces. The facility offers a various size of units and every single unit on the ground floor has its own access door from the street. Due to the limitation of the existing building, Groot Handelsgebouw has 3.50-metre ground floor height. Only the main lobby has 10-metre ground floor height, and the plinth at Stationsplein side has 7-metre ground floor height.
- The user perceptions between the three building are different. They are extremely satisfied with the flexibility and ground floor height of CIRCL and fairly satisfied with the scale of units. The users of The Edge are satisfied with the flexibility of workplaces and ground floor functions, extremely satisfied with the ground floor height, and feel neutral with the scale of units. Lastly, the users of Groot Handelsgebouw do not feel impressed with the flexibility of workplaces and ground floor functions. However, they feel satisfied with the ground floor height and scale of units of the building.
- According to the case studies, it can be concluded that flexibility involves the three sub-variables, which are the flexibility of workplaces and ground floor function, sufficient ground floor height for space adjustment, and appropriate unit scale for adaptation. Firstly, the flexibility of workplaces and ground floor function should be based on the corporation's requirements and the user's needs. Without the goal from the corporation or the users would lead to the functions that do not respond to the actual needs of the users. Secondly, Higher ground floor leads to the capability to adapt, adjust or change the functions of the ground floor of the building. The users prefer the higher ground floor regarding flexibility. Laslty, Smaller-scale units are more comfortable to adapt and adjust to other functions by the users. The users are more satisfied with the plinth that is divided into smaller units using window patterns and the number of access doors.

3. Function and activity

- Zuidas and RCD shared the same goal of mix residential, office, and leisure functions in the area. However, RCD has additional goals of developing good plinths and supporting 24/7 life.
- Both ABN AMRO and Deloitte require flexible workplaces, facilities and commercial functions. On the other hand, GHG wants to transform Groot Handelsgebouw into modern office spaces and major renovation to provide quality functions for tenants.
- All of the architects of the three cases propose multi-purpose spaces, working spaces, and diverse commercial functions on the ground floor, such as the conference area, gym, cafes and restaurants. PLP and van Stigt tried to offer new patterns and new concepts of working space. Only, PLP traduces digital platform, which supports mobile working and remote working.
- All buildings from the three cases serve the purposes accordingly to the goals of the corporations and the cities. CIRCL, The Edge and Groot Handelsgebouw provide various types of office function, and diverse functions of the ground floor, including meeting spaces, conference area, café and restaurants. Only Groot Handelsgebouw has various types of commercial shop on the ground floor while The Edge integrates the digital platform to allocate working spaces in the building. Besides, all of the buildings have seating and tables on the streets extending from the eating functions inside the buildings. However, none of them has public market near or around the location of the buildings.
- According to the survey, the users of CIRCL and The Edge are very satisfied with working activities and workplaces in the building while the users of Groot Handelsgebouw feel satisfied with this aspect. The users of CIRCL are very satisfied with the activities on the ground floor and the street. In contrast, the users of CIRCL and The Edge are not impressed with these aspects. The users of all buildings are disappointed that the areas lack public market.
- The cross-case analysis demonstrates that various types of quality workplace, activities on the ground floor and the street, various commercial functions on the ground floor, and exchanged functions are the essential elements for the interaction between corporate office building and the city. Firstly, the users are more likely to be satisfied if the building offers various types of working spaces, working activities, and connecting spaces, such as mutli-purpose space and atrium. Secondly, the users prefer diverse activities on the ground floor, especially food merchandise, retails and shops. The functions offer opportunities for the people to occupy the space although they do not work there. In addition, the seating and tables on the street encourage people to occupy the space. Even though public market could offer more activities on the street, the major barrier for the emergent of public market is the urban flow and circulation. In addition, the market also affects the image of corporations, in which it does not fit to be placed in the dense area of office functions.

4. Inclusiveness

- ABN AMRO wants to involve small businesses and representatives of the Academic institution in the building. On the other hand, Deloitte wants to maintain a good relationship with universities in the surrounding while GHG intends to provide rental office and commercial spaces for small businesses start-ups, and entrepreneurs as well as preserving post-war monument status of Groot Handelsgebouw. However, none of the corporations has an apparent involvement of the users in the development processes.
- Both Zuidas and RCD support the activities of the local businesses. Nonetheless, RCD focuses more on the idea of campus and innovation district.
- De Architekten Cie involved small suppliers during the design processes of the building as well as discussing with academic institutions for the possible activities in the building. In contrast, PLP only had a discussion with the representatives of the universities around the surroundings during the design processes. For Groot Handelsgebouw, van Stigt intends to adapt existing spaces into smaller units for small companies and return the building to

the city to emphasize monumental value.

- For the outcomes of the real estate object, CIRCL provides multi-purpose spaces as living lab for small business to present innovative circular ideas. Many public activities are hosted in this space, such as exhibition, movie night. The Edge does not provide any space for small businesses to occupy the area. However, there are several activities involving academic institutions. The activities are open house day and the building tour. Lastly, Groot Handelsgebouw does not have any involvement with academic institution, but most of the office commercial spaces are provided for the small businesses, entrepreneurs and start-ups. The building is maintained as the post-war monument and local identity.
- According to the survey, the users of Groot Handelsgebouw are extremely satisfied with the inclusion of small businesses in the building while the users of CIRCL feel reasonably satisfied with this aspect. In contrast, users of The Edge are dissatisfied with a few numbers of small business included in the building. Both users of CIRCL and Groot Handelsgebouw feel neutral with the level of involvement of local communities while the users of The Edge are disappointed with this aspect. It is stated that there are too few public activities in the building. Lastly, the users of CIRCL are not impressed by the engagement with the user's involvement. The users of the other two buildings are disappointed with a lack of involvement in the design processes.
- The lesson learned from the cross-case analysis shows that the relevant variables for the interaction of corporate office building and the city regarding inclusiveness are the inclusion of small businesses, the involvement of the users in the design processes and the involvement of local communities. Firstly, small businesses diversify functions and activities in the building, which increase the engagement of public people to the building. More number and types of small businesses lead to more interaction. Secondly, the involvement of users in the design processes does not facilitate the engagement of the public. It focuses more on the workplace, behaviour, user satisfaction and well-being inside the building. Therefore, the variable is excluded. Lastly, local community involvement increases the sense of belonging of the building, which encourages the local to occupy the building willingly. The monumental status does not help with the interaction but keeps the reputation and acknowledgement of the building in the city level.

5. Aesthetics

- ABN AMRO and Deloitte require beautiful and outstanding buildings, which represent the corporation's image. On the other hand, GHG aims to restore classic qualities and focuses more on locational identity.
- Zuidas and RCD focus on the quality of public spaces and green area. However, RCD emphasizes preservation of classic post-war buildings.
- De Architekten Cie and PLP Architecture include transparency and visibility in the design concepts while Van Stigt wants to restore original design, and recover elements, colours and materials.
- The characteristics of CIRCL is different from the surroundings in terms of colour, texture, and material. The main materials for finishing and structure of CIRCL are re-used woods and timbers. There is no ceiling finishing due to circularity and maintenance reasons. The design of the public space is diagonal shapes with a variety of materials and diverse vegetation. The shape of The Edge is defined from the optimisation of daylight in the building. The north side presents a large area of transparent glass to the highway while the south side is more solid with façade elements to protect office spaces from the direct daylight. The Edge is harmony to the surroundings regarding material, colour and texture. The materials of the plaza on the west side are good quality but not as diverse as CIRCL. For Groot Handelsgebouw, the building is well-preserved as classic elements and concrete material, which restores the overall unity of the building. Groot Handelsgebouw fits in well in the area of RCD. However, few materials are used in the courtyards and also lack vegetation and green usable green area.
- According to the users' opinions, The users of all cases agree that CIRCL, The Edge and Groot Handelsgebouw are physically pleasant and nice-looking. The users of The Edge and Groot Handelsgebouw are satisfied with the harmonies of the buildings to surroundings. However, the users' opinions on the quality of public paces are diverse. The users of CIRCL are fairly satisfied with the quality of public spaces while the users of The Edge are not impressed by this aspect. Lastly, the users of Groot Handelsgebouw are disappointed with the quality of internal courtyards of the building.
- To conclude, the variable of aesthetics consists of three sub-variables: physical aesthetics, a harmony of texture, colour, material and scale, and quality and liveliness of the public space. Firstly, the physical aesthetics of the building attract people to engage and interact with the building. It also acts as the visual impression in the urban fabric. Nevertheless, the aesthetic is an intangible topic and difficult to be assessed. It requires the new assessment tool to be implemented in both individual-level and city level. Secondly, the harmony of texture, colour, material and scale helps to keep the visual comfort of the urban fabric and keep the continuity of the visual flow. It has less impact than the aesthetics and tangible quality but still essential to keep the overall visual characteristics of the city. Lastly, the physical quality and liveliness of the public space also play an important role to stimulate the interaction. Public space helps to attract people to occupy the space and connect the building to the street as the hybrid space. Besides, physical quality of the public space offers an excellent environment and comfort to the public, which encourages people to linger in the area longer.

6. Openness and transparency

- Zuidas and RCD want to improve the interaction between office buildings and public spaces by developing quality plinths. Also, RCD specifies more on the 24/7 life and transparency of plinths.
- The three corporations do not share the same goal. Only Deloitte's goal matches the theory, in which the goal transparency and social encounters. On the other hand, ABN AMRO wants to re-invent the new experiences for customers and users of the building.
- The three designers have similar goal for the design of the buildings, which is opening the building for the public. De Architekten Cie differentiates by providing more variety of functions on the ground floor and avoids mono-function.
- All three buildings are transparent, and activities inside the building can be seen. CIRCL and Groot Handelsgebouw have sufficient access doors for openness and transparency. Public spaces of The Edge and Groot Handelsgebouw are difficult to be accessed compared to CIRCL. The Edge and Groot Handelsgebouw provide sufficient night light to maintain transparency and safety of the street during the night time. On the other hand, CIRCL only provides illumination during the night time at the restaurant.
- According to the survey, the users of CIRCL are very satisfied with the transparency of the plinth and openness of the public spaces. They also feel reasonably satisfied with the number of the access door on the ground floor and feel neutral with the illumination during the night time. The users of The Edge are impressed with the transparency of the plinth and night illumination of the building. However, they feel neutral with the openness of the public spaces and feel disappointed with the number of the access door on the ground floor. Lastly, the users of Groot Handelsgebouw are satisfied with the transparency of plinth, the number of access doors, and the night light to maintain transparency and safety of the street. Nonetheless, they feel neutral with the openness of the public spaces.
- The lesson learned demonstrates that openness and transparency consist of four sub-variables: transparency of the plinth, sufficient access doors, night light and safety of the street, and openness of the public space. Firstly, the transparency of the plinth offers the visibility of the activities inside the building. The building with an opened and transparent plinth is more likely to be engaged and interacted by the people on the street. Secondly, sufficient access

doors provides the opened feeling to the people on the street. People tend to access the building that is opened and has many access doors on the ground floor. Thirdly, night light provides clarity and maintains transparency during the night time. Building with sufficient illumination during the night time makes people feel safe to walk on the street, to engage and interact with the building. Although this benefits the safety of the street regarding the social aspect, it conflicts with the concept of reducing energy consumption. Lastly, the openness of public space invites people to occupy the area. Public space with a physical boundary or enclosed by the structure causes the people to be reluctant to enter the space. On the other hand, integration of the public space and the street makes people more comfortable to occupy the space according to the theory of hybrid space by Karssenberg and Laven (2016).

7. Human scale

- ABN AMRO has the goal regarding the scale of the building while the other two corporations do not have any specific goal regarding human scale.
- Zuidas and RCD have minimum ground floor height control for office buildings. However, RCD has the specific requirements for units and number of access doors.
- De Architekten Cie and PLP Architecture intend to design high ground floor height for their projects. Van Stigt has a constraint of existing ground floor height. In contrast, PLP Architecture does not consider the scale of units on the ground floor in the design processes.
- CIRCL has 5.50-metre ground floor height, some higher volume spaces, 8 access doors on the ground floor along the 80-metre plinth length. The window and door frames divide the façade plane into smaller units. The ratio of CIRCL's height and Gustav Mahlerplein width is 3:1. The ground floor height of The Edge is 4.50 metres, excluding atrium space, and the general plinth height is 5.50-6.00 metres. There are only 3 access doors on the ground floor. The ratio of The Edge's height and Gustav Mahlerlaan width is 3:1. For the last case, general plinth height of Groot Handelsgebouw is 3.50 metres, while the height of the main lobby is 10 metres and plinth height at the Stationsplein side is 7.00 metres. Diverse size of offices, shops, cafes, and restaurants are seen on the ground floor. Besides, every single unit has its own access door. Therefore, there is an access door for every 6 metres. The ratios of the building height and the street width are 1:1 at Weena side and 3:1 at Stationsplein side.
- According to the survey, the users of CIRCL and Groot Handelsgebouw are satisfied with the scale of units while the users of The Edge are not impressed with this variable. CIRCL and The Edge extremely satisfy the users regarding the height of the ground floor while the users of Groot Handelsgebouw feel fairly satisfied with the height of the ground floor. Lastly, the users of all buildings are satisfied with the ratio of the building heights and the widths of the streets.
- To conclude, there are three essential variables to enhance the interaction between corporate office building and the city regarding human scale. Firstly, the small scales units offer opportunities for people to better interact with the building since the physical size of the elements is reachable and related to the human scale. Secondly, the ground floor height plays an important role in offering space for people to occupy and engage activities. Higher height is more capable of having public activities on the ground floor. Groot Handelsgebouw is the only case that the ground floor height is lower than the suggested height by Karssenberg & Laven (2016). However, the height of 3.50 metres is acceptable for small public activities. Lastly, the building height and street width offer human experience on the eye level and perception of the lighting and shadings. A good ration of the building height and the street width provides a better experience on the urban ground plane and eye-level.

8. Sustainability

- ABN AMRO and Deloitte have similar the main goal of sustainability for the buildings. On the other hand, GHG aims to carry out the major renovation to provide quality functions for users.
- Amsterdam Zuisdas and RCD have a goal of sustainable urban area and flexibility. However, RCD focuses more on the restoration of monument buildings.
- De Architekten Cie proposes a circular building idea while PLP architecture initiates a smart sustainable building. Van Stigt focuses on restoration and refurbishment.
- CIRCL and The Edge reach outstanding BREEAM certification at a score of 85% and 98.30%, respectively, while Groot Handelsgebouw achieves Green Building label A. Besides, The Edge is installed with more than 20,000 sensors for motion tracking to optimise the energy consumption of the building. All of the buildings are well-maintained in good condition.
- According to the survey, the users of CIRCL are impressed with the sustainability of the building while the users of The EDGE feel extremely satisfied with this aspect. In contrary, Groot Handelsgebouw does not sufficiently impress the users of the building regarding sustainability. For operating and maintenance, both users of CIRCL and The Edge feel very satisfied with this topic, while the users of Groot Handelsgebouw are fairly satisfied with the condition of the building. Lastly, CIRCL and The Edge impress the users regarding well-being and flexibility. At the same time, the users of Groot Handelsgebouw feel neutral about this aspect.
- The findings from the cross-case analysis show that sustainability variable consists of three sub-variables, which are the sustainability of the building, operating and maintenance, and well-being and flexibility. Firstly, sustainability determines how much the building reduce the amount of energy consumption and the amount of pollution produced. It clarifies the impact the building contribute to the environment and the city. Secondly, operating and maintenance shows how the building optimises the cost and maintain the condition. It has less impact on the interaction between the building and the public. Lastly, well-being and flexibility show the environment of the building. The building with a good environment encourages people to stay longer and use the facilities.

06
Conclusion and Discussion

6. Conclusion and Discussion

The main goal of the research is to examine the crucial variables that encourage the interaction between the corporate office building and the city according to the designer's intentions and the user's perspective. This offers an opportunity to provide descriptive findings from the practices, in accordance with the theories. The research also aims to fill the missing gaps in the corporate real estate and urban development field, in which it is expected to steer the new developments of office buildings to be better connected to the public. In order to achieve the goal and objectives of the research, research question and sub-questions need to be answered and covered in both theoretical and practical aspects.

In this chapter, the conclusion of the research is discussed. Firstly, the sub-questions of the research are answered based on the results from the theoretical study and empirical research outputs. These answers are combined to generate the final answer for the main research question of the thesis.

6.1 Conclusion

SQ1. What are the existing theories of the corporate real estate and the city in accordance with the interaction between them?

The first goal of the research is to acquire a better understanding of corporate real estate strategies and urban area development. The answer is given based on the literature review in the second chapter. The explanation of the first sub-question then establishes a knowledge foundation of the empirical research as well as operationalising conceptual model as the theoretical framework for the case studies. The research of corporations and cities divide the literature review into two parts: the corporation side, and the city side. Based on the added-value of good design (Macmillan, 2006), the factors are categorised into three different groups: functionality and use value, physical characteristics, and social interaction.

For the corporation side, we will firstly dicuss the about the functionality factors, which include flexibility, facilities and productivity, accessibility and locational choices, sustainability, and innovation and technology. Flexibility of the company allows the company to adjust real estate portfolio for uncertain future and leads to a better productivity and profitability, better working environment, well being and satisfaction, teamwork and communication. Accessibility and locational choices influence physical assessibility, asset value and image of the company. Productivity and facilities affect user satisfaction, profitability, working environment and competitiveness of the company. Sustainability results in better resource consumption, adaptability, flexibility, robustness, operating and low maintenance. Innovation and technology differentiate other competitors, encourage user participation and support business activities. They also reflects corporate identity, vision and brand image of the company (O'mara, 1999; Lindholm & Levainen, 2006; Macmillan, 2006). The second category is physical characteristics, which includes locational context, aesthetics and

workplace design. Locational context involves attractiveness of the area and surroundings, and connectivity of the building. Aesthetics represents organisation's image, identity, prestige and reputation to attract customers. Workplace design directly affects physical environment, which leads to a better mental status, actions and performance (O'Mara, 1999; Lindholm & Levainen, 2006; Macmillan, 2006; Naseem et al., 2012, Sundstrom, 1994; Carnevale, 1992). The last category is social interaction, which consists of connection with the public, safety and security, user satisfaction, environmental impact and local identity. Connection to the public requires building to create opportunities opportunities for positive social interaction as well as encouraging social inclusion. Privacy, safety and security of the building help to increase user satisfaction, comfort, and ensure c onsistent productivity and good working environment to maximize business activity performances. User satisfaction focuses on the involvement of users to realise facilities and activities of workplace. Environmental impact aims to reduce energy consumption, waste and pollution produced. It provides better working environment and better city environment. Local identity concerns context, historical development and a sense of place, cultural value and symbolism (Lindholm & Levainen, 2006; Macmillan, 2006).

Moving on to the city variables, the city factors in functionality that influence the out come of the real estate object consist of function and activities, flexibility, and hybrid space. Open city encourages city to be built with many borders to stimulate a mix of functions, street life and good transition between building and street. Mix and diverse functions enhances experience of people in the city and offer better opportunities to choos lifestyles. Flexibility offers capabilities of the city to adapt for future changes. Hybrid space is the concept to create blurry edge between building and public space, in which it encourages exchange function between the two spaces (Sennett, 2013, Sennett 2018; Adam & Tiesdell, 2012; Karssenberg & Laven, 2016; Schlickman & Domlesky, 2019; Gehl, Kaefer & Reigstad, 2006). The next category is physical characteristics, in which the factors in this category includes plinth and transparency, human scale, and material and details. Quality plinth present transparency to the street to clarify activities inside the building. The idea is also to diversify facade surfaces, rhythms and functions help to keep eyes' attention. In order to enhance the connection and create better experience between people on the street and buildings, elements of building should take human scale into account in the designed processes such as, ground floor height, units, building height and street width. Quality materials and details offer good sensory experiences for both users of the building and people on the street (Karssenberg & Laven, 2016; Gehl, Kaefer & Reigstad, 2006; Adam & Tiesdell, 2012; Schlickman & Domlesky, 2019). The last category is social interaction, which cosists of social interaction, street life, connectivity, local identity, and safety. Cities should offer opportunities for people for people to connect and interact with people while mixed-use provide greater opportunities for social interaction. For street life, there should be a balance between fast and slow transport,

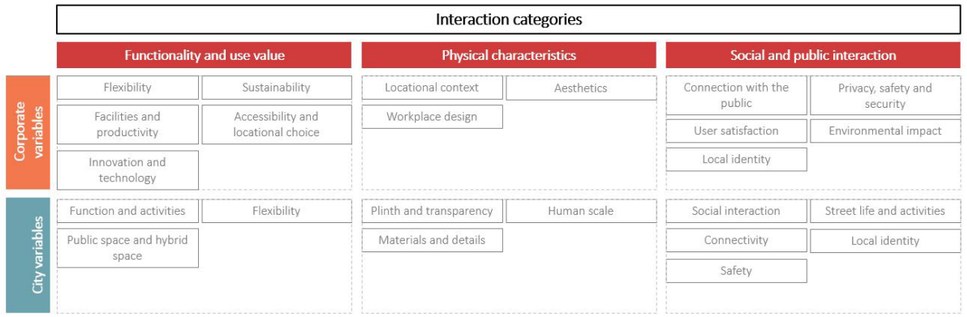


Figure 6.1
Corporate and city variables that influence the outcome of real estate object (own illustration).

including pedestrians, and bicycle. To create intimate feeling, the street should be placed with vegetation, illumination, street furniture and artistic objects. The city should be well-connected and enphasise the pedestrian flows as the first priority. The distinctive city should emphasise on the local identity, local heritage, personalities, and characteristics of places to design wayfinding symbol help to enhance the character of the place (Sennett, 2013; Adam & Tiesdell, 2012; Karssenberg & Laven, 2016; Schlickman & Domlesky, 2019; Gehl, Kaefer & Reigstad, 2006).

The findings of the literature study from both corporation side and the city side are divided into three categories: functional and use value, physical characteristics, and social interaction (figure 6.1). These variable are used for the realisation of the theoretical framework in the later stages.

SQ2. What are the existing assessment tools and techniques being used to measure the quality and performance of the building?

The second objective of the research is to understand the tools and techniques that are used to measure the building in various aspects. The answer of this sub-question is also based on the third part of the literature review. The study on the assessment techniques determines relevant variables in the assessment, which is carried out accordingly in the empirical research (figure 6.2). Several tools and techniques are collected and explained in the following paragraph.

Preferences for Visual Characteristics in urban streetscapes is a tool to measure the preferences on the characteristics of the urban scene using five variables: order, visual, scale, human scale, and cleanliness (Gjerde, 2011). Public Life Studies (Gehl & Svarre, 2013) introduces several tools to measure people behaviour in the public area. The techniques are counting, mapping, tracing, tracking, photographing, keeping a diary, and test walks. Plinth rating tool (Karssenberg & Wezenberg, 2016) observes plinths of the buildings and public interaction from the user experience. The scoring technique is used to investigate the interaction with public space, functions, attractiveness, ambience and human scale. The Post Occupancy Evaluation (National Academy Press, 2001) is a tool to evaluate the building after occupied by the users for the time being. It mainly examines the user experience regarding organisation goals, customer relations, productivity, profitability, efficiency, safety and security. In addition, several aspects of the building performance are also evaluated, such as visual aesthetics, spatial comfort, air quality, thermal comfort, privacy, lighting, ergonomic and acoustic. Lastly, the Sense of Community Index is capable of measuring various types of building. There are four essential elements for the tools: membership, influence, meeting needs, and a shared emotional connection. SCI mainly focuses on social interaction variables.

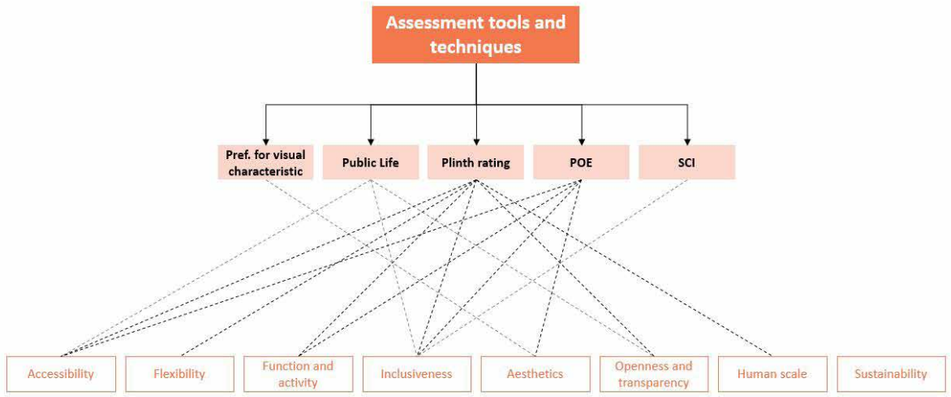


Figure 6.2
An overview of assessment tools and relationship with each variable (own illustration)

SQ3. What are the corporation's requirements, city's requirements and the designer's motives for the development of the real estate object?

The third objective of the research is to examine the requirements of the corporations, requirements of the cities and the intervention ideas of the designers. The answer provides the drivers and requirements for the development of the real estate object from the practical perspective (figure 6.3). The answer of this sub-question is from the case studies, specifically, from the documental study and interviews with the stakeholders. The empirical research is based on the theoretical framework from chapter two.

Firstly, the requirements of the municipality of Amsterdam for Amsterdam South Distirct is discussed. The main goal of Zuidas is to develop the area into a sustainable and successful urban environment of inter-national allure, but with traditional Amsterdam qualities (Zuidas Amsterdam, Gemeente Amsterdam and Arup London, 2009). In order to achieve the vision, many action plans are carried out. Firstly, the municipality aims to mix residential functions, offices, and public amenities in the area. Secondly, the area is required to be flexible for economic and social changes. Quality public spaces and interaction between plinths and public spaces are also addressed in the plan. In addition, the municipality also has goals of small businesses inclusion, 4.50-metre ground floor height, building height limit, improving connectivity, and involvement of local communities.

Secondly, the discussion of Rotterdam Central District's goals is conducted in this paragraph. The main goals of the RCD are to increase the density of the area, connect the east and the west side of Rotterdam Central District, and to develop good plinths as well as preserving monument buildings and creating mix function area (Municipality of Rotterdam, interview, October 16, 2020). This leads to the realisation of the three design directions: Sense of Place, Urban Healthy Living, and Innovation Centre (O Team, 2018). Sense of Place focuses on plinths development and activities on the streets. The research identifies eight requirements for an innovation district: Identity, diversity, continuity, network, proximity, mobility, flexibility, and inclusiveness (Karssenberg et al., 2019). In addition, the municipality also provides number of access doors control, height control, and transparency of the plinth. Urban Healthy Living emphasizes the integration of the green spaces in urban area and buildings, in which the concept is called Urban Jungle. Lastly, the concept of Innovation District supports businesses, freelancers and start-ups as well as enhancing the connection between urban fabric in terms of dynamic and experiences.

Thirdly, the goals of the corporations are discussed. The main goal of ABN AMRO is to develop pavilion that connects the headquarter to the street with the meeting facilities to host conference and events. The pavilion must represents the company's culture and image. For Deloitte, the company requires a smart sustainable building that enhances social encounters and is visible to the highway and railway. Besides, Deloitte also require flexible workplaces and a digital system to optimise the usage of the building. On the other hand, the management team of GHG requires a major renovation of Groot Hadelsgebouw to restore its qualities, transform into a modern commercial office building and provides quality office spaces for tenants. Also, GHG wants to preserve the post-war monument status of Groot Handelsgebouw.
The last paragraph discusses the designer's motives for the three real estate objects. De Architekten Cie proposes the idea of a circular pavilion, including using recycled materials, easy to disassemble parts. At the same time, PLP Architecture presents the idea of a smart sustainable office building with a digital system to utilise energy consumption and space allocation. On the other hand, van Stigt intends to restore forgotten qualities by recovering, cleaning, and repairing classic elements and colour. The architect also wants to transform Groot Handelsgebouw into modern flexibile office building. All architects of the three cases shared the same goals of open the buildings for the public and design transparent plinths to support active frontage. Both De Architekten Cie and PLP include multi-purpose space, flexible workplaces, meeting and conference area, cafes, and restaurants in CIRCL and The Edge. Van Stigt initiates new concepts of office spaces and adds commercial functions on the ground floor.

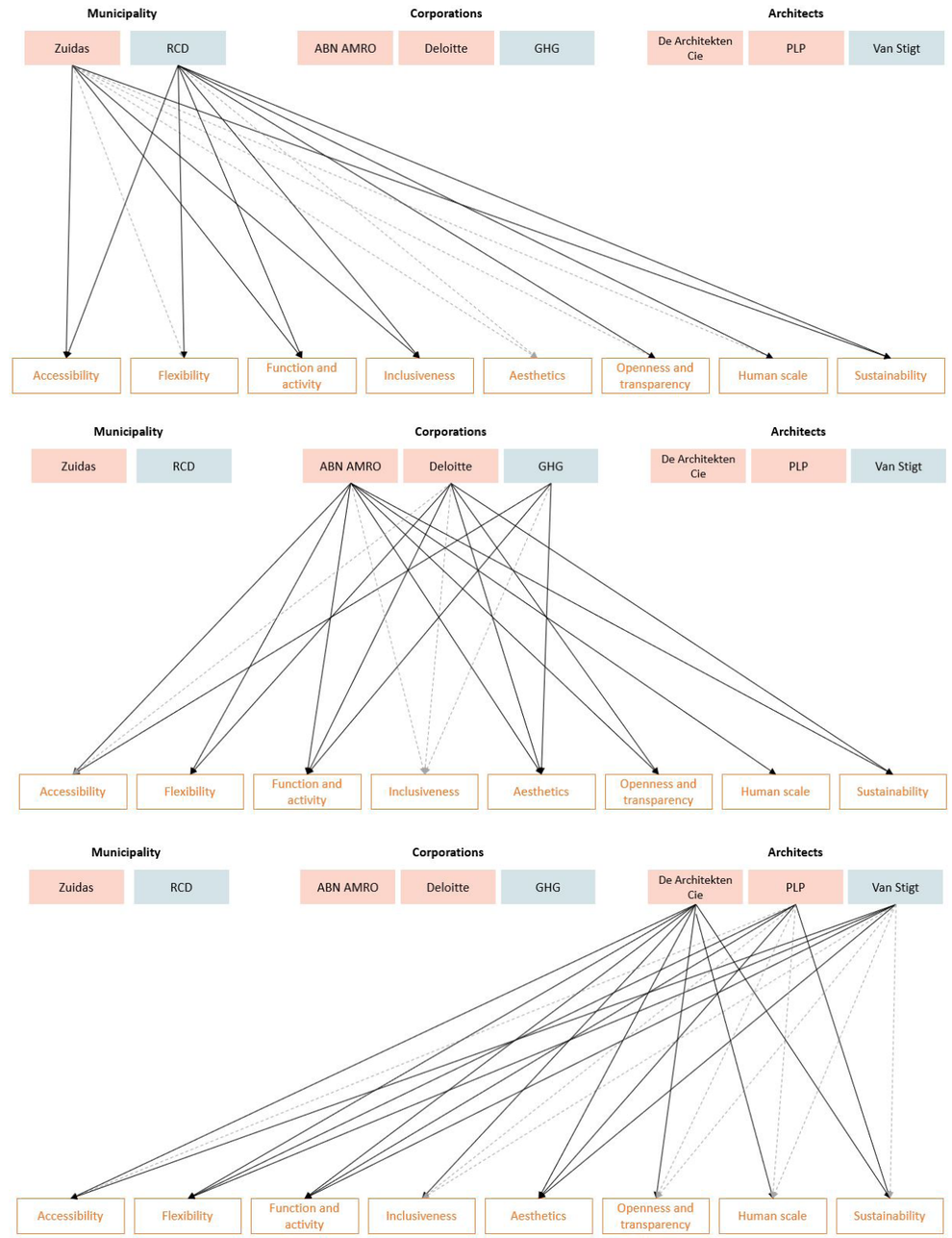


Figure 6.3
An overview of corporation's requirement, city's requirement, and designer's motives for the development of the real estate object (own illustration).

4. What are the outcomes of the physical characteristics of the building(s) and its surroundings?

The answer of this sub-question provides the findings from the actual real estate outcomes from the three cases, which is based on the documental study and direct observation on the real estate object. The theoretical framework is the guideline to determine variables for the observation.

CIRCL and Groot Handelsgebouw are located on the pedestrian flows, directly connect to the main public transport hubs and situated in the centre of business functions. In contrast, The Edge is located in a quiet area, away from the train station, and isolated from the business functions. CIRCL has the warm corporate look constructed by recycled materials. Therefore, CIRCL is different from the surrounded buildings. The Edge is transparent and visible to the highway side. The building is harmony to the buildings in the area. Groot Handelsgebouw's classic elements and materials are restored to its original design. The building fits well in the context. The main functions of the three buildings are similar, having a various types of office spaces and offers diverse public functions and activities on the ground floor, such as conference space, cafés, restaurants. In addition, The Edge use adaptive 3D digital platform to facilitate space allocation of the workplaces to increase the flexibility of the building. However, only Groot Handelsgebouw provides a variety of commercial shops on the ground floor. CIRCL and Groot Handelsgebouw offers many access doors on the ground floor to enhance openness and small scale units while The Edge has a few access doors on the ground floor. CIRCL has 5.50-metre ground floor height with some higher volume spaces. Similarly, the ground floor height of the Edge is 4.50 metres with atrium space connecting all of the functions together in the middle of the building. Lastly, Groot Handelsgebouw has slightly lower ground floor height at 3.50-metres. However, the ground floor height of the main lobby is 10 metres, and the plinth height at Stationsplein side is 7.00 metres. Both The Edge and Groot Handelsgebouw provide sufficient illumination during the night time to maintain transparency and safety of the street. On the other hand, CIRCL only provides night light at the restaurant due to sustainability reasons.

The outcomes of the real estate object are used for the cross-case analysis, connecting them with goals and requirements of the corporations and cities and linking them with the theories and user perceptions. The cross-case analysis is conducted in chapter 5.

5. How does the real estate object influence the users from both corporation and city sides and how do users interact with the building?

In order to answer the last sub-question, the findings from the case studies and the analysis of the result are referred to Chapter 4 and 5. The findings are identified from the direct observation at the site of case studies and user perception survey on the real estate properties of the three cases. The direct observation investigates people's behaviour in public areas while the survey explores users' opinions on each aspect of the building, based on the variables from the theoretical framework (figure 6.4).

The first variable is accessibility. The more the building is located closer to the transport hubs and pedestrian flows, the more number of people on the street, which increase the engagement with the building. Transparency provides visibility to the public. However, it is more effective to engage people's eye level that the vehicles.

Secondly, the variable of flexibility is discussed. The flexibility of workplaces should be based on the actual user needs. The higher ground floor leads to the capability to adapt, adjust or change the functions of the ground floor of the building. The users prefer the higher ground floor regarding flexibility. The users are more satisfied with the plinth that is divided into smaller units using window patterns and the number of access doors.

For function and activities, the users are more likely to be satisfied if the building offers various types of working spaces, working activities, and connecting spaces. Food merchandise, retails, and shops are the ideal function to attract pedestrians to the building. People often occupy a public seat in front of train station or park. For the corporate office building, the seating and tables on the street encourage people to occupy the space and diversifies activities on the street.

Figure 6.4
Influences of the real estate object on the users (own illustration).

Moving on to the inclusiveness, small businesses capable of diversifying the activities in the building, which leads to the more engagement of public people and the building. Local communities involvement is hardly seen in the three cases. Only the case of CIRCL manages to have public activities in the building such as exhibition and movie night. The local community involvement increases the sense of belonging of the building, which encourages the local to occupy the building willingly.

The next variable is aesthetics. The visual impression could attract people to visit the building. The harmony of texture, colour, the material keeps the visual comfort of the urban fabric and keep the continuity of the characteristic visual flow. Public space attracts people to occupy the space and connect the building to the street. Quality public space encourages public people to stay longer.

The variable of Openness and transparency is discussed in this paragraph. The building with opened plinths is more likely to be interacted by the public people as they can see the activities inside the building. For example, people stop to stare at products on the display window. Besides, people prefer to enter the building with more access doors on the ground floor. Illumination during the night time maintains transparency and safety on the street. People are not afraid to walk on the street in front of the building with night light. Lastly, people are reluctant to enter enclosed public space. The integration of the public space and the street makes people more comfortable to occupy the space.

Next, the variable of human scale is discussed. Small scale units are reachable for the people's eye view, which they are more likely to interact with the building elements that are adjusted to the human scale. Higher ground floor capable of having public activities on the ground floor, which could attract people to participate in activities. Moreover, a good proportion between the building height and the street width offers a better experience in the eye level of the people, provides better visual comfort.

The last variable is sustainability. Sustainable building has a slight impact on the interaction between the building and the public. It has a substantial effect on the city environment, including pollution and waste. The operating and maintenance defines well-being and flexibility of the building. It directly affects the user satisfaction and climate of the building, which encourages people to stay longer and occupy facilities.

"How do corporate office building interact with the city from the development team's intentions and users' perceptions, and to what extent how do they relate to each other?"

The main research question asks for the answer to fulfilling the objective of the research, which is to examine the important variables that encourage the interaction between the corporate office building and the city from the users' perspectives and the designer's ideas. In order to answer the main research question, the whole process of research is conducted, including a literature review, documental study, semi-structured interviews, user surveys, direct observation, result analysis and cross-case analysis.

The literature study is conducted to find relevant variables for the interaction between the office building and the city, in which it is illustrated as the theoretical framework in chapter two. The theoretical framework consists of a vast array of variables, which is used as the guideline for empirical research. It is categorized into three groups: functionality, physical characteristics, and social interaction. The findings from the case studies are determined accordingly with the variables from the theoretical framework. The result of the case studies is shown in chapter 4. The variables, together with the results, are selected and integrated to prepare for the cross-case analysis in chapter 5.
In the process of cross-case analysis, the researcher identifies eight variables that support interaction between corporate office building and the city: accessibility, flexibility, function and activity, inclusiveness, aesthetics, openness and transparency, human scale, and sustainability (figure 6.1).

Accessibility

The first variable is accessibility. Successful places should be well-connected, with clear urban block grid and pedestrian flows (Adam & Tiesdell, 2012) .Corporate office building can better interact with the public by achieving several goals. Accessibility consists of four sub-variables: location selection, transparency, access doors, and liveliness of location. Both Zuidas and RCD have goals of improving connectivity and mobility in the urban area. For location selection, the users are more satisfied when the building is located close to the transport hubs and the main pedestrian flows according to the case studies in chapter 4. It is also important to be located in the business agglomeration since it provides opportunities for public people to approach the building. The transparent plinth also helps to attract people to access the building and maintain the pedestrian flows in the urban level. It is important to provide transparency on the eye level as people can perceive it better. Many access doors facilitate the engagement of public people as they are more likely to enter the building with many access doors on the ground floor. Lastly, corporations are benefited by transport links and urban circulation. In order to maintain that, the architect proposes transparency and accessibility in the design concept to improve connectivity with the urban fabric. This is a give and take advantages for both corporations and the city.

Flexibility

Flexibility expresses the incompleteness of the open city, in which it supports creativity and local identity of the city (Sennett, 2018). Regarding interaction, flexibility is divided into three sub-variables: flexibility of workplace and ground floor function, sufficient ground floor height, and small scale units. On the city side, both municipalities require flexible plinths that can be adapted for other functions. According to the case, the users are more satisfied when the corporation has a clear goal of flexible space of the building. In addition, shared working or socializing space from the inputs of the designers have a significant impact on the flexibility of the building. For the ground floor height, the evidence from the case studies confirms that the users are more satisfied with the building with higher ground floor height since the taller height is more effortless to change function or activities.

For instance, building with higher ground floor height can adapt to various functions, such as conference, exhibition, party. The small scale units are more flexible for changes than larger units. For an example of Groot Handelsgebouw case, the unit width is 6 metres wide, and every single unit has its own access door. For the length of 60 metres, Groot Handelsgebouw has 10 different functions and these units can be merged into bigger spaces for more extensive activities, such as gym and restaurant. Lastly, flexible function on the ground makes office building become resilient to the social and economic changes. In return, the city also able to survive various kinds of transformation, which make the city dynamic and lively as well as avoiding the occurrence of mono-function.

Function and activity

One of the characteristics of a good urban area is to have mix functions and diverse activities (Sennett, 2018; Adam & Tiesdell, 2012; Karssenberg & Laven, 2016). Function and activity are divided into four sub-variables: various types of workplace and working activity, diverse activities on the ground floor and the street, commercial functions on the ground floor, and exchanged function. Firstly, the users are more likely to feel satisfied if the building provides various types of workplace and connecting spaces together with socializing space, such as the atrium and multi-purpose space. Zuidas and RCD aim to mix residential function, offices, leisure and public amenities in the area. However, RCD focuses more on 24/7 life and developing quality plinths. De Architekten Cie and PLP intends to provide a variety of workplace type in the buildings while van Stigt focuses on developing new concepts of office space. As a result, CIRCL and The Edge differentiate Groot Handelsgebouw with diverse working spaces. Therefore, the users of CIRCL and The Edge are very satisfied with the workplaces while the users of Groot Handelsgebouw are reasonably satisfied with this aspect. Secondly, public people tend to interact more with the office building that has diverse functions and activities on the ground floor, especially food merchandise, retails and shops. These functions offer opportunities for the people to enter and occupy the space in the building. All of the architects from the three cases propose various functions on the ground floor. However, Groot Handelsgebouw is a multi-tenant building, which allows more diverse function on the ground floor. On the other hand, CIRCL and The Edge belong to the corporations, so the space on the ground floor is reserved for the companies. The users of CIRCL and The Edge feel neutral with the variety of function and activity on the ground floor. Nevertheless, the users of Groot Handelsgebouw are extremely satisfied with this issue. In addition, the seating and tables on the street encourage people to occupy the space. This could be a vital factor for interaction. Lastly, public market could provide more activities on the street. However, it obstructs pedestrian flows in the urban level and affects the image of the corporations (Municipality of Rotterdam, interview, October 16, 2020).

Inclusiveness

Inclusiveness has two relevant sub-variables: inclusion of small businesses and involvement of the local community. Small businesses represents the local identity of the area, as well as diversifying functions and activities in the building. This leads to more engagement and interaction with the building. Besides, small businesses relate to diverse activities on the ground floor and the street in the previously mentioned variable. The space contribution for the small businesses offers opportunities for them to create the local identity and add more functions and activities in the city. This greatly benefits the city. In return, the building takes advantages of a strong economy of scales, the vibrancy of the city, and local identity and qualities. Groot Handelsgebouw is mostly occupied by small businesses, start-ups and entrepreneurs while some groups of innovative companies occasionally use the multi-purpose space of CIRCL. In contrast, The Edge lacks the inclusion of small businesses. The results of the survey directly reflect the outcomes of the three buildings. The users of Groot Handelsgebouw are incredibly delighted with the inclusion of small businesses while users of CIRCL feel neutral with this topic. Nonetheless, The Edge disappoints the users regarding the inclusion of small businesses. The local community involvement enhances the sense of belonging of the public people to the building. It also encourages the local to occupy

the building for public activities. According to the case studies, Zuidas and RCD emphasize on the local qualities. De Architekten Cie and PLP tries to involve academic institutions to participate the public activities in the building. At the same time, van Stigt intends to return the building to the city, which increase the sense of belonging of the city. As a result, several public activities, such as exhibition and conference, take place at CIRCL while some academic activities occurred at The Edge. In the meantime, Groot Handelsgebouw is preserved as the post-war monument and becomes the local identity of Rotterdam Central District. However, none of the users of any case is satisfied with the level of local community involvement in the buildings.

Aesthetics

Aesthetics consists of physical aesthetics, harmony, and quality and liveliness of the public space. Physical aesthetics act as the visual impression of the area. It attracts public people to engage in all kinds of activity to the building. For instance, people visit the building for photography. However, aesthetics is an intangible variable, in which none of the municipalities has a control on this aspect. Only the aesthetics committee assesses on this variable. Due to the evidence from the survey, all of the buildings from the three cases impress the users regarding visual comfort and nice looking. Secondly, harmony of colour, texture, scale and materials helps to keep the visual flow and continuity of the urban characteristics. Although the variable has a slight impact on the user perceptions, it maintains the unity of the urban characteristics. According to the survey, the users feel that The Edge and Groot Handelsgebouw fit well in their contexts. On the other hand, the users of CIRCL agree that the characteristics of CIRCL are different from the surrounded building, in which it is difficult to confirm whether it is a positive or negative issue. Thirdly, quality public space attracts people to occupy the space, which offers an opportunity to connect to the building. The characteristics of good public space are no physical boundary, use a variety of public material, unclear shape and blurred transition (Shlickman & Domlesky, 2019; Sennett, 2018). CIRCL has the terrace on the rooftop of the building, accompanied by diverse types of plant, a variety of materials and street furniture. CIRCL has two public spaces, which are the plaza on the west side and the atrium space. Groot Handelsgebouw has three inner courtyards, which can be accessed from the internal circulation. The courtyards have a few types of material used. Therefore, the users of CIRCL are satisfied with the quality of public space while the users of The Edge and Groot Handelsgebouw feel neutral and disappointed, respectively.

Openness and transparency

Openness and transparency of the plinth are supported by the theories of City at Eye Level (Karssenberg & Laven, 2016) and Close Encounters with Buildings (Gehl, Kaefer & Reigstad, 2016). Openness and transparency are distinguished into four different sub-variables: transparency of the plinth, sufficient access doors, nightlight and safety of the street, and openness of public space. Transparent plinth offers visibility of the internal activities, which allows public people to engage and interact with the plinth. According to the Groot Handelsgebouw case, people stop to look at products on the display window of commercial shops. All buildings of the three cases have opened and transparent plinths on the ground floor. Therefore, the users are satisfied with the transparent plinths of the buildings. The variable of transparent plinth also relates to the topic of accessibility as they share the same characteristic. Secondly, sufficient access doors provides the opened feeling to the people on the street, in which it makes people prefer to engage and enter the building with more access doors on the ground floor. De Architekten Cie and van Stigt take number of access doors and small scale units into account during the design processes. Consequently, the users are impressed with the number of access doors of both buildings. In contrast, PLP does not consider scale of unit and many access doors on the ground floor. It results in having only three entrances on the ground floor of The Edge, in which the users are disappointed with that aspect. Thirdly, illumination during the night time offers clarity and maintain transparency of office building. Even though office function does not operate at night, commercial and leisure functions still active until late. The night light makes people feel safe on the street and encourages them

to interact with the building. Municipality of Rotterdam supports the idea of 24/7 life in the city. At the same time, all of the architect from the three cases have the goal of opening the building for public. As a result, The Edge and Groot Handelsgebouw provide sufficient illumination at night while CIRCL only provides night light at the restaurant due to the operation and sustainability reasons. Lastly, only CIRCL provide public space that can be accessed directly from the street. In contrary, public spaces of The Edge and Groot Handelsgebouw is inside the building and enclosed by the structure, respectively. In consequences, the users of CIRCL are extremely satisfied with the opened public space while the users of The Edge and Groot Handelsgebouw feel neutral about this topic. All in all, corporate office building provides transparency and night light to maintain transparency and keep the street safe and secure. In return, safety street leads to an increase in the number of people on the streets, which benefit back to the corporation regarding the engagement of people and interaction during the night time.

Human scale

Small scale involves many units, rhythm, street width and building height (Gehl, Kaefer & Reigstad, 2006). The human scale consists of the three sub-variables: small scale units, sufficient ground floor height, and building height and the street width. Firstly, people are comfortable to interact with the small scale elements of the building since the size is reachable and related to the human scale. The indication for the small scale unit is the number of access doors on the ground floor. This idea is supported by the municipality of Rotterdam since Zuidas has a requirement of access doors on the ground floor. However, the stakeholders of the three cases are not emphasizing the variable of small scale units yet. None of the corporations has this goal. However, De Architekten Cie and van Stigt take the scale of unit and many access doors into account. Therefore, the users of both buildings are reasonably satisfied with the scale of unit and number of access doors on the ground floor. The tall ground floor height also provides space for public activities, which allures people to engage in activities in the space. Higher ground floor height is more capable of hosting diverse kinds of activities, and offers opportunities for people to interact with the building. Even though Groot Handelshebouw has the ground floor height lower than the suggested height by Karssenberg & Laven (2016), the ground floor height of 3.50 metres is sufficient for small public functions. A good ration of the building height and the street width provides a better experience on the urban ground plane and eye-level (Karssenberg & Laven, 2016). The building height constraint is controlled by both Zuidas and RCD. However, only ABN AMRO require the certain to avoid an obstruction with the view of the headquarter office. To respond the need, De Architekten Cie intends to design the pavilion with only 2 storeys, in which the pavilion acts as the spatial boundary and connect to the street. All of the buildings from the three cases have a similar ration of building height and street width, ranging between 1:3, 1:1 and 3:1. Therefore, the users of all three cases are satisfied with the ratio of the building height and street width of the buildings. All in all, the buildings contribute to the city by offering small scale units to support diverse functions and activities on the streets. Therefore, the city becomes more vibrant providing more activities on the streets, which increases the engagement of public people and corporate office buildings.

Sustainability

Sustainability has three sub-variables: sustainability, operating and maintenance, and well-being and flexibility. Both Zuidas and RCD have the goals of creating a sustainable urban environment that is flexible to economic and social changes. Sustainability of the building explains how well the building could cope with energy consumption, the amount of pollution produced and environmentally friendly. Sustainability does not directly influence the interaction of building and the public, but it contributes a better environment on the street and around the building. Buildings benefit the city by minimising environmental impact. In return, corporations are benefited from the good environment of the area. Due to the evidence from the case studies, ABN ARMO and Deloitte have goals of sustainability and circularity, and a smart sustainable building with a digital system,

respectively. On the other hand, GHG aims to renovate Groot Handelsgebouw and provide the quality function for tenants. Therefore, users are more satisfied with the building with the clear corporation's goal of sustainability. Operating and maintenance demonstrate how the building can optimises the cost and maintain the condition, in which condition of the building influences function and activity. De Architekten Cie proposes a circular pavilion concept while PLP presents a digital platform that helps to optimise the energy consumption of the building and allocate working spaces in the building. Both the users of CIRCL and The Edge are very satisfied with the operation and maintenance of the buildings. There is a connection between sustainability and flexibility as they share a similar sub-goal of flexibility.

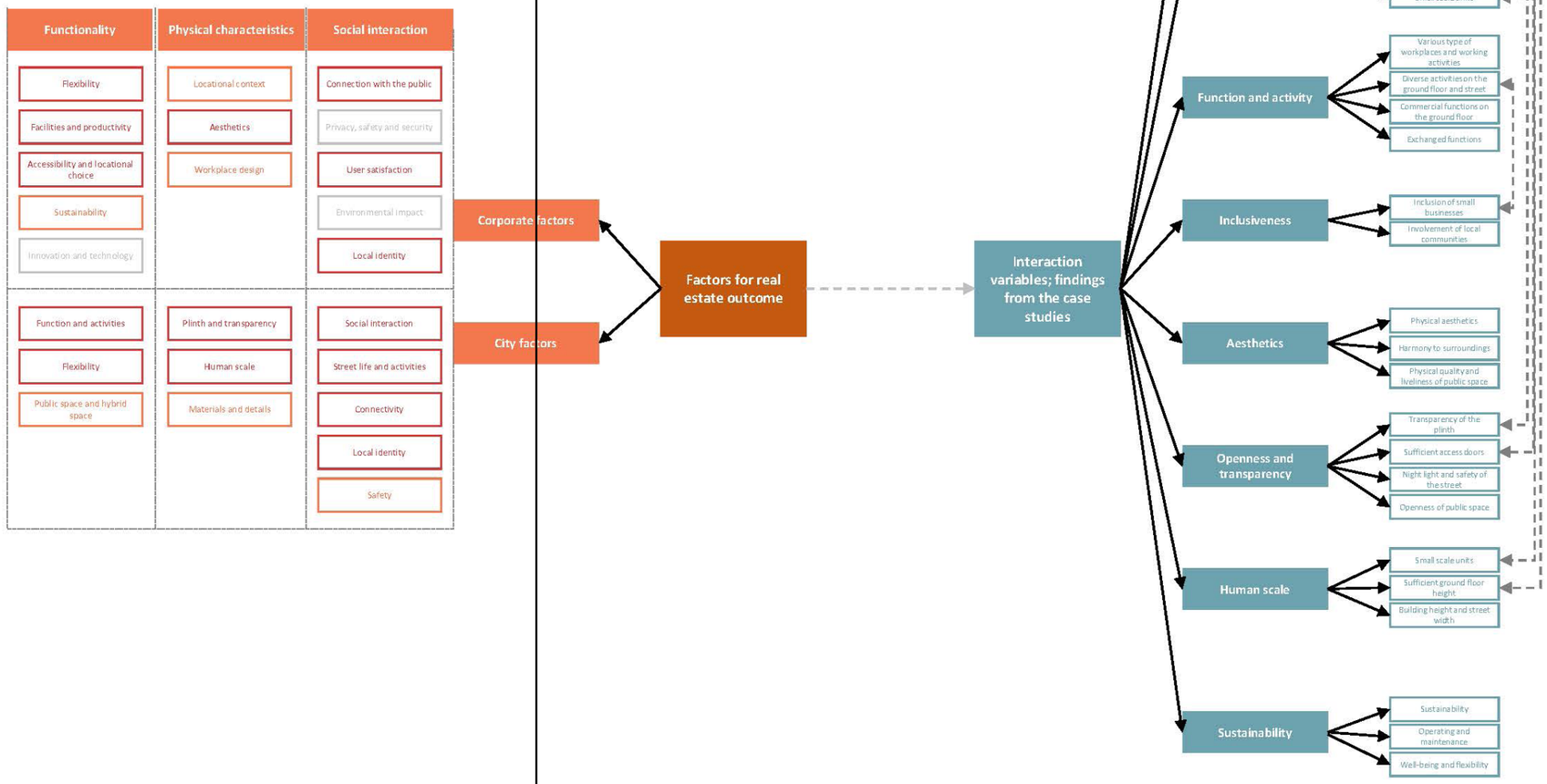


Figure 6.5
An over view of the theoretical result and practical findings of the research (own illustration).

6.2 Discussion

In this section, the main findings of the research are discussed in generalisation and on a broader view of the interaction between corporate office building and the city. It aims to examine how the interaction between corporate office building and the city could contribute and improve the built environment field. Besides, several general lessons learned from the three cases are discussed.

In general, all of the stakeholders concern about the importance of the interaction between buildings and the cities. They take most of the variables from the theories into account and take actions practically. Both of the municipalities have drawn tangible plans for both area development. The only difference is that the municipality of Rotterdam focuses more on developing quality plinths, which is one of the most important factor to stimulate interaction between buildings and public area. According to the case studies, the three most crucial variables that help to enhance the interaction are accessibility, function and activity, and openness and transparency. In contrary, sustainability is the only variable that has the least impact on the interaction between corporate office building and the city. There are some common attributes that sustainability shares with other variables, such as flexibility, operating and maintenance, good environment, and less environmental impact. These attributes have indirect effect on the interaction since sustainability focuses more on the energy consumption and waste produced.

All of the three cases contribute a rich variation of mixed-function and activities on the ground floor. However, Groot Handelsgebouw seem to provide most diverse functions and activity. The reason is that Groot Handelsgebouw is multi-tenancies building, in which it is occupied by multi-type of businesses and retails, resulting in diverse activities. This is also the result of inclusiveness, in which Groot Handelsgebouw is occupied by small businesses, start-ups, and entrepreneurs. On the other hand, CIRCL and The Edge are single-owner buildings, which functions and activities are limited for the corporations. It is also important to note that users do not consider same impact as the designers intended to be. For example, the designer of CIRCL intends to include small business in the building and the real estate outcome is promising. However, the users do not see the apparent impact as they feel neutral about this issue .according to the survey. There is no clear evidence about this issue from the case study. The reason from the opinion of the writer is that even though CIRCL offers rental working space, the single ownership of ABN AMRO may impede small business from occupying the space. Invited companies are more comfortable to use the facilities at CIRCL.

According to the results of the observation, The Edge has the least number of public encounters comparing to the other two case. The reason behind this is that both CIRCL and Groot Handelsgebouw are located in the centre of business activities, transport hubs and pedestrian flows while The Edge is located far away from the centre. The accessibility and connectivity have a significant effect on the public encounters since the three cases provide sufficient opened and transparent plinths. CIRCL is the only case that offer transitional spaces as the accessible gardens while the other two buildings are clear enclosed with the building shell. Due to the observation, CIRCL is more easily to be accessed or occupied by diverse activities on the street and public area. Blurry transitional space encourages people to be more comfort to interact with the building. The Edge is the only building that provide insufficient access door on the ground floor according to the theories. However, this attribute seems insignificant since the location and accessibility play a bigger role on this issue. The topic of aesthetical excellency is also interesting to be discussed. Physical aesthetics, harmony of colour, texture and material help to provide visual comfort on the street scape. However, there is no clear evidence from the observation that these sub-variables attract people to occupied the facilities. On the other hand, inviting comfort public spaces visually and physically attract people to enter the areae, to perform socialised activities and encourage them to stay longer.

Considering from the case studies, CIRCL is developed based on a value-based strategy, promote marketing and sales, increase innovations, increase productivity, and increase flexibility strategies. Similarly, Deloitte uses a value-based strategy, increase employee satisfaction, increase innovations, increase productivity, and increase flexibility strategies. For Groot Handelsgebouw, the building is developed based on an incremental strategy, increase value of assets, promote marketing and sale, increase employee satisfaction and increase flexibility strategies. It is difficult to identify which of the strategies have the most influences on the interaction between corporate office building and the city since there are a vast array of dependency variables. However, there are some corporate real estate strategies that are not included in any of the three cases. The strategies are a standardisation strategy and reduce cost. Therefore, cost-concern approaches have the least impact on the interaction aspect.

6.3 Recommendation for future research

This research is a descriptive empirical research that study theoretical part of the corporate real estate factors that influence real estate outcomes and city's requirement for better interaction. Findings from the theoretical part are operationalized for practice to identify how corporate real estate in real life commit and implement theories into the actual world. The results from the case studies can be utilized as guidelines for the future development of the corporate office buildings to stimulate social impact consideration. Guidelines used for real estate managers, designers to develop office buildings as well as including the findings into the new urban development plan. The ultimate aim is to create open city that provide opportunities for people to connect with corporations and result in mixed-use area with diverse activities. In addition, it is expected that the positive impacts for the study will lead to the end of inequality, mono-function area and isolation of the city. However, the results of this research is only a description framework while there is a strong need for an assessment tool to measure social impact of corporate office building on the cities. The new researcher on the related-topic can apply the findings from this research for the development of the assessment tool. The design of the assessment tool may need quantitative case studies and user tests in order to validate the tool. The assessment tool would be a valuable output for the processes of real estate development, such as building permit application and social impact measurement. The tool would also fill the missing gap that the built environment desperately needed to encourage better interaction between corporate office building and the cities.

At first, the research was planned to study on the case of Rijnstraat 8, which is one of the most interesting case regarding the relationship between the building and the city of The Hague. Unfortunately, the epidemic crisis is the main barrier that prevent the researcher to collect sufficient data for the research. Therefore, I would strongly recommend researcher to consider the case of Rijnstraat 8 for the future research.

07
Reflection

7. Reflection

Chapter seven contains a reflection on my graduation research project upon several topics. Firstly, the reflection on the research process is explained. Secondly, the reflection on the research method is discussed, including a literature review and case studies. This is followed by the reflection of the research results and the relevance of the research. Lastly, I will provide a personal reflection on my graduation research project, which is the end of the chapter.

7.1 Reflection on the research process

My graduation research started in September 2019 (The research plan is presented in Appendix D.). From the starting point, I am interested in the research of the two themes. Firstly, I have been interested in the real estate management topic, specifically on the corporations. Secondly, as an architect myself, I have always wondered how urban development would affect the development of office buildings in the cities. During the searching for the topic, I found the research topic of Corporations and Cities, initiated by Herman Vande Putte. I decided to select this research topic, in which it involves the case study of The Rijnstraat 8, governmental office building renovation by OMA.

Based on the literature study, I started to understand the concept of Corporations and Cities research in terms of the interaction between corporate office building and the city. I identified the problem of this topic, the missing gaps of the research, and the goals of my research. As a result, I formulated my main research questions as the starting point in late October 2019, which is “How can we improve the interaction between corporate office building and the city by an assessment tool”. The question was realised due to the fact that there is a lack of assessment tool to measure the level of interaction between office building and the city. After that, I began to study the theories from both corporation and the city side. The difficulties arose in this process since there are vast arrays of sources for literature to select for this research. It was a complicated process to filter only relevant sources for the research topic. Consequently, I was able to construct a theoretical framework, which will be used for empirical research in the later stages at the end of January 2020. At that point of time, the goal and structure of my study were clearly established, I was looking forward to investigating the relationship between the corporate office building and the city in order to develop a further assessment tool to measure office building developments.

7.2 Reflection on the research method

At first, the research was structured to be a mixed-method approach. It consisted of three essential steps: a literature review, case studies, results and assessment tool design.

Firstly, the purpose of a literature review is to build a strong knowledge foundation for me and acquire a better understandings of both corporate real estate and urban development. The output of the literature review was a theoretical framework, which would be a guideline for empirical case studies and results analysis. The theoretical framework is one of the most essential elements in the research, in which it connects every part of the research together and to comprehend the relationship of each topic deeply. The process of a literature review is one of the toughest challenges of my research. Even though it is not an entirely new subject, it was the processes of linking relevant existing literature together, which was problematic.

The second step of the research was case studies. In order to gain insights from corporations, public authorities, designers, and users, many methods of data collection were carried out. The data collection consists of a documental study, semi-structured interviews, direct observation, and quantitative surveys. At first, the three cases were decided to be The Rijstraat 8, ABN AMRO CIRCL, and Delftse Poort. However, I was not able to arrange interviews and collect data in some cases due to an epidemic crisis in the Netherlands. Therefore, the case buildings were changed to ABN AMRO CIRCL, The Edge, and Groot Handelsgebouw. Fortunately, online-interviews and online-surveys were able to conduct during the epidemic with the help of online-platform technology. Another problem occurred when collecting data through direct observation. CIRCL was closed due to Covid-19 while The Edge and Groot Handelsgebouw were not fully operated during that time as many office workers were obligated to work from home. It was difficult to observe people's behaviour in the public area and the interaction of people with the building. In order to identify people's behaviour, I had to collect data from the past during a normal situation from several sources, such as photos and videos. The outputs of the case studies were findings from stakeholders, such as goals of the municipalities, corporations' requirements, architects' design intentions, design decisions of the real estate objects, and user perceptions on the buildings.

Thirdly, it was decided that this step would be the result analysis and assessment tool design. Nonetheless, achieving assessment tool design was over-ambitious due to the time frame limit of the research. Therefore, I left out the part of the assessment tool design and focused only part of cross-case analysis instead. The assessment tool design is suggested for further research, which can use results from this research as the starting point. The main research question was changed to "How do corporate office building interact with the city from the development team's intentions and users' perceptions, and to what extent how do they relate each other?". The output of this step would be a descriptive lesson learned from the cases, comparing the three cases, and linking them to the theories to find the matches, mismatches, similarities, and differences.

7.3 Reflection on the research results

The findings of the research on the corporations and cities in the different stages answered all sub-questions that were mentioned in chapter one. All of the answers combined into the final answers for the main research question "How do corporate office building interact with the city from the development team's intentions and users' perceptions, and to what extent how do they relate each other?". The research identified eight essential variables to stimulate interaction between corporate office building and the city, including accessibility, flexibility, function and activity, inclusiveness, aesthetics, openness, human scale, and sustainability. Each stakeholder has its own goals and intentions for each variable, in which they lead to the outcomes and design decisions of the real estate objects. The outcomes also indicated matches, mismatches, differences, and similarities between those goals, design intentions, and user perception.

In my opinion, the research results derailed from what I expected due to the circumstances of the Covid-19. The epidemic has a significant impact on people's behaviour in the public area and interaction with the building. The results of users' behaviour may not be entirely accurate. The other sources of data are collected instead to acquire the research results, such as photos of people behaviour, video footages of the building interaction. On the other hand, the results from the user's opinions survey considerably benefited the results, which helped to identify user's perceptions on the real estate objects.

7.4 Ethical consideration

In this research, three ethical issues were identified regardings the interaction between corporate office building and the city. Firstly, office buildings that neglect urban planning and context resulting in the introvertly self-contained office buildings for corporations only. This is the idea of capitalism which results in the monopolization of the city, isolation, inequality and mono-function area in the city (Vande Putte, 2016; Karssenberg & Laven, 2016). On the other hand, enhancement of the interaction between office building and the city supports the idea of open city which encourages people to connect with people and the city (Sennett, 2018). In addition, the idea of open city tries to solve the issues of capitalism and introduces socialism of the city including, diversity, inclusiveness, equality, and public oriented (Sennett, 2018).

The second issue involves the conflict in the variables for the interaction between office building and the city. The conflict is openness and privacy of the building. Openness plays the crucial role of encouraging people to enter and interact with the building, in which it allows people on the street to see activities inside the building (Gehl, Kaefer & Reigstad, 2016; Karssenberg & Laven, 2016). However, certain type of corporation requires privacy and security of the building. There is a clear evidence from the case of Rijnstraat 8 in the Hague, which shows that governmental office building also opens for the public while maintain privacy and security at the same time. Due to the epidemic crisis, the research was not able to collect the data from the case of Rijnstraat 8. Therefore, this issue is not clearly solved yet. If the future research would like to explore more about the governmental office building, I strongly recommend taking Rijnstraat 8 as the case study.

The third ethical consideration is the conflict between nightlight to maintain transparency during the night time and reduction of energy consumption regardings sustainability. Nightlight helps to maintain transparency of the building during the night time as well as ensuring safety of the street near the building and supporting 24/7 life. Nevertheless, night illumination consumes a huge amount of energy in exchange which conflict the idea of sustainability. According to the case of The Edge in Amsterdam South, the building was designed to be a smart sustainable building and uses digital platform to better allocate space and utilize energy consumption of The Edge (PLP Architecture, 2020; Mapiq, n.a.). The 65,000 sq ft of solar panel is located on the façades and the roof of the building, providing alternative energy source for both building and neighbourhood level. Therefore, the energy source of the night illumination is well-preserved by the solar panel.

Apart from the three issues of the interaction between office building and the city, the data collection methods of the research also ethically concerns. For this research, the participation of the interviewees is voluntary. They were informed the main topics of the research before the interview and they could stop the interviews anytime if they needed to. Secondly, in order to maintain the privacy of the interviewees, information of the participants is anonymous and the conversations between the interviewer and interviewees are confidential. If the reader would like to know more about the interview, please contact the researcher. Lastly, since the participants helped out with the interviews, they will receive the digital file of the completed research, which is expected to benefit them.

7.5 Personal reflection

Thinking back to the processes of my graduation project, I have been through a mix of feelings during the research. I faced many challenges, difficulties, and had to overcome those obstacles to finalise and deliver my thesis. Most importantly, I have achieved my own goals and finished the thesis within a certain amount of time. Besides, I acquired new knowledge and skills that would greatly benefit my career in the future.

I experience one of the most difficult situations in my whole life in March 2020 as I suffered from sudden depression and burned-out. I had to stop my graduation project and other academic activities temporarily, and flew back home to stayed there until July 2020. It was a hard time and difficult to overcome. But with the supports of people around me, including my family, my friends, my mentors and psychologist, I was able to get through it. The things I learned from this circumstance is that I should not hesitate to ask for help when I am in trouble. People are willing to help, no matter what the problem is.

I started my graduation project again in September 2020 and tried to regain what I left off several months ago. During that time, the process of data collection became more difficult due to the epidemic crisis in the Netherlands. I was not able to use facilities of TU Delft nor arrange some interviews with relevant stakeholders of the cases leading to many significant changes in the cases. However, I tried to reach out to as many people as I could to collect the data for my research. Fortunately, I contacted my old friend who works for Deloitte, and he helped me out with the survey process. The lesson learned from the data collection process is that connection and network are the most crucial elements to connect with the people in academic and other professional fields. The connection and network can support you and acquire relevant data for the research. The last thing I learned from data collection processes is contacting people through as many sources as possible. You will get good results in one way or another.

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Appendix

Appendix A: Example of interview protocol

1. Introduction

1.1 Research Summary

Corporations have a strong preference to be located in the urban fabric area and gain benefit from diverse activities, urban connection, accessibility and resource of high-skilled people. This results in an increasing number of office buildings being constructed in the city area. There is a strong need for office buildings to be better connected to the cities on the ground plane and contribute to the broader fabric of the cities, especially on the ground floor or plinth. In other words, buildings should contribute enough public and green spaces, and they are meant to be for not only users of the facilities, but also for people in the cities. However, most of the office buildings are built for only private purposes. They are closed to the public, which leads to a lack of diverse activities, social interaction, quality and attractiveness of the area around the building. There are gaps to be filled in this field. Firstly, many theories exist, but the implementation is yet to be seen. Secondly, assessment tools and evaluation do not include the social aspects regarding the connection between the building and the city. Thirdly, there is no explicit guideline for real estate manager to facilitate decision making on the real estate strategies that emphasize the benefits of social interaction for the corporate office building.

The research aims to examine the crucial variables that encourage the interaction between the corporate office building and the city from the users' perspectives and designer's ideas which leads to the following main research question:

"How do corporate office building interact with the city from the users' perspectives and designers' motives, and to what extent how do they relate to each other?"

To answer the question mentioned above, several steps of the research are conducted. Firstly, an extensive literature study is carried out to build a strong knowledge foundation of the existing theories for the researcher and establish a theoretical framework. Secondly, empirical research is conducted based on the three case studies: The Rijnstraat 8, ABN AMRO Circl and the Edge. It aims to investigate insights of the development of the case regarding the interaction between the building and the city from the designers and users' perspectives. This phase includes documental study, physical observation, in-depth interviews and user surveys. Thirdly, the gathered data will be synthesized and further develop into a corporate office building design framework.

1.2 Structure of the interview

The interview will last 45 minutes, and it aims to gather information that helps to answer the research questions, especially form the practices' perspectives. The interview is divided into four different sections: project development, functions and amenities, physical characteristics and social interaction. Lastly, the interview will end with an open discussion regarding the effects of 'Corona crisis' of the public spaces and public behaviour. Other topics recommended by the interviewee can also be discussed at the end of the interview.

Interviewee information	
Stakeholder	Architect
Name	*Confidential, contact the researcher for more information*
Company / position	PLP Architecture/ Founding partner
Experience (years)	7 years

Project information	
Project name	The Edge
Type of project	Sustainable office building
Location	Amsterdam South
Project area	40,000 sqm.
Client	OVG Real Estate, Edge tech
Users	Deloitte, AKD, Henkel, Sandvik, Edelman
Functions and amenities	Offices, shared atrium with restaurant, café, conference, car parking, and bike parking
Sustainability	BREEAM outstanding
Municipality	Amsterdam
Year of completion	2014

3. Interview questions

The conversation during the interview is confidential and used for the academic purpose only. If the reader would like to have interview transcriptions and audio files of the interviews, please contact the researcher.

3.1 Project development

1. Could you briefly explain how "The Edge" had been developed?
    a. How was the project conceptualised and who initiated the project?
    b. What are the main goals of the project regarding added value by design?

2. What are the main requirements from the corporation (OVG Real Estate)?
    a. What are the main criteria and values from the corporation?
    b. What are the corporation's goals for the development of the building?
    c. Did the main tenant (Deloitte) involve in the development of the project? And were there any inputs or requirements from the main tenant?
    d. Which kind of contract was formed during the development of the project?

3. What are the main requirements or controls from the city?
    a. How was the land use plan influence the development of the Edge?
    b. What are the major constraints of the municipal regulation that affect the development and design of the building?
    c. Are there any specific instructions from the municipality regarding the connection with the city?

3.2 Functions and amenities

1. Do you know why OVG Real Estate choose Amsterdam South as the area for the Edge?
    a. What are the advantages for the Edge to be located at Gustav Mahlerlaan?
    b. What activities and functions are concentrated around Mahlerlaan?

2. Over the recent years, there have been a huge transformation of Berlage axis, directly connected to the Amsterdam Zuid station. The Edge is approximately 700 metres away from the station, do you think it is a big disadvantage of the location regarding connection and accessibility?
    a. What strategy or design you intended to help inviting people to the building?

3. What are main activities, features that you intended to include in the ground floor area of the building?
    a. Did the activities and features match the requirements of OVG Real Estate (or Deloitte)?
    b. If I am not wrong, there are 3 main accessible doors on the ground floor, 2 for the main atrium and 1 for the restaurant. What are reasons to provide 3 main accessible doors on the ground floor? Are three doors sufficient for public people to interact with the building?

4. How do you conceptualize the spatial plan, workplace design and space allocation of the building?
    a. Are there any privacy hierarchy of the space? For instance: Public, semi-public, semi-private and private.
    b. Was your intention for the workplace to be conventional working space or more flexible space? Why do you think it is important for the workplace to be that kind of form?
    c. Do you intend to design the workplace that would be able to be easily adapted for changes in the future?

5. How do you realize the density of the workplace in the building?
    a. How many sqm per person is considered in the design process? Why?
    b. The modern workspace tends to have more shared-working area leading to less sqm per person, do you agree with this statement? Why?

3.3 Physical characteristics

1. What is the height of the ground floor of the Edge and what are the reasons behind this?
    a. What is the ideal height of the ground floor façade to support public activities in your opinion regarding flexibility?

2. Does the building height relate to street width?
    a. What is the ratio between street width and building height
    b. How does the relation between building height and street width help to connect the building and the public?
    c. Was the building height controlled by the municipal building regulation? Or were there any instructions form the municipality of Amsterdam?

3. In terms of harmony with surroundings, did you take texture, colour and material into account in the design process? And How did you do that?
    a. Do these aspects relate to the corporation's image (Deloitte)?
    b. Did the municipality influence the outcome of texture, colour and material?
    c. Were those variables be aesthetically assessed by any evaluation tool by authority?

4. Transparency of the façade helps the building to be more opened to the public. On contrary, it opposes the idea of security that most office buildings require. What was the idea behind designing façade for the Edge?

a. Does the façade of the building provide nightlight to maintain transparency during the night time?

5. How did you conceptualise the idea of the façade design regarding scale, rhythm, and continuity? And why is it important to enhance the interaction with the public?

6. Are there any public space outside the building? Was it your scope of work?

a. Which kind of users you expect to occupy the public space?

b. What are the activities in the public space?

c. How did you come up with the shape of the public space?

3.4 Social interaction

1. In the design process, were there any involvement of local communities?

a. Were people's voices taken into account in the design process?

2. Were there any small local businesses and entrepreneurs involve in the design process of the building?

3. Does the building represent image of the company and any kind of local identity?

a. Did you intend to design the building to be the iconic building or the way finding point of the area?

4. Apart from the train, does the building easily connect to other kinds of transport? For example, can be easily approached by foot, bicycle, tram, bus and private car.

5. Does the public space of the building freely open for all public users or pedestrians?

a. Are there any free market, public installation or urban's workshop events in the public building of the Edge?

b. Do you think it is necessary for the building to include those kinds of event in the public area of the building?

c. Do those public events benefit the corporation? And How?

6. In your opinion, how can office building help to maintain safety and security of the neighbourhood?

a. Do you think that the Edge has what it takes to provide safety and secured feeling to the neighbourhood? What are those?

4. Open Discussion

1. How public spaces and the behaviour of public spaces will change due to the "Corona Crisis"?

a. How would that affect the connection between the building and the city?

2. Other topics recommended by interviewee.

5. Consent form

Please tick the appropriate boxes	*Yes*	*No*
Taking part in the interview		
I have read and understood the interview information dated 30/09/20, or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	☐	☐
I consent voluntarily to be a participant in this interview and understand that I can refuse to answer questions and I can withdraw from the interview at any time, without having to give a reason.	☐	☐
I understand that taking part in the interview involves being asked several questions about my background and opinion from working experiences. I also understand that the conversation during the interview will be recorded in audio to facilitate the process of the research. I am informed that the interview and audio-record are confidential and will only be used for academic purposes.	☐	☐
Use of the information in the interview		
I understand that the information I provide will be used for the research of "***Corporations and cities: An evaluation framework to support the design of corporate office building and foster the interaction with the city***" Further understand that the research is part of MSc4 Graduation Laboratory: Management in the Built Environment (AR4R010), master thesis of ***Ponlawat Trakulwattanakit*** at TU Delft and the interview is conducted for academic purposes only.	☐	☐
I understand that personal information collected about me that can identify me, such as my name, my organisation, my profession background and information of my client, will not be shared beyond the study team.	☐	☐
I agree that my information can be quoted in research outputs.	☐	☐
I agree that my real name can be used for quotes.	☐	☐
Future use and reuse of the information by others		
I give permission for the audio-record information that I provide for this research, may be archived in TU Delft database so it can be used for future research and learning.	☐	☐
Signatures		
Name of participant ***Signature*** ***Date & Place***		
I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands what they are freely consenting.		
Ponlawat Trakulwattanakit  12/10/20		
Researcher ***Signature*** ***Date & Place***		
Study contact details for further information:		
Ponlawat Trakulwattanakit E-mail: ponlawat.trak@gmail.com |Ph: +31 6 30465993		

Appendix B: Example of user survey

1. Structure of the survey

The survey aims to gather information about how users of the building feel on the particular aspects of the building. Firstly, we kindly ask you to fill the information of the building name, location, gender, occupation and participant's relationship to the building. Secondly, the survey is divided into three different sections: functionality and use value, physical characteristics, and social interaction. If the participant has additional comments, you can add them in the comments section under each section of the survey. Thank you in advance for your survey participation.

2. Building and participant information

Building name: _____
Location: _____

1. Please describe your occupation/job

_____

2. Your relationship to this building (please check the one that best describes you)

☐ I work in this building as an employee
☐ I work in this building in food & beverage services
☐ I work in this building for retail and merchandize
☐ I am just passing by the building
☐ Others (please explain) _____

3. User and building interaction survey

Section 1: Functionality and use value

Please indicate how strongly you *agree* or *disagree* with these statements.	Strongly Agree 5	4	3	2	Strongly Disagree 1	Do not know
1. The building is welcoming, easily accessed, and connected to transport hubs.	☐	☐	☐	☐	☐	☐
2. The workplace is designed to support business activities.	☐	☐	☐	☐	☐	☐
3. Your productivity increases because of the supportive functions.	☐	☐	☐	☐	☐	☐
4. The workplace is flexible and can be easily adapted for changes.	☐	☐	☐	☐	☐	☐
5. You feel safe and secure while occupying the building.	☐	☐	☐	☐	☐	☐
6. The building is well operated and maintained.	☐	☐	☐	☐	☐	☐
7. There is an implementation of technology for better space allocation and connect people to the building.	☐	☐	☐	☐	☐	☐
8. The ground floor of the building has a mix and variety of functions.	☐	☐	☐	☐	☐	☐
9. The ground floor functions are flexible and can be adapted or changed to other functions.	☐	☐	☐	☐	☐	☐
10. There are small businesses, start-ups, and entrepreneurs being active in the building.	☐	☐	☐	☐	☐	☐
11. There are public space inside or outside the building, and can be accessed by anyone.	☐	☐	☐	☐	☐	☐
12. Activities inside the building spread to the public. For example, there are restaurant's tables placing in the public area.	☐	☐	☐	☐	☐	☐

Comments:

_____
_____
_____
_____
_____
_____

Section 2: Physical characteristics

Please indicate how strongly you *agree* or *disagree* with these statements.	Strongly Agree 5	4	3	2	Strongly Disagree 1	No Opinion
1. The location of the building and surroundings are lively.	☐	☐	☐	☐	☐	☐
2. The physical characteristics of the building is beautiful.	☐	☐	☐	☐	☐	☐
3. The colour, texture and materials of the building are harmonies with the surrounding buildings.	☐	☐	☐	☐	☐	☐
4. The ground floor height of the building is high enough for public activities.	☐	☐	☐	☐	☐	☐
5. There are enough opening windows and transparency on the ground floor.	☐	☐	☐	☐	☐	☐
6. The are many activities at the windows on the ground floor	☐	☐	☐	☐	☐	☐
7. The building provides night light to maintain transparency during the night time.	☐	☐	☐	☐	☐	☐
8. The ground floor window or plinth is divided into small scale units to increase human interaction	☐	☐	☐	☐	☐	☐
9. There are sufficient accessible doors on the ground floor of the building.	☐	☐	☐	☐	☐	☐
10. The building height is appropriate compared to the street width.	☐	☐	☐	☐	☐	☐
11. The public square has no physical boundary or fences.	☐	☐	☐	☐	☐	☐
12. The square is lively, consisting of a vast array of materials.	☐	☐	☐	☐	☐	☐

Comments:

_____
_____
_____
_____
_____
_____

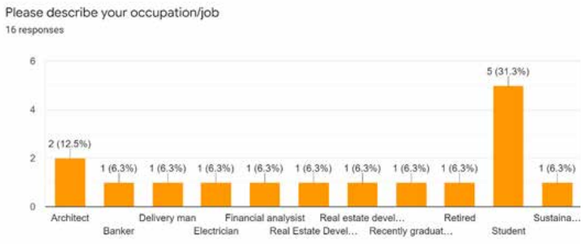
Section 3: Social interaction

Please indicate how strongly you *agree* or *disagree* with these statements.	Strongly Agree 5	4	3	2	Strongly Disagree 1	No Opinion
1. The users involved in the design processes of the building.	☐	☐	☐	☐	☐	☐
2. You feel satisfied with your experience in the building.	☐	☐	☐	☐	☐	☐
3. Many public people visit the building.	☐	☐	☐	☐	☐	☐
4. You feel safe to pass the building in the street.	☐	☐	☐	☐	☐	☐
5. The building does not produce any kind of pollution. Eg; trashed, air, water, light, noise.	☐	☐	☐	☐	☐	☐
6. You feel that the building belongs to the neighbourhood.	☐	☐	☐	☐	☐	☐
7. Many people pass the street in front of the building.	☐	☐	☐	☐	☐	☐
8. The building can be reached by foot, bicycle, tram and train.	☐	☐	☐	☐	☐	☐
9. The building is the icon of the area.	☐	☐	☐	☐	☐	☐
10. Many public people use facilities on the ground floor.	☐	☐	☐	☐	☐	☐
11. Many activities are happening on the street in front of the building.	☐	☐	☐	☐	☐	☐
12. If you get lost in the area, you can find the building and make it as an anchor point.	☐	☐	☐	☐	☐	☐
13. The local communities influence the activities of the building.	☐	☐	☐	☐	☐	☐
14. There is an occurrence of free-market on the street in front of the building or the public space.	☐	☐	☐	☐	☐	☐
15. Public installation, workshop and activities take place in the building or public space.	☐	☐	☐	☐	☐	☐

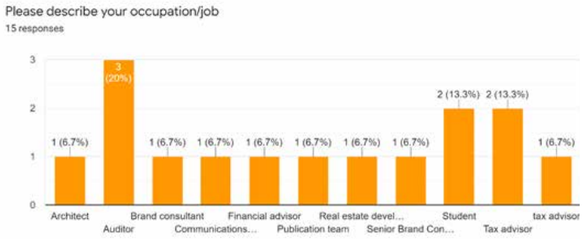
Comments:

_____
_____
_____
_____
_____
_____

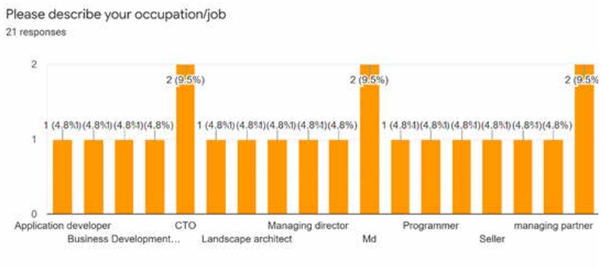
Appendix C: Raw survey results



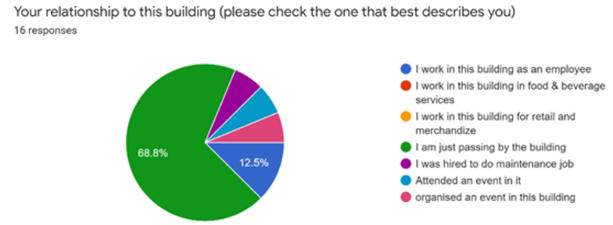
The occupation of ABN AMRO CIRCL Respondents



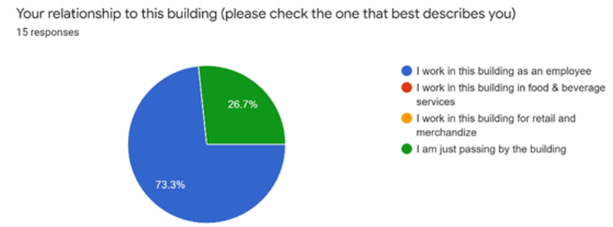
The occupation of Deloitte The Edge Respondents



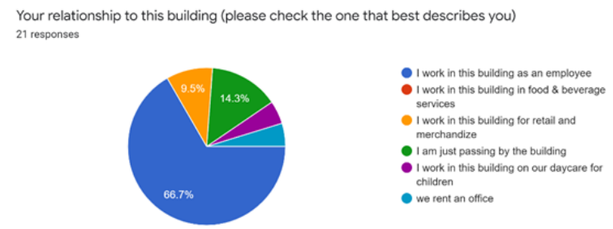
Occupation of Groot Handelsgebouw Respondents



Respondents' relationship to ABN AMRO CIRCL



Respondents' relationship to Deloitte The Edge



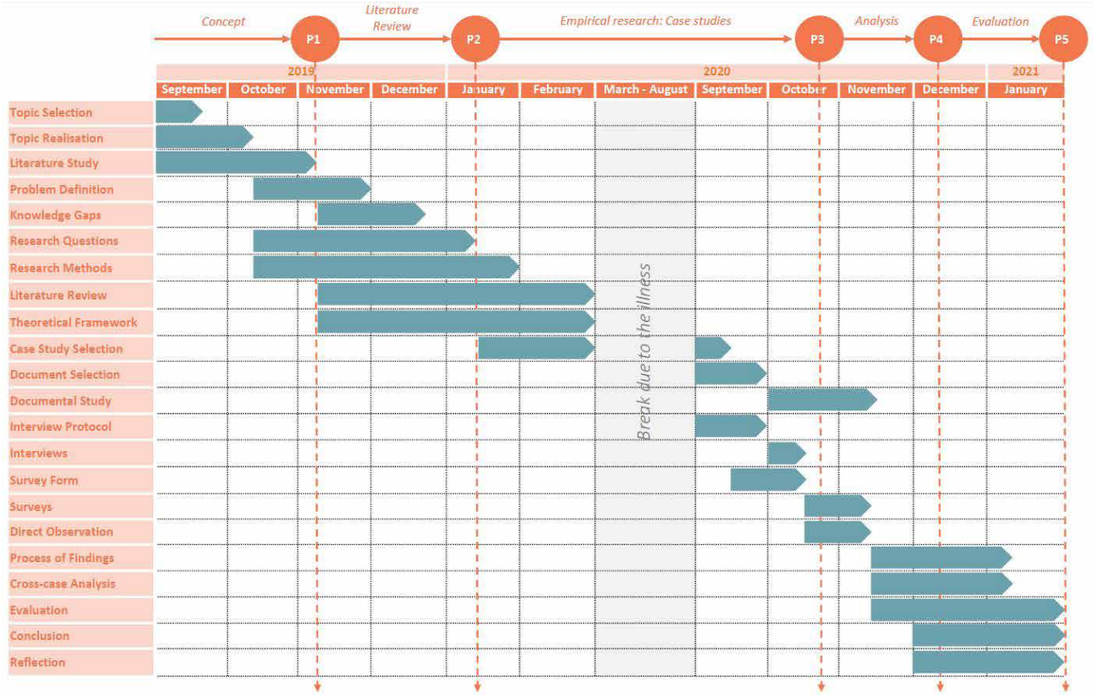
Respondents' relationship to Groot Handelsgebouw

No.	Variables	ABN AMRO CIRCL (16 samples)								Deloitte The Edge (15 samples)								Groot Handelsgebouw (21 samples)							
		5	4	3	2	1	Do not know	Score	Average	5	4	3	2	1	Do not know	Score	Avegage	5	4	3	2	1	Do not know	Score	Average
Functionality and use-value																									
1	Accessibility	14	2					78	4.88	2	2	11				51	3.40	11	7	3				92	4.38
2	Workplace and business activities	4	8	2			2	58	4.14	11	4					71	4.73	5	13	1	2			84	4.00
3	Increase in productivity	2	4	4			6	38	3.80	2	7	4			2	50	3.85	2	7	7	5			69	3.29
4	Workplace flexibility for changes	4	7	1			4	51	4.25	2	11	2				60	4.00	3	8	4	6			71	3.38
5	Safety and security	7	7	1			1	66	4.40	13		2				71	4.73	6	13	2				88	4.19
6	Operating and maintenance	8	6				2	64	4.57	10	5					70	4.67	3	13	5				82	3.90
7	Technology implementation	3	1	1	1		10	24	4.00	6	7	2				64	4.27	2	6	2	4	1	6	49	3.27
8	Mix and variety of functions on ground floor	5	8	3				66	4.13	2	9	4				58	3.87	5	12	3	1			84	4.00
9	The flexibility of ground floor functions	7	8		1			69	4.31	2	10	2			1	56	4.00	2	8	6	3		2	66	3.47
10	Inclusion of small businesses	1	4	2	1		8	29	3.63			2	7	1	5	21	2.10	16	5					100	4.76
11	Opened public space	11	4		1			73	4.56	2	3	5	4	1		46	3.07	4	14	1	2			83	3.95
12	Exchange functions	5	6	1	1		3	54	4.15		9	6				54	3.60	1	17	2	1			81	3.86
	Average								**4.23**								**3.86**								**3.87**
Physical characteristics																									
1	The liveliness of the location	9	6	1				72	4.50	1	3	7	4			46	3.07	17	4					101	4.81
2	Aesthetical excellency	7	7	2				69	4.31	6	9					66	4.40	9	9	3				90	4.29
3	Harmony of colour, texture, and materials with surroundings	1	8	4	3			55	3.44	5	9	1				64	4.27	5	12	4				85	4.05
4	Sufficient ground floor height	8	8					72	4.50	8	5	2				66	4.40	4	15	1			1	83	4.15
5	Transparency of ground floor	10	4				2	66	4.71	5	7	2			1	59	4.21	8	11	2				90	4.29
6	Diverse activities on the ground floor	2	7	5	2			57	3.56	3	2	6	2		2	45	3.46	4	11	4	2			80	3.81
7	Night light to maintain transparency	0	2	8			6	32	3.20	4	10				1	60	4.29	2	14	3	1		1	77	3.85
8	Small scale units	2	9	2	2		1	56	3.73		5	10				50	3.33	4	13	3			1	81	4.05
9	Sufficient accessible doors	7	5	2	1		1	63	4.20		2	7	6			41	2.73	9	9	3				90	4.29
10	Building height and street width	6	10					70	4.38	7	6	2				65	4.33	4	16	1				87	4.14
11	No physical boundary public space	2	4	5	3	1	1	48	3.20	3	8	4				59	3.93	2	10	4	5			72	3.43
12	Lively plaza with a variety of materials	3	7	4			2	55	3.93		7	7	1			51	3.40	1	9	6	5			69	3.29
	Average								**3.97**								**3.82**								**4.04**
Social interaction																									
1	Involvement of users	1		3	1		11	16	3.20			2	5	2	6	18	2.00	2		1	11	2	5	37	2.31
2	Users' satisfaction	3	13					67	4.19	2	13					62	4.13	1	12	8				77	3.67
3	Visiting of public people	1	2	7	2		4	38	3.17	2	2	2	9			42	2.80	2	6	9	3		1	67	3.35
4	Safety and security of the street	6	10					70	4.38	4	11					64	4.27	3	17	1				86	4.10
5	No pollution	2	11				3	54	4.15	7	7				1	63	4.50	2	10	3	5		1	69	3.45
6	Sense of belonging	2	3	6	4		1	48	3.20		6	9				51	3.40	8	13					92	4.38
7	The liveliness of the street	11	4	1				74	4.63	2	2	6	5			46	3.07	13	8					97	4.62
8	Connection with transport hubs	16						80	5.00	5	8		2			61	4.07	18	3					102	4.86
9	Local identity	2	11	1	2			61	3.81	8	4	3				65	4.33	19	2					103	4.90
10	Use of facilities by the public		3	3	2		8	25	3.13		4	2	5	3	1	35	2.50	3	10	4	4			75	3.57
11	Diverse activities on the street	1	5	7	1		2	48	3.43		3	2	8	2		36	2.40	7	7	6			1	81	4.05
12	Wayfinding	3	6	2	3	2		53	3.31		13	2				58	3.87	12	9					96	4.57
13	Local communities involvement		3	2	1		10	20	3.33			2	5	2	6	18	2.00	2	2	7	6		4	51	3.00
14	Market at the public space				4	8	4	16	1.33				6	8	1	20	1.43	1	1	2	6	9	2	36	1.89
15	Public installation, workshop, and activities	1	5	1	1		8	30	3.75			2	5		8	16	2.29	4	4	6	5		2	64	3.37
	Average								**3.60**								**3.14**								**3.74**

Raw data from the survey of the three cases.

Appendix D: Research plan

The research plan for the whole master thesis is explained from the beginning to the end of the research. It includes an explanation of every main task, milestone and deliverable. In total, the research is divided into four different phases using "P" as milestones: conceptual phase, theoretical phase, empirical research phase and operations phase. Every phase ends with the presentation, represented as P1, P2, P3, P4 and P5. At the moment of this section being written, the research is reaching the end of P4. The figure below illustrates the graduation plan with main tasks in accordance with timeframe and milestones.



Graduation plan (own illustration).

Phase 1: Conceptual

The first phase starts with a topic selection which takes around a week, and later on, the topic is realised, which could take around a month. In the meantime, relevant literature, related to the topic, is studied to build up the knowledge for the researcher. This leads to the problem definition, realising research questions and initial research methods in which they are presented on the P1 presentation.

Phase 2: A literature review

Moving onto the second phase, contents that were presented in P1 are not finalised yet. Feedbacks from the presentation were taken into account to improve research questions, problem definition and research methods. In this phase, research questions were identified in more details, including additional sub-research questions. The process of defining research questions ends at the end of P2. The aftermath

of the problem definition is the knowledge gaps. This led the research to the process of literature review, which was conducted for the whole phase. Once the literature review has started, the theoretical framework was developed from that point until the end of this phase. For the methodology, it is not fixed yet and can be revised in accordance with other tasks. The methods were developed for the whole phase.

Phase 3: Empirical research, Case studies

The third phase started by improving research methods, a literature review, and a theoretical framework. This is a vital process since the theoretical framework links all the processes together and comprehends the topics deeply. The process of case selection started at the beginning of the third phase and took up to the middle of the phase. The process of document selection began in the early of September and ended at the end of September. In the meantime, interview protocols were developed in a similar time frame for the preparation of the interviews. In the middle of September, the researcher started to establish online-survey forms in order to prepare to conduct the survey with selected samples. This step took up to the middle of October. Since the relevant documents were gathered and determined, the documental study began at the beginning of October until the end of P3. The interviews were conducted in the first half of October, and the transcription of the interviews carried on until the end of P3. Surveys and direct observation on the real estate objects and people's behaviour were started in the middle of October and went on through P3. During the P3 presentation, initial findings from the case studies were presented to the mentors.

Phase 4: Analysis

At the beginning of the fourth phase, the researcher tried to finish off the documental study, surveys, and direct observation, which were completed in the middle of November. Therefore, processing of the findings, cross-case analysis, and evaluation began in the middle of November, and kept going until the end of P4. In the meantime, the conclusion of the research and the reflection on the graduation research were started at the beginning of December until reaching P4 presentation.

Phase 5: Evaluation

The last phase of the thesis is an evaluation of the whole research. Process of findings and cross-case analysis can be improved in this phase until early January 2021. Likewise, the improvement of evaluation of findings, the conclusion of the research, and reflection are planned to conduct in the whole fifth phase until the end of the phase. The completed final version will be delivered and presented at the end of P5, which is expected to be in late January 2021.

Appendix E: Addtional Assessment Techniques

User Satisfaction Index and Building Performance Attributes

Seshadri and Paul (2018) developed an instrument to measure the feedback on the user satisfaction of the building. The research is conducted by studying existing instruments and develop User Satisfaction Index (USI) for performance evaluation of the building based on the linkage of the user requirements (ISO 6241-1984) and Building Performance Attributes (BPAs). The purpose of the tool is to assess the performance of the building after the intervention strategies by the facility management department. The main variables. It was validated through survey and assign weight to attributes based on the users. The main attributes of the USI involved with the interaction between the building and users are categorised into three main factors: built form factor, environmental factor and external factor. Each factor consists of several building attributes and user requirements which is presented in the table below. The assessment technique used in this research is to ask building users is similar to ratings, but specified keywords are used instead of numeric scoring. For example, highly safe, quite safe, barely safe, unsafe and highly unsafe.

S no.	Factor	Attributes	User requirement
1	Built form	1.1 Spaces	Suitability for spaces for specific use
		1.2 Finished, fitting and furniture	Durability requirements
			Tactile requirements
		1.3 Physical condition	Dynamic requirements
			Tightness requirements
			Stability requirements
		1.4 Safety	Fire safety requirements
			Safety in use requirements
2	Environmental	2.1 Lighting	Visual requirements
			Hygrothermal requirements
		2.2 Air, noise and water	Air purity requirements
			Acoustical requirements
		2.3 Waste	Hygiene requirements
3	External	3.1 Societal	Community participation
			Congeniality of neighbourhood
		3.2 Accessibility	Accessibility to public transport
			Location of building
			Proximity to shops, walkways etc
		3.3 Amenities	Parking, shops, recreational facilities etc

Building Performance Attributes (BPAs) (Seshadri and Paul, 2018).

Building Decree 2012

The Building Decree 2012 (Housing Act, 2012) sets physical and technical requirements and controls for the existing buildings, new construction and demolish structures in the Netherlands. The regulations are applied for all buildings under the control of Housing Act. The Building Decree guides constructor of contents need to be carried out in construction documents as well as guiding the municipality to assess building permits for new construction along with municipal regulations and zoning plan. The requirements are identical to qualification checklists that all refurbishment, new construction and demolition need to follow all requirements. Any issues that oppose the requirement would lead to a rejection of building permit. In total, the Building Decree 2012 is written in the following 9 chapters:

1. General provision – this chapter includes the regulation concerning number of persons per sqm., common and joint, quality certification, notification of use, procedure of construction and demolition work, and presence of documents.
2. Technical construction requirement to ensure safety – the chapter consists of general strength of load-bearing structure, strength in case of fire, partition for floors, staircase, ramp, movable structure components, fire-hazardous, fire and smoke, escape routes, and emergency services.
3. Technical construction requirement for health protection – the chapter involves protection from noise, reverberation control, moisture reduction, ventilation, supply air and gas drainage, Limiting the occurrence of noxious substances and ionising radiation, protection from rats and mice, and daylight.
4. Technical construction requirement to ensure usability – the chapter includes staying area and space, toilet and bathroom space, accessibility, outdoor storage, and outdoor space.
5. Technical construction requirement to ensure energy efficiency and environmental protection – energy efficiency, and environment.
6. Provisions for installations – the requirements concern lighting, facility for receiving and using energy, water supply, drainage, fire detection, fire escape, fire-fighting, reachability for emergency services, tunnel safety, accessibility for disable persons, counteracting common crimes, and safe maintenance.
7. Provisions for the use of structures, open premises, and grounds – the chapter provides requirements regarding prevention of fire hazards, safe escape in case of fire, safe and health provisions.
8. Construction and demolition work – the requirements in this chapter are preventing unsafe situations and reducing nuisance, and waste separation.
9. Transitional and final provisions.

Municipal regulations

The municipal regulations are applied due to the area of each municipality. Each municipal area may establish different requirement and controls in accordance with goals of municipality. In order to acquire building permit, buildings need qualify these requirements. Like Building Decree, the municipal regulations work as a checklist to assess the building. Many variables mentioned in the municipal regulations are identical to the Building Decree. The distinction of the municipal regulations is that it includes urban planning regulations and accessibility requirements. The example of Rotterdam Building Regulations 2010 (Bouwverordening Rotterdam, 2010) is used in the research to identify the aspects that being assess by the regulations. The following variables are presented in the table below.

Municipal regulations	
Chapter	**Contents**
1. Introductory provision	Terms, layout of the area of the municipality
2. The application of building permit	Information and documents, application for building permit, welfare assessment, prevent building on contaminated soil ***Urban planning regulation:*** Building outside zoning plan, location of the façade building line, front façade, rear façade, yard at homes, yard at other buildings, space between structures, Permitted height in the front and the rear façade, permitted height of side walls, maximum permitted height of construction works, permitted deviation from the permitted building height, car parking facilities, loading and unloading facilities.
3. The notification	Cancelled (use Building Decree 2012)
4. Duties during and on completion of construction and when commissioning a structure	Cancelled (use Building Decree 2012)
5. State of open yards and sites, fire safety installations, connection to utilities and the exclusion of harmful and annoying animal	Cancelled (use Building Decree 2012)
6. Fireproof use	Cancelled (use Building Decree 2012)
7. Other terms of use	Cancelled (use Building Decree 2012)
8. Demolition	Cancelled (use Building Decree 2012)
9. Wealth	Composition of the committee, appointment and term of office, annual accountability, term of advice, public nature of meetings, secretariat, settlement by mandate.
10. Other administrative provisions	The application for a permit to reuse an evacuated house or caravan declared uninhabitable, Review and replacement of designated standards and other regulations.
11. Enforcement	Cancelled (use Building Decree 2012)
12. Final provisions	Transitional provision for demolition notification

Contents of the Rotterdam municipal building regulations (Bouwverordening Rotterdam, 2010).

BREEAM

BREEAM, stands for Building Research Establishment Environmental Assessment Method, is the global sustainability assessment and schemes of certification for buildings and the built environment (Building Research Establishment Limited, 2018). BREEAM aims to encourage buildings to be developed following the principles of environmental quality and determine buildings with quantified measures as well as adapting flexible approach to generate positive outcomes. BREEAM is not a regulation itself but more likely to provide certifications to assessed buildings. Even though, BREEAM assessment method is voluntary, the assessment can facilitate the process of acquiring building permit and planning approval. However, some cities require that BREEAM is mandatory for the new construction, for example: London-based Local Planning Authorities. Those buildings assessed by BREEAM are acknowledged to be more environmental value, more sustainable and less negative impacts to the built environment. The assessment technique used in BREEAM is scoring. There are five different BREEAM rating benchmark for project assessed, which is shown in the table below. There are ten main issues that BREEAM assess in the construction project which are management, energy, water, waste, pollution, health and wellbeing, transport, material, land use and ecology, and innovation. Each issue is being weighted differently in accordance with construction type. Contents of main issues that being assessed by BREEAM are summarized in table on the next page.

BREEAM rating	% score
Outstanding	≥ 85
Excellent	≥ 70
Very good	≥ 55
Good	≥ 45
Pass	≥ 30
Unclassified	< 30

BREEAM rating Benchmarks
(Building Research Establishment Limited, 2018).

Main issues	Contents of the main issues	Weighting			
		Fully fitted out	Simple building	Shell and core only	Shell only
Management	Man 01 Project brief and design Man 02 Life cycle cost and service life planning Man 03 Responsible construction practices Man 04 Commissioning and hand over Man 05 Alter care	11 %	7.5 %	11 %	12 %
Energy	Ene 01 Reduction of energy use and carbon reduction Ene 02 Energy monitoring Ene 03 External lighting Ene 04 Low carbon design Ene 05 Energy efficient cold storage Ene 06 Energy efficient transport systems Ene 07 Energy efficient laboratory systems Ene 08 Energy efficient equipment	16 %	11.5 %	14 %	9.5 %
Water	Wat 01 Water consumption Wat 02 Water monitoring Wat 03 Water leak detection Wat 04 Water efficient equipment	7 %	7.5 %	7 %	2 %
Waste	Wst 01 Construction waste management Wst 02 Use of recycled and sustainably sourced aggregates Wst 03 Operational waste Wst 04 Speculative finishes (offices only) Wst 05 Adaptation to climate change Wst 06 Design for disassembly and adaptability	6 %	7 %	7 %	8 %
Pollution	Pol 01 Impact of refrigerants Pol 02 Local air quality Pol 03 Floor and surface water management Pol 04 Reduction of night-time light pollution Pol 05 Reduction of noise pollution	8 %	6 %	9 %	6 %
Health and well being	Hea 01 Visual comfort Hea 02 Indoor air quality Hea 04 Thermal comfort Hea 05 Acoustic performance Hea 06 Security Hea 07 Safe and healthy surroundings	14 %	16.5 %	8 %	7 %
Transport	Tra 01 Transport assessment and travel plan Tra 02 Sustainable transport measures	10 %	11.5 %	11.5 %	14.5 %
Materials	Mat 01 Environmental impacts from construction products – Building life cycle assessment (LCA) Mat 02 Environmental impacts from construction products – Environmental Product Declarations (EPD) Mat 03 Responsible sourcing of construction products Mat 05 Designing for durability and resilience Mat 06 Material efficiency	15 %	17.5 %	17.5 %	22 %
Land use and ecology	LE 01 Site selection LE 02 Ecological risks and opportunities LE 03 Managing impacts on ecology LE 04 Ecological change and enhancement LE 05 Long term ecological management and maintenance	13 %	15 %	15 %	19 %
	Total	**100 %**	**100 %**	**100 %**	**100 %**
Innovation	Inn 01 Innovation (additional)	10 %	10 %	10 %	10 %

Contents of the main issues and weightings (Building Research Establishment Limited, 2018).

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