

An Exploration of Real Estate Investment Decisions and the Significance of Green Certificates: Towards a Multi-Attribute Decision Model

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Abstract

Real estate investment decisions are a relevant but understudied topic. This study aims to fill this research gap by exploring real estate investment decisions in the German office market. Given the increasing trend and necessity to account for sustainability across all asset classes, and real estate in particular, I evaluate the role of green certificates in investment decisions in the German office market.

I adopt an object-oriented ontological position and a phenomenological epistemology, enabling me to explore decisions without over- or undermining them. My research is split into two phases. In the First Research Phase, I explore decision-making expertise by conducting 22 semi-structured interviews with investment managers active in the German office market. This set of participants is diversified across different firm sizes, origins and investment focuses. As a result of the First Research Phase, I obtain an understanding of the decision-makers' expertise and the criteria impacting their investment decisions. Furthermore, I devise ten attributes that describe investment decisions in the German office market. A cross-check with the participants and an external expert confirms that the set of attributes accurately represents real estate investment decisions.

The Second Research Phase aims to develop the Multi-Attribute Utility Model (MAU) for Office Investments (OffIn-MAU), a model that supports investment decision-making in the German office market. The model allows the user to transform personal views into numbers and to assess up to ten core or value-add investment alternatives at once. To use the model, the respondents allocate relative importance scores to each of the ten attributes. The average of the resulting importance weights indicates the industry consensus on the relative attribute preferences.

My research is the first to explore real estate investment decisions and to present a functioning, useful OffIn-MAU model that simplifies real estate decision-making. I have strong confidence in the results of my research because they are validated by a knowledgeable real estate expert and the participants themselves and have a high degree of coherence with the current state of the literature. My research also reveals considerable differences between accounting for environmental, social and governmental (ESG) criteria among core and value-add investments. Even within both risk classes, the high range of importance weights of the attribute and its standard deviations indicated significant variability in its perceived importance among the respondents. I conclude that sustainability

in real estate is an emerging topic known to all investment decision-makers, while its importance for decision-makers varies and it affects core investments first. Nonetheless, considering increasing regulatory requirements and the prevalence of ESG criteria, sustainability will become even more relevant across all investment classes soon.

Author's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other education institution in the United Kingdom or overseas.

Any views expressed in the thesis are those of the author and in no way represent those of the University.

Kim Thalia Dreger

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List of Abbreviations

AHP = analytical hierarchical process

BaFin = Bundesanstalt für Finanzdienstleistungsaufsicht (Federal Financial Supervisory Authority)

bn = billion

BREEAM = Building Research Establishment Environmental Assessment Method

CapEx = capital expenditures

CBC = choice-based conjoint

CBD = central business district

CRE = commercial real estate

DCF = discounted cash flow

DGNB = Deutsche Gesellschaft für Nachhaltiges Bauen

e.g. = exempli gratia

EPC = Energy Performance Certificate

ESG = environmental, social and governance

et. al = et alia

EU = European Union

GDP = gross domestic product

GHG = greenhouse gas

i.e. = id est

IPD = Investment Property Databank

IRR = internal rate of return

KPI = key performance indicator

kW/h = kilowatt hours

LEED = Leadership in Energy and Environmental Design

LTV = loan-to-value

m = million

MAU = Multi-Attribute Utility

MEPS = Minimum Energy Performance Standard

NIY = net initial yield

NOI = net operating income

NPV = net present value

OffIn-MAU = Office Investments-MAU

OOO = object-oriented ontology

p = page

para. = paragraph

Ph.D. = Doctor of Philosophy

REIT = real estate investment trust

RIWIS = Regionales Immobilienwirtschaftliches Informationssystem

RO = research objective

sq. ft. = square foot

sqm = square metre

TEG = Technical Expert Group on sustainable finance

UK = United Kingdom

US = United States of America

WAULT = weighted average unexpired lease term

1. Introduction to Real Estate Decision-Making and Green Building Certificates

"The Fridays for Future movement and the new regulatory conditions set out in the EU's sustainable finance action plan have enlivened the discussion surrounding the topic of sustainability. But is sustainability taking root in corporate portfolios – or only in people's minds?"

– Sebastian Kreutel, Senior Manager, Real Estate at PwC Germany¹

Do real estate investment decision-makers agree with the relevance of sustainability and – if yes – do they incorporate environmental, social and governmental (ESG) factors into their decision-making criteria? With my research, I aim to shed light on real estate decision-making by deriving a corresponding model for German office investments and by assessing the impact of green certificates.

This chapter introduces the research setting and my chosen approach. Sections 1.1 to 1.3 explain the research context and the development of the research topic, as well as my personal interest in the field of real estate investments and green certificates. Section 1.4 presents limitations in the current state of literature and the intended contribution of my research, resulting in the research aim and objectives presented in Section 1.5. Section 1.6 discusses the chosen methodology and research design, followed by an elaboration on ethical considerations and data validity in Section 1.7. Lastly, I describe the structure of the thesis in Section 1.8.

1.1 Research Context: Investment Decisions and Green Certificates

The amount spent in the German real estate market has increased constantly since the financial crisis in 2009, peaking in 2019 with a total investment volume in the German office market of EUR 38bn (BNP Paribas Real Estate, 2021a). Hundreds of investors are active in the German office market. It is evident that decision-makers base their decisions on certain criteria. However, so far, the questions of what these attributes are and how investment decision-making expertise can be captured remain unanswered in academic literature.

¹ Referenced by PwC Germany (2021) and in this thesis with the consent of Sebastian Kreutel

In recent years there has been a substantial increase in sustainability awareness. With temperatures on the rise and more natural catastrophes, politicians and the public have increasingly felt the urge to care for our environment. In Germany, buildings account for roughly 35% of total energy usage (Deutsche Energie-Agentur, 2019). This number represents both the potential in the building industry to add to a change in global warming and the need to initiate actions against negative environmental impacts.

To encourage investors to account for sustainability in the building sector, mandatory and voluntary certification schemes emerged. The EU imposed mandatory certificates along with other environmental regulations (European Commission TEG, 2020b; European Council, 2002, 2010). In addition, voluntary certificate schemes materialised, with DGNB (originated in Germany), BREEAM (originated in the UK) and LEED (originated in the US) among the leading voluntary certificate providers for commercial buildings in Europe (Rademaekers, 2014). Certificates provide aggregated information on a building and its efficiency in the form of a rating. The main idea behind the schemes is to increase sustainability-related comparability between properties, thereby promoting transparency for stakeholders (Reed, Wilkinson, Bilos, & Schulte, 2011).

In recent years, both environmental awareness and the investment volume of certified buildings has increased substantially. 2018 has been the first year in which the sum of investments in green buildings² exceeded EUR 10bn, contributing 22% to the total investment volume across all asset classes in Germany (BNP Paribas Real Estate, 2021c). This increased interest in green certificates might be partly explained through various advantages of certified buildings, such as energy savings of up to 30% (Kats, Alevantis, Berman, Mills, & Perlman, 2003) and higher employee productivity and satisfaction, among other social benefits (Fowler, Rauch, Henderson, & Kora, 2010; Miller & Pogue, 2009).

Against this background, it makes sense that decision-makers include certificates in their investment decisions to some degree. However, it remains unclear what factors capture real estate investment decision-making expertise, and how relevant green certificates are for experts – a topic this thesis attempts to find answers to.

² In this thesis and in line with most literature on this topic, the terms *green buildings* and *green* refer to certified properties.

1.2 Research Motivation

The research topic of this thesis – decision-making and green certificates in real estate – evolved from my academic and practical experiences with the underlying phenomena. It is grounded in two years of work experience in the real estate investments sector, succeeding five years in asset financing departments of various banks, inter alia, paired with my academic interest in investments and increasing environmental awareness. I concluded my Master of Finance programme in 2018 with a thesis on the impact of the EU’s Emission Trading System – a mandatory scheme aiming to decrease greenhouse gas (GHG) emissions – on the performance of firms.³ Regardless of the sector, the relevance of environmental aspects and sustainability have increased dramatically over the last years.

While observing the rising importance of green topics and related phenomena in academia and practice, I realised that the current literature does not satisfy the issue’s complexity. I observed a significant gap between the theoretical basis provided by literature and the impact of green certificates on real estate investment decisions in practice. I also noted that, despite the large volumes spent every year in the German office market, it is not clear what investment decisions are based on. That way, my interest in connecting sustainability and real estate investment decision-making increased until I decided to undertake the academic and personal challenge to investigate this topic thoroughly.

This was the reason for my decision to enrol in the University of Gloucestershire’s Ph.D.-programme in 2019. Initially, my broad topic idea was to analyse investments in the German real estate market, focusing on sustainability. However, throughout the first months of my research, I realised how little information there was about the ‘ingredients’ of real estate investment decisions. Furthermore, despite the significant investments being made in certified properties, I found no evidence of the impact of green certificates on office investments. Although sustainability is an omnipresent topic affecting all asset classes, green certificates seemed to be especially prevalent among office properties. Thus, I decided to focus on the German office market, as I was already familiar with it through my previous work experience.

After reading related literature, it became more obvious that only a comprehensive process of eliciting decision-making expertise in the form of an explorative research design and close interaction with investment decision-makers could result in a satisfactory response to my

³ Thesis title: „Climate change policies and their impact on corporate performance“.

research questions. Thus, with the OffIn-MAU (Office Investments-Multi-Attribute-Utility) model, a decision-making model supporting office investment transactions, I add to both the current state of knowledge and to real estate decision-making practice.

1.3 Importance and Relevance of the Research Topic

As mentioned before, literature about real estate investment decisions and green certificates is scarce. Based on previous studies, I have identified three topics that impact decision-making and the relevance of green certificates: 1) the German office market and the relevance of certified buildings; 2) decision-making in real estate investments in general; and 3) transaction and rental price impacts of green buildings. Figure 1 illustrates the topics resulting in the formation of this thesis' subject.



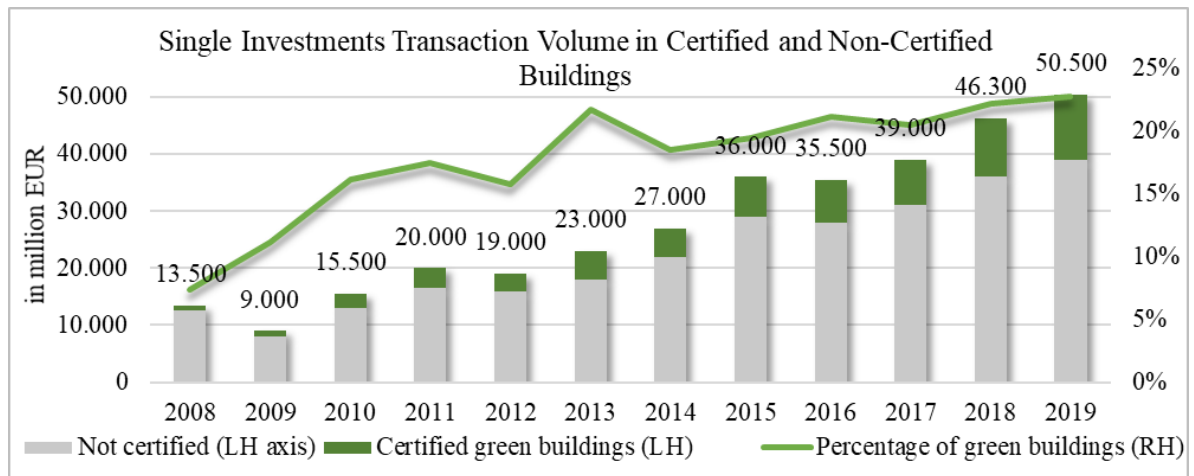
Source: Own presentation

Figure 1: Literature Topics Impacting the Subject of this Research

Going into further detail on the first topic, except for the Covid-19 pandemic-ridden year 2020, yearly investments into the German office market increased significantly. In 2019, they reached EUR 35bn with over 900 transactions. A market report conducted by BNP Paribas Real Estate (2021c) analysed the green building investment market across all asset classes in Germany. As shown in Figure 2 below, the single transactions investment volume in German real estate has been increasing over the past ten years, with certified green buildings contributing approximately 22.6% of the EUR 50.5bn total volume in 2019.

Among the German real estate market and for green buildings in particular, the office investment class is most dominant. According to BNP Paribas Real Estate (2021c), 78% of

all certified properties belong to the office asset class. Moreover, 84% of all certifications are for buildings located in the seven most relevant German cities (the so-called Top-7⁴).



Source: Own presentation based on BNP Paribas Real Estate (2021c)

Figure 2: Single Investments Transaction Volume in Certified and Non-Certified Buildings

Studies regarding topic 2 suggest a range of factors that affect investment decisions. They revealed that both pricing and investor intuition have a significant impact on investment decisions. Not surprisingly, several former researchers regarded the return of a real estate investment and the location of a property as two relevant decision-impacting factors. International research on this topic further indicates that the investment decision-making process did not significantly change since the first study about decision-making was conducted in the 1970s (Farragher, 1982; Farragher & California, 2008; Farragher & Kleiman, 1995). However, so far, no study has attempted to explore real estate decision-making criteria. Therefore, the question about the factors affecting investment decisions in the German office market today remains open.

Other studies have been concerned with the impact of green certificates on property rents and prices, which I included in the third topic addressed in my literature review. They concluded that green building certificates positively impact transaction prices and rental levels (Brounen & Kok, 2011; Eichholtz, Kok, & Quigley, 2013; Fuerst, McAllister, Nanda, & Wyatt, 2016). These rental and transaction price premia suggest that decision-makers are compensated for purchasing green buildings. In combination with the high focus decision-

⁴ The Top-7 are commonly defined among real estate brokers as the seven cities in Germany most relevant to the real estate market, namely Berlin, Cologne, Dusseldorf, Frankfurt, Hamburg, Munich and Stuttgart (DZ Hyp, 2020; Jones Lang LaSalle, 2021c). Instead of assessing the seven most relevant cities, some brokers prefer to assess the Top-6 (Savills Research, 2021b) or Top-8 (BNP Paribas Real Estate, 2021b).

makers place on an investment's return assessment, this raises the question of how green certificates impact their ultimate purchase decision.

Within Germany, research on green buildings is scarce. In line with international literature, the few studies focusing on the German market found no or only a slightly positive effect of green buildings on prices (Amecke, 2012; Cajias & Piazzolo, 2013; Leopoldsberger, Bienert, Brunauer, Bobsin, & Schützenhofer, 2011). In combination with the high relevance of risk and return for investment decisions as identified in literature topic 3, the results of academic research so far suggest that investors recognise and adjust for the degree of sustainability when conducting investment decisions.

These factors indicate a need to research investment decisions in general and, specifically, how green certificates impact investment decisions. My study will rely on the novel Multi-Attribute-Utility (MAU) theory to provide a model that supports decision-making in practice. Furthermore, it concentrates on investment managers active in the German office market, as investments and green certificates have attracted increasing attention and relevance in Germany but at the same time are underrepresented in academic research.

1.4 Limitations in the Current State of Literature

A critical review of existing literature about real estate investment decisions and green certificates in real estate revealed significant open issues in the academic coverage of these topics. I provide an extensive discussion of these shortcomings in Chapter 2. However, at this point, it makes sense to explain a few of the gaps in the literature and derive from this the intended contribution of my study. This study will build upon the current state of literature and add to the academic debate about green certificates.

First, my study is the first to explore real estate investment decisions with an object-oriented ontological view and a phenomenological epistemology. So far, researchers have often relied on pre-defined questionnaires to assess investment decisions, which has kept them from forming a thorough understanding of decisions and remaining flexible on contemporary topics in the market. In contrast, I will assess real estate investment expertise in the German office market through an in-depth, inductive research process.

Second, my study is the first to adopt the novel MAU model, which I will further describe in Section 3.5. The MAU model is used to evaluate a limited number of decisions with conflicting value drivers. It enables the user to transform personal views into numbers and

thus support complex decision-making (Edwards, Miles, & Von Winterfeldt, 2007). Nonetheless, previous literature about real estate expertise has not utilised this theory.

Third, to my best understanding, there is no existing literature about the topic of real estate decision-making expertise with a focus on green certificates. Previous studies have only, more or less, analysed the influencing topics presented in Section 1.3 individually. Still, no research combines green certificates and decision-making – a gap that my work attempts to fill.

Fourth, decision-making and green certificates are topics that evolve fast. This thesis provides current decision-makers' views and insights into their expertise. Moreover, and unintendedly, both research phases coincided with the global Covid-19 pandemic, which offers contemporary insights into real estate investments and where experts expect the German office market to move to.

Fifth, research so far has focused on properties in the USA, Australia, the UK and the Netherlands, exposing the need for a thorough insight into real estate expertise in Germany. My study is the first to fill this gap and explore real estate decision-making in Germany. It will also be the first study to examine green building certificates and their use in Germany. The topic of green certificates and their impact on German real estate investment decisions has been unexplored so far, and my research aims to fill this gap.

1.5 Research Aim and Objectives

Considering the lack of research in the field of real estate investment decisions and the shortcomings of existing academic literature, this study aims to elicit investment decision-making expertise and assess the role of green certificates for investment decisions, resulting in the derivation of a corresponding decision-making model.

To the best of my knowledge, this is the first study to conduct an in-depth analysis of real estate investment decisions with a focus on green certificates, derived from extensive qualitative fieldwork consisting of face-to-face interviews with real estate professionals. As well as developing a deep understanding of the attributes that impact investment decisions, my study also evaluates their relative importance and derives a model that supports German investment professionals in evaluating green real estate opportunities. Thus, the work adds considerably to the current state of literature, closes notable gaps in existing research and presents prospects for future research.

Table 1 presents the corresponding research questions and objectives.

Table 1: Research Objectives

#	Research Objectives
1	To elicit the expertise of real estate investment decision-makers in Germany.
2	To derive the attributes that capture real estate investment decision-making expertise.
3	To evaluate the relevance of green certificates for investment decision-making.
4	To derive a MAU model for estimating the relative value of a real estate investment opportunity.

Source: Own presentation

The First Research Objective aims at eliciting the expertise of real estate decision-makers in the German office market. Through semi-structured interviews, I explore the expertise of investment decision-makers and derive ten attributes that capture investment decision-making. The respondents sort the list of attributes following their perceived significance and thereby provide their view on the relative importance of green certificates for real estate investment decisions. The Final Research Objective aims to derive a Multi-Attribute-Utility (MAU) model that allows assessing multiple decision-impacting factors for up to ten alternatives at once.

1.6 Methodological Framework

This section gives a brief overview of the chosen methodology and methods of my thesis. In line with the components of research philosophy as outlined by Miles and Huberman (1994), I distinguish between chosen ontological and epistemological approaches before outlining the used methodology, methods and research design.

Table 2: Chosen Research Approach

Elements	Chosen approach
Ontology	Object-oriented ontology
Epistemology	Phenomenological epistemology
Methodology	Qualitative approach

Methods and Techniques

Two research phases: 1) semi-structured interviews and 2) a brief online questionnaire to elicit relative attribute preferences
Underlying model: MAU (Multi-Attribute Utility)

Source: Own presentation

1.6.1 Chosen Ontological Position

My research follows an object-oriented ontological (OOO) position, as introduced by Harman (1999). According to OOO, objects – not human beings – constitute the centre of the world. In this context, objects can be anything, including real objects, constructs or personal views. The advantage of this approach is that it regards real estate decision-making expertise as an object, thereby allowing me to explore expertise without accounting for its relationships with humans or other objects, or viewing expertise as the sum of its parts (Harman, 2018b).

I have also considered alternative approaches to ontology. Realism is "the view that entities exist independently of being perceived, or independently of our theories about them" (Phillips, 1987, p. 205). This approach is not appropriate for this study as the data basis is insufficient, and decision-making needs to be explored. In addition, realism implies reducing real estate investment decisions to their constituent parts – or undermining an object (Harman, 2018b) – while my research is concerned with the complexities of investment decisions.

Contrary to this, I considered a social constructivist position, assuming that "reality is not objective and exterior, but socially constructed and given meaning by people" (Easterby-Smith, Thorpe, & Jackson, 2012, p. 22). The world consists of experiences from interactions with others and disregards fixed, external factors. The corresponding problem for real estate expertise is that it is always examined as a sum of relationships with other objects or humans, and not simply as expertise itself. Thus, social constructivism is not a suitable approach for my research.

1.6.2 Chosen Epistemological Position

Within OOO, my research is grounded in phenomenological epistemology. For phenomenologists, research is concerned with questioning "the way we experience the world, to want to know the world in which we live as human beings" (van Manen, 1990, p.

5). Thus, knowledge is created by studying human experiences, which are seen as a whole (Cohen, Manion, & Morrison, 2000).

Following the saying attributed to Aristotle, "the whole is greater than the sum of its parts", OOO and phenomenology enable me to assess the expertise of real estate decision-makers that lies behind visible behaviour. Similarly, I am able to obtain deeper insights into the green aspects of real estate decision making. Thus, OOO and phenomenology allow for the creation of knowledge based on my assessment of decision-making expertise.

1.6.3 Chosen Methodology and Research Design

To achieve my goal, the chosen methodology must generate a valid data set on real estate decisions and green certificates. This is only possible with qualitative research, which is associated with exploring thoughts and concepts. In contrast, quantitative research seeks to measure and analyse relationships within a value-free setting (Levy & Henry, 2003). As my research aims to explore complex relationships and processes, only a qualitative methodological approach is suitable. This approach allows me to fully explore the research topic and develop a thorough understanding of investment decision-making expertise.

Following a qualitative approach and a phenomenological epistemology, I split my research into two phases. In the first data collection phase, I use semi-structured, face-to-face interviews to explore the expertise of real estate decision-makers. This method belongs to the most commonly applied interview methods. It enables the researcher to use interview questions as guidance and structure and ensures that the process is sufficiently flexible if topics emerge spontaneously (Clifford, Cope, Gillespie, & French, 2016).

After validating the usefulness and completeness of the derived attributes from Research Phase 1, each research participant assesses the relevance of the attributes by assigning importance scores in Research Phase 2. I then transform these scores into relative weights and derive the weighted average.

Moreover, my research relies on the MAU theory, which aims at evaluating a limited number of decisions with conflicting value drivers. The theory allows the transformation of personal views into numbers. Thus, decision-makers assign scores to the attributes depending on their perceived relative impact on a purchase decision (Jansen, 2011). Based on these opinions transformed into numerical form, I can develop the final decision-making model, the OffIn-MAU Model.

I follow the purposeful sampling strategy and select study participants based on their ability to contribute to the researched phenomenon. I focus on real estate professionals and investment managers who actively conduct investment decisions and have at least four years of experience in the German commercial real estate market. A mix of participants from my personal network, direct approaches and the snowballing technique resulted in a well-diversified set of participants across different focuses and backgrounds. In line with Fusch and Ness (2015), I continue with the interviews until I reach data saturation.

I audio record the interviews and take notes before transcribing them. After finalising each interview, I code it and use memos with the help of NVivo 12 software⁵. This approach enables me to go into detail on specific topics that emerge in earlier interview rounds. Furthermore, the chosen data analysis procedure helps me to define, record and exploit thoughts throughout the research process.

1.7 Validity and Ethical Considerations

Two quality criteria that concern research of all types are data validity and reliability (Cohen et al., 2000). Validity is concerned with the appropriateness of methods and measures and with how generalisable and transferable results are. In this context, internal validity deals with the fact that my findings are not characterised by bias but derive from the actual purpose of my research design. In contrast, external validity refers to the generalisability of my findings (Saunders, Lewis, & Thornhill, 2019).

In order to ensure that my research is valid, I acknowledge the biases resulting from my research design and me as an active researcher and mitigate them where possible. For instance, I decrease respondent bias by cross-checking methods and results with an external expert who does not participate in my study. Furthermore, a research journal helps me to reflect on my views and the potential biases I bring into the research as an active participant.

One bias I do not intend to mitigate but instead actively promote is the bias resulting from the fact that every participant relies on their own interpretation of the attribute terms in Research Phase 2 and when using the OffIn-MAU model. Therefore, instead of providing the participants with my definitions of the attributes, I test and evaluate their personal opinions and my corresponding interpretations.

⁵ NVivo is a commonly used data analysis software which also assists with data management, coding and interpretation (Bazeley & Jackson, 2013).

My research is in line with ethical principles and procedural guidelines defined in the University of Gloucestershire Handbook of Research Ethics:

- informed consent
- deceptive and covert research
- anonymity and confidentiality, and
- general responsibilities, including mutual respect (University of Gloucestershire, 2021).

To ensure informed consent, I provide each participant with an information package, including an overview of my research plan and design. Furthermore, every participant signs an informed consent form to confirm their participation and the possibility of withdrawing their consent at any stage in the research.

Moreover, Creswell (2007) notes the importance of confidentiality and guaranteeing that information is stored safely, accurately and properly backed up. Therefore, I ensure data safety in my study by analysing interview material on only one computer with reliable antivirus and firewall software installed and by regularly creating back-ups to an external storage device.

1.8 Structure of this Thesis

Following Saunders, Lewis and Thornhill (2009), I divide my thesis into a conceptualisation phase, involving the derivation of the research aim and the applied methodology; an implementation phase, including the data gathering and analysis; and a results interpretation and conclusion phase.

This dissertation is structured as follows. Chapter 2 provides an extensive literature overview of the topic and is organised according to the main drivers of my research topic: the increasing popularity of green building certificates, the pricing impact of green building certificates and real estate investment decision making. Chapter 3 presents the chosen ontology, epistemology and research approach and discusses several alternatives before going into detail with the derivation of the OffIn-MAU model. Chapter 4 goes into detail on the research findings of the First Research Phase, consisting of interviews based on which I was able to derive a set of ten attributes that describe real estate investment decisions and discusses the results. Chapter 5 shows and interprets the results of the Second Research Phase, dealing with the respondents' relative preferences of the attributes. Finally, Chapter

6 concludes, presents the limitations of my research, and provides an overview of avenues for future research.

2. Literature Review

2.1 Introduction

This chapter presents the literature review that constitutes the basis of this research. The literature review critically assesses existing literature on the research topic and leads to the revelation of a knowledge gap that my study intends to fill. In other words, the literature review offers the theoretical framework within which my thesis adds value to the state of knowledge and academic research (Tharenou, Donohue, & Cooper, 2007).

2.2 Procedure, Structure and Presentation of Literature Review

Before presenting the details of the literature relevant to my thesis, this section describes the literature review procedure. It also provides an overview of the structure and presentation of the findings.

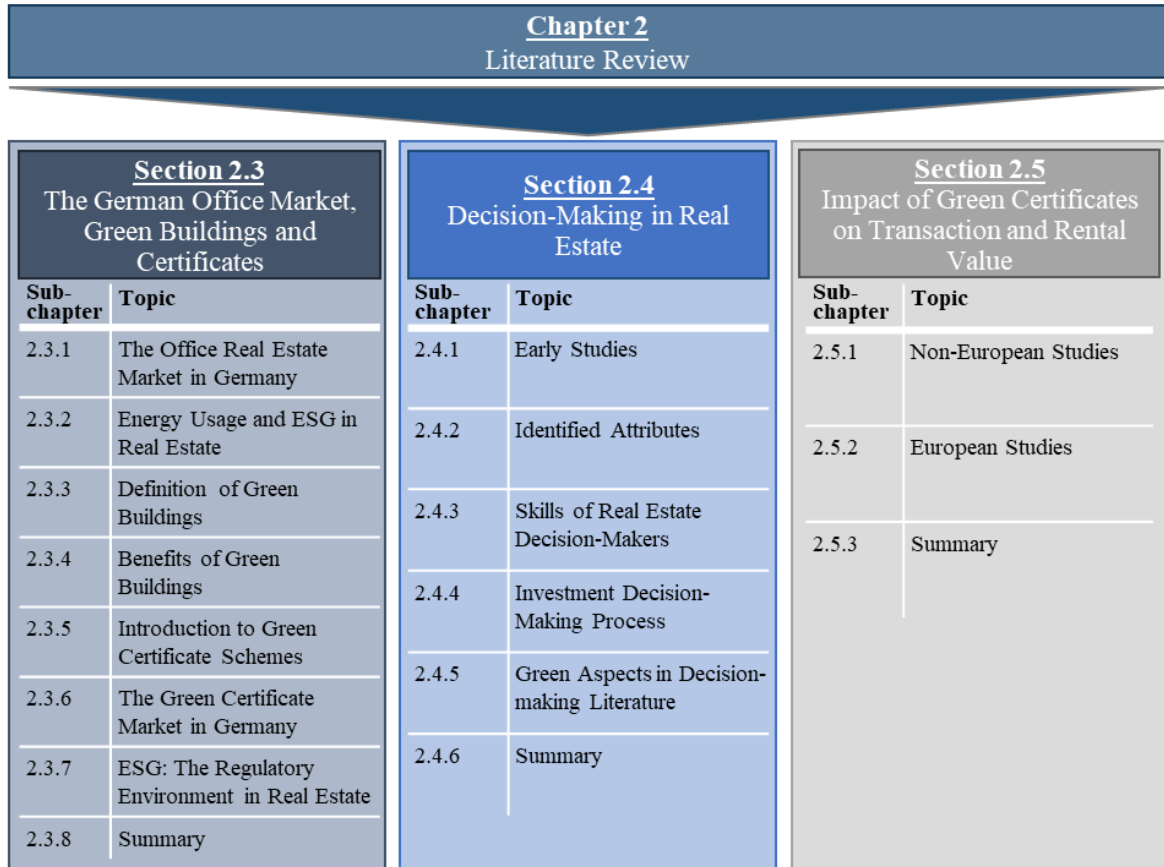
2.2.1 Procedure

Procedurally, I conducted a structured, critical literature review as proposed by Saunders et al. (2019). I started by obtaining an overview of the available sources and information addressing my topic. To do so, I searched for potentially related literature in online databases and, to a lesser extent, in physical libraries. Furthermore, I analysed market reports from known brokers to assess the German real estate market. I then narrowed the research domain to the relevant sources and coded them using NVivo 12, a qualitative data management and analysis programme, to obtain an overview of relevant findings. After gaining further insight into the most relevant sources, I repeated these steps to find complementary literature. I searched for new sources until I felt that I had found and included all relevant literature on my research topic.

In the next step, I summarised key facts about each source and its main findings. I then clustered the literature by related topic and research style to derive an overview of agreement and contradictions among the different papers. I ultimately derived three thematic complexes relevant to my research topic, which I further narrowed into sections in this chapter.

2.2.2 Structure

This literature review distinguishes between three thematic complexes pertaining to decision-making and green certificates in real estate. Figure 3 provides an overview of the topics discussed in this literature review.



Source: Own presentation

Figure 3: Structure of Literature Review

Section 2.3 presents the German real estate market and provides an overview of green buildings and green certificates. In Section 2.4, I discuss the literature on real estate decision-making. As there are various studies on this topic, I distinguish them by the aspect of real estate decision-making on which they focus, or on the study's timing. As the results from Section 2.4 reveal that decision-makers pay great attention to investment returns, Section 2.5 reviews the literature on two main cash flow drivers – transaction price and rental value impacts – and how green certificates influence them. Section 2.6 describes the applicability of international studies to the German market, summarises the findings in the current literature and identifies the gaps in the literature which I address in this thesis. The concluding section derives and presents the research objectives for my study.

2.2.3 Sources and Presentation of Findings

Real estate investment decision-making is a complex topic, and organising the applicable studies is challenging. To provide an optimal overview of the current state of the literature, I present the findings in the three main literature sections differently. I used NVivo 12 to code the literature and extract and organise the main results.

Insofar as the presentation of outcomes is concerned, all three sections are similar in the sense that I reflect on the main findings of the literature and discuss them in the body text. In addition, Section 2.3 – concerning green buildings and the green certificate market in Germany – presents the findings in tables or graphs. Moreover, in Section 2.4, I summarise the main findings of the papers individually in tables. Table 3 shows an example and a legend of the presentation of the findings. The individual table structure and content varies by reference.

Table 3: Exemplary Result Presentation and Legend for Core Papers

Reference							
Country/ region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
Geography focused on in the study	Approach to research	Methodology / method used	Asset class of the properties under investigation	Number and type of participants	Total sample size	Time frame during which research was conducted	Source used
Primary factors analysed							
<ul style="list-style-type: none"> Overview of significant factors/attributes under investigation 							
Most relevant findings/factors							
<ul style="list-style-type: none"> Overview of key findings 							
Other relevant findings							
<ul style="list-style-type: none"> Other relevant findings 							

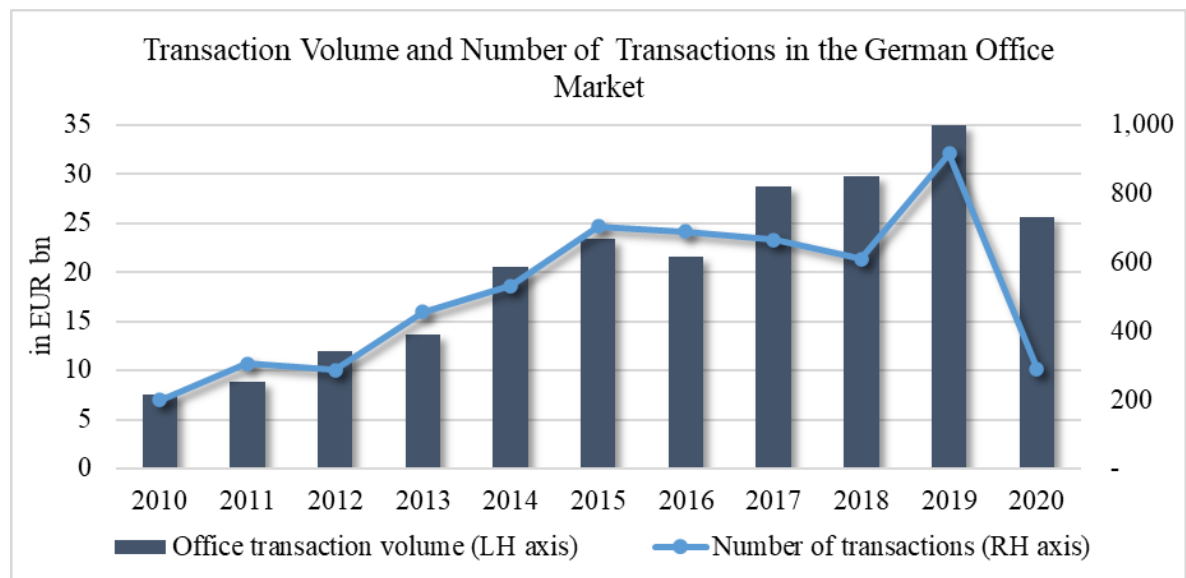
As well as presenting the findings individually and discussing them in the text, I compare the results of studies on the same topics in corresponding tables. In Section 2.5 – concerning the price effects of green certificates – I present the literature in text and comparison tables. This procedure simplifies the understanding of the main findings of the papers since the results of most studies are quantitative. I have ordered the papers' presentations by their publication date (newest to oldest) or the geographical focus of the study (non-European studies followed by studies focusing on Europe).

2.3 The German Office Market, Green Buildings and Certificates

In the context of increased environmental awareness and the importance of the carbon footprint of the real estate industry, green certification systems have become increasingly popular. This section first presents the German office market and then examines the building industry's potential to contribute to global sustainability targets. Next, this section defines green buildings before presenting and comparing the most relevant schemes for this thesis, followed by an overview of Germany's emerging green certification market.

2.3.1 The Office Real Estate Market in Germany

Before delving into the details of green certificates, I will provide a brief overview of the German office real estate market. As illustrated in Figure 4, the total investment volume in the German office market amounted to EUR 35bn in 2019 before decreasing to EUR 26bn in 2020 amid the Covid-19 pandemic. This latter figure equals approximately 60% of the total investment volume across all asset classes in Germany. Total office transactions amounted to roughly 700 and 500 in 2019 and 2020, respectively, according to Real Capital Analytics (RCA, 2021e).



Source: Own presentation based on data from RCA (2021e)

Figure 4: Transaction Volume and Number of Transactions in the German Office Market

Over the last eleven years, more than 2,500 investment firms have been active in the German office investment market (RCA, 2021c). Thierry, Patrick and Olivier (2015) distinguished between real estate for personal use, for property development and the existing real estate

market. This dissertation deals with the latter – a market which "covers professional investors who invest their capital in real estate with the aim of making a profit" (Thierry et al., 2015, p. 1422). These investors are institutional, including corporations, pension funds, insurance companies, and banks.

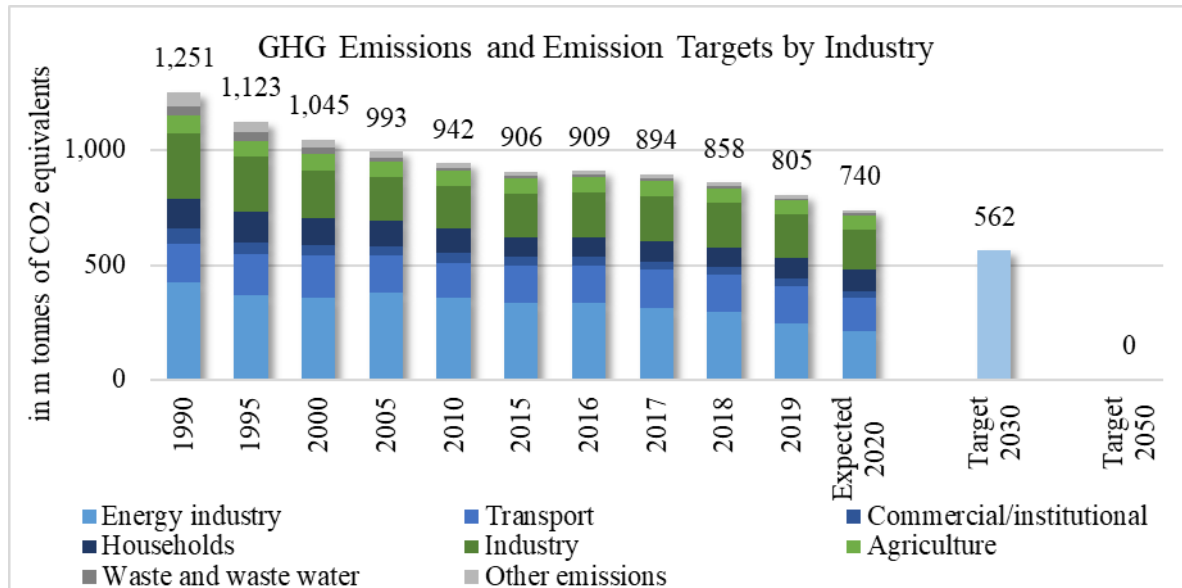
Institutional investors usually invest in real estate via third-party investment managers, who source and manage the transaction (Bailey & Richards, 2017; Waldron, 2018) and are responsible for implementing strategies to generate a specific target return mandated by investors. Thus, investors are the ultimate owners of the property and receive an annual yield net of a fee to the manager in return for management services rendered. The investment manager thus seeks investments suitable for the investor's portfolio parameters and conducts the ultimate investment decision. Alternatively, an investment manager may frequently approach investors with specific opportunities or funds to attract capital for particular transactions that the manager has discovered (Waldron, 2018).

2.3.2 Energy Usage and ESG in Real Estate

Having provided a brief overview of the German office real estate market, in this section I discuss the building industry's effect on carbon dioxide emissions in Germany and the corresponding relevance of sustainability in the sector. Real estate in Germany comprises 35% of total energy usage (Deutsche Energie-Agentur, 2019). In addition, households and the energy industry generated 46% of total carbon dioxide equivalent emissions estimated for 2020. Thus, indirect and direct emissions from real estate are double those from industrial production (German Environment Agency, 2021b) – a sector that is often regarded as the major source of emissions (Catella, 2020).

As illustrated in Figure 5, total GHG emissions in Germany decreased by 41% between 1990 and 2020. In absolute figures, emissions from households and the energy industry dropped from 132 and 427 million tonnes of GHG to 90 and 212 million tonnes, respectively, between 1990 and 2020 expectations (German Environment Agency, 2021b). The next milestones for EU member states are a 40% reduction by 2030 and an 80 to 95% reduction in GHG emissions by 2050, compared to the 1990 level (German Environment Agency, 2019). In September 2020, the European Commission proposed more ambitious targets to decrease GHG emissions by 55% by 2030 and reach GHG neutrality by 2050 (European Commission, 2021a). The German government went one step further, planning to accomplish 65% and 88% decreases in emissions by 2030 and 2040, respectively, and complete GHG neutrality

by 2045 (German Federal Government, 2021). This indicates that the next 30 years will evolve significant changes for the real estate industry.



Source: Own presentation based on data from German Environment Agency (2021a)

Figure 5: GHG Emissions and Emission Targets by Industry

In light of the significant role the real estate industry plays when it comes to reaching climate goals, companies increasingly attempt to introduce ESG-friendly techniques. PwC Germany (2021) divided ESG in real estate into several sub-topics: first, as described above, real estate has the potential to positively contribute to the *climate change* and to the *transition of energy* sources towards renewable sources. Second, the industry could be transformed to become a *circular economy* by intensifying recycling efforts of unused building material. Third, real estate owners increasingly have the opportunity to quantify and track their progress towards reaching their sustainability targets – an *impact valuation*. Fourth, the emergence of green bonds and other *sustainable financing* standards improved the industry’s ability to have a positive impact. Throughout my research I developed the understanding that real estate decisionmakers view certified buildings with green certificates as a sign of the level of ESG-conformity among buildings. ‘ESG’ and ‘sustainability’ are umbrella terms for the degree of *greenness* of a property. I use all of the terms accordingly in this thesis: although I detected a general preference for the term ‘ESG’ in this context throughout my research, I also use ‘sustainability’ to describe the broad topic of sustainability and environmental awareness. In addition, ‘green certificates’ apply to the real estate industry and make the degree of ESG-conformity of a building tangible for a prospective buyer or tenant or me as a researcher.

2.3.3 Definition of Green Buildings

Several researchers have attempted to provide a definition for green buildings. Kibert (2012) proposed that green buildings are constructed in line with sustainable goals and defined them as "Healthy facilities designed and built in a resource-efficient manner, using ecologically based principles" (Kibert, 1994, as cited in Kibert, 2012, p. 8). Yudelson (2008) incorporated social aspects, describing a green building as "a high-performance property that considers and reduces its impact on the environment and human health" (p. 13). According to Jones Day (2019), a "green building is a building that, in its design, construction, or operation, reduces or eliminates negative impacts, and can create positive impacts, on the climate and natural environment" (p. 2). The broader qualities of green buildings relating to sustainability provide features including

- energy and water efficiency
- minimisation of pollution and waste
- consideration of renewable energy usage and recycling
- promotion of indoor and outdoor quality for tenants, including air quality, daylight, proper access
- adaptive design, and
- usage of sustainable material (Jones Day, 2019).

As mentioned before, in this thesis, the terms 'green buildings (as defined above), 'sustainable buildings' and 'certified buildings' are used interchangeably. This is in line with several former studies (Jones Day, 2019; Kibert, 2012; Leskinen, Vimpari, & Junnila, 2020; Runde & Thoyre, 2010; Wong & Zhou, 2015).

2.3.4 Benefits of Green Buildings

Green buildings provide several advantages. For this analysis and in line with the aims of green certificate schemes as described in the remainder of this chapter, I divide the benefits into environmental, economic and social benefits – the three concepts that describe sustainability according to de Francesco and Levy (2008).

Before going into detail with these three groups of advantages on the property level, I would like to briefly discuss the reason for the emergence and popularity of green buildings.

Falkenbach, Lindholm and Schleich (2010) identified three main drivers to adapt green building certificates:

- external drivers, such as the regulatory environment,
- corporate-level drives, such as the company's image and marketing advantages, and
- property-level drivers, such as lower energy usage, as discussed in the following, and higher rental income and transaction prices, as described in Section 2.5.

Andelin, Sarasoja, Ventovuori and Junnila (2015) studied the motives of investors to acquire green certificates. They found that tenant demand, resulting from the tenant's *corporate culture* and *corporate image*, the own company's *corporate culture* and *corporate image* and *marketability* are the main drivers for investments into green buildings. Furthermore, the authors revealed that investors attempt to differentiate from other market players.

Exemplary streams through which green buildings have an environmental effect are less greenhouse gas emissions, less water and resource usage and self-sufficient energy production, leading to a positive ecological footprint and a potential increase in biodiversity. On a global level, the real estate industry is the largest energy-consuming industry, therefore also bearing the most significant potential to save energy and emissions (World Green Building Council, 2020). MacNaughton et al. (2018) estimated energy savings of USD 7.5bn and health improvements from less air pollution of USD 5.8bn resulting from the introduction of LEED's certification scheme for six countries, including Germany. The authors also claimed that 33 megatons of carbon dioxide emissions had been averted since 2000 due to the LEED certification. Despite these improvements, energy used by buildings on a global level has to decrease by a further 30% in order to reach the goal of limiting the global temperature level to 2% compared to pre-industrial levels (UNEP, 2018).

Kats et al. (2003) evaluated the impact of green certificates at the building level. They concluded that green buildings saved an average of 30% of energy compared to conventional buildings. Table 4 shows the energy efficiency, which varied by certification level. In addition, certified buildings required lower electricity and were more likely to produce energy on-site. In a later report about 170 buildings in the USA, Kats (2010) discovered that the average energy saving rate was 34% resulting from "efficient systems, including a ground heat pump, daylight, a highly insulating envelope, zones heating and cooling, and on-site photovoltaic panels" (Kats, 2010, p. 15). For Australia, Green Star certified buildings produced up to 62% less CO₂ emissions, used 66% less electricity and required 51% less

potable water than average Australian buildings (Green Building Council of Australia, 2013).

Table 4: Energy Savings from Green Buildings

	Certified	Silver	Gold	Platinum	Average
Total GHG emissions in metric tonnes per square foot	0.009	0.007	0.006	0.004	0.0065
Energy savings compared to conventional buildings by level of LEED-certification	18%	30%	37%	n/a	28%

Source: Own presentation based on Kats et al. (2003) and Pyke (2019)

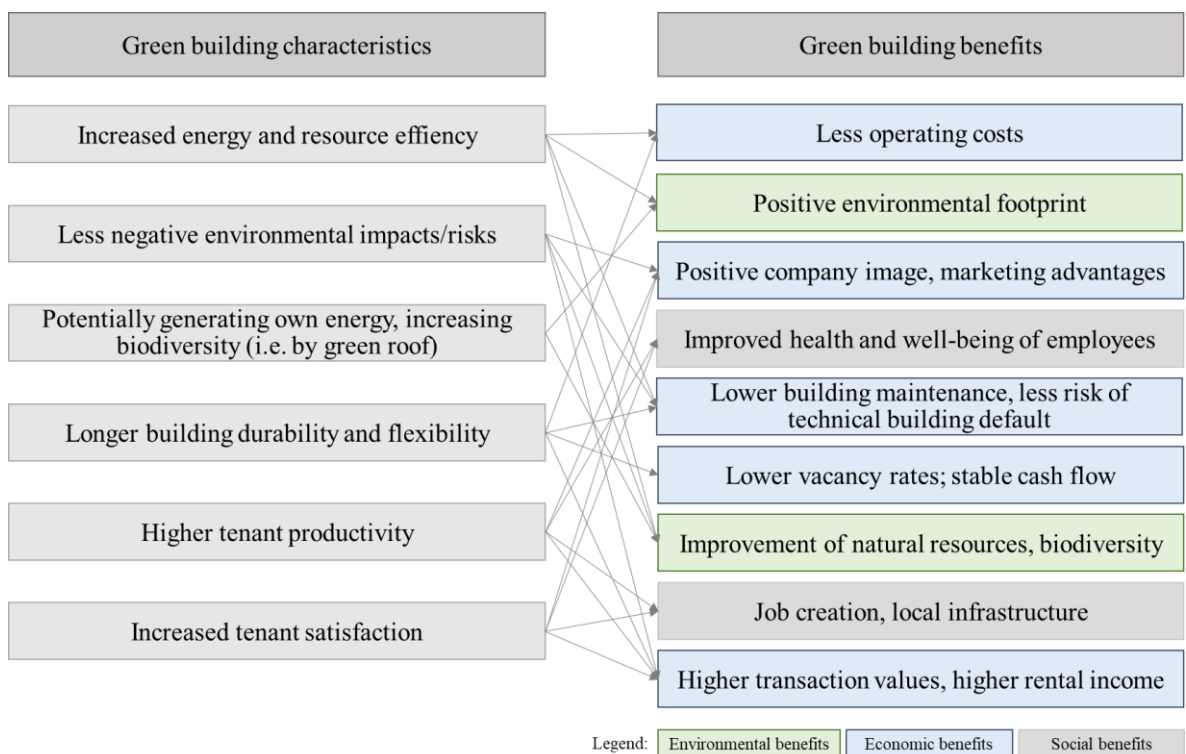
Apart from the environmental benefits of green building addressed above, there are economic benefits that are directly connected to the first. For instance, with less energy consumption, tenants pay less for utility costs. Other examples of economic benefits are decreased construction costs, more employment opportunities, higher occupancy and higher transaction values. A European Commission (2015) study indicated that economic benefits resulting from energy savings could amount to EUR 280bn to EUR 410bn per year, with 1.7 to 2.5 million jobs potentially created. In addition, Fowler et al. (2010) surveyed tenants from 22 mostly LEED or Energy Star-rated properties and estimated operational cost and maintenance cost to be 19% and 12% lower for green buildings, respectively.

Furthermore, Dodge Data & Analytics (2018) conducted a relatively recent global study and surveyed more than 2,000 real estate professionals. The results showed that new sustainable buildings (which by survey design did not necessarily have a green certification) saved 8% and 14% of operating costs by year one and five, respectively, due to energy savings. Retrofitted buildings saved 9% and 13% of operating costs over the same time frames. In general, the expenses for retrofitting an existing property to a green standard exceeded the costs of building a new, green property, *ceteris paribus*, as green standards can be incorporated in the planning process of the latter properties beforehand (Fondsmedia, 2010, p. 5).

The third category is social benefits. Several studies have been concerned with different levels of social impacts, such as employee satisfaction or efficiency. For example, Kats et al. (2003) found that the number of sick days decreased while worker productivity increased in a green environment. Furthermore, Miller and Pogue (2009) analysed social impacts for employees working in 154 LEED-certified buildings. Their results also suggested that the improved work environment resulted in higher employee productivity, less sick time, a better public image, and more employee satisfaction. Fowler et al. (2010) estimated occupant

satisfaction to be 27% higher in green buildings. Medical studies, such as that from Allen et al. (2016), found cognitive scores which were 61% and 101% higher after people had spent one and two working days in a green building environment, respectively. In addition, the American Academy of Sleep Medicine (2013) noted that employees who had offices with windows sleep 46 minutes longer every night.

Figure 6 shows the connection between green building characteristics and corresponding financial and non-financial benefits, distinguished into environmental, social and economic benefits.



Source: Own presentation based on Lützkendorf and Lorenz (2005)

Figure 6: Green Buildings Characteristics and Benefits

2.3.5 Introduction to Green Schemes

The main idea behind certification schemes is to increase the sustainability-related comparability between properties, thereby enhancing transparency for stakeholders such as building investors and tenants (Reed et al., 2011). Certification systems support households and companies in their decision-making by implementing market signals; thus, they contribute to making the real estate market more efficient. Nonetheless, there is no global or European benchmark, and more than 50 different certification schemes exist (Bienert, 2016).

Most countries have created their own green certification systems with different focuses, complicating direct comparison of the schemes (Nelson, Rakau, & Dörrenberg, 2010).

Table 5 provides an overview of the most popular European, North American and Australian voluntary certification schemes.

Table 5: Overview of Global Certification Schemes

Europe	Germany	DGNB	2009
	United Kingdom	BREEAM	1990
	France	HQE	2005
	Italy	Protocollo ITACA	1996
	Netherlands	BREEAM Netherlands	2010
	Switzerland	Minergie	2008
	Spain	VERDE	2009
North America	USA	LEED	1998
	USA	Energy Star	1995
	Canada	LEED Canada	2002
Oceania	Australia	Green Star	2003
	New Zealand	Green Star NZ	2007

Source: Own presentation based on data from Wilkinson, Sayce and Christensen (2015)

In Rademaekers' (2014) study on behalf of the European Commission, he identified the Building Research Establishment Environmental Assessment Method (BREEAM, originating in the UK), the Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB, originating in Germany) and the Leadership in Energy and Environmental Design (LEED, originating in the US) as some of the leading voluntary certification schemes for commercial buildings for the EU. The first international certification system was BREEAM, launched in 1990. BREEAM is still the most widely used certification system in Europe, with over 81% of commercial certifications registered under it (European Commission, 2020). In comparison, DGNB is relatively new, but it is the most sophisticated and complex green certification scheme (Nelson et al., 2010).

DGNB has the largest market share in Germany, with approximately 1,180 certificates in 2018, followed by LEED and BREEAM with circa 320 and 300 certificates, respectively

(BNP Paribas Real Estate, 2021c). Table 6 shows the key characteristics of the most relevant schemes in the German market.

Table 6: Comparison of DGNB, LEED and BREEAM

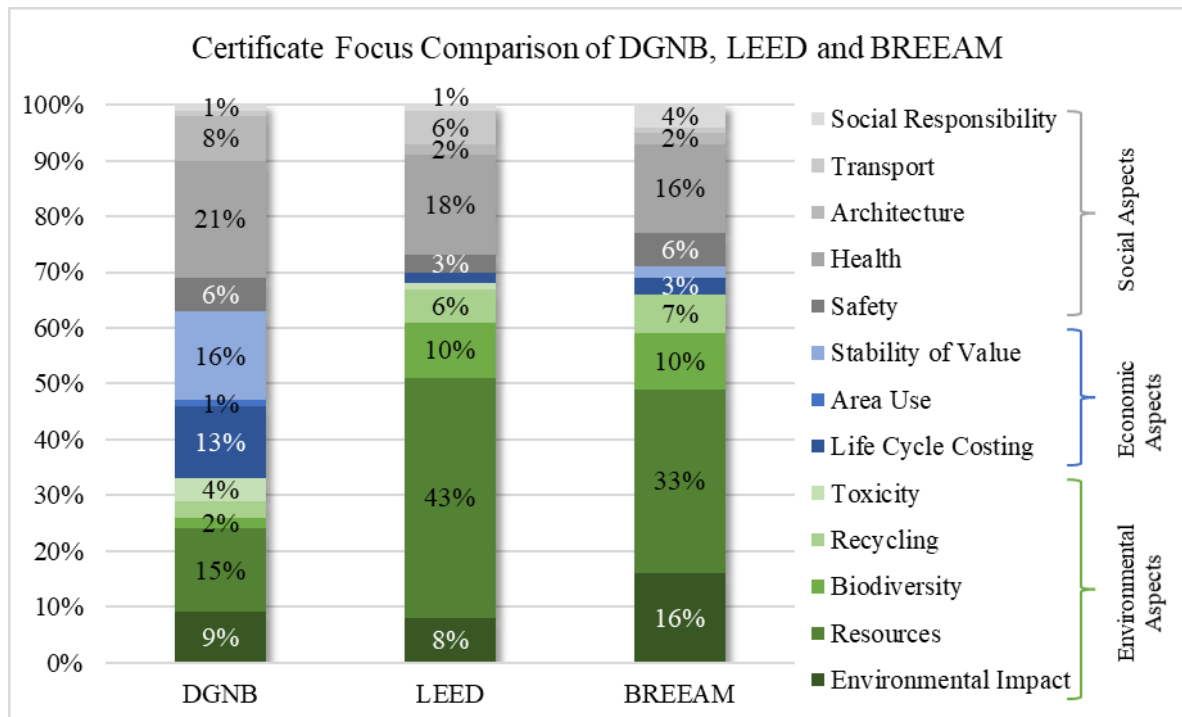
Certification scheme	DGNB	LEED	BREEAM
Name	Deutsche Gesellschaft für nachhaltiges Bauen	Leadership in Energy & Environmental Design	Building Research Establishment Environmental Assessment Method
Country of origin	Germany	USA	UK
Launch date	2009	1998	1990
Most recent version	2018	2019	2019
Governance	German Sustainable Building Council	US Green Building Council	Building Research Establishment
Main categories	Environmental quality Economic quality Sociocultural and functional quality Technical quality Process quality and site quality	Indoor environmental quality Energy & atmosphere Location & transportation Water efficiency Materials & resources Sustainable sites Regional priority Innovation	Management Health & well-being Energy Transport Water Material Waste Land use & ecology Pollution Innovation
Rating approach	Pre-weighted categories	Additive credits	Pre-weighted categories
Rating levels	Bronze ($\geq 35\%$) Silver ($\geq 50\%$) Gold ($\geq 65\%$) Platinum ($\geq 80\%$)	Certified (40 – 49 points) Silver (50 – 59 points) Gold (60 – 79 points) Platinum (> 79 points)	Pass ($\geq 30\%$) Good ($\geq 45\%$) Very Good ($\geq 55\%$) Excellent ($\geq 70\%$) Outstanding ($\geq 85\%$)
Number of certified buildings	Approx. 6,000 in 30 countries	Approx. 70,000 in 167 countries	Approx. 572,500 in 86 countries

Source: Own presentation based on data from Jensen and Birgisdottir (2018); DGNB (2020); USGBC (2020) and BREEAM (2020)

Although the systems aim at certifying the sustainability of a building, the focus regarding certification standards varies significantly between the different schemes. For instance, LEED and DGNB concentrate primarily on new constructions, while BREEAM puts emphasis on existing properties (BNP Paribas Real Estate, 2021c). When comparing the schemes' certification focuses across the three main aspects identified in Section 2.3.4 (environmental, economic, and social), as illustrated in Figure 7, DGNB stands out as the scheme with the most equal distribution.

While resource usage, including water and energy consumption, accounts for more than a third of the rating for LEED and BREEAM, the focus for DGNB lies in minimising costs over the building's lifetime and in value stability. The rating proportion of health

qualification standards such as air quality, acoustic isolation and daylight is 15 to 21% for all schemes, signalling the increasing relevance of social sustainability for a green property. All rating schemes regularly develop new sets of criteria, showing the need and interest to quickly adapt to a changing sustainable environment (Jensen & Birgisdottir, 2018).

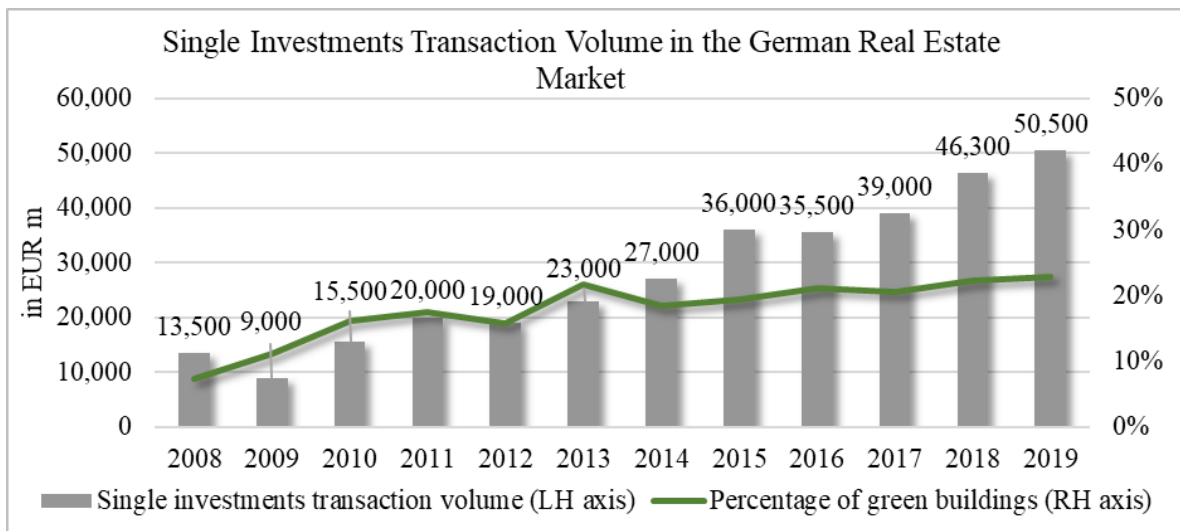


Source: Own presentation based on data from Jensen and Birgisdottir (2018)

Figure 7: Certificate Focus Comparison of DGNB, LEED and BREEAM

2.3.6 The Green Certificate Market in Germany

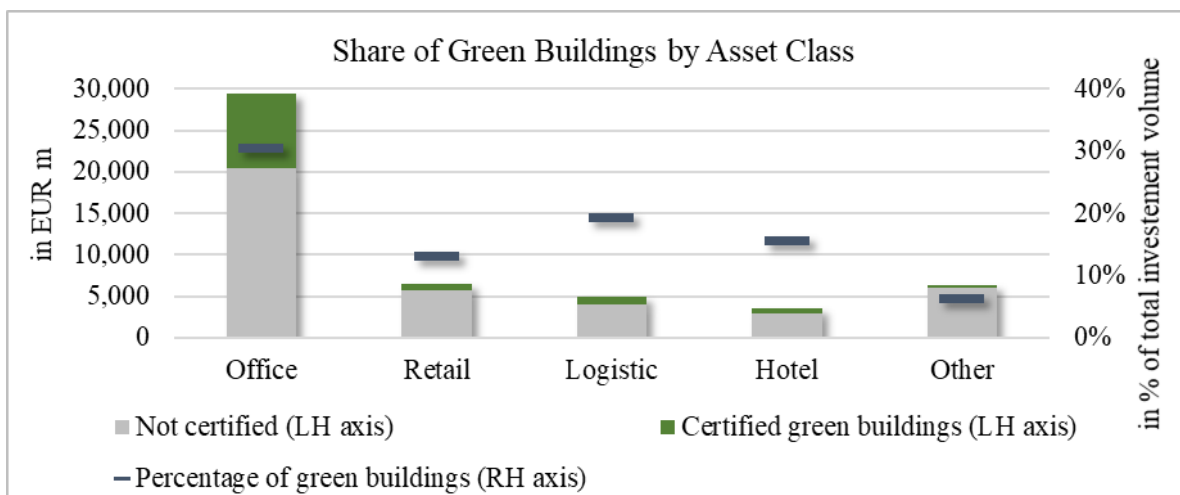
In Germany, the total transaction volume across all asset classes in real estate has increased continually in the last decade. The year 2018 was the first year with a total transaction volume in green buildings of more than EUR 10bn, constituting 22% of total investments into single assets. In 2019, this volume was exceeded both on an absolute and a relative basis, resulting in a market share of certified properties of 23% with a total single asset investment volume of more than EUR 50bn. Figure 8 shows the development of individual transaction volumes in Germany, as well as the proportion of green buildings. However, the graph does not include commercial portfolio transactions, which amounted to approximately EUR 22bn and EUR 21bn in 2019 and 2020, respectively (BNP Paribas Real Estate, 2021a).



Source: Own presentation based on BNP Paribas Real Estate (2021c)

Figure 8: Single Investments Transaction Volume in the German Real Estate Market

Certifications were predominantly issued for large office buildings, as 78% of green transactions in 2019 concerned the office asset class. Thus, the office asset class is the most relevant for green investments in Germany, followed by logistic and retail properties, which contributed 8% and 7% to the total green transaction volume in 2019, respectively. In the office asset class, almost a third of all investments were green buildings. For other asset classes, only 5 to 19% of the transactions were green. Figure 9 illustrates the investment volume by asset class in 2019 (BNP Paribas Real Estate, 2021c).



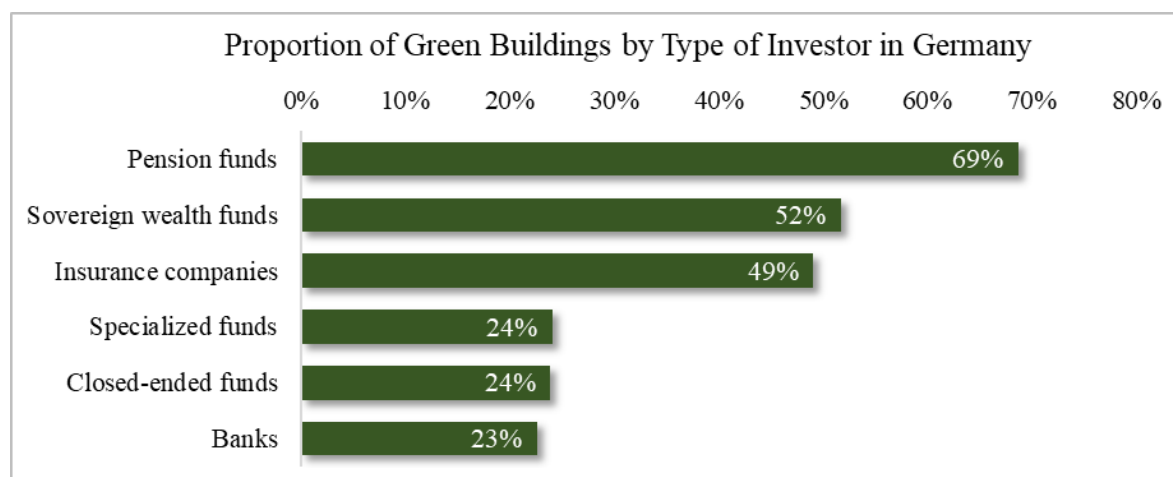
Source: Own presentation based on BNP Paribas Real Estate (2021c)

Figure 9: Share of Green Buildings by Asset Class

A total of 71% of all properties sold in 2019 were located in Top-7 cities, while 84% of all green transactions took place in these locations. Thus, the most popular German cities for real estate are especially relevant for green transactions. Only 16% of green transactions were conducted in smaller German cities. The average volume for green real estate office

investments amounted to EUR 155m between 2015 and 2019 – a figure which was partly affected by some green deals with very large properties in Top-7 cities (BNP Paribas Real Estate, 2021c). In 2018, 92% of certified buildings had a transaction volume of more than EUR 100m (BNP Paribas Real Estate, 2020a). Two examples of popular green transactions in 2019 are the Edge East Side (LEED-certified) in Berlin and the KITE (DGNB-certified) in Cologne (BNP Paribas Real Estate, 2021c). With 65% of certified properties being newly built, most investors certify their properties during construction (BNP Paribas Real Estate, 2020a).

Figure 10 plots the proportion of green buildings by investor type in 2018. Investors focusing on equity investments in core areas, such as pension funds or sovereign wealth funds, show the highest number of green buildings as a percentage of their total assets. Insurance companies and banks are also among the investors for whom sustainability and long-term stability in risk-return profile are essential, and who correspondingly have a larger stake in green buildings. In addition, some investors have pre-defined ESG objectives that permit investments in sustainable assets only (BNP Paribas Real Estate, 2021c).

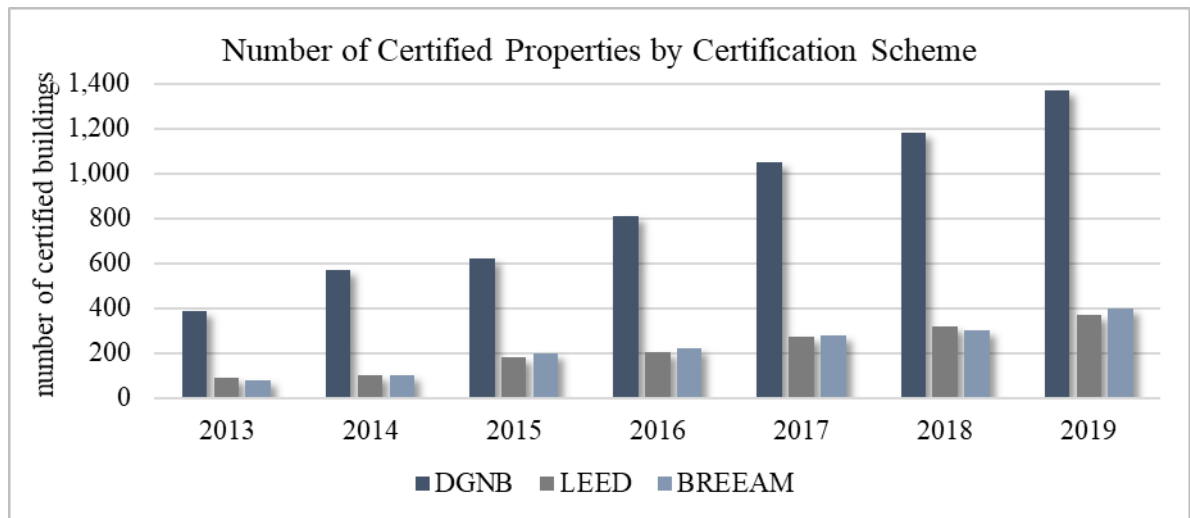


Source: Own presentation based on BNP Paribas Real Estate (2021c)

Figure 10: Proportion of Green Buildings by Type of Investor in Germany

Moreover, Figure 11 illustrates the development of certified properties in Germany by market share of the most popular certification schemes. In line with the rising investment volume depicted in Figure 8, the total number of certified properties has increased from 550 buildings in 2013 to 2,100 in 2019. While the proportion of LEED and BREEAM has caught up to DGNB between 2013 and 2016, the market share of DGNB has increased further since 2017. DGNB is the undisputed market leader in the German green certificate market, with a total proportion of DGNB certificates among new and existing buildings of 64%. In the new

construction business, DGNB has a powerful position and a market share of 80%. The shares of LEED and BREEAM in the German market are relatively equal, with between 370 and 400 certified properties in Germany (BNP Paribas Real Estate, 2020a, 2021c).



Source: Own presentation based on BNP Paribas Real Estate (2021c)

Figure 11: Number of Certified Properties by Certification Scheme

2.3.7 ESG: The Regulatory Environment in Real Estate

Several new regulations to enforce sustainable goals across all industries guided the increased acceptance and usage of green certificates. In this section, I provide an overview of the most relevant policies for the real estate industry. The Paris Agreement was signed in 2015 by 189 countries and constituted a significant milestone to reach a more sustainable world. The agreement came into force in November 2016. It aimed to limit the increase in global temperature to 2 degrees Celsius higher than pre-industrial levels by reducing greenhouse gas emissions globally (European Commission, 2021b) and reaching carbon neutrality by 2050 (European Commission TEG, 2020b).

In light of the increased attention paid to ESG factors, the EU introduced the Action Plan for Financing Sustainable Growth in March 2018 (European Commission, 2018a). The Action Plan included several regulatory requirements that would enhance the sustainability of market players, including banks, insurance companies and investment funds investing in real estate. A major aim included establishing a binding sustainability standard and enforced publication requirements (Lang, 2020).

As part of the Action Plan, the EU introduced the EU Taxonomy, the final report published in March 2020 (European Commission TEG, 2020b). The EU Taxonomy aimed to introduce

a uniform classification standard for sustainable practices in the EU, thereby increasing investor's access to sustainable investments and supporting investors with environmentally-friendly investment decisions. The Technical Expert Group (TEG) from the European Commission proposed that sustainable projects can only be labelled accordingly if they promote one of the following environmental objectives without contradicting another:

- climate change mitigation
- climate change adaptation
- sustainable use and protection of water and marine resources
- transition to a circular economy
- waste prevention and recycling
- pollution prevention and control, and
- protection of healthy ecosystems (European Commission, 2018b, p. 14; European Commission TEG, 2020b, p. 43).

As a result of the Taxonomy regulation, market participants active in the financial market have to advise their customers about the degree of sustainability of their investments in advance. Participants in financial markets are obliged to disclose climate change mitigation activities and activities concerning their sustainability activities from 2021 and 2022 onwards, respectively (European Commission TEG, 2020b). Supplements to the EU Taxonomy include enhanced disclosure regulations (European Commission, 2019a) and benchmark regulations (European Commission, 2019b), as well as the EU Ecolabel – the introduction of a sustainable label for financial products, similar to that used for consumer goods (Lang, 2020).

Thus, market participants will be affected across all markets by increased regulations. From the investor's point of view, these regulations imply that due diligence has to specifically deal with sustainability aspects concerning the whole property life cycle (Lang, 2020). The EU regulations lead to an even higher awareness of sustainability in real estate. In addition, EU Taxonomy allows the use of existing certifications and other tools to “ensure a high degree of compatibility” (European Commission TEG, 2020a, p. 12) for the Taxonomy assessment of firms. The fact that firms are allowed to use green certificates as proxies for their environmental efforts is likely to increase the demand for green certificates further.

2.3.8 Summary: The German Office Market, Green Buildings and Certificates

Section 2.3 provided an overview of the German office market and introduced the concept and benefits of green certificates and related schemes. Market reports showed the size and volumes invested into the German office market, contributing approximately 60% of the total investment volume spent into the German real estate market (RCA, 2021e).

Moreover, this section revealed insights into the purpose of green certificates and the differences between the most prevalent certification schemes, with DGNB being the most dominant provider in Germany. The volume invested in certified properties increased annually and reached 22.6% of the total investment volume in 2019 – most of which was invested in the office asset class (BNP Paribas Real Estate, 2021c). An increasing number of regulatory requirements imposed by the EU, such as the EU Taxonomy, further underlines and encourages the growing relevance of green certificates in real estate. All in all, the findings from Section 2.3 indicate that green certificates are becoming increasingly prevalent in the real estate environment in Germany.

2.4 Decision-Making in Real Estate

For a long time, sustainability was not a high priority for decision-makers. As mentioned before, my research addresses the attributes affecting real estate decisions and their relative importance. To reach my research aim, it is useful to understand the attributes former researchers have identified, as well as the circumstances under which decision-makers reach decisions and the tools they use.

Section 2.4 deals with a literature review about decision-making in real estate. I distinguish between early studies, identified factors surrounding a real estate decision, the skills of real estate decision-makers, the process of decision-making and green aspects in decision-making.

2.4.1 Early Studies

There is a range of literature dating back to the 1970s about investment decisions in real estate. Many researchers have concentrated on traditional theories in finance to reveal the circumstances under which investment decisions were conducted in various fields. Data

gathering in these studies has focused almost exclusively on mail surveys with a pre-defined set of answer options. Thus, respondents were not able to ask clarifying questions or add other aspects they considered necessary.

Wiley (1976) was the first to carry out a survey about the decision-making process in real estate investing. He performed a study with 159 real estate investment trusts (REITs), insurance firms and real estate companies about the circumstances under which they conducted real estate decisions. His findings indicated that 91% of the participants used return analysis measures, with a majority relying on cash flow projections. Furthermore, 67% conducted risk measurement by adjusting the required return upwards or the expected future cash flows downwards. Considering that the study took place in the early to mid-70s, it is not surprising that only 27% of respondents used computers for investment analysis purposes. The results also suggested that there were generally no significant differences in decision-making between different types of real estate investors.

Wiley's (1976) study resulted in some interesting findings regarding real estate investment decisions. It provided useful insight into return and risk measurements and was the first study dealing with real estate decision-making. However, Wiley's (1976) study was not concerned with the attributes and factors impacting real estate decisions but rather with techniques and setting of the decision itself. Furthermore, the paper was published more than 40 years ago, at a time when computers were only emerging and there were no environmental considerations on the agenda. Moreover, the chosen methodology resulted in an understanding of what aspects are relatively more important than others, but prohibited the respondents from providing any more profound insights into decision-making practices that the pre-defined set of answers did not account for.

Table 7: Summary of Wiley (1976)

Wiley (1976)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
USA & Canada	Quantitative	Survey (mail)	Cross asset class	72 life insurance, 49 REITs, 38 real estate firms	159 surveys	Early 70s	Survey
Primary decision-impacting factors analysed							
Aspects surrounding decision-making <ul style="list-style-type: none"> • Size and type of real estate portfolios • Before-tax investment return measures • After-tax investment return measures • Risk adjustment techniques • Computer usage • Planning horizons 							

Most relevant findings/factors
<ul style="list-style-type: none"> • Before-tax investment return measures <ul style="list-style-type: none"> ○ Cash flow analysis (58%) ○ Net income/initial equity (36%) ○ Investment yield (32%) • After-tax investment return measures <ul style="list-style-type: none"> ○ None (46%) ○ Cash flow analysis (25%) • Risk adjustment techniques <ul style="list-style-type: none"> ○ Adjust benefits downwards or required return upwards (67%) • Computer usage <ul style="list-style-type: none"> ○ 43% of larger investors use computers for investment analyses, but only 14% of smaller investors
Other relevant findings
<ul style="list-style-type: none"> • Only 10% used purchase price as the basis for calculations, most used the initial equity investment • One-third of life insurance companies relied on after-tax return measures • The majority of REITs used only before-tax return measures • The most common form of measuring risk and return was a discounted cash flow model, which was more popular than gross and net income measures • While 69% of REITs used cash flow return figures, only 54% of insurance companies relied on this figure • 40% of insurance companies used investment yields, while only 27% of REITs did so • More than 20% of investors did not explicitly account for uncertainty • Computers were most often used for rate-of-return analyses, forecasting and simulating • Most participants (32%) planned to hold properties for ten years

Page (1983) surveyed 101 REITs, insurance companies and real estate firms intending to update and extend Wiley's (1976) study from seven years earlier. His results showed that 95% of respondents used before-tax decision-making criteria, with the internal rate of return (IRR) (57%) and the overall capitalisation rate (45%) – classified as a rule of thumb – as the most relevant impacting factors. Risk-adjustment techniques remained similar to those discovered in the earlier study. The author noted the lower popularity of static return measures, such as the equity dividend rate, compared to the 1976 survey and concluded that the increasing inflation raised the need for measures that account for the time value of money, such as the IRR. A rather unsurprising change was the increased use of computer technology, with more than 80% relying on technology to assess the return and cash flows of the investments.

While Page's (1983) study was helpful in analysing the changes in investment decision settings and techniques used between the mid-70s and the early 80s, it demonstrated the same flaws earlier studies had. The different research settings regarding time and geography do not allow to transfer the researcher's findings to my research. Furthermore, although Page (1983) extended the work from Wiley (1976), both studies had a relatively narrow focus with their survey questions, only aiming at the comprehension of return and risk measures as well as IT uses and holding periods. All other relevant factors, e.g. property-specific considerations, were disregarded.

Table 8: Summary of Page (1983)

Page (1983)							
Country/ region	Research Approach	Metho- dology	Asset class	Participants	Sample size	Time frame	Data Source
USA	Quanti- tative	Survey (mail)	Cross asset class	72 life insurance, 49 REITs, 38 RE corporations	159 surveys	Mid-1970s	Survey
Primary decision-impacting factors analysed							
Aspects surrounding decision-making <ul style="list-style-type: none"> • Size and type of real estate portfolios • Before-tax investment return measures • After-tax investment return measures • Ratio analysis • Risk adjustment techniques • Computer usage • Planning horizons • Changes in investment interests after the Economic Recovery Tax Act 							
Most relevant findings/factors							
<ul style="list-style-type: none"> • Before-tax investment return measures <ul style="list-style-type: none"> ○ Discounted cash flow: IRR (57%) ○ Rule of Thumb: Overall capitalisation rate (45%) • After-tax investment return measures <ul style="list-style-type: none"> ○ Discounted cash flow: IRR (50%) ○ None (26%) • Ratio analysis <ul style="list-style-type: none"> ○ Debt coverage (44%) ○ Return on equity (31%) • Risk adjustment techniques <ul style="list-style-type: none"> ○ Adjust benefits downwards or required return upwards (69%) • Computer usage <ul style="list-style-type: none"> ○ 43% of larger investors use computers for investment analyses, but only 14% of smaller investors 							
Other relevant findings							
<ul style="list-style-type: none"> • 70% of respondents conducted ratio analysis for decision-making • The IRR was the most relevant figure for return analysis and had experienced a significant increase in popularity compared to earlier studies • Most investors used more than one technique to assess their investments' return • 70% of the participants used ratio analysis for risk management • For ratio analysis, leverage ratios were more popular than profitability ratios • Risk adjustments remained relatively similar to earlier studies, but sensitivity analysis had increased in popularity 							

Farragher (1982) performed a similar survey with 148 US firms, including real estate developers, focusing on return measures and risk adjustment techniques. Like Page (1983), the author found that the IRR method was most widely used for assessing after-tax returns. Nonetheless, he indicated that in comparison to Fortune 500 firms, many real estate investors did not use the quantitative tools available to them.

The three studies from Wiley (1976), Farragher (1982) and Page (1983) posed fairly similar questions in similar settings. Farragher's (1982) work focused on return measures and the risk assessments real estate decision-makers used when conducting decisions, but

disregarded any attributes and effects leading to the real estate decision itself. In addition, the surveys showed that sustainability was not relevant for real estate decision-makers at that time. Nonetheless, these studies provide valuable insight into the beginnings of academic research on real estate decision-making.

Table 9: Summary of Farragher (1982)

Farragher (1982)							
Country/ region	Research Approach	Metho- dology	Asset class	Participants	Sample size	Time frame	Data Source
USA	Quantitative	Survey (mail)	Cross asset class	66 life insurance, 26 REITs, 12 pension fund advisors, 20 private real estate developers	148 firms	Early 1980s	Survey
Primary decision-impacting factors analysed							
Aspects surrounding decision-making							
<ul style="list-style-type: none"> • Before-tax investment return measures • After-tax investment return measures • Risk adjustment techniques 							
Most relevant findings/factors							
<ul style="list-style-type: none"> • Before-tax investment return measures <ul style="list-style-type: none"> ○ Equity dividend rate (61%) ○ Discounted cash flow: IRR (57%) • After-tax investment return measures <ul style="list-style-type: none"> ○ Cash flow over required equity (45%) ○ Cash-on-cash (39%) • Risk adjustment techniques <ul style="list-style-type: none"> ○ Adjust benefits downwards (38%) or required return upwards (25%) 							
Other relevant findings							
<ul style="list-style-type: none"> • Did not survey portfolio sizes and computer usages • 26% reported the use of sensitivity analysis as a risk adjustment technique 							

Webb (1984) built on the findings from Wiley (1976), Farragher (1982) and Page (1983) and extended their survey by accounting for mortgages and diversification strategies. Webb's (1984) survey concentrated on life insurance companies and pension funds. In a parallel work published shortly afterwards, Webb and McIntosh (1986) conducted the same survey for REITs. Apart from that, the two studies were similar, which is why I have consolidated them in Table 10.

The participants were not selected by a particular asset class, although the majority had equity positions in office buildings. Some interesting findings indicated significant differences between investor types. For instance, while 40% of the insurance companies did not attempt to diversify systematically, most pension managers and REITs diversified their portfolios by geography. More than half of the pension managers did not rely on any form of after-tax measure – twice the percentage for REITs and insurance companies. While 24%

of insurance companies did not use risk adjustment techniques, this was the case for only 15 and 6% of REITs and pension funds, respectively.

Interestingly, the results did not differ this much among the investor groups in Wiley's (1976) study. Both studies from Webb (1984) and Webb and McIntosh (1986) found that cash flow and net income were more relevant than IRR, which was in contrast to earlier findings from Farragher (1982) and Page (1983). Webb (1984) noted the significance of mortgages for pension funds and life insurance companies. His findings indicated that mortgage holdings were especially popular for office buildings for these companies, while REITs primarily used mortgages for apartment purchases (Webb & McIntosh, 1986). Table 10 presents the findings of the studies. Both studies attempted to remedy the perceived flaws of previous studies but concentrated on the 1970s and 1980s. Thus, it is questionable how transferable the findings are today.

Table 10: Summary of Webb (1984); Webb and McIntosh (1986)

1) Webb (1984) 2) Webb and McIntosh (1986)							
Country/ region	Research Approach	Metho- dology	Asset class	Participants	Sample size	Time frame	Data Source
USA	Quanti- tative	Survey (mail)	Cross asset class	1) 252 life insurance companies (LI), 25 pension fund managers (PF) 2) 47 REITs	1) 277 firms 2) 47 firms	Mid- 1980s	Survey
Primary decision-impacting factors analysed							
Aspects surrounding decision-making <ul style="list-style-type: none"> • Size and type of real estate portfolios • Diversification strategy • Before-tax investment return measures • After-tax investment return measures • Risk adjustment techniques • Computer usage • Planning horizons • Mortgage holdings and construction loans 							
Most relevant findings/factors							
<ul style="list-style-type: none"> • Diversification strategy <ul style="list-style-type: none"> ○ Diversify by varying location (65% for REITs, 94% for PFs, 56% for LIs) ○ Diversify by asset class (47% for REITs, 88% for PFs, 56% for LIs) • Before-tax investment return measures <ul style="list-style-type: none"> ○ Cash flow over initial equity (80% for REITs, 65% for PFs, 59% for LIs) ○ Net income over initial equity (55% for REITs, 65% for PFs, 60% for LIs) • After-tax investment return measures <ul style="list-style-type: none"> ○ Cash-on-cash (53% for REITs, 35% for PFs, 51% for LIs) ○ Discounted cash flow: IRR (26% for REITs, 41% for PFs, 56% for LIs) ○ None (19% for REITs, 53% for PFs, 25% for LIs) • Risk adjustment techniques <ul style="list-style-type: none"> ○ Adjust benefits downwards (40-45%) or required return upwards (71-77%) • Computer usage <ul style="list-style-type: none"> ○ 49% and 38% of REITs and LIs and PFs, respectively, use computers to compute return rates • Mortgage holdings 							

<ul style="list-style-type: none"> ○ LIs & PFs: 66-69% for office buildings, 13-29% for residential property; REITs: 27% for office buildings, 53% for residential property
Other relevant findings <ul style="list-style-type: none"> • The majority of companies had equity stakes in office properties • 44% of life insurance and 30% of REIT companies did not systematically diversify their portfolio, while only 6% of PFs did not diversify • More than half of pension funds did not conduct any after-tax return measures • Only 15% of PFs and LIs and 21% of REITs did not systematically adjust for risk • 50% of REITs and 62% of PFs and LIs did not use computers at all • For mortgage holdings, shopping centres and land followed apartments and office buildings by popularity • Many REITs, PFs and LIs did not diversify their mortgage exposures

Table 11 provides an overview of the determinants under investigation as well as the key findings from the five studies examined up to this point. For each factor, I depicted the most significant approach in the boxes with the percentage of the participants in brackets. For instance, 64% of participants in Webb and McIntosh's (1986) study diversified their portfolio by geography. Key academic literature about the beginnings of real estate decision-making is useful in deriving the relevant determinants and assessing how the practice has changed. In general, the studies show an increased use of sophisticated return measures among real estate investors. Compared with other types of investors, REITs seem slow to implement modern techniques. The rare use of computers was period-specific; a time when computers had only just started to become popular.

All of the studies applied a rather positivist approach to research. Their methodology was similar in that they distributed mail surveys and weighed the results. This method is more efficient than conducting the interviews face-to-face and avoids being biased by the physical presence of the interviewer. However, this approach leads to a response bias (Farragher & Kleiman, 1995). Consequently, the studies had relatively low response rates (e.g. Webb's [1984] study showed a 25 to 29% response rate), with replies primarily from sophisticated investors.

Furthermore, the physical presence of the interviewer allows for the clarification and adjustment of questions, if necessary (De Wit, 1996). As all of the studies used more or less the same questionnaire, they likely missed aspects in real estate decision-making by not allowing the respondents to add to or amend their answers. Instead, I rely on semi-structured interviews to explore decision-making and derive the attributes participants considered important to their investment decisions. Therefore, I develop the set of attributes through an in-depth analysis of the interviews and avoid providing potentially outdated answer possibilities.

In addition, all of the studies were concerned with how real estate decision-makers conduct investment decisions, but not what attributes affect their decision. This focus suggests that real estate decisions in the 1980s were primarily pursuant to return and risk figures and did not address sustainability and building-specific attributes, such as quality and location. However, these factors might be implicitly priced into the cash flow. The questions asked in the questionnaires indicate that sustainability was not an issue for investment decisions at that time. Moreover, all of the studies focused on the USA, whereas my research will concentrate on Germany. Therefore, although the results are interesting, their applicability to today is limited.

Table 11: Comparison of the Results from Wiley (1976), Page (1983), Farragher (1982), Webb (1984) and Webb and McIntosh (1986)

	Wiley (1973)	Page (1983)	Farragher (1982)	Webb (1984) ⁶	Webb & McIntosh (1986) ⁷
Participants	72 life insurance, 49 REITs, 38 RE corporations	72 life insurance, 49 REITs, 38 RE corporations	66 life insurance, 26 REITs, 12 pension fund advisors, 20 private real estate developers	252 life insurance companies (LI), 25 pension fund managers (PF)	47 REITs
Method & Methodology	Quantitative, mail survey				
Type of real estate portfolios	24% apartments	18% office, 18% land	n/a	61% office	70% office
Diversification strategy	n/a	n/a	n/a	61% by location, 61% by asset class	64% by location
Before-tax investment return measures	Cash-on-cash (58%)	IRR (57%)	Cash-on-cash (57%)	Net income over initial equity (80%)	Cash-on-cash (94%)
After-tax investment return measures	None (46%)	IRR (50%)	Cash flow over initial equity (45%)	IRR (65%)	Cash-on-cash (62%)
Ratio analysis	n/a	Debt coverage ratio (44%)	n/a	n/a	n/a
Risk adjustment techniques	Decrease expected benefits (37%)	Decrease expected benefits (38%)	None (52%)	Increase required return (71%)	Increase required return (77%)
Computer usage	None (73%)	Use to compute return rates (82%)	n/a	None (50%)	None (62%)
Planning horizons	6-10 years (32%)	6-10 years (48%)	n/a	6-10 years (72%)	6-10 years (70%)
Investment interests after the tax reform act	n/a	No effect (79%)	n/a	n/a	n/a
Mortgage holdings & construction loans	n/a	n/a	n/a	Residential (53%)	Office and Residential (64% each)

⁶ The number of respondents using the respective measure is derived by summing up “often used” and “sometimes used” responses.

⁷ The number of respondents using the respective measure is derived by summing up “often” and “sometimes” responses.

In the 1990s and 2000s, a range of researchers conducted studies based on the findings presented above to measure the changes in decision-making over the years. Louargand (1992) performed a similar study to Webb (1984) with pension fund managers. The IRR was still considered one of the most crucial return measures, while the number of respondents using the cash-on-cash rate decreased to 43%. With an increasing academic focus on sophisticated return measures, the author concluded that new business school graduates increasingly moved away from single-period return measures. He also surveyed the performance goals of real estate managers, discovering that total expected return was most relevant, followed by cash flow from operations.

One flaw of this study was the limited range of potential answers. For instance, the respondents' category 'other' was considered the fourth most important diversification criteria. This methodology prevented the author from examining what further attributes he might have missed. In addition, the possibility of providing multiple answer options, for instance, when asking for risk assessment techniques, made it difficult to evaluate the relative importance of certain findings.

Table 12: Summary of Louargand (1992)

Louargand (1992)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
USA	Quantitative	Survey (mail)	Cross asset class	42 advisors 83 sponsors	125 pension funds	1990	Survey
Primary decision-impacting factors analysed							
Aspects surrounding decision-making							
<ul style="list-style-type: none"> • Diversification • Risk adjustment and performance measurement • Manager's real estate performance goals 							
Most relevant findings/factors							
<ul style="list-style-type: none"> • Diversification <ul style="list-style-type: none"> ○ 89% diversified by property type, 50% by property size • Risk adjustment and performance measurement <ul style="list-style-type: none"> ○ 22% did not make any specific risk adjustment ○ 48% conducted a sensitivity analysis ○ 58% used IRR as a performance measure, 43% used cash-on-cash • Managers' real estate performance goals <ul style="list-style-type: none"> ○ Most were evaluated by total expected return, followed by cash flow from operations 							
Other relevant findings							
<ul style="list-style-type: none"> • 72% and 50% diversified their portfolio by location and property size, respectively • An increasing focus was put on multi-period return models as opposed to single-period assessments 							

Brzeski, Jaffe and Lundström (1993) were the first researchers to undertake a survey about real estate decision-making practices in continental Europe. They surveyed 215 real estate investors in Sweden. All participants saw their main investment aim as maximising the long-term real return on equity – except for publicly traded firms, which focused on maximising

regular return on equity. Interestingly, diversification efforts were only named priority 2 and 3 by insurance firms and foundations, while other investor types did not mention diversification as the main aim. Between 75% and 95% of investors adjusted for risk, which was in line with findings from the USA. However, sophisticated risk-adjustment measures, such as sensitivity analysis and probability adjustments were more prevalent in Sweden.

Another difference between the sets of participants was before-tax criteria, with net operating income (NOI)/price and NOI/initial equity considered most relevant. Only half of the investors in Sweden used the IRR. The overall low usage of after-tax criteria (47%) was due to the tax-exempt status of insurance companies and foundations in Sweden. The authors also asked about the increasing tendency to invest in smaller Swedish cities. They concluded that this move away from large cities was primarily due to too few metropolitan investment opportunities and better return rates. Among the active respondents in smaller markets, 83% relied on their own market knowledge and external opinions of local contacts as information sources.

The authors observed significant differences between the types of investors, which signals a more unified set of participants. Results for a single criterion ranged between 0 and 75% between investor types, suggesting different structures and targets among the firms. In contrast, I select the set of participants from different firms with various backgrounds. I split my group of participants into firms focusing on core and those focusing on value-add investments so that the data is valid and comparable. Apart from that, Brzeski et al. (1993) faced the previously discussed issue of biases resulting from mail surveys, which I avoid in my thesis by choosing a different approach to data gathering.

Table 13: Summary of Brzeski et al. (1993)

Brzeski et al. (1993)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
Sweden	Quantitative	Survey (mail)	Cross asset class	215 property-holders, developers, pension and insurance firms	215 real estate investors	Early 1990s	Survey
Primary decision-impacting factors analysed							
Aspects surrounding decision-making <ul style="list-style-type: none"> • Investment aims • Diversification • Risk adjustment • Return assessment (before & after-tax returns) • Motives and information used for investing in smaller cities • Portfolio evaluation • Property management and financial controls 							
Most relevant findings/factors							

<ul style="list-style-type: none"> • Investment aims <ul style="list-style-type: none"> ○ Maximise the long-term real return on equity was the first goal for all firms except publicly traded firms, which focused on maximising regular return on equity • Diversification <ul style="list-style-type: none"> ○ Approx. 50% of property holding companies, insurance firms and construction firms did not diversify at all ○ If they diversified, asset class and geographical location were equally relevant • Risk adjustment <ul style="list-style-type: none"> ○ Adjusting the required rate of return and expected cash flow were the most frequently used diversification techniques • Return assessment <ul style="list-style-type: none"> ○ Before-tax criteria (used by 69%): NOI/Price (76%), NOI/Initial Equity (70%), Price/Gross-rents (68%) ○ After-tax criteria (used by 47%): Tax write-offs and depreciation (71%), cash flow/initial equity (58%), IRR (49%) • Motives and information used for investing in smaller cities <ul style="list-style-type: none"> ○ Motives included higher returns after risk and lack of alternative investment options ○ Most investors used own market knowledge and local opinions (80-90%) as main source of information • Portfolio Evaluation Techniques <ul style="list-style-type: none"> ○ Budget feedback on property level (65%) and internal market valuations (50%)
<p>Other relevant findings</p> <ul style="list-style-type: none"> • A third important investment aim was value appreciation for most of the firms • Compared to the US, more investors used sophisticated risk assessment techniques in Sweden • Significant differences between the types of investors, with 100% and 50% of foundations and insurance companies, respectively, reporting the use of NOI/Price • Local development studies (40%) and appraisal reports and intuition (17%) were other information sources • 77% of companies had encompassing internal property management, 65% have feedback control on property level

De Wit (1996) was the first real estate decision-making researcher to interview respondents face-to-face and not via mail, thereby avoiding poor response rates and a pre-defined answer set. His survey questions were similar to those of Louargand (1992) and Webb (1984). In addition, he surveyed pension fund managers in the Netherlands, where investors had larger equity stakes in real estate than in the USA.

The results indicated that 30% of respondents did not thoroughly diversify their portfolios. Regarding a specification of the type of diversification, he only provided two answer possibilities, whereas locations were only marginally more relevant than diversification by asset class. De Wit (1996) also inquired about the most important criteria for establishing a real estate portfolio and noted that property type and country were the most important criteria for Dutch investors. Other criteria mentioned included “social political and fiscal opportunities and restrictions” (p. 138). His findings concerning return measurement signalled a higher relevance of cash-on-cash and brokers rate⁸ compared to Louargand (1992) and Webb (1984). When asked about the relative preference of net present value (NPV) or IRR, 100% of respondents preferred the latter. As opposed to simple risk

⁸ Defined as cash flow and equity over initial equity by Webb (1984).

adjustment techniques used by US real estate decision-makers, almost 80% of respondents did not correct for risk at all. Nonetheless, the author noted that many investors conducted qualitative risk controls by constraining the location or property sizes they invested in.

All in all, De Wit's (1996) study resulted in some valuable insights into real estate decision-making in Europe, the advantages of face-to-face interviews and the criteria for establishing a portfolio. It also showed the relevance of return figures for real estate decision-makers in Western Europe. Nonetheless, it did not include the specific property-related attributes for real estate decision-making I am looking to examine.

Table 14: Summary of De Wit (1996)

De Wit (1996)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
Netherlands	Quantitative	Survey (face-to-face)	Cross asset class	34 institutions	34 respondents	October-November 1991	Survey
Primary decision-impacting factors analysed							
Aspects surrounding decision-making <ul style="list-style-type: none"> • Diversification • Return measurement • Investment goals Decision-making <ul style="list-style-type: none"> • Criteria for real estate portfolio building 							
Most relevant findings/factors							
<ul style="list-style-type: none"> • Diversification <ul style="list-style-type: none"> ○ 70% of respondents diversified their portfolio ○ Property type and location were equally relevant from a diversification perspective • Criteria for real estate portfolio building <ul style="list-style-type: none"> ○ Property type (most important for 16 of 34 participants), country (13), region, area and submarket (3) • Return measurement <ul style="list-style-type: none"> ○ Cash-on-cash (74%), cash flow and equity over initial equity (65%), IRR (56%) • Investment goals <ul style="list-style-type: none"> ○ Hedge against inflation (most important for 20 of 34 participants), rental return (10), diversification benefits (7), sale price (6) 							
Other relevant findings							
<ul style="list-style-type: none"> • Among large institutions, property type was marginally more relevant for diversification than location • Tenant characteristics were mentioned as third and fourth-most important criteria for institutional investors • All respondents preferred the IRR over the net present value • Many respondents depended on self-imposed investment constraints by avoiding specific locations or property types • Most Dutch investors did not compare returns with a benchmark, which may be because no Dutch benchmark existed 							

Farragher and Kleiman (1995) followed a more sophisticated approach. Their study was also the first to consider sustainability issues to some degree. In their research, they found that “real estate decision-making is a complex process” (p. 50) involving several steps⁹:

- definition of a strategy
- derive return and risk targets
- forecast returns
- evaluate risks
- adjust forecasts following identified risks
- apply proposals, and
- post-auditing.

Indeed, almost 80% of REIT investors conducted a strategic analysis first. Before making decisions, nearly 90% of respondents required a hazardous waste report. This was the first time a researcher included a sustainability-related question in their survey on this topic. While almost all REITs forecasted annual operating returns, only 47% of them projected an exit scenario. This result indicated that many REITs preferred to follow a buy-and-hold strategy. Their findings also showed that REITs conducted multiple-year cash flow forecasts but measured investments by assessing certain ratios (e.g. cash/purchase price and cash/equity) over a one-year horizon. REITs often did not use quantitative risk assessment techniques. Interestingly, the survey results indicated that more than a third of forecasts were not appropriate, resulting from a biased personal view or the interests of the management.

In general, the study results were in line with earlier findings. They were similarly concerned with the circumstances under which real estate decisions were conducted and which methods were used, instead of assessing the attributes that affected the decision. Although the authors asked for the relevance of hazardous waste for the investment decision, sustainability and energy consumption were still not of interest for real estate investment decisions in the 1990s. The study also showed familiar disadvantages mail surveys have, including a pre-defined set of possible answers. That way, the authors disregarded other potentially relevant factors for real estate investment decisions. My research offers the decision-makers the possibility to discuss all relevant aspects of decision-making. This procedure ensures that I do not miss any attribute in a pre-defined set of answers.

⁹ Literature about the decision-making process will be discussed further in section 2.4.4.

Table 15: Summary of Farragher and Kleiman (1995)

Farragher and Kleiman (1995)							
Country/ region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
USA	Quantitative	Survey (mail)	Cross asset class	47 REITs	47 firms	1994	Survey
Primary decision-impacting factors analysed							
Aspects surrounding decision-making <ul style="list-style-type: none"> • Forecasting (time period, types, reliability) • Market and property reports • Risk assessment • Risk adjustment • Return evaluation measures • Post-auditing 							
Most relevant findings/factors							
<ul style="list-style-type: none"> • Forecasting <ul style="list-style-type: none"> ○ Most participants (62%) used a standard time and forecasted over a ten-year horizon (73%) ○ 94% were required to forecast operating return ○ 45% considered their forecasts as being overstated, and 46% believe they are accurate • Market and property reports <ul style="list-style-type: none"> ○ 87% used a hazardous waste report • Risk assessment <ul style="list-style-type: none"> ○ 64% conducted a qualitative and 26% a quantitative risk assessment ○ Among quantitative tools, scenario analyses (40%) were most popular • Risk adjustment <ul style="list-style-type: none"> ○ 26% undertook a formal risk adjustment • Return evaluation measures <ul style="list-style-type: none"> ○ Before-tax cash over purchase price and cash over equity as primary evaluation measure were both used by 70% of respondents • Post-auditing <ul style="list-style-type: none"> ○ 66% of respondents conducted post-audit procedures, mostly (65%) on a cash basis 							
Other relevant findings							
<ul style="list-style-type: none"> • 79% of respondents conducted strategic analyses, but only 62% of them regard this step as advantageous towards competitors • 73% of respondents forecasted returns over ten years, although used evaluation metrics over one year • 47% required a market feasibility report, and 38% use an appraisal report for their decision • All of the respondents who made risk adjustments subjectively adjusted the rate of return or the return itself • Among the participants who had implemented post-audit procedures 72% used the outcomes to track individual abilities to make good forecasts and good forecasts 							

Almost ten years later, Farragher and California (2008) conducted another survey to update the findings from earlier studies, relying on Farragher and Kleiman (1995)'s survey instrument. The authors surveyed 188 institutional investors and other investors and developers. Their results indicated that strategic investment aims were highly relevant for conducting investment decisions for 84% of participants. Institutional investors placed an even higher value on this factor. This finding is essential for my thesis, as it implies that decision-makers account for the long-term consequences of their decisions. Thus, in my opinion, accounting for green certificates is also a strategic consideration. After identifying a strategically suitable investment, investors forecasted returns and adjusted for risks.

Almost all institutional investors considered diversification issues, and 87 and 81% did so by varying the location of the chosen property or the asset class, respectively. Property size and age were only incorporated by less than a third of all participants.

The authors also asked about the factors that affect decision-making and found that individual property factors were more relevant than strategy- or portfolio-related attributes. This finding is interesting for my study and suggests the need for further research about individual, property-related factors. Although Farragher and California (2008) did not specify the questions and the results, they did not further identify individual factors when posing the question. Their survey results regarding risk and return models and other investment practices indicated that real estate decision-makers have not significantly changed their procedures compared to research results from the 1990s.

Table 16: Summary of Farragher and California (2008)

Farragher and California (2008)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
USA	Quantitative	Survey (mail)	Cross asset class	32 institutional investors 156 investors and/or developers	188 firms	Mid-2000s	Survey
Primary decision-impacting factors analysed							
Aspects surrounding decision-making							
<ul style="list-style-type: none"> • Stages in decision-making • Importance of factors while searching for investments & evaluation measures • Forecasting • Risk assessment • Diversification • Implementation • Audit 							
Decision-making							
<ul style="list-style-type: none"> • Individual factors 							
Most relevant findings/factors							
<ul style="list-style-type: none"> • Stages in decision-making <ul style="list-style-type: none"> ○ Most important stages (upper third): Searching for investment opportunities, forecasting expected returns, evaluating forecasts, establishing risk/return objectives and setting strategy • Importance of factors while searching for investments & evaluation measures <ul style="list-style-type: none"> ○ Most participants (rating of 2.9 out of 3) cared for individual project characteristics ○ Most considered the IRR as most important measure of return, followed by the cash-on-cash rate ○ 84% of respondents had a strategic focus when conducting investment decisions • Forecasting <ul style="list-style-type: none"> ○ 64% conducted a qualitative and 26% a quantitative risk assessment ○ Among quantitative tools, scenario analyses (40%) were most popular • Risk assessment <ul style="list-style-type: none"> ○ 55% conducted quantitative risk assessment, thereof 49% sensitivity analysis ○ 59% did not conduct risk adjustments • Diversification <ul style="list-style-type: none"> ○ 81% diversified their portfolios, thereof 71% by location and 68% by asset class 							

<ul style="list-style-type: none"> • Decision-making <ul style="list-style-type: none"> ◦ Investors cared more about individual, property-related factors than portfolio-specific or strategic attributes when making investment decisions
Other relevant findings
<ul style="list-style-type: none"> • Setting a strategy was more important for the decision-making process for institutional investors (2.6 out of 3) than for other investors and developers (2.3 out of 3) • Institutional investors put a higher focus on IRR and cash-on-cash (3.8 and 3.6 out of 4, respectively) than other investors and developers • Strategic considerations were more important than portfolio considerations • Other investors and/or developers preferred forecasting over complete holding period, while institutional investors were more likely to forecast over a 7.5-year timeframe • 59% of institutional investors diversified their portfolio • 71% had a plan that guides the implementation of the investment process • Auditing was required by 55% of respondents

2.4.2 Identified Attributes

While a range of research on the return and risk measures used for decision-making has been conducted since the 1970s, studies about the attributes that impact real estate decisions themselves have been scarce.

In the 2000s, studies moved away from simple mail surveys towards more sophisticated approaches. In addition, studies often included a more detailed assessment of qualitative or quantitative attributes affecting real estate decisions. For instance, Gallimore and Gray (2002) surveyed almost 400 UK real estate decision-makers about the role of sentiment, revealing that *personal judgement* was an essential source of information. This attribute is novel compared to earlier studies as they mostly attempted to analyse quantitative aspects concerning investment decisions, disregarding the decision-maker's personal views.

In a recent study, Hutcheson and Newell (2016) surveyed 14 real estate fund managers in Australia and used the Analytical Hierarchical Process (AHP) to rank the factors according to their relevance. In this multi-step model, respondents evaluated each element by conducting pairwise comparisons. The aim was to identify the most to least significant attributes for real estate decision-making by continually comparing two factors among the five levels and 14 total identified criteria on the sub-level. Their results indicated that Australian fund managers considered *strategic decision-making* the most critical factor, with a rating of almost double that of the second-most important factors. On the sub-level, *risk-adjusted return* (13%) was most important for the decision-makers, followed by *direct property investments, core* and *personal judgement* (all 12%).

One flaw of the study is again the reliance on a pre-defined set of attributes. Hutcheson and Newell (2016) used a group of 14 elements but did not allow for amendments or the addition

of further attributes which might have been identified during interviews. For instance, the set *qualitative techniques* only included *personal judgement* and the incorporation of *industry comparables*. As a result, the authors missed other aspects identified in earlier literature, such as market knowledge (see, e.g. MacCowan & Orr [2008]) or property quality (see, e.g. Roulac [2000]). Similarly, the methodology did not allow respondents to mention any additional factors that might have significantly impacted their decisions. Furthermore, although the paper was published relatively recently, green aspects were not considered separately. Despite these limitations, the study provided a valuable basis for my research.

Table 17: Summary of Hutcheson and Newell (2016)

Hutcheson and Newell (2016)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
Australia	Quantitative	Semi-structured interviews (face-to-face)	Cross asset class	14 property funds	14 respondents	March – April 2016	Questionnaire Survey
Primary decision-impacting factors analysed							
Decision-making							
<ul style="list-style-type: none"> • Type of real estate vehicle: direct property, REIT, unlisted fund • Geographical location: CBD, non-CBD, international • Strategic decision-making: return analysis, risk analysis, risk adjusted analysis • Investment style: core, value-add, opportunistic • Qualitative techniques: personal judgement, industry comparables 							
Most relevant findings/factors							
<ul style="list-style-type: none"> • Main factors <ul style="list-style-type: none"> ○ Most important: strategic decision-making (29%) ○ The other level 1 factors received a rating of 16 to 19% • Sub-factors <ul style="list-style-type: none"> ○ Most important: risk-adjusted (13%) ○ Relatively important (9 to 12%): direct property, core, personal judgement, return, CBD ○ Rest between 2 and 7% 							

Pfnür and Armonat (2001) were the first researchers to publish a study about real estate decision-making in Germany, which they presented in English three years later (Armonat & Pfnür, 2004). Their survey of 91 German institutional investors indicated that the location (6.4 out of 7) was the main driver for real estate decisions. *Provisioning on property* (5.8), including assessing the initial value, return and expenses, was the second-most relevant factor for investors' decision-making, followed by *sale price* and *marketability*, including *tenant quality* and *initial appearance* (both 5.7). *Economic environment* and *market yields* were moderately important for decision-makers. Finally, the factor *cost-effectiveness* (4.9) included fees and costs, while efficiency was of subordinate importance to real estate decision-makers in 2001.

The authors also assessed the return profile of a property. They concluded that rental income and sales price, as well as acquisition cost, were highly interdependent. They also surveyed the experienced relevance of specific factors for the return of a property as well as the respondent's perception of how accurately they predicted this factor. For instance, rental income was considered the most critical factor affecting a property return, but there was a 38% estimation error over a ten-year horizon. Even for construction cost, with an estimated relevance of 74% for the return, there was a forecasting error of 35%. Unsurprisingly, the highest prediction error of 47% occurred for the sale price over a ten-year horizon. In addition, the study from Pfnür and Armonat (2001) showed that only 37% of respondents used scenario analysis and 29% adjusted their calculations for risk assessments.

The study resulted in various interesting and relevant findings on which my thesis is able to build. It was the first study about this topic in Germany and underlined the relevance of the investment's return for the decision-maker. Similarly, it revealed that real estate investment decisions are complex, as the forecasting ability is limited and allocation according to historical data series is flawed. Nonetheless, the authors did not specifically account for sustainability, used a pre-defined set of attributes, and did not discuss the sub-factors further. In contrast, I started my study by deriving the attributes and continued to estimate their relevance afterwards, thereby avoiding missing relevant attributes that might have been disregarded in Armonat and Pfnür (2004)'s study.

Table 18: Summary of Pfnür and Armonat (2001) and Armonat and Pfnür (2004)

1) Pfnür and Armonat (2001) 2) Armonat and Pfnür (2004)							
Country/ region	Research Approach	Methodo- logy	Asset class	Participants	Sample size	Time frame	Data Source
Germany	Quanti- tative	Survey (Telephone)	Cross asset class	91 institutional investors including funds, developers, public and private real estate investors	91 respon- dents	Spring 2001	Survey
Primary decision-impacting factors analysed							
Factors in decision-making <ul style="list-style-type: none"> • Location • Provisioning on property • Sale price • Marketability • Cost-effectiveness • Capital market yields • Economic environment • Cost of equity • Financing Others: <ul style="list-style-type: none"> • Factors that affect property return and accuracy of predictions • Diversification 							

Most relevant findings/factors
<p>Relevance of factors for decision-making (X out of 7):</p> <ul style="list-style-type: none"> • Relevant factors for decision-making: location (6.39); provisioning on property (5.83), sale price (5.67) • Medium-relevant factors: marketability including tenant worthiness (5.65); cost-effectiveness (4.92), capital market yields (4.84), economic environment (4.81) • Real estate finance (3.78) and cost of equity (4.59) were considered as least important for real estate decisions <p>Factors that affect property return and accuracy of predictions:</p> <ul style="list-style-type: none"> • Factors according to importance and forecasting uncertainty in brackets: rental income: 86% (38%), building/acquisition cost: 74% (35%), sales price: 66% (47%), maintenance cost: 36% (35%), equity yield: 31% (37%), operating cost: 25% (38%)
Other relevant findings
<ul style="list-style-type: none"> • Only a minority of investors accounted for risk. 39% use scenario analysis and 29% adjusted for risk • Portfolio managers often did not audit the returns of the property after acquisition, most assumed that 65% of the investment returns have been set at acquisition • 77% of investors diversified by varying the micro-location, 68% by macro-location, 58% by asset class and 33% by property size

Ginevičius and Zubrecovas (2009) created a real estate efficiency evaluation model by conducting a literature analysis of mainly Eastern European and Russian research. The researchers distinguished between economic and project environment criteria and assigned weights to the attributes based on a “survey of experts” (p. 263), which they did not elaborate on in the paper. Table 19 presents the identified attributes and relative weights.

The authors distinguished between *economic efficiency of the project* (60% relevance) and *environmental criteria of the project* (40% relevance). Among the economic efficiency group, financial efficiency and the financing of the property were most relevant. Most respondents used the pay-back period (46%) followed by the IRR (25%) as a return measure. Among the territorial considerations, visibility (20%) and parking possibilities (19%) were considered most valuable.

The study from Ginevičius and Zubrecovas (2009) provided additional insight into potential factors and attributes that affect real estate decision-making and might correspondingly be incorporated into my research. However, as the authors did not describe methodology and study participants, the reliability of the results is questionable. Similarly, the authors disregarded aspects such as sustainability and ESG criteria.

Table 19: Summary of Ginevičius and Zubrecovas (2009)

Ginevičius and Zubrecovas (2009)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
n/a	Quantitative	Literature study, expert survey	n/a	n/a	n/a	n/a	Literature study and survey
Primary decision-impacting factors analysed							

<p>Environmental Criteria</p> <ul style="list-style-type: none"> • Market: Funds exchange market index, EURIBOR, changes in national GDP, consumption prices, unemployment level • Location and property: car parking possibilities, existence of equal competitors, number of inhabitants living in 1 km radius, land value, public transport, visibility, infrastructure of communications • Legal environment: criminology, legal environment <p>Economic efficiency of Project - Criteria</p> <ul style="list-style-type: none"> • Financial efficiency: IRR, NPV, pay-back period of investments, profitability index, cost efficiency of investments • Financial: net income, maintenance cost, net cash flow, taxes, profit, sale price • Financing: demand for own resources, other loans, amount, tenor
<p>Most relevant findings/factors</p> <ul style="list-style-type: none"> • Economic efficiency of project (60%) more important than market environment (40%) • On level 1, financial efficiency and financing were most important (both 40%) • On the sublevel: market: EURIBOR (31%), location and property: visibly from the main street (20%), legal environment: legal (73%), financial efficiency: pay-back period (46%), financial: net income (38%), financing: demand for own resources (32%)

Another study that is worth discussing at this point is that of Roulac (2000). Although his research aim was to compare due diligence practices in 1993 and 1987, he also provided some potentially valuable attributes surrounding real estate investment decision-making. He conducted a telephone survey with 51 institutional investors, finding that due diligence practices were less stringent in the optimistic and economically positive late 1980s compared to 1993, “a time when institutional real estate investors had experienced considerable adversity” (p. 390). He assessed the relative importance of *investment decision tasks, investment factors, property characteristics, developer attributes, market factors, economic factors, and financial and legal/documentation factors*.

An interesting finding from Roulac (2000) was that, among the *legal/documentation* group, which ranked as most important among all the groups, *environmental reports* were considered most relevant, yielding 9.14 out of 10. However, while today this term often relates to sustainability reports, the authors most likely referred to information on the real estate and economic environment, rather than ESG issues. Another interesting finding which is unique for the time of the study is the incorporation of property-related attributes. For instance, the results showed the relevance of location, tenant quality, property inspection and building condition as significant impact factors (ranging from 8.52 to 8.10) among the property characteristics group.

All in all, the study provided useful insights on relevant attributes divided by topic groups. However, the findings are not entirely applicable to my research, as they are more than 25 years old and based on US institutional investors. Moreover, Roulac (2000) again provided a pre-defined set of possible responses to the respondents via telephone, and therefore did not provide the possibility for remarks or explanatory notes.

Table 20: Summary of Roulac (2000)

Roulac (2000)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
USA	Quantitative	Survey (Telephone)	Cross Asset Class	51 institutional investors	51 participants	March to April 1993	Telephone Survey
Primary decision-impacting factors analysed							
Relevant factors sorted from most to least important (X out of 10):							
<ul style="list-style-type: none"> • Investment decision tasks: review of financial analysis (8.9), own expertise, own quantitative and qualitative analysis, review of property information, market information, legal information (8.0), economic information, appraisal reports, others' informal opinions and impressions (6.7) • Investment factors: confidence in investment quality (8.5), quality and comprehensiveness of information provided, type of investment, market knowledge, reputation of borrower/developer/seller, prior experience in that market (7.5), property type, prior experience with borrower/developer/seller, size of investment (6.3) • Property characteristics: location (8.5); tenant quality, property inspection, building condition (8.1), construction quality, competitive position in market, access to transportation and major highways, design/architecture (7.0) • Developer attributes: prior experience with borrower/developer (7.8), evaluation of borrower's/developer's capability, substance and track record (4.5), market performance of borrower's/developer's other projects (3.7) • Market factors: rents for comparable properties (8.9), vacancy rates in the submarket, rental rates in the market, lease terms on competing properties, vacancy rates in the market, familiarity with market (8.1), rental rates and trends in the submarket, sales prices of comparable properties, new competitive building, new construction trends, local restrictions on new building, limited land availability, corporate expansion and relocation decisions (6.7) • Economic factors: strength of local economy (8.1), capital availability, overall economic conditions and outlook (7.5), tax policy and regulations, national real estate market inflation (5.3) • Financial factors: current occupancy levels (8.4), tenant quality, projected future income, debt coverage ratio, pre-leasing requirement, lease terms, loan-to-value ratio, capitalisation rate, tenant improvements and requirements, cash-on-cash return, lease clauses, sensitivity analysis, price per foot, required IRR (discount rate), anticipated holding period, projected future value, replacement cost (6.6) • Legal/documentation: environmental reports (9.1), title report, loan documents, soils and engineering reports (8.5), building and occupancy permits, construction documents (7.3) 							

More recently, Reddy (2012) surveyed 51 Australian fund managers, most of whom had property asset allocation targets of 6 to 10%. Their semi-structured mail survey asked the different types of funds for their analysis techniques to conduct asset allocation decisions. The results indicated that the respondents used both quantitative and qualitative methods. They mentioned simple return and risk analysis and sophisticated models among quantitative techniques, including Monte Carlo simulations and econometric models. They also accounted for various qualitative attributes, including personal judgement, property quality and external opinions. The results also illustrate that the use of sophisticated models for return and risk assessments was higher compared to previous studies from the UK and US (see Section 2.4.1).

The survey from Reddy (2012) provided useful insight into the decision-making factors of Australian fund managers. It also depicted the significance of personal judgement or *gut feeling* for conducting real estate decisions. Interestingly, although the study was conducted

in the 2010s, the fund managers did not seem to account for sustainability at all. In fact, the words ‘sustainability’, ‘green’, and ‘energy’ did not occur once in the study. This might be because, on average, only 10% of the funds was allocated to real estate. I plan to avoid this flaw by concentrating on decision-makers only active in real estate.

Table 21: Summary of Reddy (2012)

Reddy (2012)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
Australia	Mixed	Semi-structured survey via mail	Cross asset class	21 superannuation funds, 15 investment management wholesale funds, 7 property funds and 8 asset consultants	51 responses	May to August 2011	Questionnaires
Primary factors addressed in study							
<p>Real estate decision-making techniques - results of the survey (no ranking):</p> <ul style="list-style-type: none"> Quantitative: valuation modelling (cap rate), scenario analysis, efficient frontier, covariance, Monte Carlo simulations, risk/return analysis, volatility analysis, correlation matrix, factor analysis, financial models, financial ratios (REIT specific), econometric models, asset liability modelling, portfolio construction models/ portfolio optimiser, relative return models vs alternative investments Qualitative: personal judgement, manager skill and quality, asset quality, general discussions with managers, surveys, investor/ shareholder meetings, fund manager experience/ understanding, industry peer comparison <p>Internal and external factors influencing investment decision:</p> <ul style="list-style-type: none"> Internal: advice from investment team, asset manager skills, general skills/ intuition of decision-maker, investment period External: trends, external/ independent advice, actions from peers, market sentiment, regulatory/ legislative environment, economic environment/ outlook, financial market conditions, market demand and supply factors <p>Return evaluation measures</p> <ul style="list-style-type: none"> Reversionary yields, payback period, NPV, IRR, management fees, rent multiplier, cash-on-cash, cap rate, return on investment <p>Risk assessment measures</p> <ul style="list-style-type: none"> Treynor ratio, Sharpe ratio, Sortino ratio, tracking error, Monte Carlo simulation, probability analysis, beta, default ratio, debt coverage, scenario analysis, sensitivity analysis 							
Most relevant findings/factors							
<p>Real estate decision-making techniques: no ranking</p> <p>Internal and external factors influencing investment decision (X out of 5)</p> <ul style="list-style-type: none"> Internal: advice from investment team (5), all other factors (4) External: all factors ranging between 3 and 4 <p>Return evaluation measures</p> <ul style="list-style-type: none"> Most investors used capitalisation rate (37%) and IRR (33%), followed by NPV (22%) Gross rent multiplier, payback period and return on investment were the least popular (around 3 to 5%) <p>Risk assessment measures</p> <ul style="list-style-type: none"> Most investors used scenario analysis (57%), followed by debt coverage ratio (51%) and sensitivity analysis (48%) Limited use of Treynor ratio, Monte Carlo simulation and breakeven ratio (10 to 17%) 							

2.4.3 Skills of Real Estate Decision-Makers

A few researchers have been concerned with the skill set managers require to conduct real estate decisions. Although my research will deal with attributes affecting real estate

decisions, it is helpful to briefly discuss real estate decision-makers' characteristics, as they obviously impact the corresponding decisions.

Gibler, Black, and Moon (2002) analysed the responses of 166 real estate executives from the UK, Australia, Hong Kong and the US regarding 38 skill areas that a survey by the Corporate Real Estate Management Unit at the University of Reading identified in 2000. They revealed *strategic management skills*, including *scenario planning* and *strategic planning* as the most critical and *interpersonal skills*, including *community relations* and *personnel management* as least essential for real estate decisions. Nonetheless, the authors noted that most respondents did not correctly incorporate their decision into the overall corporate strategy of their firms and instead conducted purchase decisions based on return projections and prices. This is an interesting finding for my research as it suggests that decision-makers follow a specific strategy when they conduct decisions and underlines the relevance of strategic planning (as discussed in Section 2.4.1). Applied to the set of attributes that describe decision-making, the findings from Gibler et al. (2002) indicate that factors such as return analyses and forecasts of rental income are especially relevant for investment decisions.

Gibler and Black (2004) used the same questionnaire. They analysed 187 global responses from service providers and real estate managers, two thirds of whom were active in companies that did not have real estate as a core competency. Both groups confirmed the importance of “strategic and management skills rather than narrow technical or financial skills” (p. 148). However, one difference between the groups was that real estate managers considered strategic management and finance skills more relevant than the service providers group.

Although the number of respondents was relatively large, it is questionable how generalisable the findings from people with such different geographical backgrounds are and how applicable the survey results are for German decision-makers. Furthermore, the studies examine the skill set real estate managers require in general but do not specifically assess real estate investment decisions. Nonetheless, they identify the value of long-term planning and strategic development for real estate decision-makers, underlining the importance of forecasting the investment's return for purchase decisions.

Epley (2004) conducted a survey with 38 real estate executives from various US firms to identify the concepts and skills necessary for investment decisions. He recognised market supply and demand and analyses of the present value, location and investment value as the

most important concepts impacting real estate investment decisions. Moreover, the survey respondents regarded *use market data to set rents* as the second-most relevant factor in the market subgroup, followed by *interpret vacancy and absorption rates* and, ranking sixth out of eight, *recognize the impact of demographics*. My research also discusses all of the above-mentioned factors. Thus, the study from Epley (2004) enhances the degree of confidence I have in my research results.

Interestingly, the survey respondents tended to rely on general market analysis tools, including simple return models, instead of specific models. This confirms my choice of a relatively simple decision-making model as opposed to more complex models. However, both studies from Gibler et al. (2002) and Epley (2004) are based on a pre-defined set of skills. They did not allow the incorporation of other relevant factors and attributes impacting the decisions of the respondents. Neither study accounted for sustainability and personal views.

Table 22 provides an overview of the findings of the three studies. Apart from the findings described above, the most important takeaway for my research is the relevance of *strategic decision-making*. In accordance with the results from studies presented in sections 2.4.1 and 2.4.2, their consensus underlines the significance of the strategic evaluation of a property, including the expected rental return, location and demographic analysis of investment decisions. Although the studies presented in this chapter did not specifically account for sustainability, I consider ESG factors and green certificates as part of many companies' strategic positioning. Thus, they will likely play an essential role in this area as well.

Nonetheless, the research setting of the studies did not allow for an interpretative approach to their research questions. Instead, respondents ranked the options and had no possibility to add remarks. Similarly, the studies were conducted around 20 years ago, and the focus from real estate decision-makers has likely changed in the meantime.

Table 22: Summary of Gibler et al. (2002), Gibler and Black (2004) and Epley (2004)

	Gibler et al. (2002)	Gibler and Black (2004)	Epley (2004)
Participants	166 chief real estate officers, thereof 63 in finance, real estate or insurance	187 chief real estate officers, thereof 126 from non-real estate firms	38 representatives from real estate firms
Country/region	US, Australia, UK, Hong Kong	Global	US
Methodology	Questionnaire	Questionnaire	Questionnaire
Time Period	2000	2000	2000

Most relevant findings about real estate decision-maker's skillset			
Strategic management (e.g. scenario planning, performance measurement)	0.52 to 0.76 (out of 1)	3.94 to 4.09 (out of 5)	3.6 to 4.2 (out of 5)
Physical property skills (e.g. construction management, project management, site analysis)	0.52 to 0.81	3.02 to 4.11	4.1
Knowledge to protect against external threads (e.g. government regulation, risk management)	0.54 to 0.77	3.33 to 3.72	3.0 to 3.2
Globalisation (e.g. foreign languages, globalized services)	0.62 to 0.74	3.26	n/a
Financial measurement (e.g. benchmarking, investment appraisal, leverage analysis)	0.74 to 0.75	3.67 to 3.69	3.2
Technology (e.g. IT, E-business)	0.61 to 0.68	3.72 to 3.96	n/a
Traditional business functional area (e.g. accounting, marketing, tax management)	0.50 to 0.69	3.15 to 3.44	n/a
Interpersonal skills (e.g. personnel management, community relations)	0.53 to 0.73	3.39 to 3.50	3.9

2.4.4 Investment Decision-Making Process

In his recent study, Parker (2016) investigated the decision-making process of Australian property funds. He conducted a thorough literature review of existing research about the real estate decision-making process as part of his study. I refer to this study if the reader is interested in an extensive literature review of this topic, as conducting an in-depth literature review about the decision-making process would exceed the scope of this thesis. However, I noted the significant variance in the number and content of decision-making stages between previous studies. Most studies proposed a process consisting of between four (Roulac, 1994) and ten steps (Roberts & Henneberry, 2007). The previously mentioned papers from Farragher and Kleiman (1995) and Farragher and Savage (2008) identified processes consisting of seven and nine steps, respectively. Most of them included a planning stage, a return calculation and risk assessment stage (often separately), an execution phase and a post-auditing phase.

Parker (2016) conducted semi-structured interviews with nine Australian fund managers. He divided the responses to his open-ended questions into prompted and unprompted responses, enabling him to distinguish between the level of recall participants showed of the varying stages. Prompt responses indicated a high prevalence and significance of the discussed factor. Similarly, I discussed the first three attributes mentioned by the participants in the

interviews. This method enabled me to understand which characteristics were especially relevant to the decision-makers.

By following an explorative approach, the researcher confirmed the relevance of four steps in investment decision-making, namely *envisioning*, *planning*, *dealing* and *executing*. In addition, *strategic asset allocation* and *advanced financial analysis* were among the sub-factors with the highest number of prompted responses. These findings add to the take-aways from the previous sections, underlining the relevance of the investment return.

Further similarities to my study derive from the explorative nature of the study from Parker (2016), involving open-ended questions. However, the author allocated the responses towards the pre-defined stages and steps, which might have led to disregarding other significant steps as corresponding answers were assigned to a related, pre-defined set of answers. Similarly, Parker's (2016) study resulted in another model of the real estate decision-making process, but not in any new findings of the attributes used for conducting real estate decisions.

Table 23: Summary of Parker (2016)

Parker (2016)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
Australia	Qualitative	Semi-structured interviews (face-to-face)	Cross asset class	9 unlisted property funds	9 respondents	Mid-2010s	Interviews
Primary decision-impacting factors analysed							
Decision-making process							
<ul style="list-style-type: none"> • Stages: Envisioning, Planning, Dealing, Executing • Steps in decision-making 							
Most relevant findings/factors							
<ul style="list-style-type: none"> • Stages in the decision-making process <ul style="list-style-type: none"> ○ Participants recalled all stages on a relatively equal level (envisioning: 58%; planning: 67%; dealing: 82% and executing: 64%) ○ The percentage of prompted answers for envisioning was highest • Steps <ul style="list-style-type: none"> ○ 100% response rate: strategic asset allocation, portfolio impact assessment, governance decision and due diligence ○ Documentation and transaction closure received less than 11% reference; all other steps were between 33 and 88% 							

2.4.5 Green Aspects in Decision-Making

In the literature already discussed in this chapter, green aspects were mostly underrepresented or completely disregarded. Nonetheless, there have been a few studies

about several green aspects in real estate decision-making, although none of them covers a comprehensive analysis of decision-making expertise to the extent of my research.

Elliott, Bull, and Mallaburn (2015) conducted semi-structured interviews with 12 UK-based senior decision-makers to determine what influences their decisions and how respective policies can become more efficient. They interviewed the participants about their attitudes towards Energy Performance Certificates (EPCs)¹⁰, the UK’s Minimum Energy Performance Standard (MEPS) and other green initiatives. Their results indicated that newly introduced policies led to greater inclusion of green factors into investment decisions. However, the authors concluded that environmental considerations were still primarily based on an obligatory or “box-ticking” (p. 672) basis and were insufficient to mitigate harmful climate impacts.

In the study, two investors active in London signalled the importance of sustainability and accounted for it using the BREEAM certification. However, most of the investors focusing on rural areas did not account for sustainability, although some acknowledged the increasing relevance of ESG criteria. The results also showed that companies that have introduced green investment guidelines have a market advantage. The authors argued that governments were distracted by the various sustainability objectives, including water, waste and transport, and therefore could not fully focus on energy efficiency goals. Although Elliott et al. (2015) have provided useful insights on the relevance of green policies, their research was solely based in the UK. Furthermore, they focused on the impact of policies, whereas my thesis will also consider other effects on real estate decision-making.

Table 24: Summary of Elliott et al. (2015)

Elliott et al. (2015)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
UK	Qualitative	Semi-structured face-to-face interviews	Cross asset class	12 UK-based property investors	12 respondents	Early 2010s	Interviews
Primary factors analysed							
Respondent’s attitudes towards green factors							
<ul style="list-style-type: none"> • Attitudes to Energy Performance Certificates (EPC) • Attitudes to Minimum Energy Performance Standard (MEPS) • Tenant’s attitudes to energy efficiency • Attitudes to energy efficiency initiatives 							
Most relevant findings/factors							

¹⁰ EPCs are the EU’s mandatory certificates.

- The EPC scheme was generally well understood and perceived; however, it was more regarded as an obligatory exercise than a value-add
- Tenants' expectations regarding green had to be accounted for by investors
- Outside of London, there were almost no sustainable properties, thus energy efficiency was no priority for investors here
- Investments were selected according to their return and not (yet) according to energy efficiency

Sayce, Ellison and Parnell (2007) examined the drivers for sustainable real estate investment by surveying 60 real estate market participants from different backgrounds and examining the legislative environment and market effects. They compared the survey results with two other studies conducted up to ten years earlier. The respondents increasingly recognized sustainability as significant for real estate investments. While 37% of surveyed property advisors experienced that sustainability affected investment yields at the time of taking the study, the corresponding percentage among banks was only 11%. This result indicates that property advisors, who usually hold an intermediate position between landlord and tenant, might experience shifts in real estate focuses of investors and tenants earlier.

85% of participants supported financial incentives for sustainable investments. More than half of the respondents perceived BREEAM as impacting real estate decisions to at least some degree. However, only 15% of participants regarded the impact as significant, which is not surprising as the survey is from 2005 – before the German certification scheme DGNB had been established. Nevertheless, the findings revealed an increasing expected relevance of sustainability in the future.

Some of the study's flaws resulted from the time when the survey has been conducted. For example, the researchers only asked about the perceived significance of regulations and sustainability, but not through which channel real estate investments were affected. Moreover, the study showed the common disadvantage of mail questionnaires: pre-defined, limited options. For instance, the options regarding the questions asking for the perceived effect of sustainability of yields were 'now' and 'in five years', without distinguishing impact and period any further.

Table 25: Summary of Sayce et al. (2007)

Sayce et al. (2007)							
Country/region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source
UK	Qualitative	Mail survey/questionnaire	Cross asset class	60 institutional investors, valuation surveyors, developers and banks	60 respondents	2005	Surveys
Primary factors analysed							
<ul style="list-style-type: none"> • Market drivers of sustainable investments • Attitudes towards BREEAM and legislative changes 							

<ul style="list-style-type: none"> • Evaluation of potential financial incentives
Most relevant findings/factors
<ul style="list-style-type: none"> • The term <i>sustainability</i> replaced <i>green</i> and <i>environmental</i> • Most investors expected sustainability to affect investment yields in five years from taking the study. Only 11% of banks but 37% of property advisors considered it to be relevant at the time of taking the study • While 81% of respondents thought that sustainability would affect real estate investment strategy by 2005, in the 2005 survey, only 20% of respondents felt that sustainability had an impact on strategy in 2005 • 0% of investors considered BREEAM as a highly significant incentive for sustainable investments, 15% as significant and 48% as not significant

Jackson and Orr (2011) surveyed 51 UK fund managers to assess real estate attributes that affected real estate decision-making. Their model comprised a range of tenant- and property-related characteristics, including *credit worthiness*, *location* and *sustainability*, with the BREEAM certification as a proxy. The authors used the Choice-Based Conjoint (CBC) technique and asked fund managers to choose between three options consisting of different combinations of property attributes 20 times.

The results showed that *location* was the most important attribute, with towns and city centres preferred over locations without public access. Sustainability measured by the BREEAM certification ranked seventh out of eight attributes, indicating that green certificates are relatively unimportant to decision-makers. Among the certification levels, the participants preferred the BREEAM rating Very Good (part-worth utility value of 20.5), whereas they considered the BREEAM ratings Good (-11.0) and Excellent (-7.3) as least ideal. However, as the authors point out, this is insufficient to deduce the certification level property owners should aim for. One explanation for these results might be that the chosen methodology was unsuitable for comparing green aspects of a property: the investors might lack understanding of the differences between the BREEAM rating classes, and the research setting assigned a subordinated role to sustainability issues. The authors might have addressed these disadvantages by conducting face-to-face interviews to clarify any open matters – the research method I chose for my study.

Another flaw I identified in the study from Jackson and Orr (2011) was that they provided a pre-set range of selection options. For instance, they incorporated interior equipment, but not overall building quality and age, which might have influenced the fund managers' decisions.

Table 26: Summary of Jackson and Orr (2011)

Jackson and Orr (2011)							
Country/ region	Research Approach	Methodology	Asset class	Participants	Sample size	Time frame	Data Source

UK	Qualitative	Online Survey, Choice-Based Conjoint method	Cross asset class	51 fund managers	51 respondents	March – July 2007	Surveys
Primary attributes analysed							
<ul style="list-style-type: none"> • Tenant credit worthiness: D&B 5AA rating; D&B 3AA or 4AA rating; D&B 1AA or 2AA rating; D&B AA or BB or CC rating; D&B DD or lower rating • Single or multi-let: single let property; 2-5 tenants; more than 5 tenants • Rent review clause: rent set annually, linked to index or turnover; rent review every 2 to 3 years, upwards only clause; rent review every 4 or more years, upwards only clause; rent review every 2 to 3 years, no upwards only clause; rent review every 4 or more years, no upwards only clause • Period to expiry/break: less than 5 years; 5-10 years; over 10 years • User/assignment clause: restrictive; standard; relaxed; none • Location: in town or city centre; suburban, close to existing public transportation; suburban, no existing public transportation; out of the town/city, close to existing public transportation; out of the town/city, no existing public transportation • Sustainability and environmental performance: BREEAM ratings; pass; good; very good; excellent; not known • Economic and functional factors: high; average; low specification and flexible internal configuration 							
Most relevant findings/factors							
<ul style="list-style-type: none"> • On the attribute group level, location (22.2) ranked most important (by total utility), followed by economic and functional factors (17.1), credit worthiness of tenant (12.6), rent clause (12.1), letting status (11.3), period to expiry (8.5), sustainability (8.3), user/assignment clause (7.9) • Among the sustainability group, BREEAM Very Good ranked best (20.5), followed by rating not known (2.0), Pass (-4.3), Excellent (-7.3) and Good (-11.0) • Among location group, in town or city centre (80.8) was preferred, followed by suburban, close to existing public transportation (28.9), with suburban, no existing public transportation being least preferred (-63.7) • Among singly or multi-let group, more than 5 tenants (30.7) was ranking best, followed by 2 to 5 tenants (13.9) and single let (-44.6) 							

2.4.6 Summary: Decision-Making in Real Estate

This chapter discussed literature about real estate decision-making. My review of studies in this area revealed that researchers first started to deal with real estate investment decisions in the 1970s. The vast majority of early studies relied on a pre-defined set of attributes, which they used as a basis for mail surveys on the relative preferences of decision-makers. A few more recent studies have adopted more qualitative techniques. Nonetheless, no study attempted to explore decision-making expertise thoroughly. Similarly, no former study provided a holistic, multi-attribute view on investment decisions or a corresponding model. My research aims to fill these gaps.

The overall consensus among the studies focusing on the attributes affecting investment decisions indicated that quantitative return and property location were the most relevant attributes for decision-makers. Moreover, studies on the skills of real estate decision-makers assigned a higher level of relevance to quantitative evaluation of a transaction in the form of strategic decision-making. My impression is that the strategic positioning would also include green certificates and ESG issues. Applied to my research, this suggests that apart from the

quantitative investment return and property location, ESG factors are relatively relevant for decision-makers.

Only a few studies have attempted to understand the impact of green certificates on investment decisions. They mainly concentrated on the personal views of decision-makers and potential legislative impacts. Elliott et al. (2015) concluded that investment decision-makers do not consider mandatory EPCs a value-add for their investment. While respondents in the study from Jackson and Orr (2011) favoured higher BREEAM ratings, the authors acknowledged that their results on this topic were inconsistent. Thus, my study will be the first to shed light on the relevance of voluntary green certificates for real estate decision-makers today.

2.5 Impact of Green Certificates on Transaction and Rental Prices

Most of the literature in real estate decision-making, as presented in Section 2.4, has pointed out the investment return of a property as crucial factors in investment decision-making. This finding seems intuitive – the ultimate goal of investment managers is to multiply the money entrusted to them by their investors in accordance with the agreed terms (Waldron, 2018).

Therefore, this section addresses the influence of green certificates on two main factors that impact property return (Pfnür & Armonat, 2001): rental and transaction prices. Theoretically, higher demand for certified real estate properties should lead to higher transaction prices and higher rents, as tenants and investors are willing to pay a premium for a green building.

There is a range of literature covering real estate certifications and their impact on the economic performance of buildings. In academic research about green buildings, the number of American studies exceeds that of European studies, which can be explained by higher data transparency in the USA (Bienert, 2016). These analyses dealt with Energy Star and LEED certificates, which have existed longer than their European counterparts. While the latter certification relies on US Building Council standards, the Energy Star label signals that the building is in the upper quartile with regards to energy saving and is easier to obtain (Miller, Spivey, & Florance, 2008).

I split this section into non-European studies and European studies. There is a range of literature focusing on residential buildings, but this section will concentrate on research for commercial properties.

Before going into detail with the literature, I would like to point out several flaws all the studies discussed in the remainder of Section 2.5 have in common. First, they are all based on quantitative analyses, comparing a set of certified and a set of non-certified buildings. While this leads to some level of generalisability, none of the researchers has attempted to *understand* the relevance of green certificates. Instead, they have analysed a pre-defined set of criteria.

Second, it is almost impossible to find two fully comparable properties which only differ by their level of certification. Many researchers have matched a certified property with one or several non-rated properties within a specific geographical radius, disregarding other differences (e.g. tenancy structure, building age or quality) between the two buildings. Therefore, quantitative analyses of transaction and rental levels will also be impacted by other factors which the researchers did not incorporate into the sample set construction.

Third, there are considerable variances in the findings for different locations. Thus, although researchers attempted to use sufficiently large sets of property data, findings between countries and even within countries vary with the selected record.

2.5.1 Non-European Studies

Among non-European studies, many (Eichholtz, Kok, & Quigley, 2010; Eichholtz et al., 2013; Fuerst & McAllister, 2011a, 2011b; Kok, Miller, & Morris, 2012) covered a large area in the American real estate market and were based on CoStar¹¹ data. One of the first studies in this context was that of Miller et al. (2008), who compared transaction prices for Energy Star- and LEED-certified buildings with non-certified buildings. They concentrated on multi-tenant Class A-rated office buildings with a size of 18,500 sqm or more. Their results suggested transaction price premia of 10% and 6% for LEED- and Energy Star certified buildings, respectively.

Eichholtz et al. (2010) compared transaction data and rental figures of 199 LEED- and 694 Energy Star-rated buildings in the USA with comparable buildings within a 400 metre radius

¹¹ CoStar is the largest available real estate database in the US, comprising descriptive information and LEED certification information about more than 2 million real estate properties (Fuerst, Kontokosta, & McAllister, 2014).

of each property. Based on this data set consisting of almost 10,000 office buildings, the authors identified a significant effect of the Energy Star label resulting in about 3% higher net rent, 7% higher effective¹² rent, and 16% higher transaction prices. For LEED-certified buildings, they found an effective rent premium of 9%. However, although this certification is more complex and challenging to obtain, they could not confirm any significant effect on prices or net rents for LEED-certified buildings. In general, rent and transaction price premia were higher for properties in peripheral areas and B-cities compared to central locations in cities. There are some flaws in the approach of this paper. For instance, simply applying a 400 metre radius to find control variables might not be the appropriate range for all markets. By using this technique, the authors disregarded other crucial factors that determine the comparability of buildings. Moreover, the authors did not account for whether the properties are multi- or single-tenant; nor did they address the lease type, potentially leading to a bias in rental levels (Fuerst & McAllister, 2011b).

In a later study, Eichholtz et al. (2013) analysed the impact of an economic recession on demand for green buildings. With the 2009 crisis, US unemployment rates were 10% compared to 4.4% in 2007. In addition, vacancy rates tripled in New York, while rents for office buildings fell from USD 64 to USD 45 per square foot. The authors analysed the rental levels of a panel of certified and comparable buildings in 2007 and 2009. They concluded that although the economic premium between the two groups decreased, rental levels of green buildings in relation to similar properties were not affected.

In addition, Eichholtz et al. (2013) compared more than 20,800 LEED- and Energy Star-certified and non-certified buildings, as well as data from almost 6,000 transactions. They noted that green buildings show a premium over comparable properties of 2.6%, 7.6% and 13.3% in net rents, effective rents and transaction prices, respectively. Their results further indicated that rents and asset values capitalised differences in energy efficiency within the green buildings sector. After correcting their calculations for various factors, the authors concluded that the demand for sustainable office properties in an economic downturn is less elastic, e.g. green properties are more robust in times of a crisis.

Fuerst and McAllister (2011b) also researched the impact of green certificates on rental levels and transaction returns for office properties in the USA. Their sample included 127 LEED-labelled and 559 Energy Star-labelled buildings in the transactions dataset, plus more than 15,000 benchmark properties. The results showed that both LEED and Energy Star

¹² Eichholtz et al. (2010) defined effective rent as follows: effective rent per square foot = rent per square foot × occupancy.

certifications led to higher rents of 4 to 5% and higher transaction price levels of 25 to 26%. The authors saw the three main reasons for the price differences in increased demand from tenants, lower operating costs for investors due to lower vacancies and longer tenors of lease agreements, and a reduced risk premium. They also mentioned tax advantages, low energy costs for tenants, higher productivity and marketing benefits as some of the reasons for the attractiveness of green buildings.

When comparing the certified and non-certified sets, the authors noted that although the property age of Energy Star-labelled and comparable properties was relatively similar, certified buildings were on average 20 times larger. The authors summarised the benefits of green buildings as follows: “higher rents, lower holding costs and/or lower risk” (p. 50). While the methodologies used in Eichholtz et al. (2010) and Fuerst and McAllister (2011b) were similar, the first found no effect of the LEED certification on sales, while the latter estimated a price premium of 25% for LEED-certified buildings. This difference illustrates that it is crucial to identify a proper set of comparables.

In the same year, Fuerst and McAllister (2011a) published a study that expanded the findings of their previous study (2011b) by analysing the financial benefit for buildings with more than a single certification and adding one additional year to the research period. In addition to 313 LEED- and 2,111 Energy Star-certified buildings, they identified 264 properties with both the Energy Star and the LEED labels. Their results confirmed their findings from the earlier study with rental premia of 3 to 5% and transaction price impacts of 18 to 25%. Furthermore, they suggested that dual certification led to an even higher effect on rents and transaction prices, with premia of 9% and up to 29% for rental and sale transactions, respectively. Consequently, the positive impact of the labels increased exponentially with dual certification

Wiley, Benefield and Johnson (2008) examined the impact of sustainable design on rental and sales figures for LEED and Energy Star-certified buildings. In line with most of the previously mentioned results, they noted a price premium of between USD 30 and USD 130 per square foot, while rents and occupancy rates increased by 7 to 17% and 10 to 18%, respectively, for certified properties. The authors concluded that the significant premia for rental and transaction levels could be explained by the relatively recent emergence of green properties and resulting biases in supply and demand.

Reichardt, Fuerst, Rottke and Zietz (2012) conducted a panel analysis of rental data over ten years using a different approach. Compared to previous studies, the authors found a positive

but less drastic impact of certification on rental levels of only 2.5 to 2.9%. The rental premium had increased before 2008 and decreased with the start of the financial crisis. Jaffee, Stanton and Wallace (2019) concentrated on Energy Star-rated properties and found that transaction prices were on average 13.4% higher for rated properties. Furthermore, their results suggested that energy prices and weather metrics have a significant impact on transaction prices. Thus, transaction prices are vulnerable to shocks.

All of the studies mentioned above focused on the US market. Therefore, their generalisability to Germany might be restricted due to limited data availability. In addition, asking rents on the CoStar database are self-reported values from the building's owners and might never be actually reached for future tenancy agreements. Apart from that, none of the above-mentioned studies were concerned with less direct measures of green buildings, such as tenant satisfaction and productivity.

The survey from Devine and Kok (2015) built on some of these points of criticism. They confirmed previous literature findings by estimating a rent premium of 3.7% and 2.7% for LEED- and Energy Star-buildings, respectively, whereas their measured LEED-effect is dominant. In addition, they noted that while there was no significant effect on the likelihood of tenancy prolongation, tenant satisfactory scores for certified buildings were 6% higher than for comparable non-certified buildings. Apart from that, their findings indicated that LEED-certified buildings consume 28% less power.

Holtermans and Kok (2017) examined the retrospective adoption of green buildings in the US market. They found that green buildings offered higher transaction prices of up to 15% and marginally higher rental levels of up to 2% compared to non-certified buildings – although rental and occupancy rate growth reversed after the crisis. Moreover, they indicated that the share of certified space increased from 4.8 to 37.2% between 2005 and 2014. In 2014, 40% of the office space in the largest 30 US markets was LEED certified. The authors commented, “one could even argue that ‘green’ building is becoming the new normal in some cities” (p. 7). Thus, research from Holtermans and Kok (2017) depicted the importance of voluntary building certification schemes.

Before concluding the section, I would like to briefly present two more studies that extended the research findings examined before. Robinson and Sanderford (2015) conducted a propensity scoring analysis to forecast the certification degree of the buildings. Their study aimed at differentiating green buildings from others in the market by their attributes. However, the authors noted that it was hardly possible to predict whether a building was

certified or not based on its attributes. In fact, their propensity score methodology only matched 28% and 34% of the certified property correctly for the rental and the transaction sample, respectively. This finding led them to conclude that certified buildings were unique in their qualities and problematic to compare directly with non-certified properties.

Furthermore, An and Pivo (2018) added to this general finding by analysing the USA's debt market for LEED and Energy Star certified buildings. They discovered that green buildings have a lower risk of default; thus, green commercial mortgage-backed securities were more secure than investments in non-green properties.

All in all, previous studies conducted for non-European properties found a positive relationship between certificates and transaction prices and rental levels. For sale data, the premium for green versus non-green buildings for these studies ranged between almost 6% (Miller et al., 2008) and 26% (Fuerst & McAllister, 2011b). The impact of certifications on rental levels lay between 2% (Eichholtz et al., 2013) and 17% (Wiley et al., 2008). However, as mentioned before, transferring the findings from international studies to the German real estate market should only be done with great caution.

Table 27: Overview of Non-European Literature about the Impact of Certifications on Transaction Prices and Rents

Characteristics of study							Results		
Author(s)	Country	Certification (type)	Incorporated hedonic characteristics	Sample size	Asset class	Time period	Impact	Magnitude on transaction price	Magnitude on rental levels
Miller et al. (2008)	USA	LEED, Energy Star (voluntary)	Building: age, size, location	Certified: 284 for LEED, 643 Energy Star Control set: n/a	Office (only class A)	2003 to 2007	+	9.9% (LEED), 5.8% (Energy Star)	n/a
Eichholtz et al. (2010)	USA	LEED, Energy Star (voluntary)	Building: size, class, renovated, age, stories, amenities Other: employment growth	Certified: 694 for rent / 199 for transactions Control set: 7,411 for rent / 1,614 for transaction	Office (commercial)	2004 to 2007	+	None (LEED); 16% (Energy Star); 0 (LEED)	Net rent: None (LEED); 3.3% (Energy Star). Effective rent: 9% (LEED), 10% (Energy Star)
Eichholtz et al. (2013)	USA	LEED, Energy Star (voluntary)	Building: size, class, renovated, age, stories, amenities, public transport, type of rental contract Other: employment growth	Panel analysis: Certified: 694 for rent; first rated in 2007 Control set: 8,388 for rent Snapshot analysis: Certified: 983 for rent / 395 for transaction; rated by 2009 Control set: 19,818 for rent / 5,598 for transaction	Office (commercial)	Panel analysis: 2007 and 2009; Snapshot analysis: 2009	+	11.1% (LEED), 13% (Energy Star)	Net rent: 5.8% (LEED), 2.1% (Energy Star). Effective rent: 6% (LEED), 6.5% (Energy Star)
Fuerst and McAllister (2011b)	USA	LEED, Energy Star (voluntary)	Building: size, class, age, stories, submarket Other: market (strong/weak)	Certified: 197 LEED and 834 Energy Star for rent / 127 LEED and 559 Energy Star for transaction; Control set: 17,536 for rent / 9,411 for transaction	Office (commercial)	1999-2008 for transaction; Q4 2008 for rent	+	25% (LEED), 26% (Energy Star)	5% (LEED), 4% (Energy Star)
Fuerst and McAllister (2011a)	USA	LEED, Energy Star (voluntary)	Building: size, class, age, stories, submarket Other: market (strong/weak)	Certified: 268 LEED and 1846 Energy Star for rent / 87 LEED and 876 Energy Star for transaction;	Office (commercial)	1999-2009 for transaction;	+	25% (LEED), 18% (Energy Star)	4 to 5% (LEED), 3 to 4% (Energy Star)

				Control set: 34,122 for rent / 13,008 for transaction		Q4 2009 for rent			
Wiley et al. (2008)	USA	LEED, Energy Star (voluntary)	Building: size, age, lease type, occupancy	Certified: n/a Total: 7,308 for rent / 1,151 for transaction	Office (commercial)	n/a, but before 2008	+	USD 129.2 / sq. ft. (LEED), USD 29.7 / sq. ft. (Energy Star)	15.2 to 17.3% (LEED), 7.3 to 8.9% (Energy Star)
Reichardt et al. (2012)	USA	LEED, Energy Star (voluntary)	n/a	Certified: 1,768	Office	2000-2010	n/a	n/a	2.9% (LEED), 2.5% (Energy Star)
Jaffee et al. (2019)	USA	Energy Star (voluntary)	Building: class, age, stories, submarket, NOI, renovation, area, expenses Other: weather, forward sale	Certified: 142 Control set: 15,230	Office (commercial)	2001-2010	+	+13.4%	n/a
Devine and Kok (2015)	USA, CAN	LEED, Energy Star, Boma Best (voluntary)	Building: size, class, age, location in submarket Other: tenant satisfaction, likelihood of renewal, utility consumption	Total: 12,667	Office (commercial)	2004-2013	+	n/a	3.7% (LEED), 2.7% (Energy Star)
Holtermans and Kok (2017)	USA	LEED, Energy Star (voluntary)	Building: size, class, age, location in submarket Other: tenant satisfaction, likelihood of renewal, utility consumption	Certified: 828 LEED, 2,755 Energy Star, 828 both for rent; 195 LEED, 737 Energy Star, 115 both for transaction; Control set: 23,868 for rent / 9,522 for transaction	Office (commercial)	2004-2013	+	6.6% (LEED), 14.8% (Energy Star)	Net rent: 1.5% (LEED), 1.9% (Energy Star). Effective rent: not significant (LEED), 4.1% (Energy Star)

2.5.2 European Studies

The number of studies on European green buildings still lags behind that for US-based properties due to lower information availability, but it has increased in the last years. Most European studies concentrated either on mandatory energy certificates such as EPCs or on residential properties (or both). EPCs are part of the EU's mandatory asset-rating scheme ranging from A to G, with A being the best, "intended to inform potential buyers or occupiers about the intrinsic energy performance of a building and its associated services as built" (Fuerst & McAllister, 2011c, p. 4). This is similar to mandatory ratings for washing machines and other large appliances.

Among studies concerning the price impact of green buildings for the residential asset class, an early study was from Salvi, Horehájová and Mürri (2008) about the price impact of Minergie, a Swiss voluntary certificate for residential properties. Their results indicated a transaction price surplus for certified Swiss single-family homes and apartments of 7 and 3.5%, respectively. According to the authors, buyers pay this premium as this housing

category offers greater energy-saving potential. They also discovered that green building activity was affected mainly by cultural aspects and income differences.

Wameling (2010) analysed transaction prices for German single-family properties and found that lower energy requirements resulted in higher transaction prices of approximately EUR 1.3/sqm per saved kW/h. Nonetheless, the author did not incorporate certification schemes into his analysis but simply compared less energy-dependent with higher energy using houses.

Brounen and Kok (2011) examined the effect EPCs have on residential prices in the Netherlands. Unlike in Germany, access to EPC-related information in the Netherlands is publicly available, explaining the relatively higher number of studies conducted in the Netherlands. Their results suggested that the price premium for Dutch residential green properties, defined as EPC rating classes A, B or C, was 3.6% over non-green comparables with a lower rating. Furthermore, green residential dwellings occurred more often in areas with higher voter support for green political parties and with greater density.

Furthermore, Cajias and Piazzolo (2013) used property and energy usage information from the IPD database to analyse energy consumption effects on German residential properties. Their results showed that saving 1% of energy resulted in 0.45% higher market values and 0.015% higher rental levels. They also revealed positive transaction and rental level impacts of up to 3.2% and EUR 0.76 per sqm, respectively.

Other European studies also concentrated on the residential market, e.g. by examining EPCs in Wales (Fuerst et al., 2016) or Ireland (Hyland, Lyons, & Lyons, 2013). They agreed that (at least) the highest EPC energy class corresponded to generating higher rents and housing prices. The literature about residential properties indicated a positive transaction price impact for certified properties. Nonetheless, all the studies lacked proper comparability among the sets of comparables. Similarly, the EPC scheme is an obligatory certification system. Thus, properties with an A-rating according to the EPC system do not necessarily have the same sustainability standard green buildings have.

While all of the above-mentioned studies focused on residential properties, only a few studies on the European office market exist. For different asset classes in the UK, Fuerst and McAllister (2011c) examined the impact of EPCs and BREEAM certificates on rents, capital values and equivalent yields based on the Investment Property Databank (IPD) database. The authors were the first to test the relationship between voluntary certificates and

transaction values outside the US. Their results showed no significant relationship between an EPC or BREEAM rating and market rent or market values, but a small negative effect on the equivalent yield – indicating a higher purchase price relative to the time-weighted rents. However, the authors based the capital values calculations on appraisal figures that tend to lag behind transaction numbers. In addition, the set of BREEAM-rated properties comprised only 24 properties; therefore, the sample was not representative.

Kok and Jennen (2012) analysed the impact of EPCs on office rental levels in the Netherlands. They found that more efficient buildings with better EPC ratings (A-C) experience rental levels 6.5% higher than less environmentally friendly properties. On the contrary, the aforementioned study from Fuerst and McAllister (2011c) suggested that there was no significant relationship between energy labels and office rental levels. While there were geographical and size-related differences in the two studies by Kok and Jennen (2012) analysing 1,100 properties in the Netherlands and Fuerst and McAllister (2011c) examining 708 properties in the UK, the variability of the findings within the European office market was significant. Nonetheless, one flaw of the study from Kok and Jennen (2012) was that they did not account for the buildings' quality, which might affect the property price and rental levels.

Chegut, Eichholtz and Kok (2014) analysed the London office market and concluded that BREEAM-certified properties were sold for significantly higher prices and showed higher rental levels of, on average, 28%. Nonetheless, their findings demonstrate that for each additional certified property in the area, rent and transaction price effects of certified buildings decreased by 2% and 5%, respectively.

Fuerst, van de Wetering and Wyatt (2013) conducted another UK-based study and analysed 817 rental transactions. Surprisingly, their results indicated that, compared to the control group consisting of properties with an EPC-rating of D, A-C-rated properties and E-G-rated properties were rented at a higher price of 12% and 9%, respectively. The authors could not explain this result, which indicates an error with the chosen set of properties.

Within Germany, research on the impact of green buildings is scarce. Compared to other countries, the German property market is unique, as tenants pay energy costs directly to the energy provider. Thus, property values are not affected by energy costs (Meins et al., 2011). Amecke (2012) assessed how effective EPCs are for German homeowners by conducting a mail survey. While most respondents were aware of the certificates, only 44% trusted that the programme was effective. They considered a personal site visit, the selling party and the

property’s advertising as most relevant for the purchase decision, while the EPCs ranked 7 out of 8. The author concluded that purchases were based on price levels rather than energy consumption.

In a recent German study, Ott and Hahn (2018) used a database from a German investment firm consisting of 160 office properties in Europe to assess their market values. The database included information on an existing LEED, BREEAM, DGNB or another green certificate scheme, as well as the property’s energy usage measured by EPCs. It also captured information on social aspects, such as tenant satisfaction, amongst others. Their findings indicated that the “mere existence” (p. 116) of a certificate does not impact rents or market values. The authors argued that resulting from “the ongoing discussion about sustainability and an increasing number of certified high-quality properties, environmental certification has become market standard” (p. 116). However, their results revealed that the highest certification level leads to increased market value and rents of 43% and 23%, respectively. When accounting for ‘landmark’-typical characteristics, such as exceptional architecture, size or height, the market value and rent surplus decreased to 28% and 13%, respectively.

Surmann, Brunauer and Bienert (2015) analysed 366 observations from the IPD database to assess how energy consumption and EPCs impact annual market values of office properties in German Top-7 cities. Their findings indicated that, while the building age lowers the property valuation by 2% per year for the properties under investigation, energy efficiency has no impact on the market values. Nonetheless, the authors acknowledged that this might result from the small sample sizes of less than 60 in both the energy efficiency and energy consumption subsets.

Bienert (2016) analysed the effect of accounting for voluntary green certificates when making investment decisions for an open-ended fund. He concluded that properties that have a green certification show both higher rental levels and higher market values. However, the author used a relatively small sample of 182 properties, which varied significantly by property age, location, and asset class, making it difficult to generalise the findings.

Table 28: Overview of European Literature about the Impact of Certifications on Transaction Prices and Rents

Characteristics of study							Results		
Author(s)	Country	Certification (type)	Incorporated hedonic characteristics	Sample size	Asset class	Time period	Impact	Magnitude on transaction price	Magnitude on rental levels
Salvi et al. (2008)	CHE	Minergie (voluntary)	n/a	Certified: 159	Residential	1998 to 2008	+	+7% (single-family homes), +3.5% (apartments)	n/a

Wameling (2010)	DEU	None, instead: primary energy demand	n/a	400 buildings in Germany	Residential	Late 2000s	+	+EUR 1.30/sqm per reduced kWh/sqm	n/a
Brounen and Kok (2011)	NLD	EPC (mandatory)	Building: size, age, quality, type, heating Other: neighbour-hood (density, average income, time on market, voting for green)	Certified: 31,993 Control set: 145,325	Residential	01/2008 to 08/2009	+	A vs. D: +10.2% B vs. D: +5.6% C vs. D: +2.2% A-C vs. D-G: +3.6%	n/a
Cajias and Piazzolo (2013)	DEU	EPC (mandatory)	Building: age, location, size	2,630 observations	Residential	2008 to 2010	+	B: +2.27% C: +2.34% D: +2.69% E: none F: none	B: +13.3% C: +13.5% D: +16.3% E: +0.15% F: +0.03%
Fuerst et al. (2016)	GBR (Wales)	EPC (mandatory)	Building: size, age, quality, type, location	191,544 rental transactions	Residential	02/2003 to 02/2014	+	A-B vs D: 12.8% C vs D: 3.5% E vs D: -3.6% F vs D: -6.5%	n/a
Hyland et al. (2013)	IRL	EPC (mandatory)	Building: type, size, bedrooms, bathrooms	40,000 rental transactions, 20,000 rental transactions	Residential	01/2008 to 03/2012	+	A vs D: +9% B vs D: +5% C vs D: +1.7% E vs D: none F vs D: -11%	A vs D: +1.8% B vs D: +1.8% C vs D: none E vs D: -1.9% F vs D: -3.2%
Fuerst and McAllister (2011c)	GBR	EPC (mandatory) BREEAM (voluntary)	Building: size, age, area, location, vacancy rate, lease term, number of tenants	708 commercial properties in the UK, thereof 24 BREEAM-rated	Retail, office, industrial	Q3 2010	None	No effect of certificates on prices	No impact of certificates on rents
Kok and Jennen (2012)	NLD	EPC (mandatory)	Building: size, age, area, distance to public transport, renovated	1,072 rental transactions	Office	2005 to 2010	+	n/a	A-C vs. D-G: +6.5%
Chegut et al. (2014)	GBR	BREEAM (voluntary)	Building: size, age, area, storeys, distance to public transport, distance to road, renovated, lease term Other: investor type	Certified: 68 (sales); 64 (rent) Control set: 2,035 (sales) 1,085 (rent)	Office	2000 to 2009	+	+28%	+24%
Fuerst et al. (2013)	GBR	EPC (mandatory)	Building: size, age, quality, type, rent type, region, lease length	817 rental transactions	Office	2008 to 2010	+ / -	n/a	A-C vs D: +12% E-G vs D: +9%
Amecke (2012)	DEU	EPC (mandatory)	n/a	1,239 survey participants	Residential	07/2010	n/a	n/a	n/a
(Ott & Hahn, 2018)	DEU	Various green certificates (voluntary), EPC (mandatory)	Building: number of floors, construction, vacancy rates, leasable area Location: local supply, access to public transport, medical care Macroeconomic: employment	Set of 366 office properties	Office	2011 to 2014	+	+43% on property valuation (with Excellent certification)	+23% (with Excellent certification)
Surmann et al. (2015)	DEU	EPC (mandatory)	Market values, rents, building characteristics, measures of energy efficiency, location indicators	Set of 366 office observations, thereof 44-57 in the relevant subsets	Office	2009 to 2011	n/a	+0% on property valuation	n/a
Bienert (2016)	DEU	EPC (mandatory)	Building: size, age, area, vacancy Other: unemployment rate	189 properties	Commercial	2010 to 2014	+	+19.9%	+23.6%

2.5.3 Summary: Impact of Green Certificates on Transaction and Rental Prices

Section 2.5 presented the findings from previous research about the impact of green certificates on transaction and rental prices. Several researchers have dealt with this topic,

which is why I concentrated on studies of commercial properties and distinguished between European and non-European geographical focus. The results from non-European studies on this topic revealed that certified properties achieve a transaction and rental price of up to 26% and 17% higher than that of uncertified comparables, respectively. European studies mainly concentrated on the impact of mandatory certificates, primarily EPCs. Properties certified with the best level showed transaction prices that were up to 45% higher than uncertified comparables, with rental values up to 24% higher.

To summarise, these studies indicated that green buildings face higher rental income and transaction prices compared to the uncertified control group. Nonetheless, many studies lacked a proper set of comparable and uncertified buildings. Based on the findings described above, I conclude that a real estate decision-maker most likely accounts for the impact of green certificates to some degree. This conclusion derives from the fact that decision-making literature described earlier in this chapter revealed that the quantitative return is a primary consideration for decision-makers. Similarly, this section showed that previous literature identified a clear impact of certificates on essential cash flow items.

2.6 Conclusion and Implication for my Research

In the literature review chapter, I concentrated on studies with considerable relevance for my research topic, namely real estate investment decisions in Germany. Section 2.6.1 discusses the applicability of the assessed studies to my research. Many interesting findings result from my literature review, but the extensive examination also revealed a significant gap in the literature. This section summarises the findings from previous studies before describing the shortfall in the current state of literature and deriving the research objectives, which form the basis for my research.

2.6.1 Applicability of Studies Discussed in Sections 2.4 and 2.5 to My Research

Sections 2.4 and 2.5 discussed several studies focusing on different geographies. This raises the question of the applicability of the studies' findings to my research, especially in terms of geography and issues of practice within a specific location. As discussed previously, different geographical focuses complicate the direct transferability of findings. Nonetheless, the studies reviewed in these sections are relevant in understanding the state in academic

coverage of real estate investment decisions as well as the impact green certificates have on prices according to the literature.

All the earliest decision-making studies as well as international research on the impact of green certificates on prices and rents focused on the US market. The USA stands out as a country with a large, well-developed real estate market and exceptional high data coverage driven by green standards such as CoStar, especially compared to Europe (Michal, Agnieszka, & Bartłomiej, 2021; Ott & Hahn, 2018). Unsurprisingly, interest in decision-making sparked here, with the first US researchers dealing with the topic in the 1970s, almost 20 years before the initial European study emerged.

A survey on the global efforts surrounding ESG advances in the real estate industry from Jones Lang LaSalle (2021a) found that sustainability and ESG have increased in relevance across the globe. Many companies from the USA, Australia and Europe outpaced local ESG regulations and policies in an attempt to outperform their competitors. While European tenants especially accounted for their employees' wellbeing, US occupiers focused on their environment's expectations and invested more in technologies. These findings indicate that ESG attempts are relevant for all developed countries on a voluntary basis, while corresponding regulations play a relatively minor role. The report confirms this by suggesting a significant increase of ESG target adaption in the real estate sector globally.

Several European studies focused on mandatory EPCs, this can be primarily explained by the general lack of comparable data availability on voluntary certificates in Europe. Most countries track relevant information on EPCs, but prevent the public from accessing such data. The Netherlands are an exception and provide public access to their EPC database, on which the studies from Brounen and Kok (2011) and Kok and Jennen (2012) rely.

Although EPCs are mandatory, which is why it is not possible to draw direct conclusions based on the mere existence of the certificates, the studies about the impact of EPCs on price and rental levels provided valuable insights for my research on the possible impact of green certificates: Buildings with a better EPC rating were sold for a price which was up to 20% higher, while rents were up to 24% higher for better-rated properties. This leads to a possible preference for more sustainable properties, suggesting that real estate decision-makers account for green certificates when conducting investment decisions.

the European office markets are relatively comparable, partly due to their geographical proximity. A study from Michal et al. (2021) indicated that cities with a high degree of green

awareness tended to implement green certificates at a faster pace. Although differences in prices and rents between Eastern and Western Europe exists, reflecting higher market instability in Eastern European countries, the office markets among Western European countries are relatively comparable. Thus, in terms of maturity, volumes, prices, trends and threats that the individual markets face, e.g. through more home office working or challenges due to individual regulations, the Netherlands, the UK and Germany are relatively comparable (Deloitte, 2020; German Economic Institute, 2020; Savills Research, 2021a). Nonetheless, it is impossible to fully transfer the findings from one jurisdiction to another without thoroughly accounting for individual market sizes, as well as regulatory and economic factors, which is why I do not attempt to replicate these approaches in my thesis. Instead, the results discussed in sections 2.4 and 2.5 provide useful insights into real estate decision-making practices and generally concur that green certificates have a positive impact on price and rental levels, respectively – findings that are valuable for developing my research objectives and for approaching my research aim.

I conclude that despite differences between the individual real estate markets' data availability and regulatory requirements, the studies discussed in this literature chapter address large and developed real estate markets. All the studies positively contribute to informing my research topic, namely the understanding of real estate investment decisions and the relevance of green certificates, and to formulating corresponding research objectives.

2.6.2 Summary: Literature Review

In Chapter 2, I presented an extensive, critical literature review of my research topic. I distinguished the broad issue of real estate expertise and green certificates between studies and reports about the German real estate market and green buildings, literature about real estate decision-making, and studies about the economic impact of green certificates on real estate transaction prices and rent levels.

2.6.3 Summary: Literature Review

In Chapter 2, I presented an extensive, critical literature review of my research topic. I distinguished the broad issue of real estate expertise and green certificates between studies and reports about the German real estate market and green buildings, literature about real

estate decision-making, and studies about the economic impact of green certificates on real estate transaction prices and rent levels.

Reports on the German office market showed that the investment appetite increased substantially in recent years. Both the transaction volume and the proportion of certified properties were at a record high in 2019, while the Covid-19 pandemic negatively impacted 2020 figures. Within the German commercial real estate market, offices are the largest asset class, contributing 60% to the total investment volume.

Studies about green certificates revealed their increasing relevance for the German commercial real estate market and the benefits both tenants and real estate owners experience with a certified property. Therefore, I conclude that green certificates have several advantages, and it is likely that decision-makers account for them when conducting real estate investment decisions.

Previous research about decision-making in real estate was conducted through multiple different lenses. They revealed the high relevance of an investment's quantitative return, but also addressed location as a relevant decision-making factor. Studies about the skills of decision-makers indicated the high importance of strategic management and financial skills. The investment decision-making process passes through various phases, including strategic planning and execution. Studies about green aspects in real estate decision-making have mainly dealt with the legislative aspects of decision-making or personal views on certificate schemes, or they have added certificates into a pre-defined questionnaire about investment decisions.

The studies about real estate decision-making generally showed the high relevance of a building's cash flow in real estate investment decisions. For this reason, I have also examined studies about the transaction price and rental values of certified properties. A significant number of studies agreed that certified properties record higher sale prices and rental levels of up to 45 and 24%, respectively. However, the studies for Europe and the US were not unanimous, as some indicated no impact of certificates on price levels. Nonetheless, the consensus from the literature suggests that tenants and future buyers pay a premium for certified buildings. In combination with the high attention paid to the investment's return, this indicates that real estate decision-makers might consider green buildings to be more favourable than uncertified buildings.

From my perspective, these findings suggest that decision-making in real estate is a significantly underexplored topic, and that green certificates might be highly relevant for decision-makers: substantial regulatory pressure and increasing investment volumes indicate a high relevance of green certificates in real estate. Not surprisingly, real estate decision-makers pay great attention to the investment cash flow. Transaction and rental prices are some of the main cash flow drivers. The results from the literature review in Section 2.5 signal the significant impact green certificates have on these factors.

2.6.4 Shortfall in Current State of Literature

Although the literature review findings produced a range of valuable conclusions for my research, I have identified several shortfalls in the literature, which I describe in this section.

First, and closely related to the critique of the study from Jackson and Orr (2011), previous studies on real estate decision-making have almost exclusively relied on a quantitative approach and provided respondents with questionnaires with a set of pre-defined answer possibilities. That way, researchers were able to evaluate the relative importance of previously identified attributes for decision making. However, this procedure does not allow for the discussion of newly emerged topics, or any answer possibilities not included in the questionnaire.

Most studies followed an explanatory approach to research with the aim of explaining a topic instead of exploring it. In addition to this, the prerequisite of the quantitative nature of most of the studies about the cost, transaction and rental level impact of green certificates as examined in Section 2.5 were two sets of comparable buildings. However, several researchers either did not correctly explain how they derived the control set, or simply used non-certified buildings in the same area without accounting for the various other differences buildings might have, including size, tenancy structure, and age. In that way, some of these studies have compared apples with oranges, making the overall reliability of their results questionable.

Second, my study is the first to use the MAU model to explore real estate decision making. While some researchers have used specific models – Huteson and Newell (2016) used the AHP model to conduct pairwise comparisons of the attributes and Jackson and Orr (2011) used a CBC technique to assess the relative comparable value of a pre-defined set of attributes – none of them constructed a decision-making model. The approaches in earlier

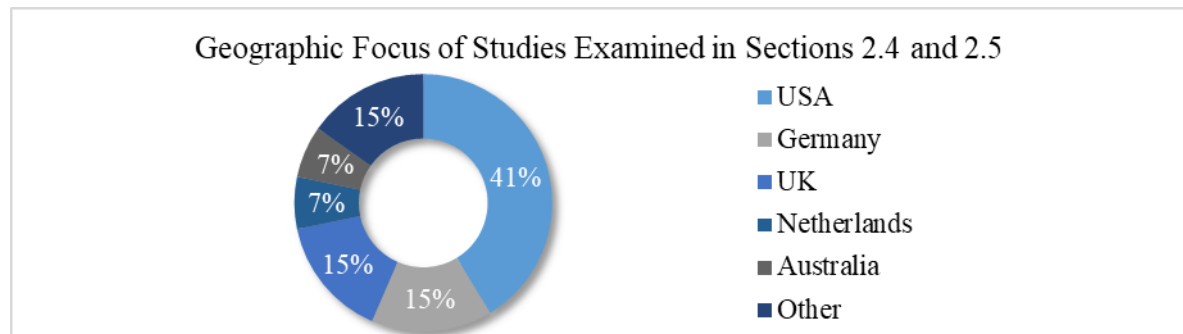
studies resulted in insights into isolated aspects of decision-making, but did not provide a holistic view incorporating all attributes relevant for investment decisions. Another advantage of MAU is that it does not emphasise the definition of specific terms before the interview takes place, allowing the respondents to bring in their own ideas about factors impacting their investment decision while avoiding over-defining a term.

Third, to the best of my knowledge, there is no existing research about real estate decision-making expertise and how green certificates impact it. This result is surprising, as the extensive literature research presented earlier in this chapter suggests that green certificates seem relevant for the real estate industry, with a further increase in importance expected in the future. Nonetheless, only a few researchers have attempted to analyse the impact of green certificates on specific aspects of real estate investment decisions. Many researchers concentrated on the personal attitudes towards green certificates and potential consequences for the legislation. Only Jackson and Orr (2011) aimed to determine the attributes fund managers account for when conducting real estate investment decisions and included an assessment of the BREEAM certificate. However, using the CBC method and standardised questionnaires, their research methodology did not allow for exploring real estate investment decision-making expertise.

Fourth, the findings from Section 2.3 indicate that green certificates are a relatively recent topic that has emerged in the 2000s. In fact, the German DGNB was only founded in 2009, and has since become the most popular certificate scheme. This explains why most real estate decision-making studies have not accounted for sustainability in their pre-defined answer set of relevant attributes. One exception is the study from Farragher and Kleiman (1995), although they only included the relevance of a hazardous waste report. The lack of studies about the impact of green certificates on other aspects than transaction price or rental levels further shows the need for current research that assesses real estate decision-making expertise.

Fifth, there are disproportionately fewer European and German studies compared to American studies. As discussed in Section 2.6.1, the difference in the number of studies is primarily due to the greater data availability in the US resulting from databases such as CoStar, which most of the studies used. In fact, almost half of the studies examined in sections 2.4 and 2.5 had their geographical focus on the USA, followed by 16% in the UK, as shown in Figure 12. 15% of the studies focused on Germany. All the studies concentrating on the impact of green certificates on transaction prices in the German market used information about EPCs,

the EU's mandatory certificates, instead of voluntary certificates. Consequently, available data about real estate investment decisions in Germany is scarce. An exploratory, qualitative approach is needed.



Source: Own presentation

Figure 12: Geographic Focus of Studies Examined in Sections 2.4 and 2.5

Sixth, resulting from the timing of my study, I am able to assess the perceived and expected impact of the Covid-19 pandemic on the views of decision-makers – something previous studies were not able to do. The pandemic started in 2020 and impacted all industries, including real estate, and thus provides valuable and novel insights into the future of the German office market.

2.6.5 Derivation of Research Objectives

The critical analysis of previous studies and the corresponding shortfalls in the current state of literature form the basis of my research questions and objectives. A significant gap in literature results from the lack of exploring real estate investment decisions. Most studies have aimed to assess the relative importance of a pre-defined set of attributes for decision-makers. My study seeks to fill this gap with the First Research Objective:

Research Objective 1: To elicit the expertise of real estate investment decision-makers in Germany.

By conducting face-to-face interviews with real estate decision-makers in Germany, I elicit their expertise. In a phenomenological data analysis procedure, I analyse their responses and derive the essence of real estate decision making expertise. The outcome of RO1 is crucial for the remainder of my thesis as it provides the basis for the other assessments.

Research Objective 2: To derive the attributes that capture real estate investment decision-making expertise.

The next research objective is concerned with the derivation of ten attributes that capture decision-making expertise. I derive the list of attributes by an extensive analysis process of the responses from the First Research Phase, including coding, note-taking and categorising the interview transcripts. The list of attributes fulfils the quality criteria identified by Keeney and Raiffa (1976), namely completeness, operationality, decomposability, non-redundancy and minimality. I cross-check the list of attributes with an expert not participating in my research and with the participants to ensure that the set of attributes is useful and complete.

Previous literature mostly considered risk and return objectives (De Wit, 1996; Farragher, 1982; Farragher & California, 2008; Farragher & Kleiman, 1995; Page, 1983; Webb, 1984; Webb & McIntosh, 1986; Wiley, 1976), while some researchers included the property's location and more descriptive criteria (Armonat & Pfnür, 2004; Ginevičius & Zubrecovas, 2009; Hutcheson & Newell, 2016; Reddy, 2012; Roulac, 2000). My research adds to the findings from previous literature. The explorative approach of my study leads to the derivation of contemporary attributes for decision-makers, thereby avoiding adding outdated attributes in the decision-making model.

Research Objective 3: To evaluate the relevance of green certificates for investment decision-making.

Research Objective 3 builds on the results from research objectives 1 and 2, and is concerned with evaluating the importance of green certificates for real estate decision-makers. I developed this research objective based on the high regulatory attention paid to ESG aspects in real estate and the rising market volumes invested in green certificates, as presented in Section 2.3. From these factors and the overall prevalence of the topic, I concluded that the availability of green certificates might be relevant to the decision-maker.

In addition to discussing green certificates as impacting factors in the First Research Phase, I ask the participants to assign importance scores to each of the ten attributes in Research Phase 2. Thus, I obtain insights about the relevance of *ESG criteria* as a proxy for green certificates in the interviews and am therefore able to assess the relative importance of each attribute by converting the importance scores into an average importance weight. As the list of attributes includes ESG criteria as a proxy for green buildings, the final importance weights provide information on the relative importance of green certificates compared to the other identified attributes.

Research Objective 4: To derive a MAU model for estimating the relative value of a real estate investment opportunity.

The outcomes from research objectives 1 to 3 provide the basis for Research Objective 4. Based on the MAU theory, I combine the findings from the two research phases. As a result, I derive a decision-making model that assists real estate investment decision-making in the German office market. The model can provide relative scores on up to ten alternatives. I name this model OffIn-MAU, as it specifically addresses decisions with multiple attributes in the German office investment market. Research participants and external experts not participating in my research test the model and confirm its usefulness and practicability. Thus, this research results in an operable decision-making model which is novel in both theory and practice.

3. Research Philosophy and Methodology

3.1 Introduction

In this chapter, I describe the chosen approach to my research topic. This chapter is divided into the main components of research philosophy following Miles and Huberman (1994): After presenting my research philosophy, I discuss my thesis' ontology, epistemology and methodology. In Section 3.6, I provide a detailed description of MAU theory before discussing my research design and how I developed the OffIn-MAU model in Section 3.7.

3.2 Research Philosophy

Philosophical views and assumptions are a “system of beliefs and assumptions” (Saunders et al., 2019, p. 130), and form the basis of academic research. When assessing research philosophies, it soon becomes evident that meanings and definitions vary significantly between researchers (Grix, 2019). The emergence of various approaches to knowledge was encouraged by the fact that philosophical views have been discussed since the ancient Greeks and are still debated today. Many philosophical subfields led to different, sometimes contradictory, sets of terms and definitions (Killam, 2013). These research philosophies constitute the research foundation and include setting a strategy, developing a research aim, and collecting and analysing data. Therefore, this section provides popular definitions of the respective terms, whereas the term *research paradigm* constitutes an umbrella term for all philosophical positions (Žukauskas et al., 2018).

Table 29 provides an overview of the main components of research philosophy and shows the chosen approaches for my research, which I will discuss further in this chapter.

Table 29: Definitions of Key Elements in Research Philosophy

Elements	Definition	Chosen approach
Ontology	“assumptions about the nature of reality” (Saunders et al., 2019, p. 133)	Object-oriented ontology
Epistemology	“the theory of knowledge embedded in the theoretical perspective and thereby in the methodology” (Crotty, 1998, p. 3)	Phenomenological epistemology

Methodology	“the strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes” (Crotty, 1998, p. 3)	Qualitative methodological approach
Methods	“the techniques and procedures used to gather and analyse data related to some research question” (Crotty, 1998, p. 3)	Two research phases: 1) semi-structured interviews and 2) a brief online questionnaire to elicit relative attribute preferences Underlying model: MAU (Multi-Attribute Utility)

Sources: Own presentation, definitions from Crotty (1998) and Saunders et al. (2019)

Ontology represents the way we view the world and shape our research outcomes. According to Crotty (1998), the researcher has to first make sense of the essence of the knowable and how they see the world. Based on these chosen ontological beliefs, the researcher should consider how knowledge can be gathered, achieved and communicated. *Epistemology* describes how knowledge is acquired (Burrell & Morgan, 1979). Next, *methodology* is the strategy that leads to the production of knowledge (Grix, 2019). The research *methods* refer to the chosen techniques to approach the research objectives and are independent of the chosen research paradigm (Grix, 2019; Guba & Lincoln, 1994). Nonetheless, researchers often rationalise the research method with their choice of research paradigm (Corbin & Strauss, 2008).

3.3 Ontological Perspectives

Ontology describes how a researcher views the world. It defines the nature of reality and the researcher’s interpretation of what is true (Killam, 2013). In this section, I discuss four ontological views, followed by a presentation of the chosen approach.

3.3.1 Realism

A positivist paradigm is often connected with a realist ontological and positivist epistemological position. Phillips (1987) defines realism as “the view that entities exist independently of being perceived, or independently of our theories about them” (p. 205). The classical, sometimes called naïve, form of realism was branded by Auguste Conte (1798

– 1857). He believed that knowledge should be formulated based on empirical phenomena grounded in scientific laws (Miller, 2000). Classical realists assume that the world is external and pre-defined, not constructed by the human mind. Thus, science can only work through observation and is free of values (Easterby-Smith et al., 2012). This traditional, objectivist ontological view contrasts the social constructivist view of a world consisting only of the individual's perceptions (Lee, 1992), which will be discussed in Section 3.3.2.

There is only one truth about the world for classical realists, and consequently, scientific claims may not be challenged, which discourages critical scientific exchange (Groff, 2004). For this reason, there has been increasing interest in modified versions of classical realism in the last decades to provide an alternative to the positivist image of a single, measurable reality (Maxwell & Mittapalli, 2010). This new ontological form is not unitarily defined but based on a group of theorists and is often referred to as post-positivism.

3.3.2 Social Constructivism

Social constructionism implies that “reality is not objective and exterior, but socially constructed and given meaning by people” (Easterby-Smith et al., 2012, p. 23). In other words, knowledge is the outcome of the researcher's values (Crotty, 1998). Constructionism evolved in the mid-20th century as a counter-movement to reject the value-free axiology of classical realism with subjectivism and value-focused research (Miller, 2000). The paradigm is based on German philosophers around Wilhelm Dilthey, who studied hermeneutics, or interpretative understanding (Clegg & Slife, 2009).

The concept of social constructionism is also closely related to relativism, according to which there are no objective truths. The world is shaped by experiences from interactions with others and does not consist of fixed, external factors. Thus, social constructionism is in stark contrast to the realist ontology. The ontological view of a social constructivist is subjective. By collaboration, interaction and discussions within a set environment, humans actively construct their world. Consequently, social constructivist research concentrates on the interactions between people (Easterby-Smith et al., 2012). There is no absolute truth or falsehood, as multiple realities exist. Constructions can change, similar to the reality connected with them (Guba & Lincoln, 1994).

3.3.3 Object-Oriented Ontology

One ontological view stemming from realism is OOO, as introduced by Harman (1999). This post-realistic approach rejects anthropocentrism and the belief in human specialness and instead claims that reality is independent of the human mind. Thus, “all objects must be given equal attention, whether they be human, non-human, natural, cultural, real or fictional” (Harman, 2018a, p. 8). Consequently, OOO regards all things as objects, regardless of whether we can touch them – like a chair or a human being – or not – like feelings or views. Harman (2018a) branded this idea of treating all objects as equals as “flat ontology” (p. 53).

Related to flat ontology, OOO also rejects correlationism, a term coined by the work of Meillassoux (2009), claiming that the human being cannot directly assess thinking and being, but only the relationship between them.

Furthermore, OOO avoids both *undermining* an object by reducing it into its parts, as realists do, and *overmining* the object by examining it by its relationship to other entities, as social-constructivists do. In that way, Harman (2018a) dissociates OOO from different approaches to research. As Harman (2018a) summarises, an object in OOO is “irreducible in both directions: an object is more than its pieces and less than its effects” (p. 53).

OOO is a form of speculative realism, a philosophical form that was founded in 2007 by a group of four researchers, including Graham Harman. Even though they had significant differences in their philosophical views, they shared their mutual rejection of correlationism and naïve realism. The movement later split into various divisions. Nonetheless, as Harman stated, all forms of speculative realism are speculative according to the fact that they “reach conclusions that seem counterintuitive or even downright strange” (Harman, 2018b, p. 10).

3.3.4 Chosen Ontological Position

OOO is the most suitable ontological position for my research as it centres around objects. All objects are equal, regardless of whether they are physical, such as a real estate property, or a cognitive thing such as the expertise of real estate decision-makers. In that way, I am able to explore the know-how and views of decision-makers without evaluating them by their components (*undermining*) or by examining them through their relationships with each other or their impact on humans (*overmining*).

Following the famous saying from Aristotle, “the whole is greater than the sum of its parts”, this approach enables me to analyse the expertise of real estate decision-makers and even go one step further and obtain more profound insights into real estate decision making. Stated differently, viewing expertise as an object enables me to combine components of knowledge or expertise to derive a detailed image of real estate decision making. Thus, OOO allows me to create knowledge based on the decision-making expertise I assess.

I have also considered realism and social constructivism as alternative ontological positions. While most previous research on real estate investment decisions and corresponding processes followed a realist approach, this is not appropriate for my study for a number of reasons. First, the data basis is insufficient. A purely realistic approach cannot grasp the complexity of real estate investment expertise. Second, and related to the first problem, realists do not consider expertise as an object. Instead, realism would reduce real estate investment decisions to their parts, which is not the appropriate approach to my research questions. Thus, a realist ontological position would not allow me to assess the expertise of real estate decision-makers, as it reduces science to “elements of nature”, thereby assuming that “these are more real than artificial compound things such as languages, societies, armies” (Harman, 2013, p. 189). Third, my research aims to produce generalisable results and derive a thorough understanding of the phenomena under investigation, namely the expertise of real estate decision-makers, with the ultimate goal of creating knowledge based on complex phenomena.

A social constructivist position assumes that the world is shaped by interactions and relationships between and with others. This bears the problem that observations are reduced to their relationships with each other and with human beings, but nothing more. By focusing on the impact and interrelations only, constructivist theories are also unable to account for change (Harman, 2018a). As I will examine the influence of green certificates on investment decisions in real estate, a phenomenon that has attracted increasing amounts of attention in recent years, these ontological lenses are not suitable for my research.

3.4 Epistemological Perspectives

Epistemology addresses the relationship between the researcher and the object as well as with how knowledge is obtained (Creswell, 2007). This section presents positivist and

phenomenological approaches, as well as grounded theory, before discussing the chosen approach.

3.4.1 Positivism and Post-Positivism

Positivist epistemology is associated with a realist paradigm. According to Guba and Lincoln (1994), positivist epistemology is “dualist and objectivist” (p. 110). The researcher and their object are separate entities. Inquiries happen from an observers’ point of view, and the mind is not biased in its view of the world. Knowledge is value-free, and the researcher takes a complete outside position (Guba & Lincoln, 1994).

Dualism cannot be applied to post-positivist research because the researcher influences their research. Objectivity, on the other hand, remains important for post-positivists (Clark, 1998). Post-positivism stems from a realist ontology, relying on general theories that help us make sense of the social world. Post-positivists believe in an objective reality, which can only be grasped to a certain degree (Robson, 2011). To put it differently, research findings cannot be generally adapted for all situations because they have to be examined in context (Clark, 1998). Some phenomena can be observed and tested, while others emerge from social interactions between the participants and thus have to be seen in their social context. As shown by Schumacher and Gortner (1992), in their natural surroundings, observations are seldom fully comparable or equal, which makes it difficult to compare physical observations. For critical realists, “replicated findings are probably true (but always subject to falsification)” (Guba & Lincoln, 1994, p. 110).

3.4.2 Phenomenology

Phenomenologists argue that the mechanic, objectivist view cannot explain human behaviour. In phenomenology, a study has to be conducted directly with humans and seen as a totality (Lee, 1992). According to Creswell (2007), phenomenologists “focus on describing what all participants have in common as they experience a phenomenon” (pp. 57-58). Knowledge is created by studying human experiences, and the aim is “to transform lived experience into a textual expression of its essence” (van Manen, 1990, p. 36). In combination with an OOO view, the researcher identifies a phenomenon or object of human expertise. The research phase then involves assessing the respective phenomenon – i.e. real estate

decision making and green certificates – by collecting and analysing the experiences people had with the phenomenon.

An early philosophical view of phenomenology was provided by Husserl (1900), whose work largely influenced that of Harman (1999). Husserl (1900) assumed that objects are the focus of attention for researchers. He showed the necessity of expanding one's view beyond expectations and structures to evaluate the essence of the phenomenon (Gearing, 2004) and study "the things themselves" (Flick, Metzler, & Scott, 2014, p. 184). Phenomenology was later also shaped by a range of other researchers, who agreed on their perception of investigating the essence of human experiences (Creswell, 2007).

Phenomenologist researchers are concerned with "bracketing" (Gearing, 2004, p. 1), involving the exclusion of the researcher's prejudgements to remain open-minded for data content (Gearing, 2004). In addition, they derive findings through interpreting the data after reducing it to the core of a lived experience (Flick et al., 2014).

3.4.3 Grounded Theory

Glaser and Strauss (1967) developed grounded theory with the intention to create or discover a theory. Today, there are various forms of grounded theory (Charmaz, 2006; Clarke, 2003; Strauss & Corbin, 1990), and an extensive examination of these forms exceeds the scope of this thesis. In general, grounded theory is used when there is a lack of existing theory or literature about a phenomenon. Research participants are often individuals from different locations and backgrounds. The final outcome will most likely be an inductively developed new theory with certain determinants and conditions (Creswell, 2007). According to Moustakas (1994), grounded theory involves "the examination of field notes, study of the transcribed interviews sentence by sentence, coding of each sentence or phrase, sorting the codes, making comparisons among the categories, and ultimately constructing a theory" (p. 4).

3.4.4 Chosen Epistemological Position

Within the OOO position outlined in the previous section, my research is based on phenomenological epistemology. A phenomenological approach aims to generate an in-depth understanding of a phenomenon – the *essence* of the phenomenon – by analysing an individual's experiences. This epistemological perspective allows me to fully examine how

real estate investors conduct investment decisions and how they see green certificates impacting their decisions. That way, I can comprehensively assess the decision-making expertise and the attributes affecting real estate investment decisions to reach my research aim ultimately.

Similarly, phenomenology and OOO are compatible as both disapprove of the positivist approach to explain human experiences. Both argue that behaviour and expertise have to be seen as a totality, and any decomposition efforts would lead to an incomplete understanding of experiences and behaviour (Lee, 1992). Thus, the combination of OOO and phenomenology allows me to explore investment decisions.

Apart from that, I have also considered positivism, post-positivism and grounded theory. For my research aim, grounded theory would imply shifting away from existing approaches and literature instead of developing a theoretical model on real estate decision-making by myself. This approach might be an interesting consideration – however, there is a considerable amount of existing literature on which my research is based. For instance, former studies confirmed the relevance of green certificates in the German market. Disregarding them would lead to completely different research objectives. Therefore, grounded theory is not applicable to my research aim.

Positivist and post-positivist epistemological views are also not applicable. As Miller (2000) noted, post-positivist epistemology encompasses the search for causalities in the social world. However, it makes it impossible to uncover the drivers behind investment decisions and conduct a thorough analysis of the decision-making knowledge. Furthermore, external data is not sufficient to provide a representative analysis of the research topic. Both approaches aim at the explanation of a phenomenon and involve a ‘strict’ research procedure. Instead, I chose to follow a more sophisticated process to explore real estate decision-making expertise and derive the essence of expert knowledge, which is not possible with positivist and post-positivist epistemological approaches.

3.5 Research Methodology

The methodology describes the research procedure and provides the basis for the methods used for data collection and analysis (Creswell, 2007). I broadly distinguished research methodology into qualitative and quantitative methodologies, mixed-methods and case studies.

3.5.1 Quantitative

Quantitative research has an experimental nature and seeks to measure and analyse relationships within a value-free setting (Levy & Henry, 2003). Most commonly associated with naïve realism, quantitative research methodology has been regarded as a somewhat inferior approach to management research (Johnson, Buehring, Cassell, & Symon, 2007). Quantitative analysis emphasises objectivity, generalisability and standardisation of the research procedure (Schwandt, 1996). In addition, quantitative methodologies follow an objectivist position that “evolves around the ontological assumption that the social world external to individual cognition is a real world made up of hard, tangible and relatively immutable structures” (Burrell & Morgan, 1979, p. 102).

The research approach is often deductive, aiming to test a formerly deduced hypothesis (Cooper & Schindler, 2006). Respective measures usually include statistics and large data sets to explain a phenomenon, while qualitative research relies on describing a situation and exploring an issue. Exemplary methods are surveys and questionnaires sent out to a broad set of participants to assess a range of issues, aiming to comprehend a topic within a static setting. The researcher takes an outsider position (Lee, 1992).

3.5.2 Qualitative

Various forms of qualitative research methodologies emerged from a movement away from purely objectivist research positions towards a subjective approach. They agree in their focus on *verstehen* or understanding a problem instead of *erklären* or explaining (Johnson et al., 2007). The researcher strives to explore a problem from a subjective point of view. Through interaction with humans experiencing a certain phenomenon, the researcher takes the role of an insider and generates in-depth knowledge of a phenomenon (Lee, 1992). Instead of focusing on numerical analyses, qualitative research is concerned with language, description and meaning (Cohen et al., 2000). According to Creswell (2007), qualitative research starts with “assumptions, a worldview, the possible use of a theoretical lens, and the study of research problems inquiring into the meaning individuals or groups ascribe to a social or human problem” (p. 37).

Data collection usually involves small data sets which are thoroughly selected and analysed. Corresponding research methods most commonly include interviews with a single or a group of individuals and observations, documents and audio-visual material (Creswell, 2007).

Interviews can be structured, unstructured, or – the intermediate – semi-structured. Semi-structured interviews belong to the most often used interview methods that enable the researcher to use interview questions as guidance and structure. They also allow for the necessary level of flexibility when important topics emerge throughout the research period (Clifford et al., 2016). Semi-structured interviews start with a pre-defined set of topics and key questions and leave the exact questions and order up to the interviewer (Saunders et al., 2019).

As Jansen (2011) points out, face-to-face interviews are a valuable approach to the complex process of deriving relevant attributes for decision-making. A researcher usually conducts single or multiple interviews with the participants. The interpretation and analysis process can be challenging, as the aim is to understand the participants' emotions and reasoning (Moustakas, 1994).

3.5.3 Mixed-Methods

A mixed-methods research design combines quantitative and qualitative aspects of research (Greene, Caracelli, & Graham, 1989). This research form has become increasingly popular since the 1980s (Guest & Fleming, 2015). Creswell and Plano Clark (2011) provide an overview of the development of this methodology. Among researchers, it is a common understanding that mixed-methods research is applicable if “one data source may be insufficient, results need to be explained, exploratory findings need to be generalized, a second method is needed to enhance a primary method, a theoretical stance needs to be employed, and an overall research objective can be best addressed with multiple phases” (Creswell & Plano Clark, 2011, p. 8).

Mixed-methods research combines the advantages of quantitative and qualitative research. For instance, mixing both forms of research allows for the offsetting of potential disadvantages of a purely quantitative setting, such as a disregard of both the participant's personal views and the researcher's biases. Mixed-method approaches move away from the extreme forms of research methodology and enable the researcher to combine methods that were previously regarded as mutually exclusive (Creswell & Plano Clark, 2011).

3.5.4 Case Studies

Case studies are either a methodology that comprises various data collection methods or a research design unto themselves (Howell, 2013). Creswell and Plano Clark (2011, p. 10) see case studies as one form of mixed-methods research. Case studies are comprehensive, empirical assessments and are useful to analyse a phenomenon and connect processes fully. Case studies involve “the study of an issue explored through one or more cases within a bounded system” (Creswell, 2007, p. 73). They usually involve multiple data sources to provide a comprehensive understanding of the researched phenomenon and often rely on both quantitative and qualitative methods. Potential sources of information are interviews, reports and observations (Yin, 2012).

3.5.5 Chosen Methodology

My research follows a qualitative approach, as it focuses on decision-making in real estate, with decisions being subjective and not scholastically well-researched. The methodology has to generate a valid data set on real estate decisions and green certificates to achieve my research goal. I aim to derive a comprehensive understanding of the expertise of real estate decision-makers. The chosen methodology has to allow me to *verstehen* the phenomena being studied. Based on the exploratory nature of my research aim, this is only possible with qualitative research.

My chosen methodology is in line with a phenomenological epistemology and an OOO. To fully understand investment decisions in German real estate and what factors affect them, I conducted interviews. I split my research into two data collection phases: in the First Research Phase, semi-structured, face-to-face interviews allow me to derive the essence of decision-making expertise and explore the experiences decision-makers share. The outcome of the First Research Phase was a comprehensive insight into the expertise of real estate decision-makers and ten attributes that capture their investment decisions. At the end of the First Research Phase, the respondents and an external expert confirmed the usefulness and completeness of the attributes.

The Second Research Phase consisted of ranking the attributes and deriving the OffIn-MAU model. The participants assigned importance scores to each of the ten characteristics via an Excel tool. This procedure ensured complete comparability between the participants and numeric results, which can be weighed and analysed (Cohen et al., 2000). The second data-

collection phase took place entirely online. In contrast, the first round of interviews was either conducted in person or alternatively via video call or telephone – a suitable substitute to in-person meetings (Creswell, 2007). Most respondents especially appreciated this flexibility, as both research stages took place between mid-2020 and early 2021 and coincided with the Covid-19 pandemic. Therefore, most respondents preferred to avoid in-person meetings.

A quantitative view relying on statistics and figures is not suitable to understand and interpret human behaviour. Expertise cannot be analysed from a positivist perspective as it cannot be divided into its parts but has to be examined as a totality. Furthermore, there is no sufficient data basis to analyse my research questions. Applied to my research objectives, it would be possible to conduct a case study on a certain city or a specific real estate company. However, my research aims at developing a rich understanding of real estate investment decisions in Germany, which is why I decided against a case study approach. Furthermore, confidentiality issues make it difficult to assess this topic with a case study approach within a company.

While the Second Research Phase aimed to capture the expertise from decision-makers in numbers, they are to be understood as metaphors for the level of decision-making expertise. Thus, there is no ‘real’ quantitative element in my research, which excludes the possibility of mixed-methods research, too. Instead, my fully qualitative view enabled me to explore real estate decision-making and to derive the OffIn-MAU model, which captures expertise in numbers and is helpful for decision-making practice.

3.6 The Multi-Attribute Utility Model

MAU theory constitutes the basis of the model I aim to derive. It evolved from Edwards’ (1954, 1977) research and was further defined by von Winterfeldt and Edwards (1986), Keeney and Raiffa (1976) and Edwards et al. (2007). This section presents the underlying theory and provides an overview of the literature which adapted MAU theory into practice.

3.6.1 Definition and Purpose

Making decisions with multiple attributes or value drivers can be very complex. Decision analysis can help when dealing with conflicting objectives and evaluating decision

alternatives (Edwards et al., 2007). Attributes describe decision-making problems that are assessed for several alternatives within a multi-criteria framework. This model allows the decision-maker to decide on the alternative based on all attributes that are important to the decision (Jansen, 2011). Attributes are essentially characteristics of a decision (Brennan & Anthony, 2000).

One approach to decision-making is to independently evaluate the attributes and weigh them by their perceived relative significance. The higher the relevance for the decision-maker, the higher the relative weight and resulting impact on the decision. This is the basis of MAU theory and corresponding MAU models (Jansen, 2011). A key feature of MAU theory is its ability to transform personal judgement into a numerical value and to mathematically describe the utility of alternatives for decision-makers and industry experts (Brennan & Anthony, 2000).

Apart from assessing specific alternatives, MAU can also be used to analyse the preferences of respondents. Relative importance weights allow evaluating the relevance of a single attribute compared to the others. That way, I am able to analyse the relative importance of a green certificate for a property, which is the content of Research Objective 3.

The first purpose of MAU theory is prescriptive, similar to all decision-making models – it aims to aid with finding the best alternative (Chapman et al., 1999; Edwards et al., 2007). In my case, the MAU model seeks to support everyday decision-making for German real estate investors. MAU theory also can be descriptive; thus, MAU theory also purports to explain how decisions are conducted and what affects them (Chapman et al., 1999). This is extremely useful for my research, as I attempt to explore real estate investment decisions and, based on the findings, create a model that assists decision-making.

I have decided on MAU theory as it provides a simple but not simplistic view of decision-making. Research from Czerlinski, Gigerenzer and Goldstein (1999) suggests that simple decision-making models regularly outperform more complex ones. Moreover, MAU models match the best understanding of how the brain works: the human mind predicts probabilities that are constructed based on cognition, past beliefs and experiences. If a prediction contradicts what is actually seen or experienced, the brain updates its sensory construct and thus aims to minimise the surprise factor (Omidvarnia, Pedersen, Rosch, Friston, & Jackson, 2017). This idea of a Bayesian brain implies that decisions are made based on causal relationships (Friston, 2012). MAU models use this causal relationship of current knowledge

and predictions of the attributes' attractiveness and allow each user to rely on their personal beliefs.

To summarise, MAU models aim to compare a set of options by assigning importance weights to the attributes. In my case, I use MAU theory to derive the relevant attributes for real estate decision-makers and develop a model to facilitate real estate decision making. The originality of the theory derives from the adopted procedure, as respondents are not presented with a set of pre-defined terms but instead use their own constructs throughout the development of the model. This avoids over-signification of statements and facilitates identifying a set of ten attributes that real estate decision-makers regard as especially relevant. Table 30 provides an overview of terms relevant to the MAU model.

Table 30: Definitions and Terms Relating to the Development of a MAU Model

Term	Definition
Attribute	“Characteristics” that “provide a semantic description of the phenomenon of interest” (Brennan & Anthony, 2000, p. 373). For instance, the size of an apartment is a purchase criterion.
Alternative	“Options where the decision-maker has to choose from” (Jansen, 2011, p. 103). For instance, different office properties.
Attribute scale	Scale in which attributes are measured (Edwards et al., 2007).
Attribute value	Numerical value on the attribute scale representing the attractiveness of the respective attribute for an alternative (Jansen, 2011, p. 103).
Weighting techniques	Techniques to derive the importance score, the single-attribute utility and ultimately the multi-attribute utility (von Winterfeldt & Edwards, 1986, p. 273).
Importance score	“Numerical value that indicates the importance of each attribute. A higher score is generally related to more importance” (Jansen, 2011, p. 103).
Importance weight	“The importance score after transformation such that, for each respondent, all attribute weights add up to one” (Jansen, 2011, p. 103).
Single-attribute utility	“The numerical strength of preference of an attribute level. It results from the multiplication of the attribute value with the attribute weight” (Jansen, 2011, p. 103).
Multi-attribute utility	“The numerical strength of preference of an alternative. It results from the aggregation of single-attribute utilities” (Jansen, 2011, p. 103).

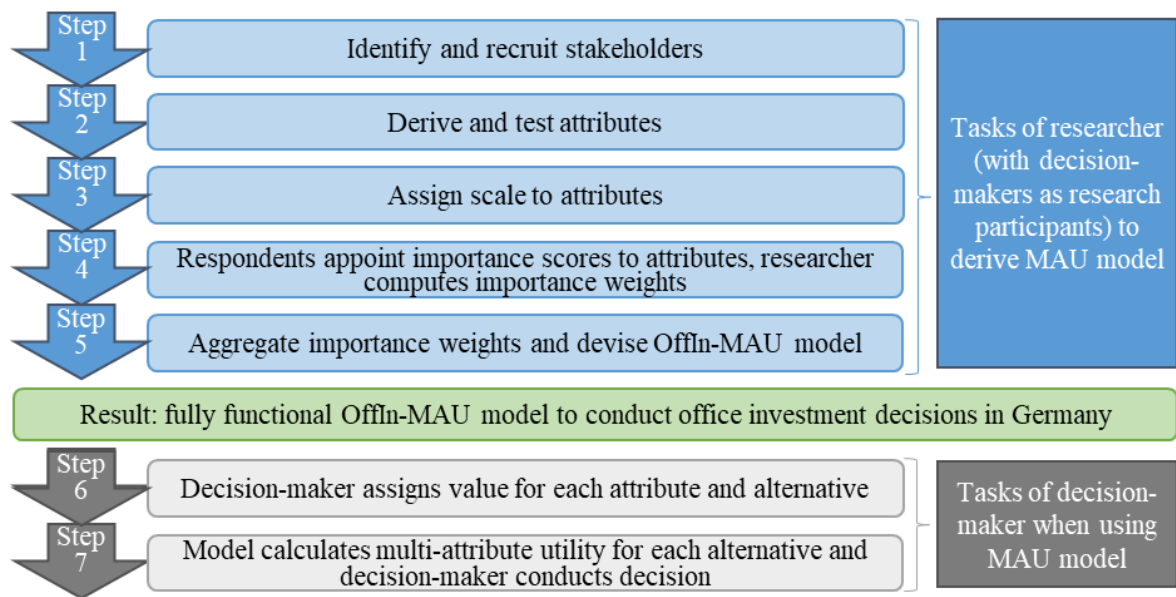
Source: Own presentation based on Brennan and Anthony (2000), Jansen (2011, p. 103) and Edwards et al. (2007)

3.6.2 Developing a MAU Model

The researchers who have attempted to adapt MAU theory into practice (see Section 3.6.4) differed by the steps they followed to develop their MAU model. While most researchers have used five to seven steps (Edwards & Newman, 1982; Eldieb, Marzouk, & Elsaid, 2005; Kim, Kwak, & Yoo, 1998; Ogle, Dee, & Cox, 2015; Roth & Bobko, 1997) to derive their MAU model, the number of steps generally varied between four (Brennan & Anthony, 2000; Torrance, Boyle, & Horwood, 1982) and ten (Edwards, 1977).

The procedure I have used to establish my MAU model is oriented towards the processes adapted from von Winterfeldt and Edwards (1986), Edwards and Newman (1982) and Edwards (1977), and is illustrated in Figure 13. My MAU procedure differs from that of these authors as I do not primarily aim to evaluate different alternatives and make recommendations (e.g. in order to find out which is the real estate investment option with the greatest value), but rather to focus on developing a MAU model which experts can use to evaluate decisions. For instance, von Winterfeldt and Edwards (1986) derive attribute values in step 2 of 5 before calculating importance scores in step 3. This order is possible in their work as the authors only create their MAU model to assess a pre-identified set of alternatives. However, in my case, attributes, importance scores and importance weights first have to be derived as the options are not known yet. In the model application phase – steps 6 and 7 in my procedure – alternatives are then identified and assessed, and the MAU model is put into practice.

The scheme includes seven steps that result in a functional OffIn-MAU model. This thesis covers the first five steps, after which I obtain a useful MAU model, which the decision-maker then implements in steps 6 and 7. This section provides the theoretical background of each step and briefly describes how I approached them in my research. Section 3.7 then goes into detail with my research design and how I adapted each of the steps.



Own presentation, adapted from von Winterfeldt and Edwards (1986), Edwards and Newman (1982) and Edwards (1977)

Figure 13: Seven Steps to Devise and Test the OffIn-MAU Model

3.6.2.1 Identifying and Recruiting Stakeholders

In the first step, the decision-makers and stakeholders have to be defined and recruited to develop the model. Edwards et al. (2007, p. 39) described stakeholders as “someone who can affect or will be affected by the decision”. Thus, stakeholders are interested in the decision and can provide information on the phenomenon under investigation (Edwards & Newman, 1982).

I have identified real estate investors and real estate investment managers active in the German commercial market as the primary stakeholders for my research. A total of approximately 2,500 investors has invested in the German office investment market since 2009, 728 of which were active in 2019 and 2020 (RCA, 2021c). However, this figure only shows the number of firms – each of which is most likely to have more than one decision-maker. Thus, it is almost impossible to talk to all the stakeholders conducting investment decisions. For this reason, I have approached a well-diversified set of investors based on my network. Section 3.7.1.2 explains the participant recruitment process.

3.6.2.2 Deriving and Testing Attributes

A crucial step in the development of a MAU model is the derivation of attributes. Attributes are traits of the phenomenon under investigation. The total of all attributes measures and describes the respective decision (Brennan & Anthony, 2000). For instance, a car purchase

decision could be characterised by the attributes of price, acceleration and environmental friendliness. All alternatives can now be measured against these attributes (Edwards et al., 2007). Alternative terms for attributes are criteria, metrics (Edwards et al., 2007, p. 118), dimensions (Edwards, 1977, p. 251) and value dimensions (Edwards & Newman, 1982, p. 12).

As Keeney and Raiffa (1976) point out, “attributes are not simply handed to us in an envelope at the beginning of an analysis” (p. 64). Instead, the process of finding a proper set of attributes is complex and interwoven. For this reason, there is no ‘how-to’ guide describing the identification of attributes. Instead, the authors influencing MAU theory have developed a range of qualities single and a set of attributes must fulfil. For example, Keeney and Raiffa (1976) have identified two qualities of attributes to support decision making. First, an attribute has to be “comprehensive” (p. 38), meaning that it is understandable and relevant to the decision-maker. It should also be “measurable” (p. 39), implying that it can be used to assess the relative importance compared to other attributes.

To avoid bias in expert assessments of a decision, attributes and assessment criteria in a MAU model should be as simple as possible (Edwards et al., 2007): “To implement rational models in a complex world, it is important to simplify a complex decision environment to a manageable size for analysis” (Edwards et al., 2007, p. 5).

Moreover, a set of attributes has to be “complete”, “operational”, “decomposable”, “nonredundant” and “minimal” (Keeney & Raiffa, 1976, p. 50). The set is complete if it sufficiently describes the decision and no aspect impacting the decision is missing. The term ‘operational’ is related to the idea of decision-making theory, which is to support decision-makers to find the best alternative. Stated differently, a set of attributes is not operational if the information is not attainable or does not contribute to improved decision-making. A set of attributes must be meaningful for the decision-maker and valuable to help them find the best alternative. The term ‘decomposable’ refers to breaking the set further down to solve complex decision-making problems. The set of attributes also has to fulfil the quality of nonredundancy. Thus, attributes should not substitute each other, and double counting has to be prevented. The set of attributes also must fulfil the condition of being minimal in size.

As real estate decision-making is a broad and complex topic, my primary goal in this phase of my research was to derive a set of attributes that complies with the criteria defined by Keeney and Raiffa (1976), especially the requirement of being minimal in size. The smallest number of attributes I derived based on the interviews was ten. Further decreasing this

number would have led to a significant limitation of the applicability of the decision-making model.

Previous decision-making research has indicated that the optimal number of attributes affecting a decision should not exceed ten (Malhotra, 1982). The famous paper from Miller (1954) is titled ‘The Magical Number Seven, Plus or Minus Two’. With this title, the author refers to the attributes people can incorporate into a decision at once. Nonetheless, he notes, “I suspect that there is also a span of perceptual dimensionality and that this span is somewhere in the neighbourhood of ten” (p. 348). Similarly, Ryan (2019) stated that “cognitive fields of ten constructs appear to be a good, but not necessary, rule for defining a particular field of expertise” (p. 99). The author also showed that a set of attributes exceeding the intuitive and widely prevalent number ten becomes more challenging to justify. Thus, previous research confirmed that the intuitive, highly prevalent number ten – the number of attributes I derived based on my extensive analysis process – is an appropriate number of attributes for decision-making problems.

Relating to the nonredundancy criterion mentioned above, it is also crucial to only use direct attributes, not a distinction of other attributes. Developing attributes often involves indirect properties, which are only identified after a repeated analysis of the derived attributes (Edwards et al., 2007). While I have to acknowledge a certain degree of interconnectedness between single attributes, for instance, *quantitative evaluation*, *return* and *property quality*, *features*, I tried to mitigate the resulting bias where possible. To do so, I took much time to identify the final list and went over the phrasing multiple times.

Attributes can be derived by analysing literature, individual face-to-face interviews, or group discussions (Keeney & Raiffa, 1976). Through their interactive nature, groups tend to be more creative and are more likely to produce a set of attributes on which all participants have agreed (Roth & Bobko, 1997) and ensure the same level of information from all participants (Edwards, 1977). Nonetheless, research from Gigone and Hastie (1997) indicates that the accuracy of the average of an individual’s judgements is better than that of a group. In addition, my research participants were extremely busy, and finding a suitable date and time for all participants seemed to be nearly impossible. Furthermore, confidentiality prevented me from disclosing the identity of participants to other respondents. For this reason, I decided to interview each participant individually.

I identified the attributes in an iterative process. First, I explored decision-making in semi-structured interviews. After the First Research Phase, I transcribed the interviews and coded

them. My data analysis process was guided by constant note-taking and data visualisation, as further described in Section 3.7.1.6, to derive a range of preliminary attributes. In line with Edwards and Newman (1982), I first merged terms with a similar meaning and created a value tree. Value trees are a handy tool to structure attributes and analyse decisions. They present the attributes in an orderly manner, ranked by hierarchy, and enhance the organisation of the terms (Edwards et al., 2007).

In the next step, I moved values that were dependent on another value or not important enough for the investment decision (according to the experts) to the lower level of the value tree. Thus, after a process of carefully amending, removing and rephrasing the terms, I developed a set of attributes that was in line with the properties Keeney and Raiffa (1976) identified and described above. By cross-checking the final set of attributes with the respondents and an external expert, I confirmed that the criteria were fulfilled.

3.6.2.3 Assigning a Scale to Attributes

To put the MAU model into practice, measuring and scaling the attributes is an important step. This step involves transforming the attribute into a number, thereby enabling the decision-maker to quantify their preferences and alternatives. For some terms, this task is not as intuitive as it seems. While attributes like return are easy to measure (the higher the return, the more attractive the alternative), others are not. For instance, attributes such as the area's racial composition might influence the site choice of a new drug counselling centre (Edwards & Newman, 1982).

Keeney and Raiffa (1976, p. 40) distinguished between subjective and objective attribute scales. Objective attributes are well-defined with a common understanding of their measurement. For example, profit can be measured in Euros. This is not the case for subjective attributes, which depend on the judgement of the individual. For instance, assessing the comfort level of passengers is not objectively possible. Thus, a new scale has to be developed for this type of attribute (Keeney & Raiffa, 1976).

One key advantage of MAU models is that they are able to transform subjective impressions into quantitative figures, thus making the attributes tangible for decision-makers (Brennan & Anthony, 2000). von Winterfeldt and Edwards (1986, p. 220) suggested adapting natural scales for all types of attributes. Jansen (2011) provided *number of rooms* or *area in meters* as examples for natural scales for decision-making in housing. Natural scales are often

monotone, i.e. “more is always better or always worse” (Jansen, 2011, p. 104). However, monotonicity is not always the case, for instance, when there is a limit on an attribute, such as the number of rooms (Jansen, 2011). The research about environmental planning from Kim et al. (1998) is an excellent example for varying scales and measures: the attributes *agricultural production*, *visibility* and *morbidity* are measured in percent, kilometres and number of persons, respectively. The different scales complicate both assigning a value and an importance weight to the attribute. For this reason, I have aimed to keep the attribute scale clear and simple, as recommended by von Winterfeldt and Edwards (1986, p. 220).

A straightforward approach to measuring attributes is to assign a number of between 0 and 100 to each attribute, with 100 meaning ‘good’ and 0 meaning ‘bad’ (Jansen, 2011; von Winterfeldt & Edwards, 1986). According to Edwards and Newman (1982), this scale is the obvious choice for both subjective and objective decisions, if applicable. The authors also note the value of keeping the scale reasonable. In addition, all attributes are measurable with numerical values, and an attribute scale of 0 to 100 is equal to the weighting scale I used in step 4, consisting of assigning importance scores to the attributes. Thus, to simplify the attribute assessment process, I used a scale of 0 to 100 for each identified attribute.

3.6.2.4 Appointing Importance Scores to Attributes and Computing Importance Weights

In the next step, the attributes have to be prioritised and scored in accordance with their perceived importance. MAU theory proposes that experts conduct this exercise (von Winterfeldt & Edwards, 1986).

There are many possible approaches to deriving the importance score of an attribute – the so-called weighting techniques. These techniques include basic ranking, point allocation, direct rating, pairwise comparisons, ranking and weighting and swing weights (Eckenrode, 1965; Ittersum, Pennings, Wansink, & Trijp, 2007; Ottmann & Lifka, 2011; von Winterfeldt & Edwards, 1986).

The basic ranking technique involves evaluating relative importance scores by sorting the attributes from most to least important. Each attribute is assigned with a number following its position in the ranking, and two values cannot receive the same rank (Ittersum et al., 2007).

Another way to assign relative importance scores to the attributes is by allocating a pre-defined sum, e.g. 100 points, following their relevance (Edwards et al., 2007) – this is the point-allocation method (Bottomley, Doyle, & Green, 2000). One disadvantage of this technique is the high cognitive effort of entirely splitting precisely 100 points to multiple attributes without any remainder. For this reason, participants prefer more straightforward approaches (Bottomley et al., 2000).

The direct rating method is a popular approach in MAU theory. It involves rating each attribute on a pre-defined scale, e.g. from 0 for extremely unattractive/unimportant to 100 for extremely attractive/important (Eckenrode, 1965; Edwards, 1977; von Winterfeldt & Edwards, 1986). Eckenrode (1965) proposes to plot the rating scale, list the attributes next to it and connect each attribute with the respective level on the scale. It is possible to assign multiple attributes with the same value if they are equally important (Eckenrode, 1965). Each attribute is rated independently, while the difference between two values provides insight into the relative importance of each attribute. Nonetheless, the assessment process differs from the point allocation method, which consists of a simultaneous relative rating process, not a separate evaluation, as with the direct rating method (Ittersum et al., 2007).

Pairwise comparisons involve the evaluation of one attribute in relation to another attribute. For all possible pairwise combinations of attributes, the participants decide which one they prefer. After having completed pairwise comparisons for all participants, the researcher aggregates the number of different responses. The relevance of an attribute is determined by how often it was graded as superior to another (Poll, 1997). Based on this theoretical foundation, Saaty (1977) developed the AHP, which was adapted to multi-criteria decision-making by Hutcheson and Newell (2016).

On one hand, this method enables the participant to concentrate on comparing two attributes instead of all attributes at once, similar to the point allocation method (Hutcheson & Newell, 2016). On the other, the assessment process is still significantly more complex and time-consuming than, for instance, the direct rating technique (Ottmann & Lifka, 2011). Moreover, it does not enable the user to assess multiple attributes of a decision at once, but instead requires them to evaluate them in sets of two.

Several researchers prefer the ranking and weighting method (Edwards, 1977; Edwards & Newman, 1982). In the first step, the attributes are ranked following their relevance. Assuming the rating scale is set to a commonly used scale of 0 to 100, the importance scaling process starts by determining the two attributes which are allocated to both extreme values

(Edwards et al., 2007). The most crucial attribute is assigned a value of 100, the least essential attribute a value of 0. These are the anchor points (von Winterfeldt & Edwards, 1986, p. 218). The next step is to assign a number to the next-least important attribute, which constitutes the relative importance of this attribute compared to the least important attribute or both least and most important attributes.

Afterwards, this process is repeated by comparing the next-least important attribute with the least important attribute and so on. For instance, a person looking to purchase a house might consider *total garden area* as the least important criterion and assign a value of 0 to this attribute. Afterwards, *access to a metro station* is identified as ten times as relevant for the decision compared to *total garden area*, and thus is assigned a 10 (Edwards et al., 2007). While this process allows participants to assess the relevance of one attribute over another relatively, this practice also bears disadvantages. For instance, the ranking and weighting method does not permit the individual to allocate the same importance score to all attributes in the theoretical case that the participants consider all attributes equally important. Similarly, the minimum value of 0 has to be assigned to one attribute, although the participants have acknowledged the importance of this attribute already in the prior step of deriving the attributes. To put it differently, although the whole set of criteria is considered highly relevant, the decision-maker is forced to assign a value of 0 to one attribute, as all attributes have to be valued on a scale of 0 and 100.

The relative significance of various attributes is straightforward to evaluate when they have linear utility functions, which is the case for the vast majority of attributes (Edwards et al., 2007, p. 240). Linearity in a utility function is achieved when an improved decision criterion's added value is the same along the whole attribute scale. To give an example, saving lives might be an attribute for a medical MAU study. The value of saving a life does not increase more with the fiftieth life saved than the first life saved. Thus, saving lives has a linear utility function. However, some attributes are nonlinear, e.g. when costs increase at a higher rate after a certain threshold, as discussed in Edwards et al. (2007). In this case, it might be useful to apply another weighting technique: swing weights.

In the swing weight method, the decision-maker first considers the least preferred mix of attributes, e.g. all attributes are set to 1. In the next step, the decision-maker changes ('swings') one attribute to its highest level on the attribute scale. This procedure is continued with the other attributes. Afterwards, the decision-maker assigns a number to each of the attribute combinations, showing how preferred this mix of attributes is compared to the least

preferred scenario – which is assigned a value of 1. Alternatively, this process can be conducted the other way around, that is, by evaluating the attribute sets as a portion of 100 for the best-case scenario (Edwards et al., 2007).

In my case, all attributes have linear utility functions. Thus, I considered rather simple methods. However, the ranking method does not account for relative differences between the attributes and only assigns numbers from 1 to 10 in the case of ten attributes. All other techniques discussed in this section have the advantage of accounting for the relative importance between the attributes. One disadvantage of the point distribution method is that decision-makers face a more complex task by distributing 100 points and thereby assessing all attributes at once. I consider splitting 100 points as more time-consuming and thus more likely to lead to an ill-considered result compared to the direct ranking method. Similarly, pairwise comparisons are laborious as they involve the relative comparison of all potential attribute pairs.

Although it is used by a range of MAU researchers (Brennan & Anthony, 2000; Carretero-Gómez & Cabrera, 2012; Ogle et al., 2015), a negative point about the ranking and weighting method is the fact that decision-makers are forced to assign the worst and/or best rating to any of the numbers. What if various attributes are considered equally moderately important and none really unimportant? This disadvantage can be mitigated by using direct weighting; a simple, easily understandable and proven method (Bottomley et al., 2000).

While the direct weighting method involves the individual assignment of a score between 0 and 100 for each attribute, it is possible to account for relative scores by assessing all attributes shortly after one another. This can be further supported by including visual elements into the assessment process (Creswell, 2007). Thus, I ultimately decided on the direct rating method because it is intuitive, simple, time-saving and allows decision-makers to assign relative weights to each attribute in a structured procedure.

MAU experts use various weighting scales in this MAU construction step, including scales from 0 to 10 (Eckenrode, 1965); 1 to 10 (Ogle et al., 2015); 10 and multiples of 10 (Edwards, 1977; Roth & Bobko, 1997); 10 to 100 (Poll, 1997); and, most commonly, 0 to 100 (Brennan & Anthony, 2000; Carretero-Gómez & Cabrera, 2012; Keeney & Raiffa, 1976; von Winterfeldt & Edwards, 1986). I decided to use a scale from 0 to 100 for the direct rating method, with 100 being the best, as this scale is intuitive (Edwards et al., 2007), most widely used in literature and applicable to my researched phenomenon.

After the respondents assigned importance scores to all attributes, I could derive importance weights for each attribute. In this “purely computational step” (Edwards, 1977, p. 252), the importance scores are normalised so that they add up to 1. Eckenrode (1965) proposes to aggregate the individual weights assigned by the experts with the simple average formula. First, the individual rating assigned by a respondent has to be normalised and transferred into an attribute weight as follows (Eckenrode, 1965, p. 184):

$$w_{ej} = \frac{p_{ej}}{\sum_{j=1}^m p_{ej}}$$

where p_{ej} is the individual importance rating assigned by respondent or expert e for attribute j , and w_{ej} is the relative importance weight assigned by respondent e for attribute j , and m is the number of attributes. For instance, if an expert has assigned 80 points to attribute A and has allocated a total of 640 points to all attributes, the importance weight for attribute A is 0.125. The sum of all weights from expert e for m attributes $\sum_{j=1}^m p_{ej}$ equals 1, i.e. all attribute weights for an expert add up to 1.

3.6.2.5 Aggregating Importance Weights of Attributes to Devise MAU Model

In the next step, the normalised individual importance weights that I derived based on the decision-maker’s assessment in step 4 have to be aggregated in order to form the MAU model. The weights assigned to the attributes can be described as probabilities. A key advantage of probabilities is that they are additive if the events are mutually exclusive (Edwards et al., 2007).

The formula to transform individual weights for each attribute j by respondent e into a group consensus is the linear weighted average formula (Eckenrode, 1965, p. 184):

$$w_j = \frac{\sum_{j=1}^n w_{ej}}{\sum_{e=1}^n \sum_{j=1}^m w_{ej}}$$

where w_j is the aggregated importance weight of attribute j and n is the total number of respondents. In addition, the sum of m weighted attributes $\sum_{j=1}^m w_j$ equals 1. Thus, the linear average of each individual’s weight results in the total weight for this attribute for the MAU model.

Although the calculation is straightforward, this exercise should not be underestimated. Its result forms the basis for the MAU model about real estate decision-making in Germany. Furthermore, the relative attribute weights form the basis for future usage of the model.

Edwards and Newman (1982) also consider simply averaging the weights as an appropriate approach to derive the overall weights for the phenomenon. However, they note that this procedure disregards outliers in individual assessments, especially when different stakeholders have opposite interests (Edwards & Newman, 1982). As discussed before, this is usually not the case for real estate investment decisions, which is why I considered averaging the individual weights as an appropriate measure for aggregating the expertise.

3.6.2.6 MAU Model in Action: Decision-Maker Assigns Value for Each Attribute and Alternative and Conducts Decision

In steps 1 to 5, I have developed a functional MAU model for conducting real estate investment decisions in the German real estate market, which I named the OffIn-MAU model. The model provides an overview of the criteria that affect investment decisions. By ranking and weighing the alternatives, the respondents also reveal their personal preferences, which enables me to evaluate how relevant green certificates are for the decision, resulting in achieving Research Objective 3. In the next step, the MAU model has to be put into practice.

The key ambition behind MAU models is to assist the decision-maker with choosing the best alternative (Jansen, 2011). The OffIn-MAU model provides the basis for conducting real estate investment decisions in Germany. One key ingredient to evaluating alternatives are the alternatives themselves. For instance, an investor might look at several real estate properties but can only acquire one of them. Apart from optional amendments of the importance weights, the alternatives are the only ‘changeable’ part of the model. Therefore, steps 6 and 7 deal with evaluating alternatives and reaching a decision.

As briefly discussed before, one key difference between my approach and that from Edwards et al. (2007), von Winterfeldt and Edwards (1986) and Edwards and Newman (1982) is that these authors include the evaluation of alternatives at an earlier point of their model construction. For instance, von Winterfeldt and Edwards (1986) assessed alternatives on each attribute as the second of five steps. However, this is only applicable if the other options are known at this point. As mentioned before, in practice, the decision-makers who use the

model are the ones who appraise the alternatives, which is why I was not able to include this step earlier in my MAU model.

From a practical point of view, the decision-maker evaluates every attribute for their alternatives. The respondent assigns a number along the scale defined in step 3. Thus, the decision-maker estimates how many of the 100 points for the attribute are earned by that alternative (Edwards et al., 2007). For instance, the decision-maker might consider that in *ESG criteria*-terms, Property A earns 100 points to this alternative and attribute – the *attribute value* for this alternative. The decision-maker then assesses the next attribute and assigns an attribute value of 50 to *location within submarket*. The decision-maker continues with this process until all alternatives are rated for every attribute.

In the next step, the model derives the total utility for each alternative. The MAU model aims to maximise utility for the decision problem (Keeney & Raiffa, 1976). Stated differently, the alternative which achieves the maximum number of weighted points for all attributes is the most attractive choice.

Von Winterfeldt and Edwards (1986) propose a few different approaches to deriving the multi-attribute utility of an alternative, whereas the most practical and common approach follows simple additive aggregation rules. Another less frequently adapted method is multiplicative aggregation. The linear addition incorporates all necessary input factors for deriving the best alternative, and the process of weighting the attributes has diminished any potential divergence between two attribute values (Jansen, 2011). Thus, the sum of all attribute values weighted by the pre-defined weights will result in a total numerical value for each alternative, the multi-attribute utility (Edwards et al., 2007).

The equation for deriving the linear additive utility U for each alternative i is as follows (Edwards, 1977, p. 253):

$$U_i = \sum_{j=1}^m w_j u_{ij}$$

where $\sum_{j=1}^m w_j = 1$ so that the total weight of the attributes equals 1, w_j is the relative importance weight as derived in step 5 on the j th attribute, and u_{ij} is the value the decision-maker assigns in step 6 for each alternative i and each attribute j .

As the reader might note, this formula is simply the weighted average. Edwards et al. (2007) have conducted an extensive literature analysis about simple averages' ability to capture

individual probabilities effectively. Their study included research from Seaver (1978) and Clemen and Winkler (1990) and concluded that “simpler aggregation methods perform better than more complex methods” (Edwards et al., 2007, p. 165).

In addition, according to Keeney and Raiffa (1976), deducing the utility function by adding the individual weights or multiplying them should be the preferred procedure for problems with more than four attributes. As I have identified a total of ten attributes, I have found enough evidence to apply the simple additive formula to my MAU model. Afterwards, I tested it with dummy numbers before asking the respondents to test the model with real alternatives.

As part of developing the MAU model, I wondered: how can I maximise the likelihood that decision-makers apply my model to their real estate investment decisions? MAU theory evolved from the academic subject called decision analysis. Many researchers in this academic field, labelled “evaluation researchers” (Edwards & Newman, 1982, p. 13), are confronted with whether their evaluation is applicable to practice. There are three courses of action to increase the likelihood that decision-makers adopt evaluations.

First, decision-makers should be included when developing the model. Therefore, real estate investment managers are my target research participants, as they are the group who would use my model. Second, the ‘ingredients’ of the MAU model should be applicable to the decision. I ensure this by closely involving the decision-makers in the iterative process of deriving and checking the attributes and the attribute scales. Third, the evaluation should be easily understandable and formulated as succinctly as possible. Long, academic documents are not attractive to decision-makers and should be avoided (Edwards & Newman, 1982).

3.6.3 The Advantages of MAU

MAU theory involves several advantages. They are the reason I chose to develop a MAU model for real estate decision-making. First and most importantly, MAU models allow quantifying subjective judgements, which “makes coexistence of judgmental and objective measurement within the same evaluation easy and natural” (Edwards & Newman, 1982, p. 9). Know-how and personal views can be converted into a utility function (Dabous & Alkass, 2010). Therefore, MAU theory enables me to assess real estate investment expertise and the subjective process of conducting investment decisions.

Second, MAU models enhance the comprehension of difficult interlinkages between attributes or values by being both prescriptive and descriptive. Many evaluation researchers distinguish between appraising a procedure or technique and evaluating its result. MAU theory combines both: on one hand, it allows describing decision making. Both parts of my research resulted in a description of real estate investment decisions. On the other, MAU models aim to assist the decision-maker with finding the best alternative. Thus they are also prescriptive (Edwards et al., 2007; Edwards & Newman, 1982). The support of experts with constructing the model further enhances the applicability of MAU models into practice (Carretero-Gómez & Cabrera, 2012).

Third, MAU theory is relatively easy to use and fast to adapt. If a time-sensitive decision is due, the usage of judgemental values makes it possible to derive a decision-making model in a relatively short period of time. Even if the inputs are purely subjective and another decision-maker disagrees, the model at least points out the attributes and makes it possible for the second decision-maker to grasp the aspects of opposition. A MAU model, which is established within a few days, might rationalise a critical decision (Edwards & Newman, 1982). Related to this, the structure of a MAU model makes a decision more defensible and acceptable (Roth & Bobko, 1997).

Fourth, MAU models incorporate a broader range of attributes into a decision, while classical utility analysis does not. Utility analysis only focuses on the quantitative consequences of a decision. It does not incorporate multiple aspects of decision-making, so MAU is the preferred method to analyse decisions with various elements. In addition, MAU models allow accounting for different perspectives on a problem, e.g. different positions within a firm (Carretero-Gómez & Cabrera, 2012).

3.6.4 MAU in Practice

Several researchers have adopted MAU theory in practice for different fields of research. This section provides an overview.

Roth and Bobko (1997) have applied the MAU method to human resource management. They found various advantages of using the MAU technique for employee selection, including accounting for subjective and objective criteria and multiple attributes. In addition, their findings indicated higher involvement of the decision-maker in developing the MAU leads to higher acceptance of the model. Nonetheless, the authors did not apply the MAU

model, but instead created a theoretical construct based on human resource literature. Therefore, even though it has proven the applicability of the MAU theory, I could not draw any additional conclusions for the praxis from this paper.

Carretero-Gómez and Cabrera (2012) built on the findings from Roth and Bobko (1997) and applied the MAU procedure developed by Edwards and Newman (1982) to employee training in a personal banking programme. A group of 13 experts from different stakeholder groups, including supervisors, trainers and trainees, derived 16 attributes. Each participant weighted the attributes according to their importance. Similar to my approach, the weighted average of the individual weights resulted in the total weight for the respective attribute. The authors concluded that MAU models were very applicable to testing the outcome of human resources interferences, *inter alia*, due to their ability to incorporate different viewpoints into a decision.

Kim et al. (1998) have researched the MAU application to environmental planning in Korea. The authors used the seven steps identified by von Winterfeldt and Edwards (1986) to develop an understanding of integrating sustainability interests into electricity planning. Interviewing regulatory experts and researchers revealed nine attributes. The experts then ranked the attributes by using the swing weights method. The authors discussed the advantages MAU theory has for policy decisions, including its flexibility and ability to provide multiple alternative approaches and not only one recommended action.

Jansen (2011) provided an interesting example of a MAU application to residential housing purchase decisions. The author used a set of attributes from an older study and asked 2,000 home buyers to rate the pre-defined attributes on a scale from 0 to 100. This process resembles my approach to derive relative weights. Her results indicated that pricing and the local environment are the two most relevant factors for housing purchase decisions. The research was based on a component survey of a broader questionnaire on housing acquisition preferences, which is why it was possible to reach many study participants. However, the author noted that her preferred weighting method was the ranking and weighting technique, which was not possible, as it was considered as being “too difficult” (p. 121) in a telephone interview. Although the author used the direct rating method instead, the high and low ends of the direct rating scale were not always clear for the attributes under investigation – a clear difference to my MAU model. For instance, a rating from *bad* to *very good* does not apply to the number of rooms. The researcher also acknowledged another disadvantage of her methodology: she only included a small, pre-defined set of attributes.

Other research fields which adapted MAU theory were medical or nursing studies (Brennan & Anthony, 2000; Chapman et al., 1999; Schapira, Gilligan, McAuliffe, & Nattinger, 2004), the assessment of performance trade-offs on balance scorecards (Youngblood & Collins, 2003), benchmarks for the warehousing industry (Collins, Rossetti, Nachtmann, & Oldham, 2006), pipeline projects (Eldieb et al., 2005), safer design processes in the chemical industry (Ogle et al., 2015) and bridge management (Dabous & Alkass, 2010), among others. A discussion of their findings is out of the scope of this thesis.

Most previous researchers who have applied MAU theory to different kinds of research fields used a group discussion format to either derive or test the attributes. This has not been possible in my case due to two main reasons: first, the respondents were busy and arranging a group meeting would have been difficult, especially since some did not live in Frankfurt. Second, my field research coincided with the Covid-19 pandemic in 2020, most companies switched to (part-time) working from home and advised their employees to avoid in-person meetings. Large group meetings were usually not tolerated. For this reason, I decided to conduct as many in-person meetings as possible and alternatively offer telephone or video interviews. The respondents reacted positively to this flexibility.

Another interesting aspect that emerged throughout the literature research is the divergent interpretation of attributes. As Keeney and Raiffa (1976) note, there is no common understanding of the term, similar to other popular words in MAU theory. For instance, the attributes “number of rooms” and “residential environment” (p. 115) in the example provided by Jansen (2011) have attribute levels from 2 to 4 and urban to rural, respectively. Thus, instead of estimating the level of an alternative for an attribute on a scale between 0 and 100, the respondents in the research from Jansen (2011) could only choose between two to three attribute levels. This procedure decreases the extent to which an expert can fully express their expertise and evaluate the attribute.

Furthermore, many previous researchers adapting MAU models have derived several hierarchical attribute levels. Leading MAU theorists such as Keeney and Raiffa (1976) and Edwards and Newman (1982) advised doing so to increase the clarity and hierarchy of the attributes. In my research, I also used the value tree (Edwards & Newman, 1982) to support filtering and deriving the attributes that affect decision making. However, other than researchers such as Brennan and Anthony (2000), Carretero-Gómez and Cabrera (2012) and Kim et al. (1998), I have only used the highest hierarchical attribute level for further MAU analyses. The reason is that I aim to make the model as usable as possible in practice by

keeping the number of attributes to a minimum, as proposed by Keeney and Raiffa (1976). In addition, I wanted to avoid over-defining the attributes. Instead, I confirmed that the terms were clear to the decision-makers by testing the attributes but similarly made sure that each expert conducts weighting and ranking decisions based on his or her own interpretation or expertise with the respective attribute.

3.7 Overall Research Design

This study is exploratory, i.e. it aims to explore green building certificates and real estate investment decisions and to elicit decision-making expertise. The expertise of real estate decision-makers is essentially an object. Thus, it is necessary to apply a proper and suitable research design.

Following MAU theory, I have divided my field research into two phases. They blend into the five steps to develop my MAU model, as presented in Section 3.6, and allow me to fulfil my research objectives. In the First Research Phase, I identified the relevant stakeholders – real estate professionals and investment managers who are active in the German office market. Section 3.7.1 describes stakeholders and research participants. In an iterative process of exploring their expertise, I derived the most significant determinants to real estate decisions, including the ESG conformity of the buildings. Thus, I developed the set of decision-making criteria or attributes based on the expertise I elicited from the interviews. I was constantly revising the attributes based on multiple feedback rounds with the respondents. Research Phase 1 corresponds to steps 1 to 3 in the MAU model construction process and results in achieving Research Objective 1.

In the Second Research Phase, I asked the participants to rank the attributes that I derived based on the findings from the First Research Phase by the perceived significance on their real estate investment decisions. Due to Covid-19 and for efficiency reasons, this research phase took place online. As explained before, in line with popular MAU researchers such as von Winterfeldt and Edwards (1986), I aggregated the results by using weighted linearly added values. This procedure is illustrated by steps 4 and 5 in the MAU construction guide. The results from the Second Research Phase led to the achievement of research objectives 3 and 4. Figure 14 provides an overview of the two research phases.

Research Phase	Aim	Outcome	Corresponding Steps presented in Chapter 3.6.2	Corresponding Research Objectives
1	Explore real estate decision making-expertise in Germany	Ten attributes that explain real estate investment decisions	Steps 1 - 3	RO 1 - 2
2	Test and rank attributes and develop model	The OffIn-MAU model that supports real estate decision-making in the German office market	Steps 4 - 5	RO 3 - 4

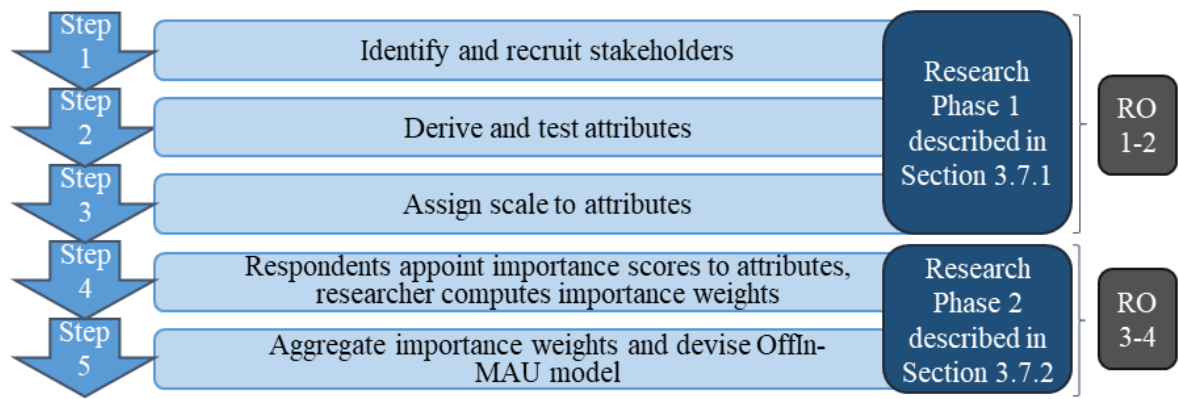
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Figure 14: Two Research Phases to Derive the OffIn-MAU Model

For Research Phase 1, pre-defined questions guided the interview process and made the interview results comparable. Similarly, semi-structured interviews left sufficient freedom to go into detail with certain topics, varying from participant to participant. Furthermore, I conducted the interviews in person, if possible. That way, I was able to react to particular topics emerging throughout the interview process. However, due to the Covid-19 pandemic, many participants preferred not to meet in person. In this case, I offered them the opportunity to conduct a video or telephone interview, which Creswell (2007) regarded as a suitable alternative to personal meetings. My research explores individual experiences with real estate decision-making and green certificates and how they impact real estate decisions, which is why focus groups were less appropriate for my research.

For Research Phase 2, interview questions and results were more standardised in order to derive comparable, numerical results. I have established an Excel sheet with an instruction tab and two tabs where the participants could insert the relative weights for core and value-add investments. The final outcome of the Second Research Phase was the OffIn-MAU model. As mentioned before, my research concentrated on real estate investment firms active in the German market focusing on German office properties.

Section 3.6 presented the five steps to derive the MAU model. In this section, I elaborate on the practical adaption of the five steps. The remainder of this section describes how I found and recruited the stakeholders, how I derived the attributes, how the participants ranked and weighted the attributes and how I created the OffIn-MAU model on real estate decision-making. I have distinguished between activities related to the First Research Phase and tasks related to the Second Research Phase. Figure 15 shows the steps which I introduced earlier and how their adaptation fits into my research.



Own presentation, adapted from von Winterfeldt and Edwards (1986), Edwards and Newman (1982) and Edwards (1977)

Figure 15: Five Steps to Derive the OffIn-MAU Model in this Thesis

3.7.1 Research Phase 1: Exploring and Capturing Expertise

In the First Research Phase, I explored real estate investment decision-making expertise. This section describes how I applied steps 1 to 3 of the MAU development guide, namely stakeholder identification and recruiting and attribute derivation, measurement and scaling.

3.7.1.1 Identifying Participants

The first step was to identify stakeholders for the MAU model. In my case, I identified real estate investors and real estate investment managers active in the German office market as the primary stakeholders. The stakeholders were similarly my interview participants who provided me with information on the problem (Edwards et al., 2007) – in my case, how to decide on an office investment property in Germany and how relevant green certificates are for this process.

As presented before, the total investment volume spent in the real estate office asset class in 2020 amounted to EUR 26bn (BNP Paribas Real Estate, 2021a). In 2019 and 2020 alone, more than 700 firms purchased office properties in over 1,200 transactions in Germany (RCA, 2021c, 2021e). Some of these firms are subsidiaries of another company, but this number is obviously much too large for my purpose. Thus, I decided to reach out to a smaller number of individuals from diversified backgrounds within this target group.

Regarding interview participants, I followed the purposeful sampling strategy. Purposeful sampling implies a selection of study participants based on their ability to inform the researched phenomenon thoroughly. As phenomenological epistemology suggests, I selected individuals who have experienced the same phenomenon for the study (Creswell,

2007). Furthermore, as Creswell (2007) points out, the participants have to be “individuals who are not hesitant to speak and share ideas” (p. 133).

As Edwards and Newman (1982) proposed, I targeted individuals who were most likely to adopt my model and use it in practice. Thus, I focused on real estate professionals and decision-makers active in the German office real estate market. To ensure that the participants had a sufficient level of experience in the real estate sector and that they were able to evaluate changes, I concentrated on participants who have been in a decision-making role for four years or more. I considered individuals who worked at a firm that has acquired an office building within the past 12 months, are active in the German market and belonged to the following target groups:

- investment managers in different levels of hierarchies, including head of investment/transaction management
- senior asset and portfolio managers, if they were actively engaged in transaction decision-making, or
- chief investment officers (CIOs) and chief executive officers (CEOs), if they were actively engaged in transaction decision-making.

A single person seldomly conducts decisions within a company. Instead, the final purchase decision was driven by an investment committee consisting of several relevant persons within the firm (Bailey & Richards, 2017). Some of the research participants were part of this committee, as confirmed in the interviews. All of the remaining participants were directly involved in the acquisition process of the respective company.

3.7.1.2 Participant Recruitment

I recruited participants by using a mix of targeted invitations and the snowballing technique: In the first step, I reached out to potential respondents based on my personal network and second-degree contacts, which I had developed within the last seven years of working in finance and real estate. Based on these networks, I found ten research participants from different backgrounds. In addition, I contacted 12 potential participants via email without prior contact or connection, of whom two responded positively, two declined due to confidentiality issues, and eight did not respond.

In line with the approach from Roberts and Henneberry (2007), I also used the snowballing technique until data saturation was reached. This method implies the referral of future participants through the network of existing participants. Thus, I asked each of the first interviewees whether they could refer or recommend a real estate decision-maker from their network. I thereby expanded my network (Bleich & Pekkanen, 2013) and reached a broader set of decision-makers in real estate. This procedure worked well. Most participants were able to refer one or two potential participants. I either reached out to them via email, or the original participant sent an introductory email to set up the contact. As a result of the snowballing technique, ten additional experts agreed to participate in my research project, leading to a total number of 22 interviews.

The initial contact with most potential participants was via email or telephone. I sent them a brief overview of my research plan. If they were interested in participating, I provided them with the official interview invitation material. Following the approach from Schmidt (2017), the official interview invitation material consisting of background information, a brief description of my study aim and an informed consent form, which I sent out to the interested participants via email. Appendix 1 shows the invitation material. To prevent any bias in the respondents' answers to my interview question regarding the relevance of green certificates, I left my study focus on green certificates out of the interview invitation material. In case the real estate decision-makers did not mention green certificates, I specifically asked for their view on green certificates towards the end of the interview.

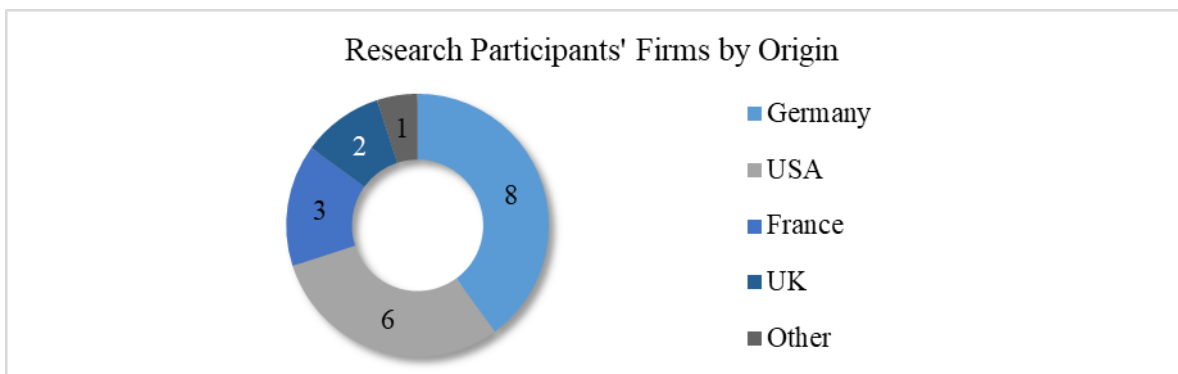
I created the informed consent form in line with the guidelines from Daymon and Holloway (2010) as well as the *University of Gloucestershire Handbook of Research Ethics* (University of Gloucestershire, 2021). This form helped to ensure that the participant provided informed consent, was aware of the procedure and nature of my research and understood their right to withdraw from the interview at any time (Qu & Dumay, 2011). The respondents signed the informed consent form at the beginning of each interview or signed it remotely and sent it to me directly after the interview. This procedure confirms the interviewee's understanding of the research aim and setting, intent to participate in the research and their permission to use their data (Daymon & Holloway, 2010).

3.7.1.3 Description of the Set of Participants

The participant recruitment procedure resulted in 22 interviews with industry experts from 20 different companies active in the German office market. Four respondents worked for the

same two companies but in different teams and with different responsibilities. Two participants were female; the other 20 were male. A total of 13 respondents held upper management positions, including two managing partners and six country heads. The other nine interviewees were (senior) transaction managers or directors with several years of experience.

Figure 16 shows the country of origin of the firms for which the respondents worked. Although 12 of the 20 companies did not originate in Germany, all participants were active in the German market. Almost all firms of international origin had representative offices in Germany. The vast majority of participants were German native speakers. Only one participant was an English native speaker and, although the person was able to speak German, too, preferred to conduct the interview in English.



Source: Own presentation

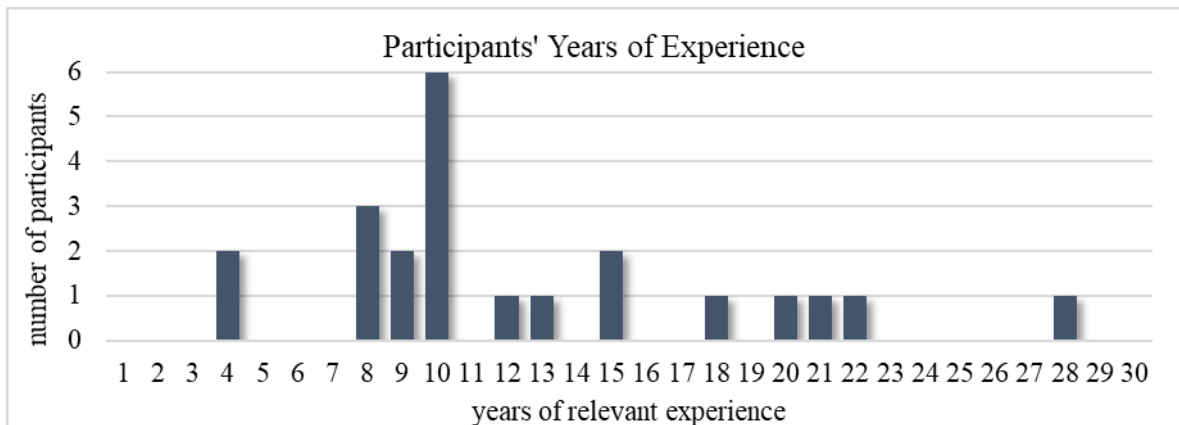
Figure 16: Research Participants' Firms by Origin

Three of 22 interviewees preferred to conduct a telephone interview. I met the other 19 participants either in person or online via a video call. I preferred seeing the other party, but I did not have the impression that the quality of the interviews or their outcome was adversely affected by me and the participants not being able to see each other.

Out of a total transaction volume in the German investment market of EUR 39bn in 2019, approximately EUR 8.3bn was contributed by the 20 companies included in my research (RCA, 2021c), or 21%. I consider this amount quite impressive, considering that at least 500 investors have been active in 2019 in the German office market, and I interviewed people from 20 companies.

Figure 17 shows the number of work experience in years each of the participants had at the time of conducting Research Phase 1. The average relevant experience in real estate

investment was 12.5 years, with a minimum of 4 years and a maximum of 28 years of relevant experience.



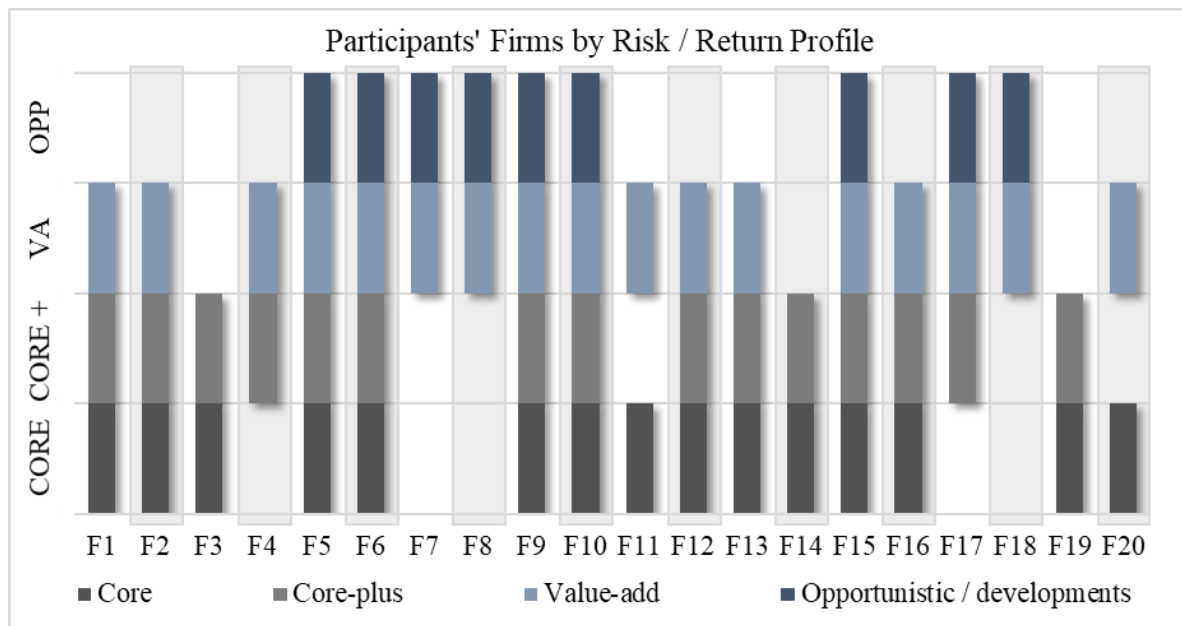
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Figure 17: Participants' Years of Experience

Similar to other asset classes, investments in real estate follow the well-known principle of a “risk-return trade-off” (Bodie, Kane, & Marcus, 2014, p. 10), implying that investors should be compensated for an investment involving more risk with a higher return. Figure 18 shows the risk and return profiles for each of the 20 firms for which the research participants worked. If a company was active in Germany and internationally, the respective profile only captures the focus in the German market.

All firms were active in more than one risk asset class. 15 firms focused on the core asset class, among other risk classes. This asset class is the most passive investment form in real estate with the least risk involved. Core properties are usually fully-let buildings in excellent locations with low leverage and low capital expenditure demand, thus producing a constant income (van der Spek, 2017).

With a total of 15 out of 20, an equal number of participating firms were real estate investors or investment managers active in the core-plus investment area. Core-plus properties resemble core properties in many ways, but they require a certain degree of active management (Lee & Morri, 2015). For instance, an office property might be located in the Central Business District (CBD) in Frankfurt but has vacant areas. To increase their attractiveness, the owner must invest capital expenditures in the property.

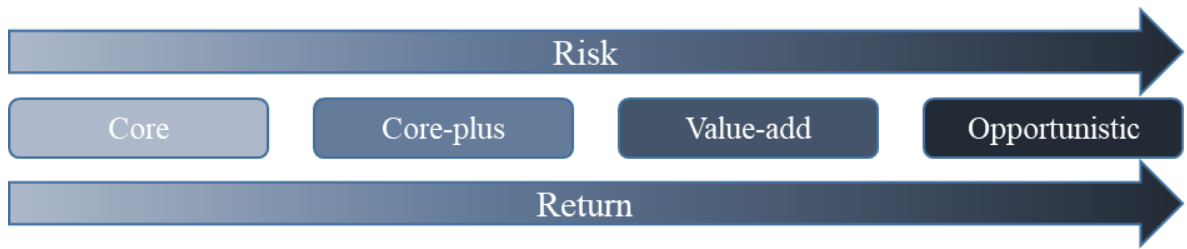


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Figure 18: Participants' Firms by Risk / Return Profile

Seventeen firms indicated that they were active in the value-add investment segment. Value-add investors conduct active asset management to a higher degree than core-plus investors, for instance, by refurbishing or reconstructing a property (Lee & Morri, 2015). Thus, value-add investors *add value* to their investments. Their leverage is usually at a moderate level (van der Spek, 2017). The lines between the different asset classes, especially the non-extreme forms core-plus and value-add sometimes blur. For this reason, some investors and researchers merge both as one risk and return asset class (Baum & Farrelly, 2009). However, as it is widespread practice in Germany to distinguish between core-plus and value-add, I did the same in my research.

Opportunistic investments are the opposite end of core on the risk/return scale in real estate investments. A total of ten firms reported being active in the opportunistic area, which often involves a considerable amount of (re-)development. To generate their high returns, investors usually lever their opportunistic investments to a high degree. In contrast to core investments, return is generated by appreciating the invested capital (van der Spek, 2017). Figure 19 illustrates the risk and return spectrum for real estate firms.

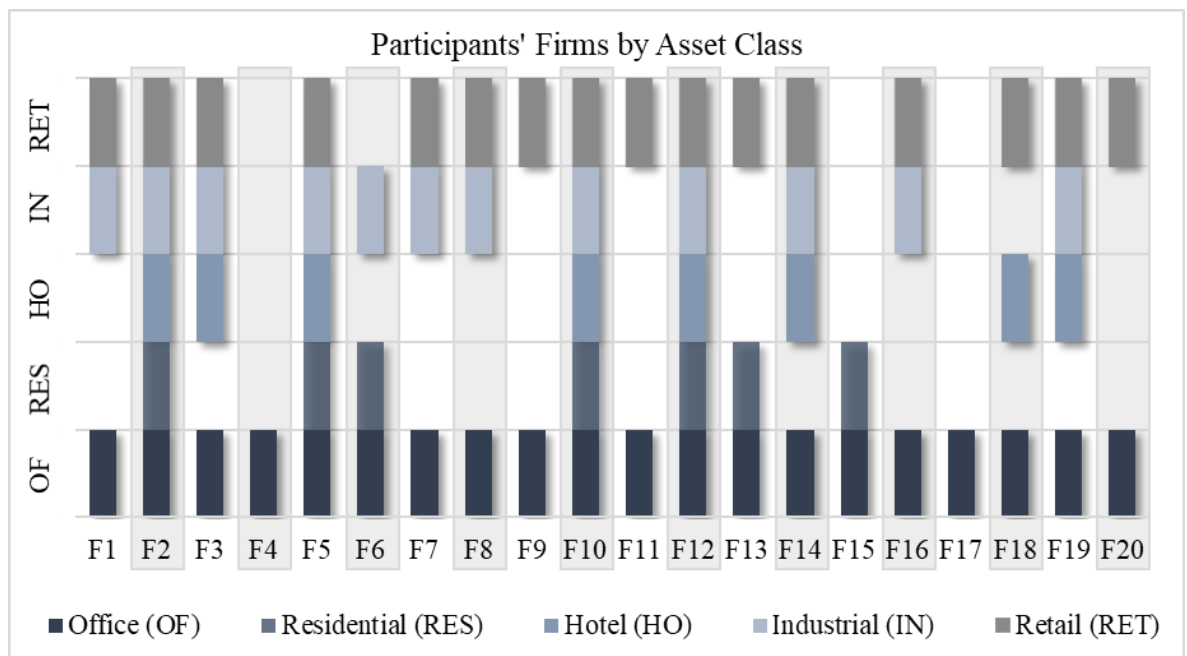


Source: Own presentation

Figure 19: Risk and Return Profiles in Real Estate

Figure 20 shows the respondents' focus by real estate asset class. As commonly used in practice (see, e.g. van der Spek [2017]; Lee & Morri [2015]; RCA [2021d]), I have distinguished between hotel, industrial, office, retail and residential. RCA (2021b) provides definitions of the respective asset classes.

While my research concentrates on office investors, only two respondent's firms solely focused on this asset class. Sixteen out of 20 firms also invested in retail assets, including shopping centres, retail parks and street retail. Moreover, 12 firms were active in the industrial asset class, i.e. properties used for warehousing or logistical distribution. Only seven and eight firms were additionally interested in the hotel and residential property market, respectively.



Source: Own presentation

Figure 20: Participants' Firms by Asset Class

3.7.1.4 Interview Process

In my phenomenological data collection method, I aimed to explore the expertise of real estate investment decision-makers. I oriented my data collection procedure towards the theoretical construct proposed by Høffding and Martiny (2016). Thus, the interviews revolved around an empathetic dialogue to obtain first-person insights into their decision-making practices. Furthermore, and in line with phenomenological epistemology, “the first-person perspective needs to be understood on its own terms” (Høffding & Martiny, 2016, p. 562). Thus, my position as an interviewer was a second-person view that explores a first-person experience or expertise (Høffding & Martiny, 2016).

The goal of the interviews was to elicit the attributes that best capture real estate decision-making expertise. To reach this aim, I conducted interviews that were weakly structured around broad discussion topics instead of pre-defined questionnaires or a detailed question list. The intent here was to avoid bias introduced through my own language which would have defeated the purpose of the expertise elicitation process.

My chosen interview technique was also based on what Matsumoto, Hwang and Sandoval (2015) branded ‘Funnel Technique’. I commenced every interview with the same open-ended question about a specific previous real estate transaction the participant has conducted in the past. As recommended by Jacob and Furgerson (2012), I started the interview with “Tell me about this deal”, referring to the specific transaction. I then picked up on one or more particular phrases the respondent used in their response and narrowed their experience down with more specific and closed questions. That way, I applied a systematic approach to reveal information and individually adapt my questions to each participant (Matsumoto et al., 2015). The interaction between me as an interviewer and the participants was reciprocal, with the respondents’ answers informing the subsequent questions (Høffding & Martiny, 2016).

While I attempted to not interrupt the ‘flow’ of the respondents’ views in their interviews, I actively drew the interviewees’ attention to the topic of ESG criteria in cases where they did not mention green certificates by themselves. To do so, I asked them at the end of the interview about their views surrounding green certificates. That way, I did not interfere with the process of eliciting their expertise but was able to interview them about the relevance of my topic. Thus, the research was mostly driven by the respondents’ words, except for my introduction of the topic of sustainability in cases where respondents did not introduce it

themselves. I did not mention my focus on green certificates to the participants in order to avoid a biased response, which would prevent me from thoroughly analysing the impact of green certificates. The feedback to this approach was consistently positive, which was expressed throughout the interview and in the concluding feedback from the respondents.

Open-ended questions are most suitable to open the dialogue between the participant and the interviewer as they encourage a more detailed answer than a ‘yes’ or a ‘no’ (Matsumoto et al., 2015). They “are designed to encourage full, meaningful answers using the subject’s knowledge, attitudes, opinions, beliefs and feelings” (Matsumoto et al., 2015, p. 8). The respondent’s answers hint towards more prevalent attributes in their descriptions of their decision-making process and suggest other topics that I can individually assess in the course of the interview. In general, I feel confident that my interviewer practices followed the qualitative standards Qu and Dumay (2011) recommended, including sensitivity, clear articulation and openness to new ideas.

Furthermore, this approach enabled me to assess the respondents’ prompted responses without being biased by suggestive questions. As Parker (2016) depicted, the most prompted responses provide information on the “aspects of greatest importance, significance or relevance to the respondent” (p. 389).

A complete interview guide is presented in Appendix 2. Table 31 provides an overview of the topics that were discussed in the interviews. It is important to note that the questions in the interview guide only served as a supportive instrument to ensure that I addressed all relevant topics in the interviews. The respondents were only asked orally about the questions and did not receive any specific interview questionnaire in advance, except for the interview invitation material, which included the topic of the interview and my research. Instead of providing a strict directive, I structured the interview guide to encourage a dialogue between myself as a researcher and the participant. Thus, I addressed all respective topics presented in Appendix 2, but in varying order and with different emphases. The questions in the interview guide were sometimes rephrased or merged.

Table 31: Overview of Interview Topics

Part	Topic
1	Introduction & first question
2	First thematic complex: criteria affecting real estate decision-making
3	Second thematic complex: current market environment and its changes

4	Third thematic complex: company investment profile
5	Fourth thematic complex: business plan and return
6	Fifth thematic complex: decision-making process
7	Sixth thematic complex: ESG and green certificates
8	Conclusion of interview

Source: Own presentation

In order to additionally mitigate a potential bias from creating the interview guide by myself, I discussed the topics and key questions with an industry expert from my network who was not participating in the study. Furthermore, as recommended by Cohen et al. (2000), I tested the interview guide in a pilot interview. As a consequence of this pilot interview and resulting from the feedback of the first interviews, some interviewees mentioned another topic that was not addressed before but seemed relevant for my research. In this case, I amended the interview guide accordingly and inquired about this topic in successive interviews. For instance, *II* highlighted the relevance of the financial environment for investment decisions – accordingly, I added this aspect to the interview guide for the subsequent 21 interviews.

While the order and the time spent on each of the topics presented above differed by interview, the first question in the first thematic complex was the same for every interview. Before the interviews, I researched the most recent relevant investment transactions the respective participant had been involved in with their firm. In the interview, the first question after the introduction was concerned with how that specific deal came about. The purpose of this approach was to give the floor to the respondents and assess the first, most prevalent attributes that came to their minds.

I proceeded with the interviews as long as they generated useful outcomes for my research until theoretical saturation was reached. Charmaz (2006) defined theoretical data saturation as “the point at which gathering more data about a category reveals no new properties nor yields any further theoretical insights” (p. 189). Thus, the number of participants is determined by data saturation – the point where confidence in replicability is high and where divergence in further coding is no longer feasible (Fusch & Ness, 2015).

The length of the interviews varied between 30 and 90 minutes, with an average duration of 50 minutes. As German was the mother tongue of almost all participants, I conducted 21 of 22 interviews in German. Only one participant preferred to speak English. I did not attempt a word-by-word translation into English, as the potential for translation errors was too high. Instead, I conducted and analysed the interviews in German and translated the findings or

key phrases as accurately as possible. For informative purposes, I translated the complete interview with Interviewee 22 and had a professional translator check it. That way, I ensured that I would not introduce my personal bias by translating. The German and English transcripts are shown in appendices 3 and 4, respectively.

3.7.1.5 Alternative Data Collection Techniques

Although there has been increased use of modern data collection techniques, such as video interviews or online focus group discussions, I decided to stick to one of the basic data collection types, namely interviewing. The other three data collection techniques are observations, documents and audio-visual materials (Creswell, 2007). Observations can be carried out as part of a group or externally. Similarly, a structured observation is conducted with a clear agenda in mind, while unstructured observations imply that the researcher starts with the observation and then decides what issue to concentrate on (Cohen et al., 2000). However, while observations might be helpful to understand how people react and interact, they do not allow me as a researcher to understand the reasoning behind real estate decisions. Furthermore, real estate investment decisions do not result from interactions between investment decision-makers, but rather from their personal views, the market and internal guidelines (see literature on investment decisions in real estate, e.g. by Farragher [1982]; Farragher & Kleiman [1995]; Farragher & California [2008]).

Documents can also be used as a data source. For instance, diaries, official memos, medical records and autobiographies might be useful study material. This approach should be considered if such documentation is available and valuable to inform the research question. Similarly, researchers could use audio-visual material, including images, videos or text messages, as a data source (Creswell, 2007). However, documents and audio-visual materials can only be used if they exist, which is not the case for my research topic.

Moreover, text messages or images would most likely not result in increased value for my research. Instead, I can best assess knowledge, views and expertise by interacting with the participants in interviews. While an investment journal decision-makers write over time could provide valuable insights on my research topic, keeping journals is very time-intensive and will be too much work for busy real estate investors. Overall, relying on diaries as a data source depends on the participants' willingness to write a diary about their investment decisions. Thus, it is not the most appropriate approach to my research topic.

Although I have identified interviews as the appropriate approach for my research question, there are also some challenges interviews present to researchers. For instance, a face-to-face interview is an interactional process between interviewer and participant. Therefore, there might be awkward moments, e.g. if the participant gives too little information, has a bad day or is stressed. The latter point is another issue with interviews: both parties have to take the time to sit together and conduct the interview. Furthermore, it is essential to organise the proper recording equipment in advance. However, all of these points can be dealt with by making appropriate preparations and maintaining an open mind (Creswell, 2007), which I also accounted for in my research.

3.7.1.6 Data Analysis

Data analysis constitutes a crucial phase in conducting research. It is a complex process consisting of various techniques and methods (Flick et al., 2014). In the following, I present the most relevant techniques I used for conducting research, namely transcription, coding, classification, visualisation and note-taking or memoing.

After having finalised the interviews, I transcribed them within one week. Transcription is an essential step in data analysis and involves the graphical or literal representation of what was said in the interview (Flick et al., 2014). As mentioned before, 21 of 22 interviews were performed in German. I transcribed and analysed these interviews in German. One interview was conducted and transcribed in English but was further analysed in German in order to remain consistent.

It is important to note that it is almost impossible to put dialogue into words directly. Thus, I have to acknowledge a selection bias when choosing how to put an oral interview into written format (Flick et al., 2014). For instance, disregarding voice speed or volume and laughs might result in an interview transcript with a completely different meaning. I mitigated this bias as much as possible by transcribing the interviews immediately after they took place so that my impressions of the interviews were still fresh and by only removing fill words and adding observations about the respondents' emotions, where applicable. The latter was simplified because real estate investment decisions and green certificates are relatively unemotional topics. Appendices 3 and 4 present an interview transcript in German and the translated version to English.

After having transcribed the interviews, I coded them with the help of NVivo. Coding “refers to the classification of events in discrete categories and the labelling of these categories” (Flick et al., 2014, p. 67). In practice, I read through every sentence of the interviews and assigned the relevant passages to codes called *nodes* in NVivo. The software was also useful in organising information, graphically presenting ideas and visualising data analyses (Bazeley & Jackson, 2013). By coding the interviews, I achieved an essential step in phenomenological data analysis, namely data reduction, to derive the phenomena of concern (Flick et al., 2014). NVivo features an option to include hierarchical code structures, which enabled me to establish a detailed node analysis. I used NVivo to conduct both my literature review and to analyse the interview transcripts.

I did not start the coding process with a pre-defined set of codes, but instead developed the codes progressively through inductive coding (Miles, Huberman, & Saldaña, 2020). I did so because the aim of my coding procedure was to elicit the attributes from the respondents’ language, and not impose any codes in my words on the respondents. As proposed by Miles, Huberman and Saldaña (2020), I performed various rounds of coding in an iterative process, which was further enhanced by additional interviews I conducted in parallel to the coding of earlier transcripts. This is a challenging process (Flick et al., 2014), on which I put a considerable amount of attention by carefully going through the transcripts and the coding multiple times. I followed the *in vivo*-coding technique, implying the coding of the interviewee’s wording, and I particularly accounted for often-used phrases or terms (Miles et al., 2020).

After I had completed the first coding round for all 22 interviews, I generated more than 2,000 references spread over 265 nodes across all the different topics addressed in the interviews. I then made use of the visualisation tools to reassess and group the attributes. This process enabled me to narrow down the number of attribute-related nodes from 54 to the ten final attributes. Appendix 5 shows a coding example and an overview of the final ten attributes in nodes on NVivo.

After I finalised the coding phase, I revised the coding structures and classified, collapsed and rephrased them, if necessary. This process of iterated reflection aimed to reduce the core of the researched phenomenon (Flick et al., 2014). Throughout this process, I used graphical support techniques, which helped to visualise ideas, relationships and reorganisation potential (Creswell, 2007). As proposed by Creswell (2007), I merged related attributes or deleted redundant terms until I felt confident that the attribute criteria identified by Keeney

and Raiffa (1976) were fulfilled, and that I had found the essence of real estate decision-making. For instance, I merged the codes for *leasing* and *transaction comparables* and for *tenants* and *area usage*, as the respondents often discussed both aspects in the same sentence or thought process and respective codes often overlapped. Several revisional rounds led to the final set of ten attributes. This set of attributes was assessed and checked for completeness and usefulness by the participants (see Section 3.7.1.8) before I derived the final set of attributes impacting real estate investment decisions based on their feedback.

The coding process was constantly accompanied by writing memos, as Flick et al. (2014) suggested. A term branded by grounded theorists, *memoing* involves taking notes of concepts and thoughts throughout the whole coding phase to maintain a clear view of the research and keep track of ideas (Glaser, 1978). In line with this proposal, I created memos whenever an interesting thought emerged. That way, I was able to add new thoughts into the interview guide, if necessary, and incorporate them in future interviews.

The final data analysis phase involves interpreting and presenting the findings, taking into account previous research on this topic. I present the results of my research in Chapters 4 and 5. I made use of visual presentation techniques, including tables and graphs. As suggested by Flick et al. (2014), I underlined my findings by direct quotes from the interviews conducted with the research participants.

3.7.1.7 Eliciting Attributes

Based on the extensive data analysis procedure outlined above, I elicited a list of attributes from the transcribed interviews. Visualising the data on NVivo and on paper enabled me to obtain a broad picture of my findings so far and amend the wording and organisation, if necessary (Flick et al., 2014). The initial round of coding resulted in a total of roughly 50 sub-attributes that were relevant to the decision-makers. By graphically presenting these attributes on paper or in PowerPoint, I managed to merge, rephrase, and classify them, resulting in the ten attributes presented in the next section.

I decided to concentrate on ten attributes, as this number fulfils the minimum criterion set out by Keeney and Raiffa (1976) for the purpose of real estate investment decisions in the German office market. In addition, and by coincidence, I find the number ten intuitive and reasonable.

I divided the ten attributes into *city / submarket characteristics* and *property / investment characteristics*. This distinction emerged from the fact that most participants stated that they first decide on a city or submarket based on several environmental criteria within Germany. Suppose the property is in a location that is regarded as advantageous. In that case, they then evaluate property- or deal-specific attributes, such as quantitative return, location within the submarket, or tenant structure.

3.7.1.8 Testing Attributes

In the next step, the attributes I derived from the interviews had to be tested. Ensuring a valid and usable set of attributes is crucial for my research. In order to obtain input about the relevance of the derived attributes in a time-efficient way, I sent all 22 participants an email, presenting them with the derived list of attributes and asking them the following three questions:

- Is the wording of the attributes clear to you?
- Do you think that the attributes represent your real estate investment decision?
- Do you have any comments or anything to add to the list of attributes?

Although I originally crafted the email in English, I translated the central part of the email into German for all non-native English speakers before I sent it to the participants. Twelve participants responded within the pre-defined deadline of two weeks. Some respondents had nothing to add and confirmed that they regarded the set of attributes as representative for their investment decision. Five respondents suggested minor amendments in the attribute wording or had questions relating to their understanding of the terms. If applicable, I included all their comments, which resulted in a minor alteration of the wording of five attributes. Figure 21 presents the final list of attributes, which I used as a basis for the MAU model.

Attribute	
City / Submarket Characteristics	Economic / Financial Environment
	Letting / Transaction Market Environment / Pipeline
Property / Investment Characteristics	Area Usage / Tenant(s)
	Deal Access / Relationship to Seller
	ESG Criteria
	Leasing / Transaction Comparables
	Location within Submarket
	Personal Judgement / Experience
	Property Quality / Features
	Quantitative Evaluation / Return

Source: Own presentation

Figure 21: List of Final Attributes

3.7.1.9 Scaling Attributes

Before the respondents could assign values to the attributes, it was necessary to allocate suitable attribute scales. As discussed in Section 3.6.2.3, depending on the decision-making problem, value scales were sometimes required; for instance, when considering how much sweetener to put in a coffee (von Winterfeldt & Edwards, 1986). However, in my case, the derived attributes were straightforward to scale, as all of them were natural and monotone, so that “more is always better” (Jansen, 2011, p. 104). For this reason, I decided on an intuitive attribute scale of 0 to 100, where 0 indicated ‘extremely unattractive’, and 100 meant ‘extremely attractive’. Assigning an attribute scale is a prerequisite for allotting attribute values and weights in the next step, as attribute values are chosen according to the respective attribute scale.

Overall, the results from Research Phase 1 enabled me to achieve research objectives 1 and 2, involving the exploration of decision-making expertise and the derivation of the attributes that capture investor’s real estate investment decisions in Germany.

3.7.2 Research Phase 2: Weighting the Attributes and Developing the MAU Model

The outcome of the First Research Phase was a set of attributes affecting the investment decision of real estate experts in Germany. The second data collection phase followed directly after the First Research Phase and consisted of weighting the derived attributes and deriving and testing the OffIn-MAU model. This section deals with the Second Research Phase.

3.7.2.1 Developing Relative Attribute Scores

As mentioned earlier, I approached the participants entirely via email for the Second Research Phase. This was for several reasons: first, this research phase did not require an oral introduction. All research participants were informed about the Second Research Phase in the invitation letter and again at the end of the interview in Research Phase 1 – an advantage of not differing the research participants between research phases 1 and 2. Second, arranging another meeting, either in-person or online, would have been very time-consuming and many respondents would likely not be able to meet for weeks due to their busy schedules. Third, the Second Research Phase started at the end of December 2020, amid the second lockdown phase in Germany due to the Covid-19 pandemic. Thus, depending on personal preferences and local regulations, we may not even have been allowed to meet in person.

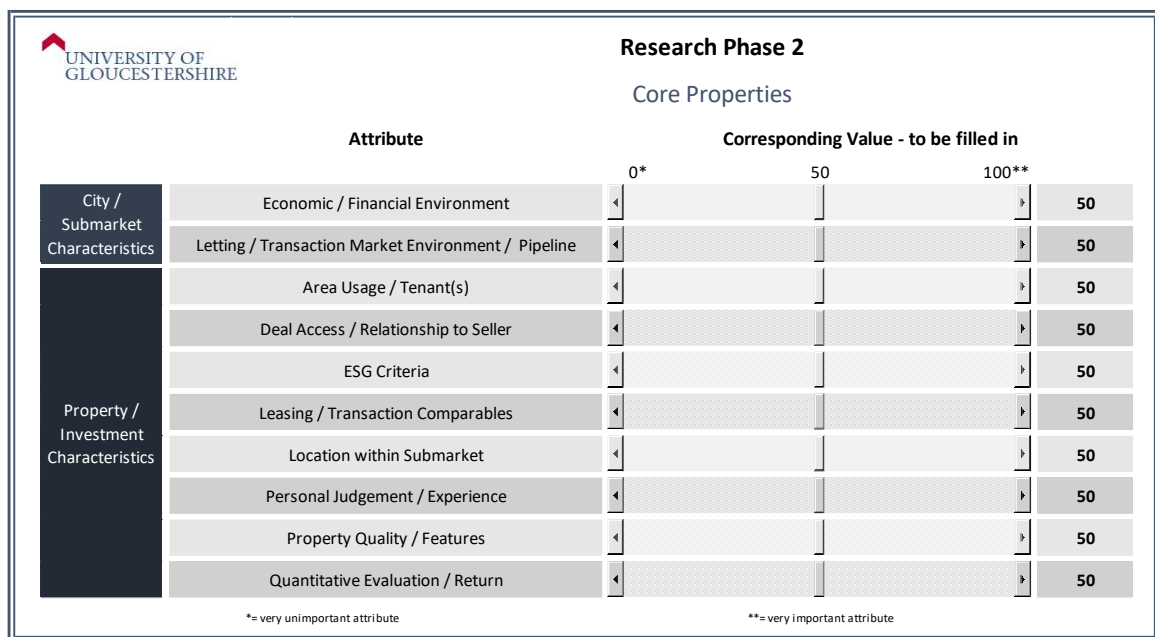
I contacted all respondents with a short introductory email and the model attached as an Excel file. I chose Excel as my work experience showed that investment and transaction professionals regularly work with this software, which some participants confirmed in the interviews. For this reason, all the research participants were familiar with Excel.

One finding that emerged from the interviews and which will be further discussed in chapters 4 and 5 was that investment criteria differed by risk/return profile. Most significantly, several interviewees depicted the differences between core strategies and value-add or more opportunistic investment strategies. For this reason, to properly capture the relative importance of the attributes, I decided to distinguish between the two risk types.

To save the respondents' time and avoid clarifying questions, I paid close attention to making the Excel tool as intuitive as possible. The tool consisted of three tabs: the first tab was an introductory page depicting my research aim and the instructions for Research Phase 2. The other two tabs were the evaluation tabs where the research participants were able to assign

values to the attributes. Tabs 2 and 3 only differed in their title, as they were concerned with core and value-add investment decisions, respectively. Apart from this, both tabs showed the same content: they listed the attributes derived in Research Phase 1 with input boxes to add the importance weights next to them. Depending on their investment focus, research participants could fill in either one of the tabs, or both.

Torrance et al. (1982) used a visual “feeling thermometer” (p. 1051) to support the decision-making of research participants. Similarly, I supported this exercise by adding a visual component into the Excel file: the respondent could either choose to put in a number between 0 and 100 or use a graphic scale and then check that the corresponding output was in line with their estimation. To avoid input errors, I restricted the input possibilities of both scale and input box to integers between 0 and 100. Figure 22 shows tab 2 before I sent it to the respondents.



Source: Own presentation

Figure 22: Research Phase 2 – Assessment of Core Properties

As discussed previously, I decided to use a value scale from 0 to 100 in line with the majority of MAU practice (Brennan & Anthony, 2000; Carretero-Gómez & Cabrera, 2012; Keeney & Raiffa, 1976; von Winterfeldt & Edwards, 1986). Following the direct rating technique, I asked the participants to first assign an importance score of between 0 and 100 to each of the ten attributes, with 0 meaning ‘very unimportant’ and 100 meaning ‘very important’ for their typical real estate investment decisions in the German office market. After having

assigned an importance score to each attribute, I recommended reassessing all values and correcting the original input, if necessary, to reflect the relative importance of the attributes.

In order to allow them to assign their importance scores in more detail, I used a scale from 0 to 100. This enabled the participants to assign an equal value to all attributes theoretically. This is not possible for alternative weighting methods, such as the often-used ranking and weighting method (von Winterfeldt & Edwards, 1986), as this method requires identifying the best and the worst attribute by definition.

I sent the Excel assessment sheets to the research participants in December 2020. One month later, I followed up via phone or sent reminder emails to the participants who had not responded. As the majority of participants informed me that they had a very busy schedule in early 2021, some only responded a few weeks later. Overall, I received feedback from 19 out of 22 respondents. A total of 16 respondents filled in the core tab, and 17 filled in the value-add tab.

3.7.2.2 Aggregating Weights

After receiving the participant's responses, the next step towards developing the OffIn-MAU model was the weighting of the attribute values the participants had assigned. To derive importance weights, I divided the importance score for each attribute and respondent by the total sum of importance scores across all attributes, in line with the formula introduced in Section 3.6.2.5 from Eckenrode (1965). The sum of all importance weights for the ten attributes equals 1 for each participant (von Winterfeldt & Edwards, 1986).

In order to derive an attribute weight for the whole set of participants, I calculated the weighted average based on all attribute weights for each attribute. Benefits of this method include the ability to easily implement the technique and interpret the results. In addition, all responses from participants are equally weighted, without any discrimination.

All in all, the process of scaling and weighting the attributes led to the achievement of Research Objective 3. With the help of attribute weights, I was able to identify the perceived importance of each of the ten attributes and assess the relative importance of *ESG criteria*.

3.7.2.3 Deriving the MAU Model

After I had derived the attributes and the respondents' importance weights for each attribute relative to its attractiveness, the final step was to derive the MAU model based on the previous steps' findings before I could put the model into practice. With the attributes and the experts' consensus on the relative importance of each attribute, I had all the ingredients I needed to set up the model.

I created an Excel tool that would later constitute the MAU model for decision-making in German real estate. I named the model OffIn-MAU model, short for Office Investments Multi-Attribute Utility model. I used Excel as standard software, with every participant knowing how to work with it. To keep the model as clear and easy to use as possible, I divided it into four tabs, which can be seen in Appendix 6. I differentiated the tabs with the help of different colours: the first tab provides an overview of the purpose of the model and instructions in English and German. I kept the remainder of the model in English.

In the second tab, the user adds up to ten alternatives office investment opportunities. The user can choose between core or value-add styles with the help of a drop-down menu. Analogous to the importance scores the research participants attributed at the beginning of Research Phase 2, the user assigns attribute values of between 0 and 100 to each alternative and attribute. A value of 0 implies that this alternative did not achieve this attribute. A value of 100 means 'fully achieved'. The third tab is filled in by default with the importance weights derived at the beginning of Research Phase 2. The user can manually overwrite each of the ten attributes and their importance weights, but the sum of the weights has to equal 100. If the user wants to restore default attributes and values, they click the 'Restore Default Values' button. Clicking this button activates a macro that reinstates the attributes and their weights derived by Research Phase 2. The fourth tab presents the results and ranks them from best to worst. A radar chart plots the values for each attribute for the three best-ranked alternatives.

3.7.2.4 Testing the Model

With my research, I have developed the functional OffIn-MAU model based on the decision-making expertise of industry professionals. The final stage of my field research involved putting the model into practice. Thus, I asked five participants to test the model with five exemplary property transactions they have recently evaluated or are currently looking at.

I selected these five participants from all those that had previously participated given their fast response time, in-depth responses and willingness to engage with the issue, but ensured that they reflected a diverse snapshot of the 22 participants in my research and thus the real estate investment management market as a whole. More precisely, four of the participants who tested the model had filled in both core and value-add tabs in Research Phase 2, and one had only filled in the value-add tab. All participants engaged in the testing had between eight and 20 years of relevant experience in the real estate investment management sector. Therefore, I concluded that these five respondents had a reasonable spread of specialism for them to constitute a suitable expert group to test the model.

All of them responded that the model was relatively easy to use and valuable for their investment decisions. The respondents particularly appreciated the flexibility the model offered and confirmed that it would provide a holistic overview of the real estate investment decision-making process.

These steps led to the achievement of Research Objective 4, the derivation of a MAU model for estimating the relative value of a real estate investment opportunity.

3.8 Researcher Values

As a researcher, it is impossible to exclude my personal values from my study. The researcher's values affect ontology, epistemology, and methodology, and thereby the research paradigm and the research outcome. The values of the researcher "reflect either the personal beliefs or the feelings of a researcher" (Bryman & Bell, 2015, p. 40). In qualitative research, the researcher works closely with the participants and is not an independent observer as in quantitative research.

It is essential to acknowledge and reflect on the role of researcher values in a study (Saunders et al., 2019). Therefore, in line with the recommendations from Duffy and Chenail (2009), my research is conducted in accordance with values of reliability, honesty, clarity, competence and contribution. Furthermore, I pay close attention to the respondents' views and situations, ethical considerations and possible biases resulting from my research design and approaches.

3.9 Ensuring Data Validity

Qualitative research has to be valid and reliable, whereas reliability is a prerequisite to validity (Cohen et al., 2000). While data reliability refers to the replicability of research (LeCompte & Goetz, 1982), validity is concerned with data “goodness” (Guba & Lincoln, 1994, p. 112) and the research quality as a whole. There are various forms of validity (Creswell, 2007; Maxwell, 1992) that “might be addressed through the honesty, depth, richness and scope of the data achieved, the participants approached, the extent of triangulation and the disinterestedness or objectivity of the researcher” (Cohen et al., 2000, p. 105).

In this context, LeCompte and Goetz (1982) distinguished between internal and external validity. Internal validity is concerned with unaccounted external influences on the research setting. It raises the question of causality, inquiring whether the dependent variables only influenced the finding, or whether there are other explanations or unaccounted biases (Cooper & Schindler, 2006). Internal validity refers to the question, “do scientific researchers actually observe or measure what they think they are observing or measuring?” (LeCompte & Goetz, 1982, p. 43).

Threats to internal validity include participant-related factors such as bias in selecting or interaction with measurement factors. For example, a threat might result from a change in behaviour after pre-testing, or ambiguous findings and situational factors deriving from a difference in the environment or diffusion of control and treatment group. In addition, studies with humans often do not allow for random sampling and involve a degree of relationship between the researcher and the participants (Taylor, 2013). In my explorative research design, I have to pay close attention to the participants’ views because I influence the description of their experiences by the way I pose the questions. I attempt to mitigate any bias by cross-checking my research approach and findings with experts who are not participating in my research and by a careful process of self-reflection.

External validity refers to the generalisability of a study and how transferable the findings are. The research setting, especially when conducted within a specific group or region, affects the external validity (LeCompte & Goetz, 1982). The study will be generalisable only if the sample represents the whole population. External validity is threatened by the research setting and the selection of participants, among other things. Researchers, therefore, have to

understand the limitations of their research with regards to the participants and setting and have to provide comprehensive information about the population (Taylor, 2013).

My study is concerned with German real estate decision-makers. The findings of my study will be affected by the social and regulatory environment in Germany and other factors, like the Covid-19 pandemic. In my research, I mitigate threats to external validity by acknowledging biases resulting from the research, mitigating them where possible, and by following a purposeful sampling technique. The high degree of external validity also results from the triangulation techniques described in Section 3.9.1, involving validation by a knowledgeable individual, the participants themselves, myself as a researcher and existing literature on this topic.

The definitions of internal and external validity described above suggest that a trade-off exists between the two forms of validity. While a potential laboratory setting would offer significant internal validity but limited generalisability, studies with field data show larger external validity but higher threats to causality (Roe & Just, 2009). My research will not be in a laboratory-like setting but rather aims to obtain a thorough perspective on real estate expertise. Therefore, the external validity of my research will be of high relevance.

While the concept of validity and reliability is applicable to all types of research, some researchers have attempted to derive a set of criteria to address the specifics of qualitative research (Saunders et al., 2019). For example, Lincoln and Guba (1985) suggested that researchers seek a set of qualitative criteria to ensure that research is credible, dependable, transferable and confirmable. Applied to my research, I pay close attention to the participants' environment, needs, individual impressions and existing literature.

Furthermore, I ensure that I use appropriate methods, instruments and participant groups while also accounting for dependability (a synonym for reliability) and credibility in my data set. I account for reliability by taking notes and recording and transcribing the interviews. In addition, I attempt to mitigate biases resulting from my research design and set of participants, if possible. Section 3.10 discusses the biases I encountered in my research. In that way, I ensure that my research is plausible and valid (Cohen et al., 2000). Apart from that, I present a detailed description of the procedure and participants, thereby providing the reader with "sufficient detail and precision to allow judgements about transferability" (Erlandson, 1993, p. 32). I conclude that I am strongly confident that the internal and external validity of my research is high.

3.9.1 Triangulation

My research will use triangulation to confirm my findings and ensure their trustworthiness. Triangulation aims to reproduce a result by varying certain aspects of the study, thereby demonstrating the research's validity. The higher the degree of similarity obtained from triangulation, the greater the researcher's confidence in the results (Erlandson, 1993). Triangulation can occur by varying the timing of the study; for instance, by repeating the study at another time, altering the setting of the study, changing the researcher, or the methodology used to gather data (Denzin, 1970).

Applied to my research, within interviews, I follow up on unexpected findings by rephrasing the question and exploring the topic in more detail in existing literature. In addition, I discuss the research design and its outcomes with an industry professional not participating in my study, which further enhances the degree of triangulation. Furthermore, I confirm my findings with the help of participant validation. I ask the participants to review and comment on the list of attributes and the final OffIn-MAU model, which helps certify the validity of my results (Saunders et al., 2019). As a consequence of the validation through the participants themselves, external experts and literature, I am very confident in my research results.

3.9.2 Ethical Considerations

Another critical consideration for my research approach is ethics. As qualitative research is concerned with interacting with people, I face various ethical issues that need to be addressed (Easterby-Smith et al., 2012). Lipson (1994) identified informed consent procedures, deceptive and covert research, confidentiality, participant's special requests and the advantages and disadvantages of research as the main ethical issues.

I conduct my research in accordance with the ethical principles and procedural guidelines of the University of Gloucestershire. Following the *University of Gloucestershire Handbook of Research Ethics*, I take into account the following principles (University of Gloucestershire, 2021):

- General responsibilities: "Research relationships should be characterised, whenever possible, by mutual respect and trust" (University of Gloucestershire, 2021, para. 2.2.1).

I respect and value the views and feelings of the respondents and ensure their autonomy at all times.

- Informed consent: research must be based on the information provided by participants in their free will. I am aware of my responsibilities. I prepare an information package about my research, including interview questions, timelines and an informed consent form, which I send to the respondents ahead of the interviews. Within the consent form, I explain that every participant has the right to avoid questions and withdraw from the research process at any time.
- Deceptive and covert research: a researcher should avoid any use of deception. In my study, I do not face any deceptive or covert research methods. All respondents were informed about my research procedure and plan at all times. In order to avoid any bias in their responses and enhance the validity of my research, I do not discuss green certificates until the end of the interview.
- Anonymity and confidentiality: the researcher has to keep personal information secure and respect the respondent's right to anonymity. I ensure anonymity and confidentiality by not disclosing any interviewee's names and personal details. I cluster descriptive data (such as years of experience) to avoid providing too much detail.

In general, research settings and samples can change throughout the research period. For this reason, it is essential to remain flexible throughout the entire process. Another aspect to consider for my research is how to store the data. Creswell (2007) noted the importance of providing confidentiality and ensuring that information is stored safely and with proper backups. I ensure data safety in my study by analysing interview material on a single computer with regular backups with reliable antivirus and firewall software installed.

3.10 Addressing Bias

Throughout my research, I have identified several biases that have to be addressed by me as the researcher. A bias is a “systematic error introduced into sampling or testing by selecting or encouraging one outcome or answer over others” (Merriam-Webster.com, 2021a). Biases are relevant to all studies, and occur when the research outcome is affected by any form of conscious or subconscious impact on the research. I was aware of the omnipresence of bias in research and tried to mitigate and eliminate it where applicable.

In semi-structured interviews, researchers often face interviewer bias, which is “where the comments, tone or non-verbal behaviour of the interviewer creates bias in the way that interviewees respond to the questions being asked” (Saunders et al., 2019, p. 447). Researchers are sometimes tempted to force their own beliefs on the respondents by the way they analyse data or pose questions. For instance, I entered my research with the impression that green certificates were of high relevance and importance for German decision-makers. This view resulted from my work experience and popular market reports, as well as increasing regulatory pressure on this topic. I was aware of this potential bias while analysing the interviews. Furthermore, I kept a research journal that helped me reflect on my thoughts and cross-checked my results and list of attributes with another real estate expert who did not participate in my study to ensure the validity of my findings.

A closely related form of bias is response bias, which is where an interviewer influences the responses by the way they phrase the question or behave in the interview. Explorative researchers should try not to impact the respondents’ views to get an opinion that is as unbiased as possible (Saunders et al., 2019). I mitigated this bias by formulating open-ended questions and avoiding questions that aim at a specific answer, as Edwards et al. (2007) proposed. Furthermore, I did not disclose my focus on the impact of green certificates until the end of the interviews. The reason for this was that I expected them to respond to the first “Tell me about your most recent transaction” – question differently if I informed them about the study’s focus. Without information on my interest in green certificates, they were able to respond with what first came to mind. This approach allowed me to explore their decision-making expertise without leading them to ESG matters as a potential impact factor. That way, I could conduct an analysis of the first attributes mentioned by each participant.

Another potential source of response bias resulted from the distinguishing between core and value-add investments in Research Phase 2. The division into the two types of risk resulted from my findings in the First Research Phase. While this was the appropriate approach to gain insights into risk class-related preferences, some participants who filled in both core and value-add sections might have selected more extreme values to differentiate between both asset classes. While this concern is hard to eliminate, the results did not confirm a significant difference in responses between the participants who filled in only either the core or the value-add tab and participants who filled in both.

Furthermore, I tested the risk of my results being exposed to the non-response bias, which describes a different study outcome due to many non-responses (Chen, 1996). As proposed

by Saunders et al. (2019), I followed up on the respondents who did not answer my email at the end of Research Phase 1 and in Research Phase 2. Their feedback revealed that a lack of time kept them from responding. I conservatively estimate the total response rate to be at 60%. Most of the experts I approached from my network replied positively, but a few other participants, with whom I had previously had no contact, declined due to confidentiality concerns or did not reply. After asking the three non-responding experts among my participant set in Research Phase 2 on why they did not participate, they explained that they did not respond due to a lack of time. Furthermore, the Second Research Phase responses did not differ between the respondents who replied immediately and the participants who responded after my follow-up call. Thus, I conclude that the issue of non-response bias is not significant for my study.

The interviews took place between August and October 2020, a time when everyone's lives were affected by the global Covid-19 pandemic. My impression was that the pandemic was present in the interviews as well. This might have imposed another form of pandemic-induced response bias, as certain aspects of real estate investing were more pressing due to the impact of the pandemic. Because of the implications for business and private persons alike, it was difficult to eliminate the omnipresent pandemic from the research results. However, I also regard the timing of the interviews as a benefit and unique characteristic of my study. The timing offered me the opportunity to explore the respondents' expert opinions on the future of the German office market in the aftermath of the pandemic.

Another impact on the timing of my research was that several respondents preferred to refrain from meeting in person, or were even prohibited from conducting meetings with persons outside of their company. When I first established my research plan and outline, I did not expect that meeting in person would be this difficult. If participants were unable to meet me in person, I conducted video or telephone interviews. While telephone interviews have the advantage of being more cost-efficient and flexible, they complicate the establishment of personal contact between interviewer and respondent, and tend to be shorter than in-person interviews (Irvine, 2011; Saunders et al., 2019). Only three out of 22 interviews were conducted via telephone. I either met the other respondents in person or online via a video call. Therefore, I was able to compare both types of interview techniques. While I preferred the interviews where I could see the respondent, I did not have the impression that the quality of the interview was adversely affected by the fact that we did

not see each other. Thus, I do not think that the interview method had a significant impact on my research outcome.

My participant recruitment process constituted another form of bias for my research. I have reached out to several participants based on my own and my network's contacts and ended every interview at the data saturation point and some by asking the respondents whether they could recommend another potential participant from their network. With this so-called snowballing technique, I reached a broad network of real estate decision-makers in Germany. However, as Lee (1993) depicted, bias almost always occurs in this approach as participants tend to select connections who are similar to themselves. While it is impossible to fully remove this bias, I mitigated it by using a mix of direct approaches and contacts through snowballing. Furthermore, my initial set of respondents was diversified by size and investment focus, which resulted in a mixed final group of participants, as discussed in Section 3.7.1.

Another form of bias related to choosing the set of participants derived from my decision to use the same set of participants for both research phases. As a result, I had previously conducted interviews with all respondents participating in the Second Research Phase. The advantage of this procedure was that given my broad set of participants, they had the same basis of information. I am also convinced that the group of participants represents the German real estate market well and that it is diversified across different market players. In addition, the multiple research phases allowed me to stay in contact with the participants in an iterative interviewing process and get back to them whenever I had understanding issues or needed to validate findings. In the First Research Phase, I introduced my research goal and discussed potential questions with every participant. However, one might argue that the participants were probably biased from the first round of interviews. To mitigate this issue, I discussed the interview guide, the derived set of attributes and the final OffIn-MAU model with a real estate investment expert who did not participate in the study and confirmed that my outline and results made sense.

I have identified a few other potential sources of bias which resulted from my research design and chosen methods. Due to the exploratory nature of my research, I included my personal views in the coding and analysis of the interview transcripts. To mitigate this bias, I followed a set of qualitative criteria outlined in Section 3.9 in order to create credibility, transferability, dependability and confirmability (Lincoln & Guba, 1985) wherever possible.

I was aware of this bias when conducting my research. Therefore, I tried to mitigate it where possible and constantly performed self-reflection and self-examination.

When I derived the list of attributes at the end of the First Research Phase, I cross-checked it by asking every participant if they thought the attributes were understandable and described their investment decisions and whether they had anything to add to the list. Furthermore, another expert who was not participating in my research reviewed the list of attributes. I cross-checked the interview guide with an industry professional from my network and tested the interview procedure in a pilot interview to confirm that the procedure was consistent and to mitigate potential researcher bias. In order to prevent any translation bias from conducting the interviews in German and presenting the results in English, I asked a professional translator to verify two interview transcript translations. Moreover, five participants and an external professional validated the final OffIn-MAU model to ensure that the model's approval and use were not subject to having participated in my study.

There is another bias, which I actively did not attempt to mitigate in my research design: the fact that every respondent relied on their own interpretation when assessing the set of attributes and when using the MAU model. I purposely did not provide a definition of any of the terms when establishing the OffIn-MAU model, as that would have biased the respondents' views on each of the attributes.

3.11 Summary: Research Philosophy and Methodology

Chapter 3 elaborated on the research philosophy within which my study is conducted and discussed each component of my research philosophy by addressing potential alternative approaches. I outlined that my ontological position is OOO after Graham Harman (2018a), as this approach is centred around objects - whether they are real or not - following a flat ontology. In combination with a phenomenological epistemology, I was able to explore real estate decision-making and derive the essence of decision-making expertise.

My exploratory research approach is split into two phases. In the First Research Phase, I conducted semi-structured interviews to elicit the decision-makers' expertise and achieve research objectives 1 and 2. The Second Research Phase was concerned with the derivation of the OffIn-MAU model. The respondents assigned importance scores to the ten attributes identified in Research Phase 1 for core and value-add investments, which I transformed into importance weights. The average weights provided valuable insight into the decision-

makers' relative preferences and thus enabled me to achieve Research Objective 3 concerning the relative importance of green certificates.

Chapter 3 also presented the MAU theory and how I put it into practice. This theory benefits because it allows to transform personal views into numbers and assess all attributes on multiple alternatives at once. The final OffIn-MAU model uses the ten attributes and average importance weights for both risk classes by default. In addition, the OffIn-MAU model provides for a considerable amount of flexibility as it enables the user to overwrite both attributes and importance weights manually.

Apart from a detailed description of my research procedure, I have also discussed my research design, including my sampling strategy and data analysis procedure. Through a mix of direct approaches and the snowballing technique, I was able to find a group of participants that was well-diversified by background and risk focus. In Chapter 3, I also assessed my researcher values and the validity and ethical implications of my research. The chapter concluded with a discussion of the biases I identified in my research design and approach and how I addressed or mitigated them.

4. Research Findings: Research Phase 1 and Interview Results

4.1 Introduction

This chapter deals with the findings and results from the First Research Phase. This research phase aimed to answer Research Objective 1, concerning the elicitation of decision-making expertise, and Research Objective 2, about the derivation of attributes that describe real estate investment decisions. As mentioned in Section 3.7, I achieved this research objective by conducting face-to-face interviews followed by an extensive, inductive analysis process. This research phase's outcome was the generation of ten attributes describing real estate investment decisions in Germany.

This chapter first presents the necessity to distinguish between *city / submarket characteristics* and *property / investment characteristics* before going into detail with the ten attributes, followed by an elaboration on other interesting findings that emerged throughout the interviews. The final two sections are concerned with an analysis of the prompt responses to the first interview question and a word cloud assessment presentation to validate the interview findings.

In each section, I describe my interpretation of the respondent's consensus on every result derived from the interviews. Each finding regarding the participant's views is underlined with corresponding statements from the participants. Within my research approach outlined in Section 3, I acknowledged my role as a researcher and describe the respondents' and my shared experiences. To validate my findings and ensure the representativeness and accuracy of the derived set of attributes, I provided each participant with the final set of attributes. Their feedback revealed that they considered the set relevant, understandable and accurate in describing their investment decision.

To protect the respondent's identities, I replaced sensitive information provided in the interviews, for instance, referring to a specific city by the letter C, and P (property), Se (seller), Su (submarket), T (tenant) and X (price or figure), respectively, in square brackets in the participants' quotes.

4.2 Attributes Describing Real Estate Investment Decisions

In the following, I present the ten attributes describing real estate investment decisions in the German office market in detail. I split the set of attributes into two subclasses of characteristics: *city / submarket characteristics* and *property / investment characteristics*. As mentioned before, a key consideration underlying the MAU model is to avoid over-defining attribute terms and instead ask the participants to provide their own interpretations and apply their personal understanding of the respective terms. Thus, when deriving and testing the set of attributes, I have relied on my interpretation of the respondents' consensus.

At this point, it is essential to note that I formed the views on investment decisions based on an extensive analysis of several factors. Consequently, although I analysed the findings based on the ten attributes assessed in this chapter, the respondents provided holistic insights into many attributes. In this context, the MAU model and its integrated assessment of the attributes were especially valuable.

4.2.1 Two Levels of Attributes

One finding which significantly influenced the set of attributes and how I presented them was the necessity to distinguish between two levels of attributes. Several participants revealed that they first decide on the city or real estate market within a town, known as a submarket¹³, before deciding on a property within this city or submarket. This process helped them to identify attractive locations and restrict their investment focus, as *I9* pointed out. This implies that, in turn, specific areas or cities constitute an exclusion criterion for the respondents. If the property was located in a city not identified as favourable, these real estate investment experts would most likely not continue to review the investment opportunity.

However, this does not apply to every expert. Some participants explained that they follow “iterative processes between ‘what cities fit in’ and ‘do I get the appropriate assets to go with them’” (*I21*). Thus, they did not establish preferences concerning their preferred city or submarket first but instead formed an opinion on submarket and city for each opportunity individually.

¹³ A term commonly used in real estate, submarkets are areas where certain property characteristics are equal to each other. That way, real estate submarkets differ from officially defined city districts (Wu & Sharma, 2012).

To summarise, most respondents followed a top-down approach: first, identify appropriate cities and submarkets, then continue to look for properties in these locations. Some participants preferred not to restrict themselves to specific locations but chose to individually assess both property and location characteristics. Nonetheless, for the ultimate investment decision, the respondents considered both attribute levels as significant:

I2: Because we do things top-down, we looked at a location and said, we think [C] and [C] are great office locations - the parameters just fit.

I11: You start with the strategy first, and select certain submarkets on that basis.

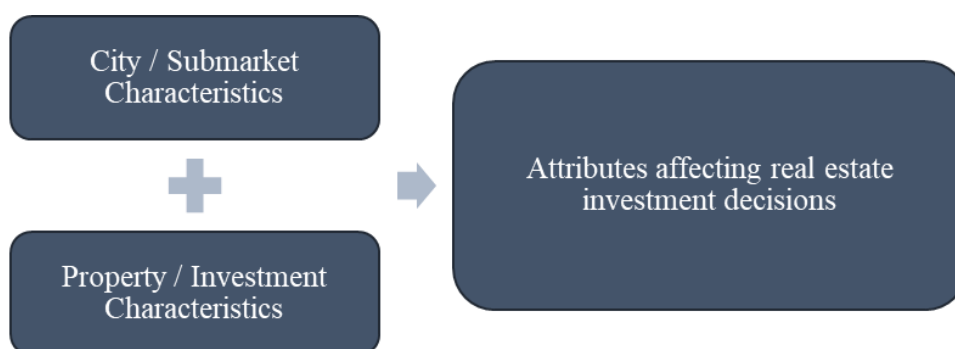
I15: We start with the Big Picture. Once I have chosen [C], I look at the city, and then at the property within the city.

I19: It is a dynamic dialectic between top-down and bottom-up. We first decide where we want to go. [...] The result from this is the definition of or limitation to a specific city. This helps us to focus when we receive a lot of investment proposals. The next step was the practice on the ground: which submarket, which locations there.

I22: One of the most important factors in a purchase decision is the macro view, which is where we all come from. This is also where we come from when setting up the fund, which regions throughout Europe, worldwide are supposed safe havens. Look at the most important KPIs of the respective countries and decide based on that whether you want to invest there. [...] Then you decide on the city, and ultimately the properties.

This finding is consistent with Baum (2009), who suggested that an investment manager's rent and transaction price projections determined the city and submarket they would like to invest in. According to the author, a combination of the decision-makers' assumptions on the development of rents and risk and the in-house investment strategy helped them identify the property to be acquired.

Figure 23 illustrates how I split investment decisions into two levels: the city/submarket and deal/investment level. Together, they inform the set of attributes that describes real estate decision-making.



Source: Own presentation

Figure 23: Two Types of Attribute Characteristics

4.2.2 Economic / Financial Environment

The first attribute I present in this chapter is *economic and financial environment*, an attribute belonging to the *city / submarket characteristics* group. The respondents indicated that when choosing a submarket or a city to invest in, they considered a range of factors as key influences on real estate investment decisions, which I summarised with the terms *economic environment* and *financial environment*.

This section will describe my view on the respondents' consensus on these terms. In the interviews, we also discussed how the participants form their opinions on the *economic and financial environment*. Several respondents relied on an internal research team to obtain information and conduct forecasts. They often worked for large real estate investment managers with many employees. Their research reports helped the decision-makers form a view on economic and financial developments.

I divided this section into several concepts related to this attribute that earlier studies have identified as well, including population, university graduates, large companies in the area and purchase power. The following respondent statements underline the relevance of the *economic and financial environment* attribute:

I7: *I have a research team that analyses the cities, the locations in terms of demographics, technology, and so on.*

I19: *Macroeconomic figures and funding capacity determine which country and city we go to.*

I21: *At the macro level, we have used statistics to analyse cities in detail.*

While Pfnür and Armonat (2001) and their English assessment of the same study (Armonat & Pfnür, 2004) also included economic environment in their questionnaire framework, they further broke down the term into *regional economic growth, inflation, macro-economic growth, regional socio-demographics, regional real estate market conditions* and *infrastructure*. Roulac (2000) identified demand as evidenced by *strength of local economy, capital availability, overall economic conditions and outlook, tax policy and regulations, national real estate market* and *inflation* as economic factors for real estate investments. According to this author, *environmental reports* constituted the most relevant due diligence factor concerning the real estate and/or economic environment. On the contrary, Baum (2009) discussed neither the economic nor the financial environment and only concentrated

on expected rent and transaction price developments as factors impacting the investment decision.

In contrast to these studies, the local infrastructure and the regional real estate market are separate topics in my thesis and are assessed in the following sections. While the researchers included financial factors in both comparable studies, Armonat and Pfnür (2004) classified it as a factor standing for its own, and Roulac (2000) merged financial and economic environment terms – similar to my study approach. Moreover, the interview participants in my study did not specifically mention inflation and other macro-economic factors, as the focus of my interviews was on German office property investment decisions.

4.2.2.1 Population

Several participants mentioned that they most closely considered the population and its development when evaluating a city or a submarket's economic environment. Demographical developments had to be advantageous in the specific area for the decision-makers to decide to acquire a property. Only in the case of a sufficiently large city in terms of the total population did the respondents feel comfortable acquiring large office buildings.

Many participants also had explicit or implicit population requirements for cities in which a property is located. The majority of participants either focused on Top-7 (A) cities or invested in A and smaller, less relevant cities but would not consider small locations. The main reason for this is the necessity to have a future exit market available. Interestingly, two participants independently provided the German city Hanover as an example of a town that they considered too small to invest in, as “the potential exit opportunities are limited” (I3) and purchasing a large office property in Hanover would result in “us basically owning the whole market” (I10). These statements imply that real estate decision-makers try to diversify their exposure within a specific city and prefer to refrain from owning a too high market share in a specific area. In addition, they assess the city's market size and form an opinion on the resulting exit opportunities before making the decisions.

I4: The property has to be of a certain size, by which I mean the number of inhabitants. We don't look at anything below that because we believe that the market is either not liquid enough or that it would simply be too big for the minimum investment volumes we are looking for. [...] We say no to anything with less than 150,000 to 200,000 inhabitants as a city with surrounding area.

I7: When I evaluate new assets, the first thing I assess is location. The asset has to fit in terms of demographics and how it will develop over the next 10 to 20 years. We buy in areas where we see a certain development.

I21: They have to be strongly growing cities. The population should grow. [...] We are analysing very carefully what different trends there will be in 10, 15, 20 years, especially concerning demographic developments.

My choice of participants most likely impacted the high interest in large cities with strong real estate markets: the participants were mainly decision-makers from large real estate investment companies. If they assess potential new properties, they will tend to prefer larger real estate markets compared to investors who specialise in small office properties. To give an example, *I3* specifically searched for high-rise buildings with an investment volume of approximately EUR 100 m, which excluded Hanover due to its small market size.

I3: If I want to buy properties worth between 5 and 20 million, there are many markets, but the only market where high-rise buildings work, is [C] in Germany. If I want to buy a property in Hanover, for example, I can do it for 100 million euros. But there might only be one that costs 100 million, just a single high-rise. And if I want to sell again, then there's a market consisting of only one property. If I want to sell a property worth 100 million euros property in [C], there's 740 of them.

4.2.2.2 Number of University Graduates

As discussed with the participants, the economic environment also included facts about the size of universities and numbers of university graduates. This finding is interesting as none of the studies presented in Chapter 2 specifically mentioned the student population as an investment criterion. While the number of university graduates did not constitute the main factor impacting decisions to invest in a specific city or submarket, some participants pointed out that they prefer to invest in “young cities” (*I17*). Young cities often attract highly qualified personnel for the companies, which are tenants in the properties the investors own. Stated differently, office space is more sought-after in dynamic cities – a factor for which investors used the number of university graduates as a proxy.

I7: Also, universities and how many students live there is always very important for us.

I17: We prefer to invest in young cities because they are often attractive for the talent acquisition of the local companies due to the many students and the lifestyle.

I21: There has to be a certain quota of university graduates.

4.2.2.3 Existence of Large Companies in the Area

When evaluating a city or a submarket regarding the potential of the location, most investors revealed that they consider the number of large and established companies located in proximity. The reason for preferring these cities and submarkets is that they are more established and attract more companies as potential tenants. Landlords hope to obtain a higher rent if well-known, established companies with excellent reputations have their headquarters nearby, which ultimately strengthens their return and exit opportunities.

Thus, the respondents considered the existence of large companies as tenants in a certain city as beneficial to the investment decision. Similarly, Ginevičius and Zubrecovas (2009) included other firms in the area into their criterion *environmental territorial attractiveness*. The following quotes underline the relevance of the existence of large companies when choosing a location.

I16: [S] was a submarket that continues to develop positively, with many corporations in the area.

I19: A plus point: large corporates were already located in the area.

I20: With these large corporations nearby, we felt secure that the market was attractive for future tenants as well.

In this context, *I10* explained that the fact that more firms in the tech sector moved into the area recently was beneficial for the investment decision. *I22* pointed out that “blue chip”¹⁴ companies were of special interest for their investment decisions.

I10: The tech companies have expanded a lot there.

I22: And then you look at the countries, what are the right regions, where are all the blue chips of the respective countries located?

I22 also noted that a submarket has increased in attractiveness since large and established companies have recently moved into the area and signed long-term leases. The lease term was a relevant component for the respondent’s view on the submarket’s attractiveness, as these firms usually signed lease contracts covering only the short term. However, they committed to move to this specific submarket for a long-term period, which the participant viewed as positive for their view on the market’s attractiveness.

¹⁴ Blue chips are publicly traded companies or their shares with a “high investment quality that usually pertains to a substantial well-established company” (Merriam-Webster.com, 2021b).

I22: Well, I've seen that [Su] is developing in a super sustainable way. Interesting businesses are moving there. They don't make short-term leases like they do in other locations and other properties, but they have been committed to this location with long-term lease contracts for a relatively long time.

4.2.2.4 Other Economic Indicators

The interview participants also brought up other economic indicators they considered relevant when choosing which city or submarket to invest in. For instance, some accounted for the area's purchasing power, while others required a favourable growth in local GDP. A non-exhaustive list of other economic indicators that the participants mentioned in the interviews is as follows:

- purchase power
- availability of employers
- GDP growth
- GDP forecast, and
- technological advantage.

The following quotes underline this finding:

I17: If a city is technologically advanced, has good internet connections, or is young – that is what we are looking for.

I19: The person who buys butter or bread rarely buys it in proportion to their purchasing power. And who spends money on real estate? Firms. Macroeconomically speaking, the trend is either upwards or downwards. And in the last ten years, the trend has clearly been upwards for Germany.

I21: There has to be a GDP upswing.

I22: We look at where there is high purchasing power, in which regions within Germany or even within cities.

4.2.2.5 Financial Environment

The financial environment was a decisive factor for several decision-makers. Based on the interviews I conducted for my study, I have identified the financial environment as a crucial factor impacting whether to invest in a particular city or location. For this reason, I merged the economic and financial environment into one attribute. In contrast, the studies from Ginevičius and Zubrecovas (2009) and Armonat and Pfnür (2004) evaluated the criteria separately.

The financial environment, including the availability and price of debt, impacts whether the participants can purchase a property given their return requirements in a specific area or submarket. In the interviews, participants distinguished between two financing levels: on one hand, financing availability was a crucial factor for real estate investments on the city and submarket level, including the financial and tax environment. For instance, the real estate transfer tax amount payable in Germany varies between 3.5 and 6.5% by federal state (Hentze & Voigtländer, 2017), impacting whether investors decide to invest in a certain location. On the other hand, financing availability and costs were a decisive aspect on the deal level, with a direct impact on the return of an investment. Section 4.2.11.5 goes into detail regarding the relevance of debt financing for the property's quantitative evaluation. The following statements explain the necessity to invest in an area that is "financeable" (I17).

-
- I6: There were different funding partners involved in the project. Without financing, nothing works for us.*
- I17: Of course, we also make sure that the area we want to invest in is financeable. For example, some banks don't like certain submarkets. [...] Also, the land transfer tax issue has to be taken into account.*
- I19: The financing of real estate as a financial product, means that we are increasingly dependent on financial parameters.*
-

Furthermore, several respondents pointed out that the perceived relevance of the financial environment has increased through the Covid-19 pandemic. As I1 stated, "banks are the most risk-averse participants in the market. And they are the first to put something on hold." A recent study from de Bandt, Lecarpentier, and Pouvelle (2021) illustrated the degree of a bank's risk aversion in times of crisis and how it impacted the actions of market participants. This risk aversion was also expressed by some bank's lower loan-to-value (LTV) ratios¹⁵ or lower amounts of debt when financing in specific locations. Section 4.3.1 details the participant's perceived impact of Covid-19 on the financial environment and the future of office properties. The following quotes underline the relevance of the financial environment for the participants:

-
- I2: At the moment, funding is an issue all over Europe.*
- I10: It has simply become more difficult. When we buy a property, we believe in market rents, that of course may not be verifiable at first. We also have our own crystal ball. And the bank, of course, has a much more conservative crystal ball, and it's always a bit tricky to come together.*
-

¹⁵ LTV is a ratio commonly used in asset and real estate finance. It is calculated by dividing the loan amount by the transaction value of the asset or property (Bian, Lin, & Liu, 2018).

I12: Then the banks are approached for the financing indication. We have a financing department that does that. We are very grateful for them, especially during this time.

I20: It has to be said that the banks, without wanting to be mean, were the first to bury their heads in the sand.

4.2.2.6 Summary: Economic / Financial Environment

This section has outlined the perceived relevance of the economic and financial environment for real estate investment decisions. Throughout the interviews, the participants mentioned further concepts related to this attribute. This section presented my interpretations of the respondents' statements. For example, the respondents evaluated the attractiveness of cities and submarkets based on the number of inhabitants, university graduates and other economic indicators. Moreover, especially in the Covid-19 pandemic, real estate decision-makers found it increasingly necessary to account for the financial environment before investing.

4.2.3 Leasing / Transaction Market Environment / Pipeline

The second attribute of the *city and submarket characteristics* group is the real estate market environment, including the leasing and transaction market environment and the pipeline. In commercial real estate practice, it is common to distinguish between the leasing market's performance and the transaction market's performance. Similarly, for instance, academic literature from Isaac and O'Leary (2012) and Roulac (2000) distinguish between lease and investment factors.

In market reports, several established real estate broker and advisor firms regularly provide market overviews of the office market in Germany quarterly. Schulte, Rottke and Pitschke (2005)'s research included an overview of Germany's most popular market report providers. Although the source is from 2005, only a few names had changed on the list by 2021. These real estate market report providers, too, distinguish between leasing reports, which usually show take-up, vacancy rate, prime and average rents and development pipeline (BNP Paribas Real Estate, 2021b; CBRE, 2021a; Cushman & Wakefield, 2021; Jones Lang LaSalle, 2021c; Savills Research, 2021b) and investment reports, including the transaction volume and yields (BNP Paribas Real Estate, 2021a; CBRE, 2021a; Jones Lang LaSalle, 2021b; Savills Research, 2021c). Similarly, Schulte et al. (2005) broke down the real estate environment in their study on transparency in the German real estate market.

In line with this literature, this section is further divided into transaction and leasing aspects of the real estate market environment. The respondents confirmed that they take into account market reports and distinguish between lease and transaction environment:

I17: We always look at the latest research reports because the development of rents and prices are the main criterion for us.

I19: The operational division among real estate investors often works like this: there is asset management and investment management. The first deals with rental agreements, the latter with purchase agreements.

The respondents agreed that they would like to have a “favourable” (I17) real estate environment, but they considered different characteristics as favourable depending on the company’s background. For instance, core investors preferred stable yield and rents, while value-add investors often emphasised the expected future development of yields and rents. This difference in focus is because core investors require a steady but usually lower cash flow (van der Spek, 2017), while value-add investors focus on adding value through refurbishments and/or an appreciation of the submarket (Lee & Morri, 2015). Section 3.7.1.3 discussed the differences between core and value-add investors and described why I have decided to assess both risk and return types separately in Research Phase 2.

Previous literature also identified the city’s or the submarket’s rents and transaction volumes as relevant drivers for investment decisions. Baum (2009) suggested that investment decisions are solely based on the decision-maker’s forecast of the rental and transaction price environment and their strategy. Pfnür and Armonat (2001) and Armonat and Pfnür (2004) included *regional real estate market conditions* as a sub-category to the *economic environment* attribute but did not further define the term. Roulac (2000) further broke down his category *market factors*, to which he added vacancy rates, development pipeline, and rents and sales prices of comparable properties. As these were not decisive attributes regarding the submarket or city, but relevant when assessing a certain property, comparables are assessed separately in this thesis in Section 4.2.7.

Several respondents pointed out that they preferred to invest in an established office market with high-profile tenants and a good reputation. Properties in established markets usually attract more tenants who can pay more rent. As a consequence, investors assume lower void periods in high-demand areas. In addition, respondents noted that exit possibilities were much higher in a prominent office location. The following statements exemplify the relevance of the *leasing / transaction market environment / pipeline* attribute:

I13: It has to be an established office location so that tenants and exit are not a problem.

I15: And I also believe that the real estate environment and the location will develop extremely here.

I16: What we need in the submarket is that it is an established office submarket. We need other office properties there. We need a good, solid tenant mix at that location.

4.2.3.1 Take-Up

The term *take-up* describes the occupation of a rental area (Sicola, 2017). If there has been a high amount of space take-up in recent months, several areas have been leased, which indicates the attractiveness of the respective submarket for tenants. This, in turn, is beneficial for real estate landlords, who estimate greater chances to achieve higher rents due to increased demand for lettable areas. Office space take-up is a standard real estate term, indicating how leasable properties in a certain location are. Decision-makers rely on this figure to underline the attractiveness of a location, as a “high take-up helps to defend the deal in front of the investment committee” (I4). The following statements underline the relevance of take-up for the participants.

I2: We took into consideration the take-up, stability, the supply pipeline and how large the average leases are.

I17: Take-up is also very important to us.

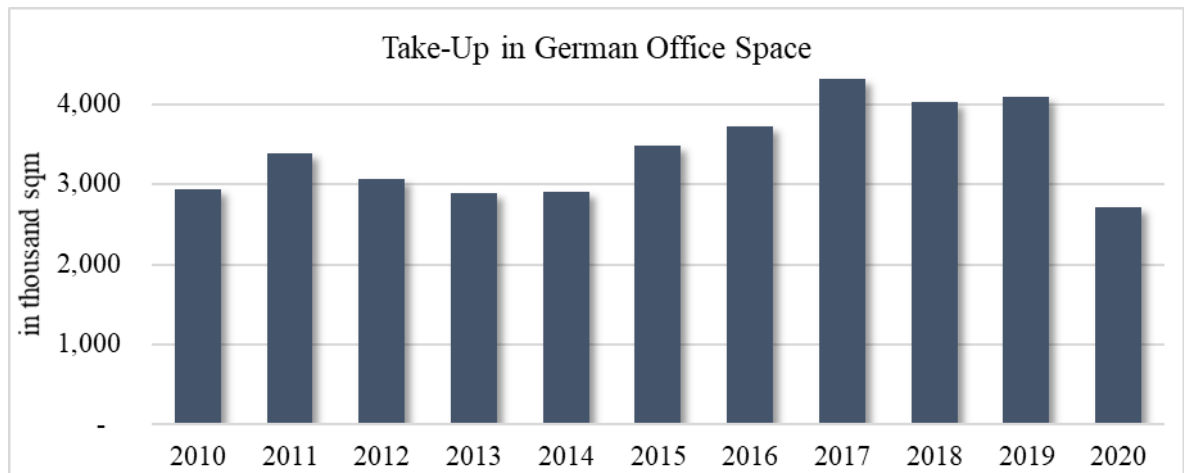
I19: We are extremely attuned to two things: Take-up is very important to us, which is often forgotten, [...] and we also care about the number of transactions and transaction volume.

I22 went into detail on the requirements of their investment committee. The respondent explained that the committee used the take-up as a proxy for the rental performance of a market or submarket. The participant, therefore, benchmarks recent take-up with figures from the last five or ten years to form a view on the rental market today.

I22: The first thing I do, or what our investment committee asks at the end of the day, is how has the letting performance been in the last few months? Benchmark that with the last five years, benchmark that with the last ten years?

Interestingly, space take-up has not been the focus of previous studies on decision-making. However, market reports frequently cover take-up developments. Figure 24 illustrates the take-up in Germany by city. Not surprisingly, the Covid-19 pandemic had an impact on the letting market in 2020. In fact, the take-up in 2020 was 34% below 2019 levels for the eight most relevant cities in the German real estate office market. The decreasing take-up resulted

mainly from the uncertainty many companies faced with regards to the impacts of the Covid-19 pandemic (BNP Paribas Real Estate, 2021b). From an investor’s point of view, experiences from 2020 show that past transaction volumes are sometimes unreliable when trying to forecast future figures. Nonetheless, the respondents explained the relevance of past letting data in informing their investment decisions.



Source: Own illustration based on data from BNP Paribas Real Estate (2021b)

Figure 24: Take-Up in German Office Space¹⁶

4.2.3.2 Vacancy Rates

The vacancy of a city or submarket is another criterion that is relevant for real estate decision-makers. A decreasing vacancy rate, measured as the “percentage of the total amount of vacant space divided by the total amount of inventory” (Sicola, 2017, p. 16), indicates that more space is leased than is developed or vacated.

Similar to take-up, decision-makers form a view on this criterion by assessing the development of past vacancy rates. Property owners prefer lower vacancy rates, as, under these circumstances, tenants have fewer options to choose from. With lower supply compared to higher vacancy rates, property owners might be able to negotiate more favourable lease conditions. Stated differently, decreasing vacancy rates are considered advantageous for a specific transaction. The vacancy rate is affected by the take-up and the development pipeline in a submarket.

The interviews revealed that a high vacancy rate on the city or submarket level usually bears risk from the respondents’ point of view, as it indicates too much space supply compared to

¹⁶ The figure shows the consolidated office space take-up in Berlin, Cologne, Düsseldorf, Essen, Frankfurt, Hamburg, Leipzig and Munich.

space demand. While future vacancy was considered to be even more relevant for investment decisions, most respondents used past vacancy rates of a location. They compare this to other cities or submarkets to inform their view of the lease market. The following statements exemplify these findings.

I15: And here again the facts speak for themselves because you look at the current vacancies and compare them with crisis vacancies at other times. In [S] and [S], the vacancy rate has already decreased significantly. And that was already a massive change - for a variety of reasons - compared to the past. If demand continues to be good, this must lead to rent increases over time, or more properties must be built. And of course, this is still limited.

I16: We pursue the so-called ABBA strategy, we like to move into B submarkets in A cities or prime CBD locations in B cities. In the case of [P], it was a classic B submarket, up-and-coming, with a very positive vacancy trend. [...] In areas where we had about 50 or 60 percent vacancy five years ago, this rate has continuously decreased. At the time we acquired [P], we had a vacancy rate of around 10 to 15 percent. The vacancy curve went relatively steeply downwards.

While these two statements imply that both respondents assess the relative development of vacancy rates, other participants instead addressed absolute vacancy rates. For instance, *I10* and *I11* discussed locations without any vacancy at all. *I22* pointed out that the low vacancy rate impacted the price of a specific transaction. In hindsight, as an effect of the Covid-19 pandemic and its impact on vacancy rates, the respondent said that the increase in vacancy was not favourable for their ongoing evaluation of the investment. This signals the high importance investors place on vacancy rates to evaluate their investment decisions.

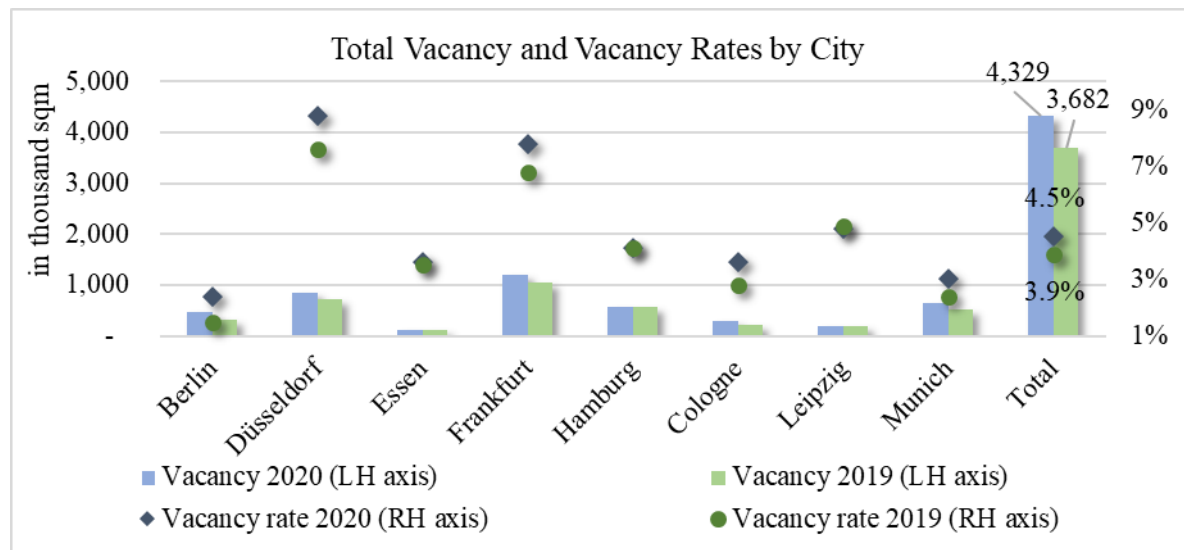
I10: We talked about [P] and that is within [S]. I think we've had a vacancy rate of zero percent across the entire submarket, so there's only a hint of individual spaces that are empty. It would be very absurd if large areas were suddenly vacant.

I11: The properties in the area are all fully let.

I22: Prime rents of [X] euros, vacancy rate of [X] percent - that's what I priced on. The vacancy rate is now [X] percent. That means we have a higher vacancy, with declined new construction activity - which is of course not good for us.

Figure 25 shows the total vacancy and the vacancy rates by the Top-8 cities as defined by real estate advisor BNP Paribas Real Estate. It is not surprising that, with fewer leasing transactions and an almost constant pipeline (see Section 4.2.3.4), total vacancy and vacancy rates increased between 2019 and 2020 by 60 basis points (BNP Paribas Real Estate, 2020b, 2021b). The participants noted that vacancy rates were very low and saw this as a positive factor for their investment decision. From their perspective, low vacancy rates indicated fewer options for companies looking for a place to rent. With only fully let properties in the

neighbourhood, investors have more negotiation potential with regards to specific lease terms.



Source: Own illustration based on data from BNP Paribas Real Estate (2020b) and BNP Paribas Real Estate (2021b)

Figure 25: Total Vacancy and Vacancy Rates by City

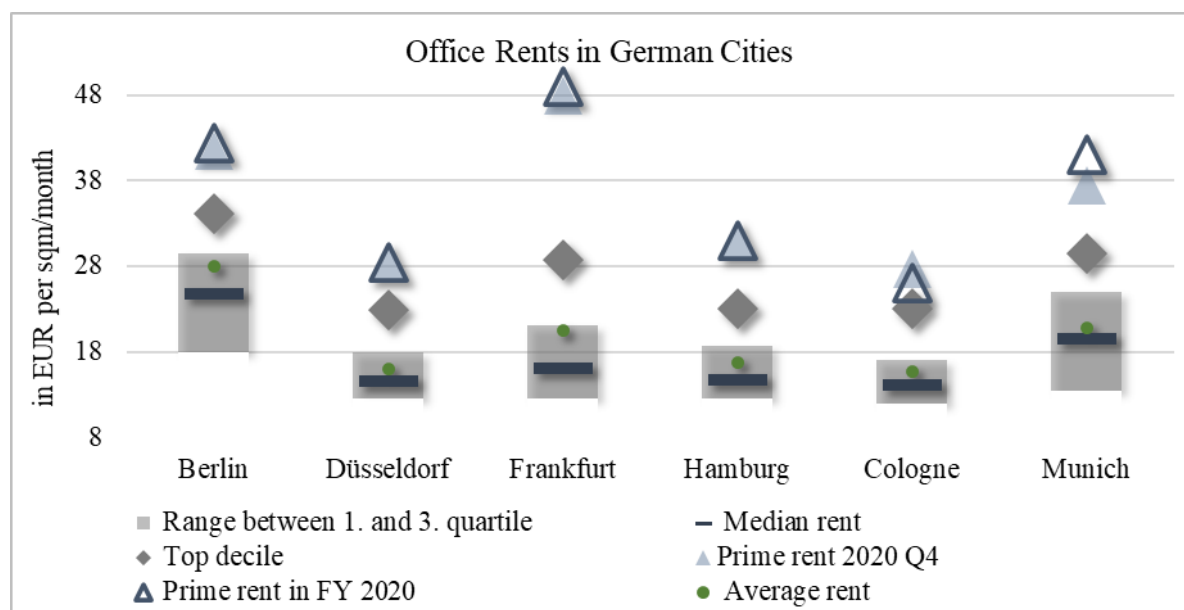
Previous literature on factors affecting real estate investment decisions also identified the relevance of vacancy rates for investors, especially on the transaction level. Pfnür and Armonat (2001) found that most investors used the vacancy rate to indicate risk. According to Roulac (2000), vacancy rates and trends in the submarket belong to the most critical due diligence evaluation elements. Jackson and Orr (2011) considered vacancy rates as input factors for a discounted cash flow (DCF) calculation. Similarly, Blundell, Fairchild and Goodchild (2005) assessed how relevant vacancy rates are for managing real estate portfolio risk. However, my research revealed the high relevance of vacancy rates and their development for investment decisions on the submarket or city level instead of the investment level, which none of the before-mentioned studies accounted for.

4.2.3.3 Rents

One of the most intuitive real estate environment factors for an investment decision is rent. Market reports often distinguish between prime rents and average rents. Prime rents do not capture the highest rent in the market, but the average of the top 3 to 5% leasing transactions in a submarket. Average rents constitute a representative rent level for an average letting transaction, as defined by the real estate analytics tool RIWIS (RIWIS Online, 2021b)¹⁷.

¹⁷ RIWIS (Regionales Immobilienwirtschaftliches Informationssystem, regional real estate information system) is the data base from Bulwiengesa AG, a German real estate research institute. More information on www.bulwiengesa.de.

Figure 26 shows office rent ranges and prime rents by Top-6 city. In Berlin and Munich, median and top quartile rents are highest, which means that these cities witness the highest lease values for the top 50% and 25% of new lease contracts, respectively. The significant deviation between leases in the top decile and prime rents in Frankfurt signal that the city offers varying rental opportunities. The top 3% of rents are in such a high demand that they result in a difference between prime rents and top decile rents of almost EUR 20 per sqm. Figure 26 also displays how prime rents changed in the fourth quarter of 2020, illustrating how the Covid-19 pandemic impacted the German office market in 2020 (Savills Research, 2021b).



Source: Own illustration based on data from Savills Research (2021b)

Figure 26: Office Rents in German Cities

Several respondents said that solid growth in rental levels was a decisive factor in choosing the city's submarket. Three of them specifically discussed the development of current and past rental levels. They agreed that strong growth in rental rates constitutes a positive sign for investing in the respective market. Furthermore, I16 pointed out that as a value-add investor, the higher the difference between the prime rent of a submarket and the whole city, the more attractive the submarket for an investment.

I2: And in [C] there was enormous rental growth.

I11: You could see very strong rent growth there.

I16: What we also always look at is where the prime rent is moving in the cities and in the submarket. If the gap is relatively big, we feel even more comfortable to invest there.

Pfnür and Armonat (2001) asked German investors how precise their forecasts of various financial cash flow factors were over a ten-year horizon. Their results indicated that on a scale from 0 to 100%, with 0% meaning no deviation, investors expected to deviate by 37.9% on average, with their rent forecast from the actual rents achieved for this property. Thus, forecasting rents constituted a challenging task for decision-makers. In the same study, the authors identified the quality of asset management and the local environment's structure as being especially relevant for the investor's rent forecast. In addition, a negative development of market rents was the primary reason for failed real estate transactions. In another study, Roulac (2000) found that market rents were the sixth most relevant factor out of a list of 68 factors investors accounted for when conducting property due diligence.

These findings are generally in line with the feedback from my study. The participants relied on past rental income and the economic environment of the submarket to forecast future rental income. Significant rental growth in the past was seen as an indicator that future rents would continue to rise, resulting in a positive impact on the investment's cash flow projection.

Interestingly, value-add investors specifically considered the difference between the rental level of the submarket and the city. A large gap between these two rental levels indicated further upside potential in the rental development of a submarket. Moreover, *I17* mentioned that they estimate future rental levels based on their personal beliefs of where they expect market levels to move in the future. As *I19* pointed out, positive rental price forecasts are beneficial for their investment decisions. Baum (2009) also focused on rent projections and suggested that investment managers base their purchasing decisions on price forecasts and the optimisation of the risk-return expectations.

I14: We obviously look at rent levels very closely. [...] But, you know, the question is, where will rents go in various different markets? Each market has a different dynamic. You have to look at each market independently and assess that.

I17: Of course, we also make assumptions depending on where we think the market is going.

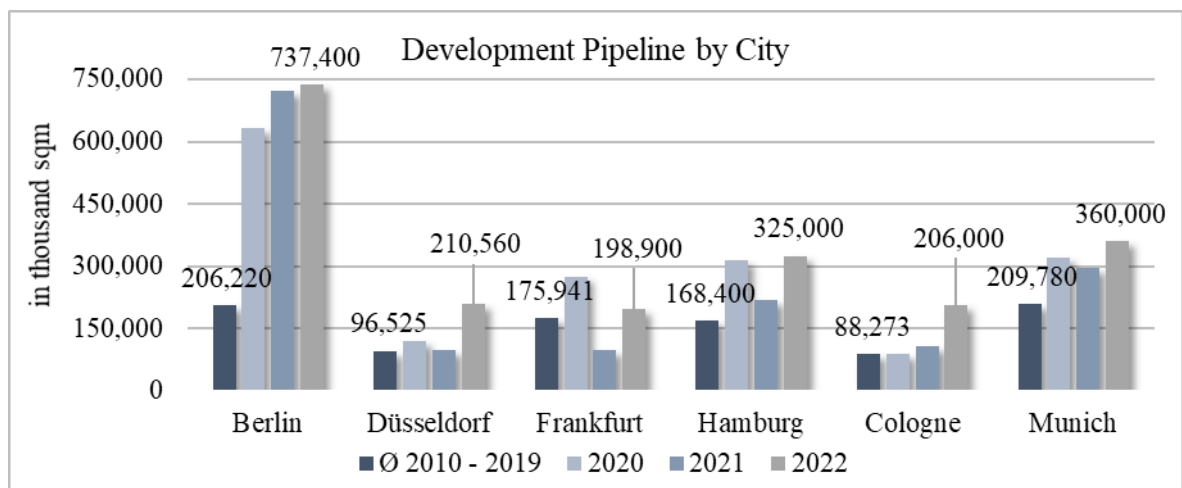
I19: We also found it attractive because not only could future estimated rental growth be taken into account, but there was already historical growth potential.

While my findings indicated that interviewees spend a considerable amount of time on deriving future rental development, De Wit (1996) concluded that his respondents “did not generally take into account possible increases or decreases in future cash-flows” (p. 140).

The difference in the relevance of forecasting rents might result from increased information availability today, which I will further discuss in Section 4.3.2.

4.2.3.4 Pipeline

The development pipeline indicates how many square metres are currently under development and will be completed within the next years. Figure 27 illustrates the impressive amount of new construction projects. For almost every Top-6 city, expected 2020 to 2022 development completions exceed the average for the ten years ending in 2019. The pipeline immediately results in a higher space supply. According to BNP Paribas Real Estate (2021b), 50% of the areas under construction at the end of 2020 were still available to rent.



Source: Own illustration based on data from Savills Research (2021b)

Figure 27: Development Pipeline by City

As *I14* pointed out, several deliveries of construction products were delayed due to the Covid-19 pandemic. In addition, *III* noted the natural boundaries newly constructed space has: in highly sought-after locations, plots to develop new properties are increasingly difficult to obtain, which naturally decreases the future pipeline potential.

III: A lot of building projects have taken place there, but that had its natural limits. Place became scarce.

I14: You know, again, take-up has suffered across Europe over the last months and there is a supply pipeline coming. Obviously, there are delays due to Covid-19.

The research participants considered a significant development pipeline in the city or submarket as helpful for their investment decision. Their rationale was that newly constructed properties upgrade the perceived environment. Thus, although they might result

in higher competition due to more leasable space supply, decision-makers interpreted new constructions in the immediate surrounding as positive due to its signalling of interest in the area from developers and tenants and a modernisation of the submarket's image.

According to many participants, the advantage of a considerable pipeline is to attract new tenants to move to the site, which increases the take-up of the submarket as presented in Section 4.2.3.1 and overweighs the 'risk' of additional space competition. As Roulac (2000) noted, "future vacancy rates are largely influenced by new construction relative to demand" (p. 398), and respondents indicated that with new developments in place, demand in the area increases disproportionately. The following statement from *I15* underlines that the respondents expect an upgrade of the area resulting from increased new construction activity.

I15: The building next to it is another development, [P] and next to it, [P]. And these two developments will certainly become the new top location in [C]. [...] I think the situation will improve. Once the building sites are all finished, there will be an upgrade of the area.

Many previous researchers did not identify the pipeline as a factor impacting real estate investment decisions. One exception is Roulac (2000), who considered both *new competitive building* and *new construction trends* as moderately relevant for the investor's due diligence when conducting an investment decision. Ginevičius and Zubrecovas (2009) implicitly added the future pipeline into their attribute *territory attractiveness criteria*. Apart from these two papers, former researchers did not specifically identify the development pipeline as relevant, making this a new finding. Interestingly, two out of 22 respondents proposed to add the development pipeline specifically to the set of attributes when I presented it to them at the end of my First Research Phase, indicating that this attribute is indeed relevant to them.

4.2.3.5 Transaction Volume and Number of Transactions

In addition to factors concerning the leasing environment in a specific market, respondents also accounted for the investment environment. Like rising rental levels, the participants considered persistent transaction volume a positive indicator for the city or submarket. Furthermore, they saw constant or increasing transaction volumes in a submarket as a sign for other investors' interest in the market and consequently for more exit opportunities at the end of the holding period. In addition to the transaction volume, the respondents also took into consideration the number of transactions:

I19: We look at the numbers of transactions and transaction volume in the market.

Nonetheless, value-add investors, in particular, put effort into finding markets that are not yet in the focus of the majority of investors. Thus, low previous transaction volumes in a submarket did not necessarily constitute a bad sign for some investors. Instead, suppose they had reason to believe in the emerging attractiveness of a certain submarket. In that case, low past transaction volumes could also indicate that this specific submarket has not yet come to the attention of the majority of investors and is the kind of “hidden gem” (I4) many value-add investors seek to find. The statement from I17 exemplifies this phenomenon. On the contrary, for core investors, high past transaction volumes and corresponding increases constituted a positive sign, as I5 depicted.

I5: What we had said strategically was that transaction volumes have already increased significantly in the good locations in recent years. A good sign for a core investor.

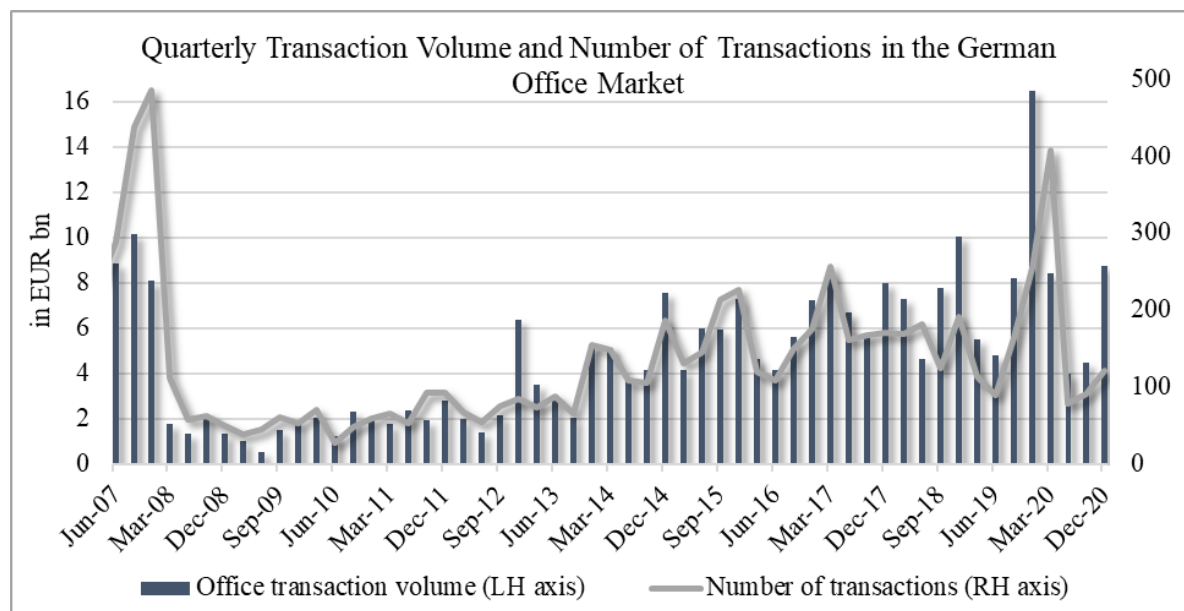
I17: Of course, the best case would be to have a crystal ball and to invest today in future emerging markets. This means that key figures such as transaction volume are not so relevant for us if the outlook is right.

Gallimore and Gray (2002) have added a joint category including transaction prices, rents and yields as part of the *facts* group in their research on the relevance of personal views for real estate investors. Similarly, Armonat and Pfnür (2004) and Pfnür and Armonat (2001) included *regional real estate market conditions*, including transaction prices. Roulac (2000) mentioned transactions as a relevant *market factor* in the text without explicitly adding investment prices or numbers as a sub-factor. The author broke *market factor* down further but focused on lease factors such as rent development and vacancy rates while refraining from specifically adding investment subfactors. Thus, no previous research has ascertained the relevance of transaction volumes and numbers in the market.

Figure 28 shows the development of the quarterly office transaction volume and the number of transactions in Germany. Since 2008, transaction volumes and numbers of transactions have increased simultaneously, indicating that the average transaction size in the office market remained relatively constant. However, after a solid last quarter in 2019, 2020 transaction volume and numbers decreased in light of the Covid-19 pandemic (RCA, 2021e).

Figure 28 does not include off-market transactions without publicly available information. More precisely, the transaction volume shown in the graph does not include non-public information on off-market transactions, i.e. transactions which were conducted bilaterally

and privately between two parties and not in a public bidding process¹⁸. A study on off-market real estate deals in Germany revealed that in 2018, the total off-market transaction volume amounted to more than EUR 40bn in Germany (HPBA & Bulwiengesa, 2020). In addition to the documented total transaction volume of roughly EUR 61bn in the same year across all asset classes (BNP Paribas Real Estate, 2021a), the report suggested that EUR 18bn of off-market transactions were missing in the publicly known transaction volume figures. As 38% of off-market transactions were in the office asset class, official transaction volume records did not capture an annual transaction volume of almost EUR 7bn office transactions (HPBA & Bulwiengesa, 2020, 2021). This amount again underlines the imperfect data availability in real estate in Germany, which Section 4.3.2 discusses further.



Source: Own illustration based on data from RCA (2021e)

Figure 28: Quarterly Transaction Volume and Number of Transactions in Germany

4.2.3.6 Yields

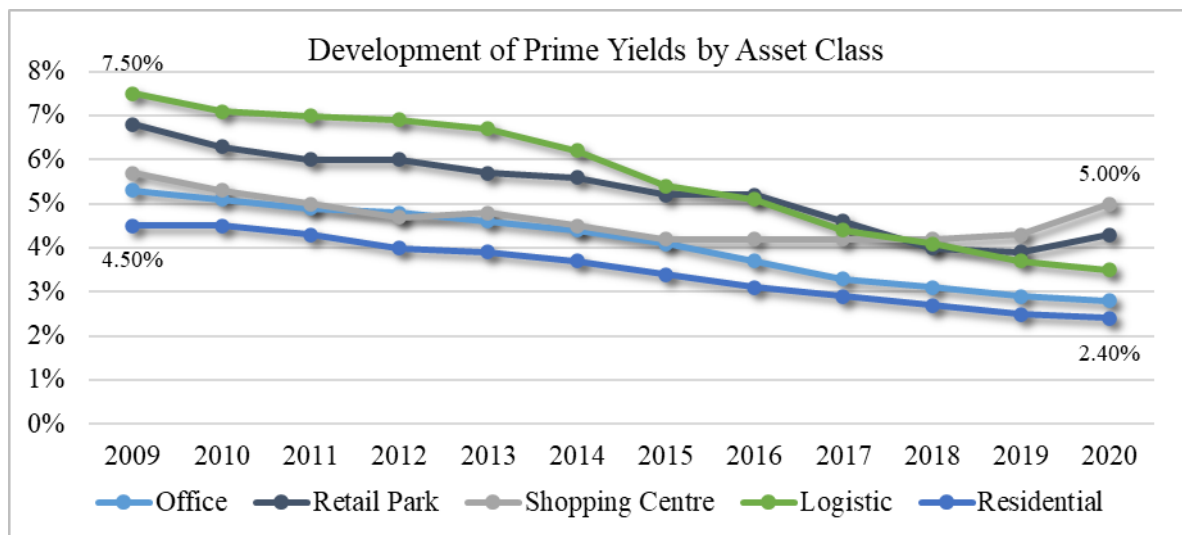
Yields are a central figure for indicating a property's value relative to the rental income. The most common form, Net Initial Yields (NIY), is derived by dividing the net rental income plus transaction costs by the property's purchase price. Thus, the lower the NIY, the higher the property purchase price relative to the yearly rental income. The rental income is either projected for newly established properties or based on obtainable rental levels for existing buildings (RIWIS Online, 2021b). A related term is the capitalisation rate (cap rate in short), indicating the operating running income of a property in relation to its current value (Geltner,

¹⁸ Please see HPBA and Bulwiengesa (2020) for a more detailed definition of off-market transactions.

Miller, Clayton, & Eichholtz, 2006; Isaac & O'Leary, 2012). The term 'prime yield' does not refer to the lowest yield achieved in a specific transaction but to the yield of ten-year lease contracts for properties with high-level tenants, excellent quality and outstanding locations (RIWIS Online, 2021a).

The opposite figure of NIY is purchase factor or price/earnings multiple, commonly used for other asset classes (Geltner et al., 2006). This figure is derived by dividing 1 by the NIY. Some decision-makers prefer to measure and calculate purchase prices in yields; others describe their expected return in multiples.

Figure 29 illustrates the development of prime yields in different asset classes in Germany. While all asset classes experienced yield compression between 2009 and 2020, shopping centres and retail parks have recently increased in price relative to rental income. This is a sign of higher supply and/or lower demand in these asset classes, which lockdowns and higher insecurities in the retail sector due to the Covid-19 pandemic further enhanced. Thus, purchase prices decreased faster than rental income in these sectors, resulting in increased yields. On the contrary, prime office yields, which are often paid for properties with long lease periods and public sector tenants, decreased further (Savills Research, 2021c).



Source: Own illustration based on data from Savills Research (2021c)

Figure 29: Development of Prime Yields by Asset Class

Some respondents discussed the yield compressions of the past years in the interviews. They acknowledged that properties have significantly increased in value due to the decrease in yields or the increase in factors.

I2: Yield compression is a huge topic: Ten years ago, I was buying at five percent minimum yield and at three percent today, if you're lucky, you have a huge capital gain.

I11: The factors have risen sharply.

I22 pointed out that in this environment of decreasing yields, value-add investors might identify exciting opportunities. As value-add investments usually aim to purchase a property at a higher yield, upgrade the value of a building by investing capital expenditures and rent vacant areas to high-profile tenants, these investors could significantly benefit from the yield compression.

I22: And another factor is the yields. [...] All the deals that we see that have been traded in the last few months have achieved abnormal prices. The yields continue to go down. That means that this brick and water business is still extremely exciting in times of such a crisis. This is also an indication that real estate as an asset class will continue to be an exciting investment for value-add investors. These investors are buying to get the property to where it is now being sold at a high price.

Furthermore, similar to rent forecasts, the participants revealed that they spend time and effort forecasting yield developments. Locations with higher yields implied that either the purchase price is relatively low or the rental income is relatively high, or both. Decision-makers regularly analyse average and prime yield developments of the submarkets and identify those markets with the most potential. Recently decreased yields or increased factors suggested that the respective markets were attractive for other investors. Generally, the participants aimed to identify areas with potential price increases to profit from a higher exit price and value appreciations.

I9: What is the optimal combination of quantity and price in two to three years, to achieve the maximum rental result, which then also has the most attractive yield. The question is, what kind of tenant constellation will the next buyer pay the highest yield on? The rent alone is important. But the factor on the rent drives the total value of the property a little further than the rent alone.

I17: We regularly look at prices and try to identify regions that have particularly high potential.

It is important to recap the distinction between attributes at the market or submarket level and attributes at the property level. This section only deals with the market environment of yields and not yields of specific properties or the property under evaluation itself, which I discuss in sections 4.2.7 and 4.2.10. Other researchers did not make this distinction. For instance, Roulac (2000) added *sales prices of comparable properties in market factors* that also included submarket characteristics such as *trends in the submarket*. With my approach,

I am able to distinguish between the two attribute levels, which is in accordance with the views of the research participants, as derived in the interviews.

Yields show relative real estate transaction prices. Most previous researchers about real estate investment decisions incorporated yields into their analyses, too. In their model, Jackson and Orr (2011) presented yield developments as highly relevant for assessing a property's return and assigned yield to the *DCF parameter* group. Gallimore and Gray (2002) merged yields, rents and transaction prices into the attribute *actual transaction prices/rents/yields* in the group *facts*. Blundell et al. (2005) also identified yields as a risk driver at the portfolio level, as “a low yielding fund requires above average capital growth to achieve its benchmark return and capital growth is more ephemeral than contracted income, hence it is higher risk” (p. 120). In addition, Baum (2009) considered yield expectations, together with rent forecasts, as the primary investment decision driver.

4.2.3.7 Summary: Leasing / Transaction Market Environment / Pipeline

This section revealed the relevance of the leasing and transaction market environment. Similar to real estate brokers, the participants distinguished between impacts on the transaction and lease prices. The respondents paid particular attention to identifying a favourable real estate environment, including take-up, rents and pipeline for the lease market, and transaction and yields for the investment market. The interviewee's preferences regarding a beneficial real estate environment differed by risk class. While core investors preferred high, stable rents and price levels, value-add investors aimed to identify a “hidden gem” with low current prices but very favourable prospects to reach their return targets. Nonetheless, all participants preferred submarkets with lower rents and price levels with growth potential. This has become increasingly difficult as the Covid-19 pandemic has resulted in higher vacancies, less take-up, and a lower transaction volume.

4.2.4 Area Usage / Tenant(s)

The *area usage / tenant(s)* attribute is the first attribute of eight *property / investment characteristics* I have identified as relevant for real estate decision-making in my First Research Phase. Several research participants discussed the importance of area usage and tenants for their investment decisions. I merged both attributes into one as they are related and were often used in the same phrase. For instance, *I17* stated: “When it comes to the

building, we pay a lot of attention to who the tenant is, on the one hand, and how space is used and what the potential is behind it, on the other“. The following two sections present the findings relating to the *area usage / tenant(s)* attribute.

4.2.4.1 Area Usage

The interviewees expressed specific interest in how the areas were used. For instance, they assessed whether the building was an entire office property or whether it offered different usage forms, such as retail, or future usage potential.

Within this topic, most respondents mentioned area flexibility as highly relevant to their purchasing decisions. They expressed the view that an investment became significantly more attractive if it offered a degree of flexibility, e.g. if a floor of an office building could be split up and leased to two tenants who require less space. As a consequence, this increases the number of prospective tenants. Nonetheless, the interviewees preferred to rent larger areas to a single tenant, with the simple intention of saving time and work. A tenant renting larger areas usually wants to avoid a split of the area over multiple floors. Thus, property owners are looking for “an optimisation of the use in connection with the maximum utilisation of the building regulation” (I9).

I9: Within the usage form, development quality has to remain as generic as possible, but account for requirements to maximise the return. This means that the building area plan takes into account the largest possible group of tenants, all of whom are able to pay the highest rent. [...] For example, on the ground floor, I see 80 percent retail and 20 percent restaurant, because I think that's the optimal mix for the building.

I10: In [P] you can rent everything from large single units to really small units, so you have a lot of flexibility and the basic equipment is absolutely solid.

I17: Area flexibility is an important point here. If you have very large areas which cannot be split in any regard, it will be more difficult to find a good tenant. Flexibility really is the key here.

Furthermore, I2 elaborated on their investment strategy. The respondent noted that the property had specific areas that were difficult to rent, which decreased potential investors' interest. As a value-add investor, the participant consolidated small areas and merged them into large, coherent areas, attracting larger tenants.

I2: And then from the real estate side, I'll say what probably scared off some investors, is that on the one hand there is a larger share of retail on the ground floor. Plus, there is 1,000 square metres of underground space in the lower ground, which has certainly scared off others. [...] Our strategy is, for example, to consolidate. Institutional tenants

in the property who rent at least 2,000 square metres, get a different exit cap rate than a tenant renting 90 square metres. [...] In [P], we have dealt with floor plates for a long time. A tenant who now rents 1,500 square metres doesn't want to have the area spread over three floors. The floor plate has to fit – ideally, it has to be connected. Nothing is perfect, but that's just a consideration.

The topic of area usage played a considerably less relevant role in previous research on real estate investment decisions. Jackson and Orr (2011) are among the few authors who have addressed this topic within their survey of 51 UK investors. The authors concluded that “Properties with the greatest flexibility should, ceteris paribus, attract the highest level of user demand” (p. 334). In addition, the results from Pfnür and Armonat (2001) indicated that area and property usage flexibility is the second most relevant attribute out of seven for real estate decision-makers. With a relevance rating of almost 6 out of 7, this attribute was only marginally less important than the location's quality.

The necessity for flexible spaces identified in the interviews increased during the Covid-19 pandemic. Real estate advisor and broker Jones Lang LaSalle acknowledged the higher need for flexible office space. They forecasted that 30% of future office space would be flexible – a trend that was further accelerated by the Covid-19 pandemic (Jones Lang LaSalle, 2020a). Section 4.3.1 elaborates on the respondents' expected impact of the Covid-19 pandemic on future office space demand.

This finding is in line with the views from the interviewees, who expected tenants to offer more work-from-home options in the future, with fewer fixed workplaces and more space for each employee, i.e. with additional break-out rooms or creative zones. *I6* and *I22* mentioned that they were in the construction phase of large office buildings when the Covid-19 crisis began and pointed out that they appreciated the possibility of spontaneously redesigning the office space to meet the new requirements, including more space between employees' desks and additional recreation rooms.

I6: The building was under construction at the time, and we were able to respond very well to the new space planning due to the pandemic.

I22: We still have the opportunity, especially in the construction phase we are in now, to really respond to the needs of the companies that are coming. And the companies now have their needs. The safety and health of the employees is the be-all and end-all.

4.2.4.2 Tenant(s)

While all respondents agreed that the tenant profile of a property is relevant, the interviewees' opinions on what constituted a favourable tenant profile differed. On one hand, several respondents, especially those belonging to the core investors group, preferred properties with long lease contracts and public tenants. This is in line with findings from real estate broker Savills Research (2021c), who considered higher risk aversion and uncertainties due to the pandemic in 2020 as the main reasons for more interest in long-term lease contracts.

I18: With the core properties, it depends on who is your tenant. What is the tenant structure in the building? And which market do you get into, depending on the WAULT? [...] In addition, this is a new lease with [T], who has a single-tenant character in the building.

On the other hand, more value-add-oriented investors pointed out that they were not looking for “boring” (I4) long-term lease contracts, as they did not offer the necessary upside potential. Instead, they looked for properties on which they could actively work. They preferred to purchase vacant properties or properties where the tenant was likely to move out shortly to reposition the areas and lease them at a higher rate afterwards.

I5: [T] is a tenant. That's also great. Plus, the building offers repositioning potential, so we want to actively intervene in the building and, if necessary, put a new building next to it.

I9: It's really value-add. The building is 50 percent let, the rent is somewhere around 50 percent of the market rent. The main tenant still has a contract until 2024. And when the main tenant moves out, new leases will be concluded at market rents.

I22 followed a specific rent strategy when they purchased a vacant property or developed a new one. The respondent aimed to attract a large tenant for the “less-qualitative areas” at a lower rent. Afterwards, they planned to lease the remaining areas to smaller, less renowned tenants at a higher rental price. With a large, well-known brand already renting spaces in the property and upgrading the area's attractiveness, they considered it possible to draw the interest of smaller tenants, too.

I22: But it was very important to us that we first get an anchor tenant in there, in the less-qualitative areas of the building. Our strategy is always the same, whether with developments or with new buildings: We try to rent out the lowest floors. And of course, we also try to attract tenants with good rent in order to give the building a name.

Despite these differences between value-add and core investors, tenant quality constituted a relevant aspect for all respondents. It is not surprising that they considered high tenant quality, e.g. in the form of creditworthiness, as more attractive than lower-quality tenants, as rental income from the latter was thought to be less secure, and loss of rent is more likely. The interviewees also noted that a proper tenant mix constituted a critical criterion. Participant *I14* mentioned that they “bought a mix of tenants with strong covenants, but also long leases and some short leases”.

I7: We needed the building, location, quality and cash flow to meet our expectations. Now we also put much more effort into understanding the quality of the tenants.

I11: Apart from the location, we were also convinced by the very exciting tenant profile. It was possible to secure a long-term lease with [T] at rental conditions that we saw below the market.

I12: So we found the combination of cash flow, growth potential and complete downside protection on the cash flow side very interesting because the tenants also have a very high credit rating and have not suffered any Covid-19 damage.

I14: And within the four properties we had a mix of several tenants, there was one larger tenant.

I16: We were satisfied with the tenant creditworthiness and quality.

I19: The tenant's creditworthiness was a decisive factor.

Most respondents preferred a mix of different tenants. This is confirmed by findings from Jackson and Orr (2011), who discovered that investors preferred more than five tenants over two to five tenants and single-tenant properties. On the contrary, *I3* pointed out that they do not consider properties at all if they only have a single tenant renting the whole building. With this view, this participant deviated from the other participants' consensus.

I3: And I put the fourth tick because it is not a single tenant, but a multi-tenant.

De Wit (1996) found that Dutch institutional investors also accounted for the tenants with the attribute *tenant characteristics*. Blundell et al. (2005) added *tenant creditworthiness* as a criterion for managing real estate portfolio risk, while Armonat and Pfnür (2004) went further into detail and distinguished between *tenant mix* and *tenant creditworthiness*. Roulac (2000) assessed the relevance of *tenant improvements* and *tenant quality*, whereas he interpreted the latter term as belonging to two groups. Thus, he analysed *tenant quality* twice: once as a financial factor and once as a property characteristic. The author concluded that both attributes had gained relative importance in investors' due diligence processes between

1987 and 1993. Moreover, Jackson and Orr (2011) accounted for *tenant creditworthiness* and *tenant mix* as two separate factors out of nine total attributes discussed in their paper.

4.2.4.3 Summary: Area Usage / Tenant(s)

How an area is used or can be used in the future and the lease mix of the property plays a vital role for real estate decision-makers. Before purchasing a property, decision-makers assess how the area usage and tenant profile could be optimised. They prefer a flexible area design, which can be easily adapted to changing requirements, e.g. resulting from the Covid-19 pandemic. In addition, higher creditworthiness among the tenant profile was considered beneficial. To generate the optimal tenant mix, some respondents followed specific strategies. For instance, one respondent noted that they first signed lease contracts for the less appealing areas with large, well-known tenants for lower rents. Afterwards, they continued to attract tenants that pay higher rents for the remaining, smaller areas.

4.2.5 Deal Access / Relationship to Seller

The next attribute concerning *deal access* and *relationship to the seller* was most often mentioned in interviews by decision-makers mainly active in the value-add investment class. Several respondents stated that they gained special access to a deal, such as through relationships to sellers from former transactions. This often resulted in them discussing transaction parameters exclusively with the seller or the seller's broker – an off-market transaction, which will be further described in this section.

According to the respondents, other possibilities for better deal access were “special situations” (I18), which I will address in this section as well. I22 pointed out that a “story to tell” is highly relevant to defend the deal in front of internal investment committees. I divided this section into the relationship to the seller and special situations.

4.2.5.1 Relationship to Seller

When describing how a deal came about, several interviewees pointed out that knowledge of the seller or an existing relationship with the seller had a significant positive impact on the investment decision. The respondents either gained access to specific information through their network or saw an increased possibility of success when they trusted the seller.

Thus, and not surprisingly, investors preferred to conduct business with people from their network or firms with which deals have been successfully closed in the past.

This finding is in contrast to Roulac (2000), who included *reputation of borrower / developer / seller* as well as *prior experience with borrower / developer / seller* as attributes into his research, but found out that this aspect is relatively unimportant for investors. Apart from this paper, earlier research on this topic has not considered the contact to sellers as relevant enough to explicitly address it in their surveys, making this a novel finding for real estate decision-making studies.

I16 and I22 explained the relevance of good relationships to the sellers for specific deals. Through their network, both got to know that the former owner of a property might want to sell in the future and approached them to conduct a bilateral acquisition from the seller without any public bidding process – a so-called ‘off-market’ transaction. As I20 noted, real estate players like to work with parties out of their network with whom they have already had positive experiences in the past.

I16: I have been relatively close to [Se] for 15, 20 years. In this context, there was information in the market that [Se] had bought this site in order to develop there. And then, we approached [Se] relatively proactively and started to find out more about this project.

I20: We looked at that a year before in a supposed off-market constellation because we had already had a lot to do with the seller [...]. It is important to see who you are at the table with. Who is the buyer, who is the broker? In case of doubt, our industry is an absolute people’s business. People like to see each other again. And I think it’s important, too, that everyone says it was fun after the deal.

I22: I worked very closely with [Se] at that time, and I knew that [Se] had bought this site, created building rights and sold it to [Se]. We entered into discussions with [Se] and asked them whether they wanted to sell it. But we want to have it structured according to our preferences so that it makes sense for our fund.

Good relationships to the seller or the seller’s broker often resulted in access to off-market transactions. The respondents shared the view that they preferred non-public, bilateral off-market transactions to classical bidding processes, for which good relationships to the seller were often not required. This preference resulted from numerous benefits such as less time investment, higher flexibility and more discretion. A report on off-market transactions in Germany conducted by HPBA and Bulwiengesa (2021) also illustrated these advantages, indicating that 55% of market participants completed a successful off-market transaction. The average success rate of on-market transactions amounted to only 38%. According to the

study, 96.7% of investors conducted an off-market transaction in the 12 months leading to October 2020.

Respondents in my research indicated that off-market deals were sometimes closed at a higher price. However, in their view, the advantage of having exclusive access to the deal, including better chances to close the deal and lower time effort, outweighed a potential price premium.

I15: And the fact that it was basically off-market, so we didn't have a process that would have created competition and thus probably would have resulted in a price spiral upwards.

I13: Through our good contacts to the respective sellers, 70% of our transactions are off-market deals. It's not necessarily always cheaper off-market. But you know that if you come to an agreement, then you have the deal.

I16: A typical off-market deal was arranged through a broker who had a connection to [Se]. Because [Se] didn't necessarily want to do a real process but rather wanted to have comfort with the buyer and to complete the deal relatively quickly.

Furthermore, the participants noted that in 2020 they were offered more off-market opportunities via their network than in the years before. Thus, the relationship to the seller and good deal access have become even more important during the pandemic. Furthermore, results from HPBA and Bulwiengesa (2021) suggested that 54% of German real estate market participants expected the relevance of off-market transactions to increase further. The study also revealed that with a share of 38%, most off-market transactions were conducted in the office asset class. The respondents' views about the price difference between off- and on-market transactions in the report from HPBA and Bulwiengesa (2021) varied: almost 40% of their participants suggested that the transaction price for off-market transactions exceeded the price for on-market transactions, 34% indicated the opposite.

4.2.5.2 Special Situation

I18 used the term “special situations” as their proposed addition to the set of attributes within the frame of their response to the second step of Research Phase 1. This indicates that special situations played a relevant role when assessing deal opportunities. *I2* provided an example of the term. In the interview, they revealed that they had purchased a property that was initially planned to be sold via a share deal structure, but the interested parties insisted on conducting an asset deal, as the planned structure was too complicated. Thus, the formerly interested investors cancelled the purchase, and *I2* was able to acquire the property at a

discount and with the complex structure the seller demanded after a failed sales process. Other circumstances for special situations include discrepancies between debt and equity, complicated ownership structures or deferred capital expenditure (CapEx) requirements.

I4: I need something that is special. For example, an investment backlog, caused by the fact that the current ownership structure is unstructured. Another example - there were discrepancies between debt and equity. The loan has been in default for a long time, but no agreement can be reached on who will actually take over ownership.

III: What made it special was the structuring.

Former studies on real estate investment decisions did not specifically include this term. Nonetheless, according to the textbook about real estate investments and finance from Brueggeman and Fisher (2011), special situations apply to circumstances under which investors purchase “underperforming or undermanaged properties” (p. 344) which are sold at a premium after “more intensive leasing, renovation, and property management” (p. 345). Thus, special situations specifically apply to value-add investors seeking to acquire properties at a discount and profit from the higher upside potential resulting from the relatively low price.

4.2.5.3 Summary: Deal Access / Relationship to Seller

The research participants mentioned special deal access and relationship to the seller as additional relevant factors for their purchase decision. Good relationships to sellers often implied simplified access to deals and more transaction flexibility, as sellers frequently exclusively approached potential buyers from their network first. The participants preferred off-market transactions as they often were less time-consuming and involved higher confidence in the transaction. Furthermore, the participants considered good previous experiences with the seller as symbolic of increased trustworthiness.

Moreover, several value-add investors sought to find investment opportunities in special situations. Special situations are circumstances under which the investors have gained extraordinary access to a deal, for instance, because it failed earlier or because the firm was able to implement a complex structure.

4.2.6 ESG Criteria

ESG criteria constituted a focus of my thesis, which is why I paid particular attention to this aspect and discussed it in detail in every interview.

There are some divergences over ESG-related terms in the literature. For instance, de Francesco and Levy (2008) distinguished between ESG criteria and sustainability: according to the authors, both terms include social and environmental aspects, but sustainability also incorporates economic impacts, while ESG issues also address governance. On the contrary, Niemoller (2021) notes that sustainability is often too loosely defined to be actually used by corporates in practice. Instead, the author notes that the term ‘ESG’ is more tangible, used more often and will likely continue to increase in relevance.

Similarly, the interviews revealed that both terms are closely linked. The respondents saw them as broader terms, while ‘green certificates’ indicate the property-related benefits compared to un-certified properties and thus are used to signal the degree of greenness. As my impression from the interviews was that the interviewees preferred the term ‘ESG’ in this regard, I decided to name this attribute *ESG criteria*. That way, I used the broadest term to account for all aspects relating to the environmental, social and governmental aspects of a real estate property with this attribute. All participants were familiar with the term and did not require any translation. In addition, my impression from the interviews was that there was a shared understanding of *ESG criteria*, which further supported this decision.

Nonetheless, in this thesis I use the term ‘sustainability’ interchangeably, while I use the term ‘green certificates’ as a measure of ESG-conformity for real estate. The statement from *I17* underlines that they interpreted green certificates as a measure to quantify how ESG-conforming a property is.

I17: For me, green certificates are useful to demonstrate the degree of ESG. Everybody can say that ESG is relevant to them, but green certificates provide proof.

Jansen (2011) and Falkenbach et al. (2010) noted that real estate market players often primarily focus on the ‘E’ aspect of ESG factors while disregarding the social and governmental elements. Jansen (2011) explained this phenomenon with the increasing ability to quantify environmental elements of investing, such as cost and energy usage models. Similarly, in my research, most decision-makers discussed the environmental aspect when I inquired about the relevance of green certificates. This is an interesting finding

because the relevant certification providers (which I discussed in Section 2.3.5) all include social, health and innovation aspects in their evaluation schemes.

As my research focuses on the relevance of green certificates for decision-makers, I spent on average more time on this topic than on other aspects of real estate decision-making. Where ESG topics were not mentioned by the participants themselves, I introduced this issue at the end of the interview. However, in order to avoid biasing responses, I did not mention my focus on this factor before or during the interviews.

Interestingly, some of the respondents' firms' practices and their personal opinions on green certificates and ESG factors in real estate differed substantially. This section presents and discusses the findings from this part of the interviews and is further divided into the firm's ESG policies, the relevance of the level of certification, the participants' personal views on the topic, the emerging importance of green policies and the need for a uniform ESG evaluation system.

4.2.6.1 ESG Aspects Discussed in the Interviews

The awareness of green certificates and ESG measures in real estate was high across the whole set of participants. All respondents were familiar with green certificates and most certificate providers. The view on green certificates has changed considerably in the last 15 years: according to Sayce et al. (2007), in 2005, 13 to 40% did not know of the current state of environmental incentives at that time in the UK. The awareness of this topic has increased substantially, most likely resulting from higher ecological consciousness and a corresponding rise in the number of incentives and regulations. Thus, most participants were well informed of the current state of green certificates and the EU Taxonomy as a regulatory tool to enhance sustainable investments in the financial industry.

As mentioned before, when asked about green certificates, most respondents focused on the environmental aspect of certifications. As a result, most participants used the terms 'green certificates' and 'ESG' interchangeably. Nonetheless, a few respondents mentioned other criteria of certificates, such as social aspects and the well-being of the tenants. Investors' green focus centred on the process of moving from a pure environmental lens to all ESG aspects, *I21* pointed out.

I17 was one of the few respondents who discussed social and governmental aspects of decision-making. For example, the respondent pointed out that they had just introduced a

new app for the building's tenants, showing the menu and leisure activity opportunities, thus enhancing their social well-being. Actions like these show that real estate owners become creative to attract the best tenants and highest rents and stand out from their competitors.

I17: The E in ESG has been in our focus for a while. The S and the G are new.

I21: It has shifted because it is not just this E that, but really ESG has moved more into focus.

Elements exceeding the 'E'-aspect of ESG were most often mentioned in connection with three other certificate types: WELL (International WELL Building Institute, 2021), Fitwel (Fitwel, 2021) and WiredScore (WiredScore, 2021). While the latter certification scheme is concerned with the IT infrastructure and technological progressiveness of a property (WiredScore, 2021), both WELL and Fitwel are certification standards that focus on tenant health and well-being.

Danivska, Heywood, Christersson, Zhang and Nenonen (2019) compared the incorporation of these factors for different versions of WELL, Fitwel, LEED and BREEAM. They found that the most recent versions of green building standards covered almost all aspects of tenant health and well-being addressed in WELL and Fitwel, too. Therefore, the newest versions of the LEED and BREEAM building standards could substitute for any additional certification schemes covering only social aspects. However, Danivska et al. (2019) stated, "WELL or Fitwel are seen as the next step of currently widely used 'traditional' sustainability tools such as LEED or BREEAM" (p. 213).

Although several participants were aware of these alternative certificates, many respondents in my research connected environmental aspects with green certificates and mentioned WELL and Fitwel as complementing additional certification options. Thus, many were not aware of the broad spectrum of sustainability-related elements green certificates include. *I21* even stated that they prefer Fitwel over a LEED certificate.

I16: There are now also new, innovative certificates that deal with the digital infrastructure of the building, such as the WiredScore certificate.

I18: At the same time, there are other aspects such as the WELL certification. How comfortable do tenants feel in the building, what kind of health effects does a building have. [...] In addition, WiredScore, but also this feel-good factor and these health aspects are becoming more important.

I20: In the last few years, we have become more and more interested in WiredScore, that is, cable and internet connections.

I21: I think for the attractiveness of a property, especially for use and rent, a Fitwel certificate is more interesting than LEED Gold. It's about how much daylight do I have? How much fresh air do I have? Because what is important today is how comfortable do I actually feel in the office.

Several interviewees indicated that tenant comfort has become increasingly relevant for them. They specifically addressed the sense of comfort tenants had in a property, the amount of daylight and fresh air at a workplace and the possibility of getting to work on a bicycle. I have identified this aspect as an emerging trend affecting the German office market, as discussed in Section 4.3.3.

In this context, I12 mentioned that some office landlords in Berlin now even charge rent of up to EUR 25 per month for bicycle stands and prefer these over establishing additional car parking spaces. Furthermore, tenant well-being is enhanced by promoting opportunities to charge electric cars and e-bikes.

I6: This goes all the way down to the tenant level – how do they dispose of their waste? What is their water consumption? How many tenants come by bicycle?

I18: It has also been proven that you can get sick because of a bad office environment. If you have too little light, too little humidity, if the room climate is simply bad, if you don't get enough oxygen, then you're not happy.

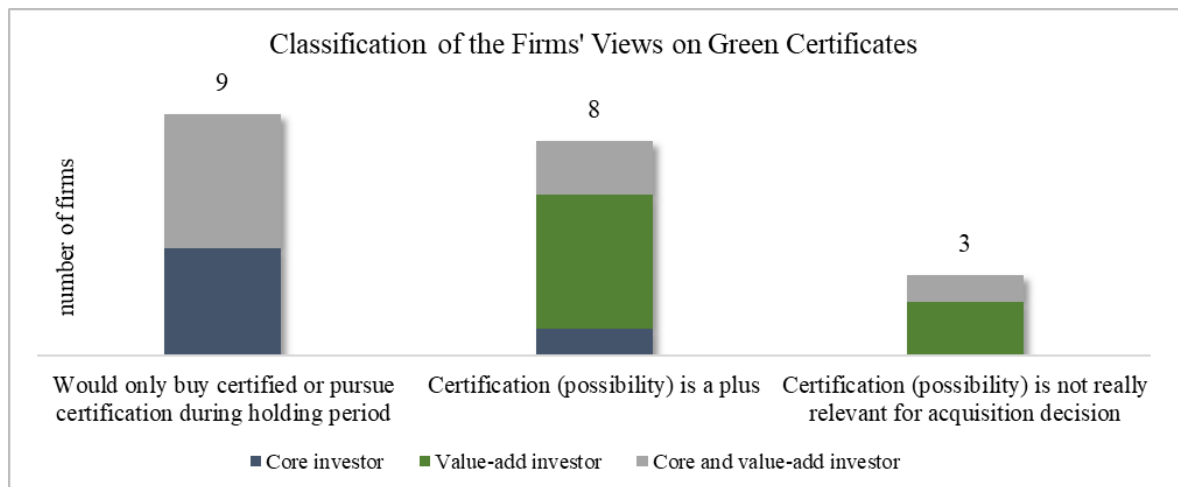
The emerging relevance of social factors in the ESG evaluation of a property is a relevant finding and plays a vital role in the future relevance of green certificate providers. However, other former research on real estate investment decision-making did not specifically assess ESG criteria in detail, except for Jackson and Orr (2011). They evaluated the relevance of environmental performance by using the BREEAM rating as a proxy. This low consideration in previous literature might partly result from the perceived increased relevance of the topic, which will further be elaborated on in Section 4.2.6.5.

4.2.6.2 The Firm's ESG Policies and View towards Green Certificates

In the interviews, I asked every respondent about their firm's policies with regards to ESG factors and green certificates. They were familiar with the terms, and most interviewees stated that *ESG criteria* was a very relevant topic for their investment decision. In general, the participants' firms' views on the topic differed by risk and return profile: for nine out of 20 participating firms, a building had to be certified either at the time of the purchase or within the holding period. The respondents generally had no objections to carrying out the

certification process on their own, but the possibility to certify was a prerequisite for their investment decision.

Four out of these nine firms were mainly core investors, and I classified the remaining four firms as active in both core and value-add risk and return classes. Only three participants stated that certificates or the possibility to certify were not relevant for their investment decision, two of which were value-add or opportunistic investors. For eight respondents, a certificate or the potential to obtain a certificate was a plus for the purchasing decision but not a relevant factor. Figure 30 illustrates the results.



Source: Own illustration

Figure 30: Classification of the Firms' Views on Green Certificates

These results underline the findings presented earlier in this chapter, indicating that investors with different risk and return profiles have varying views on the attributes, including ESG criteria. No pure value-add or opportunistic investor considered an existing green certification or the possibility to certify as a purchase condition. This is interesting, as value-add investors often acquire low-quality properties and invest in their refurbishment with the aim of selling them to core investors – what *I6*, *III* and *I20* branded “manage to core”. Nonetheless, all participants belonging to this investor class did not require an existing or prospective certification at acquisition.

Out of three respondent firms stating that certificates were not relevant for their investment decision, two belonged to the value-add group. One participant of this group (*I2*) stated that when comparing a new development with an excellent green certificate but a tenant with low creditworthiness to an uncertified building with an ideal tenant, green certificates play a significantly subordinate role.

Out of five full core participants, four required a certification, and one respondent considered a certification as a plus. Most firms active in both risk and return asset classes also required a green certificate, whereas two of the firms' policies considered it a plus and one deemed certificates as not relevant. This outcome indicated that green certificates had a higher priority for core investors than for more opportunistic investment types.

Firms focusing on ESG criteria incorporation at acquisition are likely to have significant financial advantages from these actions: according to the study from Cajias, Fuerst, McAllister and Nanda (2011) concerning the impact of sustainability on the financial performance of 80 European real estate firms, capital markets saw it as a positive sign if real estate firms put a strong focus on their environmental performance, including green certificates.

Some statements from the participants showing the need to certify a property are as follows:

I5: If a building would not be certified, we would have got it certified, as we did with many others.

I8: Because we say that if it is not certified today, then it must at least be certifiable, which means that we would then do a pre-check during the purchase.

I12: Well, that is important for us during the acquisition phase. But we are also not afraid to certify the buildings ourselves.

I13: Obtaining this certification is extremely relevant. If a property is not certified, we get the green certificate ourselves.

I16: We are very happy to buy a certified building because it simply shows that someone has given some thought to energy efficiency. [...] So this is where the focus lies, and it is certainly also a focus for every acquisition, for every asset management initiative.

I22: We always have to certify, and that's the task that our parent company and the investors expect from us. And they really pay attention to it.

Some participants expressed that their primary driver for acquiring a green building was positive marketing and external signalling effect, attracting tenants and increasing the exit opportunities. These views are in line with findings from Andelin et al. (2015), indicating that investors primarily invest in certified buildings to enhance their *corporate culture, culture image, tenant demand* and *marketability* effects.

Nonetheless, I8, part of the 'would only buy green'-group, added that they "no longer see this as a marketing tool, but we want to extract very concrete recommendations for action, instructions for action for us, what we have to do in order to tread the path of climate neutrality here and to reach the goal in the end". Thus, they stated that recently, green

certificates exceeded the role of a marketing instrument. As a result, their firm conducted transactions with certified properties by conviction, in contrast to the years before.

According to the Principles for Responsible Investments, an independent, UN-supported organisation aiming at promoting responsible investment standards (Principles of Responsible Investment, 2021a), real estate investors and investment managers can address sustainable topics at several points of the real estate value chain, including deal sourcing and due diligence, the investment decision, the holding period and the sale of the property (Principles of Responsible Investment, 2021b).

The respondents' firms' views indicated that green certificates and ESG criteria had played a significant role in their property screening and due diligence as well as real estate investment decisions, including exit considerations. They also noted that green certificates are beneficial for equity placements with investors. Other respondents mentioned the marketing advantage when renting vacant areas, as tenants preferred green buildings. Discussing ESG considerations with investors and the investment committee was essential for conducting investment decisions, and the respondents acknowledged that this topic has significantly increased in relevance in recent years.

Thus, the respondents pointed out that the ESG pre-check is crucial. Some interviewees' firms even had introduced their own ESG scoring models to evaluate the degree of ESG conformity when assessing a potential property purchase in the past years. In addition, several respondents reported that their firms implemented ESG regulations with the help of internal sustainability teams or an ESG commission responsible for enforcing corresponding regulations. Similarly, Matthiessen and Morris (2007) emphasised the increased need for setting up an internal ESG team in their research.

Most respondents were aware of the EU's sustainable investing standard, EU Taxonomy, and said it was an excellent example of increased regulatory requirements on this topic. Nonetheless, the respondents did not consider increasing regulation as the reason for their firms' consideration of green topics. On the contrary, they regarded more regulations as a sign of the increasing relevance of ESG factors in real estate as a whole. The interview responses to this topic revealed the necessity for a uniform ESG scoring model, which will be discussed in Section 4.2.6.6.

Moreover, while many firms promoted the incorporation of ESG criteria, some interviewees expressed the view that the topic was imposed on them by their management. As discussed

in the next section, the positive attitude towards incorporating ESG factors into investment decisions was only partially shared by the respondents. They sometimes felt that green certificates were not necessarily the most target-oriented approach.

In a relatively recent study, Ott and Hahn (2018) argued that the mere existence of a certification has become a market standard in the office sector and thus does not impact the market value or rent of a property. Similarly, Holtermans and Kok (2017) suggested that “‘green’ building is becoming the new normal in some cities” (p. 7). These views were not supported by the respondents, as many of them considered green certificates as a plus or not necessary at all. For instance, *I1* and *I6* pointed out that certificates were a helpful marketing tool for tenants and investors.

I1: The tenants are already very keen on green. [...] We are not so keen on it. It's a nice-to-have for us, but it's not a must-have. It's just easier to communicate to the investor if the property is green - that makes the purchase decision easier.

I6: Of course, it is also an argument for us in the context of marketing because tenants really care about ESG factors.

Furthermore, *I10*, *I16* and *I18* argued that green certificates have an economic advantage as well. For instance, *I10* considers a higher number of potential buyers at the exit as a result of a green certificate as an economic advantage. In contrast, if there was no additional pay-off from the certificate, these participants would not consider investing money into a certification.

I10: Well, as I said, so far, green certificates were seen positively. But we have never said that if it is not certified, we can't buy it. [...] Everything has to be seen in proportion to the return. [...] And if that means that you have a larger buyer base in the exit because the investors are paying more and more attention to it, then that's a good thing.

I16: But you wouldn't always want to certify an existing property. Certifying has to have an economic advantage, too.

I18: In this case, there was no return bonus. So, of course, it has to pay off.

Another interesting finding from the interviews was the fact that decision-makers would not trade-off the certification of a property with its return level. Thus, the participants required a certification to increase the rental income or demand when selling the property. Most participants would not purchase a green property for an extra charge or invest in the certification if they could not assume a financial advantage from this action. The only two exceptions were *I21* and *I11*, who stated, “we are seeing for the first time that investors are willing to sacrifice returns for more ESG, which has never been the case before” (*I21*) and

“there was a willingness among our investors to forego returns in order to remain in line with the climate protection goals” (III). Thus, some investors have already signalled that they would be willing to trade-off return for sustainability.

Within the scope of the firms’ ESG policies, I asked the respondents whether they considered themselves a market leader in their approach to ESG. As I9 pointed out, “You have to consider whether you want to be the first or second mover, whether you want to take the start-up costs [...]. Or if you think a second-mover strategy makes sense, to wait and see what catches on”. In terms of their firms’ ESG policies, most respondents thought of themselves as being in line with their direct competitors, corresponding to a fast follower position of the developments in ESG factors. I9 also pointed out the peer pressure to account for this topic: even as an unregulated investment manager without significant ESG regulatory pressure or specific sustainability requirements imposed from their investors, they accounted for ESG criteria to create the most attractive product for potential buyers at the exit. As their buyers were mainly core investors, similar to other firms targeting these buyers at the exit, they felt obliged to invest money and time into green certificates.

None of the respondents believed they were significantly less involved with ESG factors than their competitors. Nonetheless, three investors mentioned that their firms were active in ESG committees, sustainability commissions and federal associations, partly with legislative power, and had incorporated binding sustainability targets that exceeded regulations. These investors regarded themselves as market leaders for enforcing sustainability in real estate. As a researcher, I must acknowledge a certain degree of response bias at this point, and some respondents might have over-stated their firms’ green policies.

4.2.6.3 Relevance of the Level of Certification

Another interview question was concerned with the relevance of the level of certification, for instance, the difference of a LEED Gold versus a LEED Silver certificate for an investment decision. As introduced in Section 2.3.5, DGNB, LEED and BREEAM have certification ranges of Bronze to Platinum, Certified to Platinum and Pass to Outstanding, respectively (Jensen & Birgisdottir, 2018). Table 32 presents an overview of the certification levels by green certificates provider.

Table 32: DGNB, LEED and BREEAM certification levels

Certification scheme	DGNB	LEED	BREEAM
Rating levels	Bronze ($\geq 35\%$) Silver ($\geq 50\%$) Gold ($\geq 65\%$) Platinum ($\geq 80\%$)	Certified (40 – 49 points) Silver (50 – 59 points) Gold (60 – 79 points) Platinum (> 79 points)	Pass ($\geq 30\%$) Good ($\geq 45\%$) Very Good ($\geq 55\%$) Excellent ($\geq 70\%$) Outstanding ($\geq 85\%$)

Source: Own presentation based on data from Jensen and Birgisdottir (2018)

The respondents agreed that the higher the level of certificate, the more beneficial for their investment decision. Some participants' firms went one step further and introduced specific internal guidelines for the minimum certification level a property has to meet, such as BREEAM Very Good or LEED Gold. Firms active in property development had exceptionally high certification targets: certification level benchmarks for new constructions were roughly one level above those for existing properties. This difference also results from the fact that, according to the participants, it is easier to incorporate the costs and requirements for a green certification from the beginning of construction compared to certifying an existing property. Nonetheless, *I13* noted that there is a trade-off between the costs of a higher level of certification and the additional value. Furthermore, *I14* and *I22* indicated that they require a BREEAM Very Good certificate for existing properties.

I14: If we're talking about BREEAM I would be looking for a minimum Very Good certification. For LEED, Gold is probably the benchmark. But you're not going to find that everywhere, that's the issue.

I18: A certification is not that transparent. Depending on whether it is an existing building or a new building, the same label may have a different meaning.

I22: We certify all properties with BREEAM or, for new buildings, DGNB and LEED. [P] is certified with DGNB Gold and LEED Platinum. Then in [C] we also certified LEED Platinum. These are the new buildings, and for the existing buildings, we tend to go for BREEAM Very Good certificates.

I6 said that they wanted to have the best possible certification. Notably, the respondent used the term "top league", implying that they considered green certificates to be a distinguishing factor in obtaining a competitive advantage. Although none of the other participants specifically discussed the ability to differentiate from competitors by level of certificate, research from Andelin et al. (2015) also depicts obtaining an advantage over competitors as one of the drivers for acquiring green buildings.

I6: Yes, we want to be in the top league. Always the highest label in each case, whether DGNB or LEED or BREEAM.

I11 and *I13* also looked for the highest possible certification but expressed this view differently than *I6*. They both noted that they preferred higher certification levels, but achieving the next highest certification stage had to result in a financial advantage and had to be economically feasible.

I11: Exactly, LEED Gold or Silver or DGNB Platinum. The higher, the better. New buildings should be at least Gold or Platinum. For existing buildings, we have also been satisfied with Silver. Ideally, however, it should be Gold. We have guidelines internally. But we haven't said no to a property because it did not suffice in its certification level so far. If it can't be certified, then that would be a hard criterion for not buying.

I13: So there is probably always a trade-off, that at some point you say you have to invest so much more to reach the next level that it is no longer worth it. But the goal is not to have any certificate, but the most sensible, highest possible certificate that is possible.

In contrast, *I5* had a different view and noted that the difference in certification levels is currently relatively small. However, the respondent acknowledged that this might change in the future.

I5: Differences between Silver and Gold? Maybe a little bit. But there's no real competition yet, whether it's Gold or Platinum. But that might change.

Jackson and Orr (2011) analysed the impact of the level of certification on the investment decision. They assessed the relative importance by studying the preference UK fund managers have for different BREEAM ratings. Their results showed that the participants preferred the Very Good rating level over the Excellent and Outstanding levels. However, the least-liked rating level was BREEAM Good, just one level lower. Thus, the authors had to acknowledge “an absolute lack of clarity or interpretability” (p. 335) of these results, which might be explained by the novelty of the BREEAM certificate and the corresponding inexperience of the participants at the time of the study. In contrast, the research participants in my study were generally familiar with the types of green certificates and their levels. This also leads to the conclusion that posing open questions, as I did in Research Phase 1, is a more suitable approach to understanding the relevance of the certificate level than structured surveys, as conducted by Jackson and Orr (2011).

The study from Ott and Hahn (2018) was not concerned with decision-making but with the impact of ESG factors. The authors addressed LEED, DGNB, BREEAM and other certificates in their study on the valuation impact. They distinguished between properties with a green certificate level of Very Good, Gold or better, and lower certificate levels on a

binary scale. This approach led to the conclusion that, while the existence of a certificate did not impact rents or valuation results, a high certification level had a significant positive impact on both variables. Findings like these indicate that it makes sense to differentiate further between the levels of certifications. While this is difficult for numerical analyses, it is possible in my research.

4.2.6.4 The Decision-Maker's View on Green Certificates

Another interesting finding from the ESG part of my First Research Phase was the fact that the respondents' personal opinions often differed from their firms' views and approaches to ESG criteria. For example, while most respondents agreed that it was essential to increase awareness of ESG topics, some believed that certificates were not optimal to enhance sustainability awareness.

The majority of interviewees favoured increased environmental benchmarks and regulations and had a positive attitude towards ESG topics. In our current market environment, they shared the view that sustainability awareness was omnipresent, as shown by the 'Friday for Futures'-protests, which happened every Friday and often passed the buildings where the interviewees' offices were located. In their opinion, environmental awareness was a topic relevant in the real estate sector and for all different industries, making ESG factors a social responsibility. Furthermore, many agreed that green certificates constituted a step towards a more sustainable future and acknowledged the importance of the real estate industry in this regard.

Within this context, although acknowledging the relevance and urgency of this topic, the respondents' opinions on the efficacy of green certificates were divided. On the one hand, more than half of respondents stated that green certificates were not the best tool to reach sustainability targets. Several respondents expressed the view that green certificate providers earned a considerable amount of money with their schemes, while the actual added value of a building by being green was limited. For instance, *I21* and *I13* mentioned that simply building bicycle stands in front of the house or rearranging an ashtray so that it is located a few more metres away from the building could result in a better ESG rating. *I13* branded this "greenwashing". In fact, in the presentation from their general assembly in 2019, DGNB (2019) stated that their sales amounted to EUR 4.7m in 2018, with profit after taxes of EUR 84,000 in the same year, indicating that their business was indeed profitable.

To create a greener property and enhance the social well-being of tenants, I16 suggested implementing ESG standards “without having to pay for a green certificates provider”. Some participants pointed out that they preferred other types of certificates, which focused more on the social aspects of a building or the internet infrastructure. I addressed their views in Section 4.2.6.1.

I16: And it's unbelievably anti-green when it comes to buildings. If a building isn't green enough for someone, they just drive through it with an excavator. As a consequence, the carbon footprint becomes very negative. They rather flatten an existing functioning building because they say I'll get a green label on it if I put a completely new property on it, that's the real madness.

I12: That makes it easy so people don't really have to deal with the properties. You pay half a million for a certificate. [...] It's important that everyone defines for themselves what green means for them. Personally, I'm not a fan of sustainability certification, LEED and DGNB. Because I feel that this is a huge business model.

I16: I would say that a certificate is good. It is always nice to acquire a certified property. But it always has to make sense to invest the money to certify a building yourself. There are certainly other measures where you can act in an energy-efficient and tenant-friendly way without paying a certificate provider.

I19: The certifiers are also companies that want to write certain positive results at the end of the year. These are sometimes parameters that do not necessarily meet all the important sustainability criteria of an investor.

I20: Regarding DGNB, LEED, if you look in the small print. In [C], for example, as long as the ashtray is eight metres away from the wall of the building, it doesn't count negatively into the rating. I think there's a bit of window dressing involved, too. But the main thing is that something is done at all.

I21: Yes, sometimes green really isn't green. I've also read that you can simply put a few more bicycle stands in front of your house. And then you're directly a greener building again, that's more the social aspect than the actual sustainable aspect in my opinion. [...] I don't believe in this certificate madness.

On the other hand, other investment managers stated that they were personally convinced that green certificates were a valuable instrument to enhance the environmental awareness of real estate firms and to make sure that parties in the industry contributed to the sustainability targets of the EU. I5 pointed out that the image of certificates changed from a marketing tool to more detailed analyses about the ESG-conformity of a property.

I5: At the beginning of the certification trend, they said, all the investor really needs is a certificate, nobody looks closely anyway, it's just for marketing. That's changing. Now, it's really about hard facts.

I8: I am convinced of the lasting and positive influence on our industry from the bottom of my heart, and that certificates are useful to reach sustainability goals. [...] It is our job to start to solve ESG-problems now.

I13: Well, I think the company experienced a strong push to ESG. And we are also convinced that we have to become active now. There are certainly individual voices that call this greenwashing. They say that we have a building that we would or should build anyway because of the regulations. And now you can certify it. It's hard to separate. But I think there is already the conviction that it makes sense. And it will also be important for future tenants and investors.

Apart from the divided opinions on the efficacy of green certificates, two respondents noted that ESG factors were a more prevalent topic before the Covid-19 pandemic. As I7 put it, “I think that Covid-19 has taken us away from that a little bit, because now everyone is looking at the fact that the offices are being converted, that you don’t touch anything anymore, that the doors open automatically, that there are fewer people in the lifts”.

Similarly, I22 noted that “we have certain climate goals. And what are we seeing again in the crisis? That all these sustainability issues are losing relevance”. Thus, the participant suggested that the pandemic has had such a significant impact on office investment and asset management considerations that it has pushed green certificates into the background.

4.2.6.5 Increasing Relevance of Green Certificates

A topic concerning ESG factors that often emerged during the interviews was the novelty of this subject. All respondents agreed that sustainability and ESG criteria now play a more relevant role in many aspects of investing, including real estate. They noted that this has not always been the case in the real estate industry, but that the focus on ESG factors has emerged in the last two to five years.

This is in line with the results of the literature analysis conducted in Chapter 2 of this thesis. While several researchers have assessed real estate decision-making since the 1980s, sustainability was not addressed in real estate decision-making studies until the 2000s (Sayce et al., 2007). In their survey of UK property investors from 2005, Sayce et al. (2007) concluded that 80% of participants expected sustainable factors to show a higher significance in investment appraisals in the future. Back in 2005, most investors did not consider environmental aspects to have an impact on real estate purchase prices.

Adding to this, 15 years before I conducted my interviews for this thesis, 13 to 40% of real estate investors were not even aware of specific sustainability measures (Sayce et al., 2007). As all participants in my study knew the most relevant regulatory and private green initiatives, this has clearly changed. Similarly, Eccles, Kastropeli, and Potter (2017) noted

that the increasing relevance of ESG for investment decision-making derived from three factors: more ESG-related regulations and transparency requirements, more academic work proving the positive impact sustainable investments have on corporate performance and ESG standards in the industry.

Market reports on green buildings in the German real estate market have started to track transaction volumes with green properties in 2008, a year in which total green transactions amounted to approximately EUR 650m, compared to EUR 11.6bn in 2020 (BNP Paribas Real Estate, 2021c). In addition, DGNB, the most popular certification scheme with a market share of 64% in Germany (BNP Paribas Real Estate, 2021c), was only launched in 2009, again underlining the recent popularity of this topic. In their study on the impact of sustainability of the performance of real estate firms, Cajias et al. (2011) found that European real estate firms have increased their environmental responsibility actions, including green certificates, from 27% in 2006 to 63% in 2009, with 100% meaning the maximum level of sustainability action. The authors concluded that this increase was partly due to greater attention on the impact of sustainability on real estate firms' financial performance.

The increasing relevance of green certificates went so far that two respondents reported that they have recently talked to investors who would trade ESG criteria off against return. As *I21* stated, "we are seeing for the first time that investors are willing to sacrifice returns for more ESG, which has never been the case before. They used to take green for free. And now the first ones are ready and say, if it's one or two basis points for more ESG, that's fine". *I13* added that it was likely that green certificates as a proxy for a properties' ESG rating will likely soon become obligatory for all assets. Similarly, *I22* pointed out that it makes sense to incorporate ESG factors now because many European countries have already made green certificates obligatory for large corporates, and Germany is likely to follow in their footsteps.

While most other respondents did not share this extreme view on the future relevance of green certificates, they agreed that their importance would likely continue to increase even more in the next years. This increasing relevance will be supported by regulatory developments in the financial industry, such as the EU Taxonomy.

I5: ESG didn't play a too big role in the past. But of course, it will increasingly play a role now.

I8: EU taxonomy will make this topic even more important in the future.

I14: I mean, we've always paid attention to certifications. I think it has become a lot more important over the last couple of years.

I15: You read about it quite a lot. A few years ago, no one said, how ESG-conform is this? It's coming, but it's a long road, because if it's not yet economically viable, then many end up not doing it. Or why should I do it if it just costs money? It is an economic question.

Nonetheless, although Ott and Hahn (2018) and Holtermans and Kok (2017) suggested that green certificates are so common that investors consider them as a prerequisite or the “new normal” (Holtermans & Kok, 2017, p. 7), the respondents disagreed. For them, ESG criteria constituted an emerging topic that will continue to increase in relevance but did not reach self-evidence yet.

4.2.6.6 Need for a Consistent ESG Evaluation System

The interviews revealed the necessity for German real estate firms to develop an industry standard for green investments. They agreed that many real estate investment managers have set up their own model to evaluate and standardise ESG criteria when assessing a property. In this context, *I21* stated that the German real estate industry seems to lag behind regarding consistency and uniformity of several aspects, including environmental regulations, especially when compared to other German industries. For instance, *I21* depicted the lack of standardisation in lease contracts, area standardisations and the German land transfer tax, which varies between 3.5% and 6.5% by federal state (Hentze & Voigtländer, 2017).

While all respondents agreed that it was necessary to develop a uniform ESG evaluation system, some interviewees pointed towards the EU's efforts to standardise sustainability in the industry with the EU Taxonomy. This regulation obligates firms in the financial sector to disclose their environmental activities by 2022. *I8* and *I11* stated that the EU Taxonomy motivates real estate actors to pay more attention to environmental targets because real estate products now must be classified as green or non-green before being distributed to investors. *I8* added, “I prefer to see it as a motivational factor rather than a sanction option”.

My research revealed that, as opposed to findings from earlier studies such as Sayce et al. (2007), real estate market players were well aware of environmental incentives and regulatory efforts to reach environmental targets. This might be because the EU Taxonomy was the first regulation targeting sustainable investments and impacting the investor's everyday business to a significant extent.

Ott and Hahn (2018) have also identified a considerable lack of standardisation in the practice of incorporating ESG criteria into real estate appraisals and corresponding

investment decisions. Eccles et al. (2017) surveyed globally active investment decision-makers across several asset classes about their ESG factors integration practices. Their results indicated that the highest barrier to incorporating ESG into their decisions was the lack of standardisation in the topic. Thus, this is not only relevant in German real estate but across all asset classes and geographies.

The following statements underline the need for a consistent ESG evaluation system.

I11: An EU policy paper called EU Taxonomy – it has nothing to do with taxes but is very much focused on the economy, e.g. on sustainability. They want to motivate the members to implement this directive accordingly.

I12: I think standardisation would be super important for everyone. Because at the moment we are all still in the discovery phase.

I19: In any case, we would recommend a uniform evaluation system. At least in such a way that every investor has their own evaluation system.

I21: I mean, as a real estate sector, we are actually the last big sector that is completely behind in terms of digitalisation and standardisation. I don't know of any other large sector in the economy that is so far behind.

To deal with the increasing sustainability requirements for real estate investors and the rising awareness of ESG issues in real estate, several respondents reported that they had introduced their own ESG scoring model. With their models' help, they assessed and categorised energy usage or other ESG aspects of a property and incorporated the results into their investment decisions. Some respondents also used the model to determine the sustainable progress of a property over the whole holding period. A few respondents have developed their ESG scoring model with the help of an external advisor. Overall, many investors pointed out that they have introduced their own scoring models internally, but all of them differed in their descriptions of these models.

I12: We are working on defining our own standards internally. We ask ourselves, how can the buildings become greener?

I15: We have a standardised process for environmental due diligence.

I17: We have our own ESG scoring model, which includes energy usage, certifications and social aspects, amongst others.

I19: This is the so-called energy map, and there is a clear mapping of the technical facilities and technical installations in order to define an improvement plan, to assess the status, to classify. [...] We have a clear mapping, which includes not only energy factors but also social parameters.

I22: We have created our own model together with an advisor. This will be a tool where the property manager and we feed in information from properties at the time of purchase and then continuously update it every six months over the holding period.

And at the end of the life cycle of the property, e.g. when we exit, we show how the value or the analysis has developed over the term. In this way, we show our investors that we are doing something for the property and for the environment, and also for the energy balance in the building.

To deal with the increased ESG requirements and to signal their environmental awareness to investors, some investment managers have designated an ESG officer or a whole sustainability team to this topic. This practice shows that investors and investment managers put a lot of effort into complying with the regulations and standing out from competitors with their distinguished ESG approach. Ott and Hahn (2018) supported the provision of a person responsible for ESG factors and argued that “the need to implement a stringent in-house sustainability strategy which ensures long-term competitiveness on a global scale” (p. 120) is higher than ever before.

I12: We have already established our sustainability group internally a few years ago.

I14: We have a sustainability department in-house.

I19: We have a person responsible for promoting sustainability in our firm.

To summarise, the interviews revealed that each firm deals with ESG requirements differently. While most have introduced their own ESG model and/or team, the decision-makers expressed the need for defining a uniform ESG standard for the German real estate industry. With this finding, I have identified further research potential for deriving a consistent assessment model of ESG criteria in real estate, intending to support real estate decision-makers with their investment decisions.

4.2.6.7 Summary: ESG Criteria

The findings on the participants’ views on and incorporation of ESG topics into their investment decisions contributed significantly to answering the research questions of this thesis. First, at the time of the interviews, real estate decision-makers were aware of the relevance of ESG and the existence of certificates and regulations. Furthermore, they noted a shift in focus from solely environmental to environmental and social factors. Nonetheless, they did not consider green certificates as market standard and expected them to continue to increase in relevance.

Second, although most participants considered the topic as prevalent, less than half of all firms required a certificate at the timing of the purchase or within the holding period. Most

of the firms requiring a certificate were active in the core risk and return asset class. On the contrary, green certificates were not required by pure value-add investors. This distinction between the two risk types of investors is interesting, as it illustrates the difference in significance firms active in German office investments place on certificates.

Third, while most firms were actively promoting the inclusion of green certificates into investment decisions, the interviews revealed that some respondents' personal opinions differed from their firms' official views. Many respondents expressed criticism of the actual environmental use of green certificates, stating that certification providers make a considerable amount of money with sometimes unclear certification guidelines. Nonetheless, most respondents appreciated the increased incorporation of ESG topics into real estate decision-making, considering it as a necessity to ensure the satisfaction of climate targets.

Fourth, the interviews revealed a lack of uniformity among real estate decision-makers. Many market players have introduced their own scoring models due to increasing regulations and benchmarks of ESG criteria in real estate. Several participants expressed the view that they would prefer to work with a market standard for incorporating ESG factors into their investment decisions. This implies a significant market gap of ESG consistency in real estate that needs to be filled. By increasing awareness of social factors, some real estate owners have started introducing creative new tools, such as an app showing the meal plan or sports programmes available, to differentiate their properties from their competitors.

From my point of view, the relatively low relevance of green certificates for decision-makers was somewhat surprising. Although several studies (presented in Section 2.5) indicated a significant increase in transaction and rental prices resulting from certified buildings, no participant mentioned a positive impact on cash flow when considering green certificates. Instead, the participants noted firm regulations and advantages for attracting tenants and potential buyers at exit. Thus, the participants either do not see a significantly higher return being paid for green buildings or include a potential higher return in a corresponding higher price. The Second Research Phase will reveal further insights into the relevance of green certificates.

4.2.7 Leasing / Transaction Comparables

In addition to the real estate market environment I discussed in Section 4.2.3, the participants revealed that they take into account comparable lease and sale transactions, commonly referred to as ‘comparables’ or ‘comps’ among real estate professionals (Isaac & O’Leary, 2012, p. 54; Pagourtzi, Assimakopoulos, Hatzichristos, & French, 2003, p. 386). Thus, they account for the general development of rents and transaction prices within the submarket or the city and specific recent transactions in the vicinity. This section deals with the latter.

In comparables analysis, decision-makers assess previous transactions with properties located close to the asset to be acquired. They are as similar to the asset as possible in order to enable the transfer of price information to the property under investigation. Decision-makers usually use rental contracts signed in the vicinity or transaction prices relative to the rent or the size of a property for comparable properties. They derive the average of multiple comparable lease or investment transaction prices and apply them to the property; for instance, the average of recent similar rent transactions becomes the average future rent for the cash flow modelling. Alternatively, comps can confirm that the purchase price of a planned transaction is below that of comparables. This is only applicable in markets where sufficient information about previous transactions are available (Isaac & O’Leary, 2012).

Several researchers noted the relevance of comparables for investment decisions. For instance, Hutcheson and Newell (2016) and Reddy (2012) added *industry peer* to their analysis. Roulac (2000) went more into detail and divided their assessment into lease and transaction comparables. Isaac and O’Leary (2012) pointed out the relevance of comparables for property valuations. They also noted that there might be times when suitable comparables were not available; for instance, due to a unique building structure, micro-location or tenant mix. Nonetheless, the authors emphasised the fact that “Even when there have been recent and broadly comparable transactions the motives and power relationships in a particular deal will never be fully understood by a third party” (p. 3). Thus, decision-makers should be cautious when applying findings from comparable transactions to the property under investigation.

The transactions real estate investors rely on as comparables vary significantly (Robinson & Reichert, 2015) – a prominent issue arising from previous literature on real estate decision-making and the effect of green certificates discussed in Chapter 2. The Appraisal Foundation (2013) recommended selecting comparable properties based on similar submarket

characteristics and property attributes, including property size and quality. In practice, the respondents in my research often restricted their comparable selection to the same submarket or expanded it to comparable submarkets in other large cities: *I17* noted that “we usually look at transactions that happened in the same submarket in the past year or so. But this property was in the CBD from [C], so we also looked at other CBDs in this case”.

Another finding related to comparables is that the increase in the availability of data simplified their use. For example, several participants noted that they used to have difficulty finding accurate information on close-by rental or sales transactions but realised that access to usable information has improved in recent years. As *I17* pointed out, “It has become much easier to get data, which of course makes this part of the analysis easier”. I discuss data availability further in Section 4.3.

4.2.7.1 Leasing Comparables

Decision-makers revealed in the interviews that they took into account comparables to assess the potential rental level or sales price attainable for the property under investigation. This differs from an analysis of the prime and average rents achieved within a specific submarket, which I discussed in Section 4.2.3, as decision-makers analysed single deals and not general price movements across a submarket. They assessed specific recent rental transactions to identify future potential tenants or rental prices they could achieve. For instance, if a large corporate tenant moved into the building next to the property that is to be purchased, the respondents would see this as a positive indicator for potential future tenants in their property.

I10: A good sign was that a pension insurance company has just moved into the property next door.

Not surprisingly, value-add-oriented respondents preferred properties with current rent levels below comparables. This gap between the property’s actual rent and comparable rent levels indicates that future rental contracts can be signed at a considerably higher price, implying value appreciation for the property itself. Two respondents depicted the advantage of rents below market levels.

I5: It is important to have comparables that underpin our rents. [...] And the property is basically rented at a level half of that of, for example, [P] other buildings in this area of similar quality would achieve.

I14: At the end of the day, rent levels are quite important. We're obviously more comfortable with a lower rent compared to the market. It offers downside protection. [...] But again, one of the rationales for [P] is that average passing rents were super low in comparison to comparables.

I12 noted that the price differential within a submarket seemed appropriate, as a new tenant signed a new lease next to a train station for a relatively high price. This respondent's statement implies that the new tenant has paid a premium for this location within the submarket. In addition, the participant described a significant gap in rent prices between different areas within the submarket.

I12: There is also a clear difference to the beginning of [Su], where [T], for example, has signed a lease at the S-Bahn station. Or if you look at the most recent contract concluded in [P]. Then you are at 25 Euros, so that within the submarket the price differential is correct.

Although the participants acknowledged the relevance of comparable lease transactions, they underlined that each lease deal still has to be assessed individually, as “sometimes it is tough to find suitable letting deals because we are active in a submarket from which we think that it will change significantly in the near future” (I17).

A few earlier papers have dealt with leasing comparables and their impact on investment decisions. Roulac (2000) accounted for *lease terms of competing properties* in his market factors group, a factor that was considered relevant to the author's participants with a ranking of 14 out of 68. Isaac and O'Leary (2012) demonstrated the value of accounting for previous comparable leases when discussing new lease deals and in conducting real estate valuations.

4.2.7.2 Transaction Comparables

In addition to lease comparables, the participants accounted for transaction comparables – figures related to the purchase price of a nearby or otherwise comparable property. The respondents mentioned two types of transaction comparables associated with each other: NIY and capital value per square metre. Similarly, Roulac (2000) included yields and capital value in his research with the attribute *sales prices of comparable properties* in the *market factors* group.

To obtain information on specific comparable yields, the decision-makers often relied on information provided by other market players, real estate brokers or their buy-side advisors. Many participants used databases such as Real Capital Analytics (RCA) to research

themselves. RCA is a widely used platform that records deal-specific information on real estate transactions globally (RCA, 2021a). Many participants relied on RCA to obtain comparable purchase prices, yields or property sizes. Moreover, the database also offers lists of other investors active in the respective market, among other data.

I12: We are in the process of coordinating the use of RCA, which covers the transaction side - that is incredibly important. Similar to the topic of databases and overviews and being able to prove the individual comparables.

I13: We really make sure that we get all the relevant transaction comps in the market for both letting and investment. We look very closely at comparables. [...] We use RCA.

Alternatively, the respondents relied on market rumours, as noted by *I15*. Conversations with brokers or competitors from their network revealed insights into recent deals or parties which might be interested in selling. Section 4.2.5.1 discussed the easier deal access available when there is an existing relationship to the seller.

I15: Mostly, we receive information through conversations with brokers or other investors. You hear rumours - who has bought which house, who plans to sign a new lease, where is a new development is happening.

A problem with relying on comparable yields for specific transactions arises from the fact that investors only seldomly report transaction yields in Germany. To give an example, out of 477 transactions in the German office market in 2020 obtained from RCA (2021d), only around 40 provided information on the NIY. Almost 50% of the transactions on the list included information on the purchase price. Thus, the component to calculate the NIY, which was most difficult to obtain, was the rental income. *I17* notes the problem of access to information. Section 4.3.2 discusses the information availability and information sources used by the participants.

I17: Comps, e.g. purchase prices and yields, are very important for us. The problem is that there is often no concrete information on the yield of transactions.

The difficulty of finding suitable yield comparables and the changing real estate market environment in recent years have led to an increasing relevance of another metric: the capital value, which effectively equals the purchase price of a property (Hackelberg, 2010, p. 112; Isaac & O'Leary, 2012) per square metre. This figure bears the advantage that the total purchase price can be assessed relative to the property's size without being impacted by the rental income a property achieves.

For instance, I12 noted that coming from a period of substantial growth in rents, an improvement in the financing environment and decreased yields, capital value has increased in relevance for investment decisions. Capital value also supports finding a final purchase decision, as it is an easy metric to evaluate the relative price of a property. Several respondents reported that they shifted from yields or purchase price factors to capital values:

I12: You have to take the capital value into account. If someone has been living there for 30 years, paying eight euros rent, while the market rent there is 40 Euros. Then it's okay to pay a yield of 1.5 percent, because the capital value is still good.

I13: You can already see that people are looking more at the capital value than they used to. They used to think in factors, but that doesn't really work anymore. Because of rising rents in the last years, especially in the value-add area, more vacancies are now valued differently and more attention is paid to this upside now than in the past.

I20: The last few years have been driven by what factor you pay on the rent. That has changed because the rents have developed so dramatically. We prefer capital value.

The capital value is a transaction figure derived by dividing rental income by the total lettable area. Stated differently, capital value is the *actual* purchase price of a property (Isaac & O'Leary, 2012). Capital values provide insight into the transaction price relative to the lease area of a property. They are often used to assess how expensive or cheap a transaction is in relation to comparable capital values. In order to compare the capital value per square metre, investors divide it by the lettable area in square metres. Interestingly, in the interviews, I noted that this procedure is so common among German real estate investment managers that they talk about capital value per square metre when they say 'capital value'.

The following statements illustrate the frequent use of capital values among the participants. This figure helps the respondents to obtain a feeling about the purchase price compared to other transactions in the area. Another advantage was the fact that information on the transaction price and the total size in square metres was often available. A low capital value compared to comparables indicates that the price is relatively low, constituting a positive signal for the decision-makers.

I2: We paid 8,500 EUR per square metre, including [T] as a tenant. The property around the corner has been sold - single tenant [T] for 16,000 EUR per square metre.

I5: The price per square metre - that's an important comparable. That's always a final check; does the capital value fit, does it feel right?

I13: A very favourable capital value for a fairly new building.

I14: But if you look at the price per square metre, the capital value. That's for us the most important criteria. Compared to other deals that have been traded in the direct vicinity, we were comparatively a lot cheaper. [...] But at the end of the day, I look at the capital

value, because that takes into consideration the actual value of what you're buying compared to other investments in the market.

I20: We look at capital value, and I think many people do that by now. That is the euro per square metre equivalent value, how many bricks I get for my money. [...] Actually, I now almost exclusively use capital values. It is an easy figure and you easily get the information.

In addition to the capital value, I22 mentioned another type of transaction price comparable that has increased in relevance as a result of the pandemic: the land value and the potential reinstatement costs for developing a similar property. With this figure, the respondent gets a feeling about the purchase price relative to developing a similar property.

I22: What does it cost to build the house again in the same quality? If I compare this price with the purchase price minus the land value, then I see whether it makes sense to pay 20 percent more for the house if I could rebuild it, or not.

4.2.7.3 Summary: Leasing / Transaction Comparables

This section has dealt with the relevance of comparables for assessing the current and future value of a property. The respondents used information on previous lease or investment transactions with comparable properties to appraise the future potential in rental income or the purchase price of the property to be acquired. For investment transactions, the participants expressed the view that the capital value per square metre plays an increasingly relevant role for their assessment, because information on NIYs was often not available or applicable in an environment of rapidly changing rents. One respondent also noted that reinstatement costs constituted a significant comparable to assess a property's total price.

The respondents obtained data through their network of real estate brokers or advisory firms or their own research through databases. Difficulties arose from the individual selection of suitable comparables as well as the lack of availability of information on comparable lease or investment transactions, depending on the property under investigation.

4.2.8 Location within Submarket

In addition to the selection of the market or submarket, as discussed in Section 4.2.2, the participants explained that the location within the submarket was relevant to their investment decisions. The preferred location within the submarket differed by investor and required risk and return type. Nonetheless, the interviews revealed two interesting findings in this context:

on one hand, some participants preferred to have the very ‘best’ location within the respective submarket, as described in the following section. On the other, the property’s connectivity, the access to public transportation and/or the motorway, was mentioned by several respondents and will be further reviewed in Section 4.2.8.2.

4.2.8.1 The ‘Best’ Location in the Submarket

Several respondents reported that they were looking for the very ‘best’ location within a submarket, depending on the participants’ investment strategy. While this term is very subjective and often mentioned in the context of investments within the CBD with tenants with high creditworthiness and the highest rents in the market. For the Top-7 cities, prime rents were exclusively generated in properties in the CBD districts (Jones Lang LaSalle, 2021c).

The three following statements illustrate the respondents’ interest in identifying the “best” property in a market.

I1: And when we go into the submarket, we just buy the best location in the submarket as far as possible, and preferably the best quality as well.

I14: This is considered probably one of the best, most prime locations within this submarket.

I18: We only consider the best location in the submarket.

A term related to the best quality in a submarket is a landmark property, which will be discussed in Section 4.2.10.3. In addition to a prime location, a landmark building is also characterised by excellent quality and architecture, among other features (Moon et al., 2010). Ott and Hahn (2018) analysed ESG advantages of landmark properties. In their analysis, the quality of location was best when public transport, local amenities and medical treatment were available within 800 metres of walking distance from the property. In contrast, the participants in my research did not further specify access to local amenities or medical care as an influencing factor for evaluating the location within the submarket. In addition, Pfnür and Armonat (2001) suggested in their paper that the quality of the location – without further defining the term – was the most relevant aspect for success in a real estate investment.

4.2.8.2 Connectivity

A term that was often mentioned related to a suitable location within the submarket was the connectivity of a property. This included both access to public transport including bus and train and access to the motorway. The respondents shared the view that the better the access to local transport, the higher the property's evaluation in this regard. According to the participants, the best case would be to have a train station – either rail (S-Bahn) or underground (U-Bahn) – directly next to the property. *I21* branded these areas “frequency locations”.

I1: And it has the best location because it is right next to the S-Bahn station.

I10: The main criterion is that it's not too far away from the bus and train.

I11: It has good transport connections. The next S-Bahn stop is nearby.

I15: You also have the connectivity with the U-Bahn just around the corner. You walk out of your office and you have the underground right outside your door. This was the main point.

I21: The only game changer that we see at the moment is the issue of frequency locations. For us, frequency locations are suburban railway and underground crossings, a bus station, where people cross and have different public transport options.

I22: And then, of course, there were also issues like infrastructure, which we pay attention to, including public transport connections.

Most of the statements above concern properties located in urban areas. The views on connection to public transport in suburban submarkets differed. For example, Eschborn and Niederrad are located close to Frankfurt and are popular back-office locations for banks and the industry (bulwiengesa AG & Baasner Stadtplaner GmbH, 2020). In this context, *I16* mentioned that due to their return requirements, they often do not invest in costly properties located in the CBD but prefer properties in more suburban areas. The respondent pointed out that public access to the city centre is especially important if the property is located in more suburban locations.

I16: Public transport is very, very important, especially because we usually can't invest in the city centre because our distribution requirements are simply different from those of investors who can really offer multiples of 35 more in the city centre. That's why the connection to the city centre is all the more important.

Contrary to the view from *I16*, some respondents considered access to the local freeway as complementary or alternative to good access to public transport. *I6* noted that they purchased

a property that was not well connected to the train, but instead with the bus network and the motorway.

I6: This was not a CBD location. But it was very well connected in terms of infrastructure, four kilometres away from the airport in [C]. We have good access to the city centre and good accessibility to public transport. There is no railway, but good bus connections. You are quickly connected to the motorway and can provide a critical mass of back-office locations for a price for which you cannot build today.

I4 further discussed the trade-off between parking spaces or access to the motorway and access to public transport. They reported that they see a trade-off between the availability of parking spaces and access to public transport. More precisely, for back-office locations, investors often do not require excellent public transportation access if the property offers enough parking possibilities for the tenants.

I4: Yes, but certain accessibility by public transport is important for the office. But if it's in a suburban area, and you have a lot of parking spaces and better access to the motorway, you can compensate for public transport. On the other hand, if an existing office property in the city centre or close to the city centre has very few parking spaces, and doesn't have good accessibility to local public transport, then that's probably not possible for us.

Previous studies have also dealt with the relevance of the connectivity of a property. For instance, Roulac (2000) assessed this aspect with the factor *access to transportation and major highways* in the *property characteristics* group. Jackson and Orr (2011) analysed the relevance of the property's location within a submarket with five pre-defined levels, ranging from *in city centre*, over *suburban and close to public transport* to *out of town and no access to public transport*. The authors did not account for the availability of parking spaces or the proximity to highways.

In this context, I3 expressed the view that access to both public transportation and large motorways might decrease in relevance in the future. This view was not shared by the other participants, who considered either parking spaces and access to the highway or connectivity to public transport as very relevant for their investment decision.

I3: I think, at least in [C], high-rise residential buildings will continue to be built, and the S-Bahn connection is no longer that important. In times of Covid-19, people want to walk to the office or ride a bike or scooter, and nobody wants to sit in the S-Bahn or public transport. I think this will lead to more pedestrian zones because fewer people have to drive.

4.2.8.3 Excursus: Decreasing Relevance of Parking Spaces in Core Locations

An interesting topic that emerged in the interviews was the view that parking spaces decreased in relevance, particularly for offices in core locations. Several respondents noted that this was a trend that developed recently: parking spaces in the city used to be very valuable, and high-quality tenants required a certain minimum amount of parking spaces. However, many respondents reported that this has changed. More tenants now account for excellent access to public transport and the opportunity to get to work with more sustainable transport possibilities.

They mentioned a few factors that impacted this movement: more people get to work by bicycle or scooter, especially those working for young and technology-oriented firms. *I8* reported that a property they purchased had a lettable area of more than 50,000 square metres but less than 100 parking spaces. The participant added that the first office landlords have recently started to convert parking spaces into storage areas that are leased to large logistics firms. *I16* noted that “more people now want to be healthier and greener, also on their way to work”.

In addition, developers now refrained from building a garage in the cellar, especially for newly developed properties, because this part of the development process is especially cost-intensive. This is not possible in all German cities, as the local *Stellplatzsatzung* (parking space regulation) determines the number of parking spaces per area for both cars and bicycles (see, e.g. Bauaufsicht Frankfurt am Main [2017]).

I8: That would have been unthinkable years ago. It's only possible because the building is right next to the main transport hub of the region with a huge S-Bahn station. All the buses, all the trains, long-distance and local traffic cross this station. [...] We have a large bicycle cellar, we have space for e-scooters, but very little space for cars. [...] It is incredibly expensive to build an underground car park. That is one of the most expensive things when it comes to new properties, to dig three or two floors into the ground. So we try to avoid it when possible.

I10: You have to make sure you have enough bicycle parking spaces.

I12: I think the building, it's quite a big building, [X] EUR. We have only ten or 15 parking spaces in the building, and nobody cares about parking. In CBD locations, it's more modern to get to work by public transport or by bike. The sustainability aspect certainly also plays a role.

4.2.8.4 Summary: Location within Submarket

This section has dealt with the relevance of the property location within a submarket. Several participants explained that they preferred to purchase the “best” property in the submarket. Although the exact definitions were unclear, most of these respondents referred to CBD locations with excellent locations and tenants.

Furthermore, my research revealed that public transport has increased in importance. Several respondents reported that bus and train connectivity is especially crucial for properties located in the city centre. However, for properties located in more suburban areas, their views differed. Parking spaces and access to highways were more critical than access to public transport for some respondents. However, for properties in prime locations, the number of parking slots decreased in relevance: investors active in CBD districts preferred to have a sufficient number of bicycle stands and excellent connectivity to the number of car parking slots.

4.2.9 Personal Judgement / Experience

My research revealed the relevance of personal intuition or judgement, ‘gut feeling’, and previous experiences for investment decisions. The participants agreed that if the subjective judgement of a property does not feel right, the property will not be purchased. This feeling or judgement developed from their previous experiences, for instance, with a specific location. *I20* pointed out that the personal view “is and remains super important. In the first step, the gut feeling determines whether we even consider it and in the end, the gut feeling decides whether we really buy the property”.

The participants mentioned three main situations during which personal intuition was especially relevant: first, the evaluation of the submarket. They preferred to invest in a submarket or specific area which they already knew. Therefore, previous favourable experiences at a particular location were advantageous for the investment decision. A second situation during which intuition is crucial concerns earlier experiences with the seller or the developer, which I discussed in Section 4.2.5. Third, the personal judgement of the property itself, such as the perceived building quality or first impression when walking into a property and seeing its reception hall. This is especially tricky as members of the investment committee, who ultimately decide on the investment decision, also form their personal

judgement on both location and property. Consequently, several people's gut feeling will ultimately decide on the investment decision.

I10: We own this property across the street. We have a very good feeling for this part of the market and have felt comfortable with approaching our underwriting aggressively. [...] The people from the investment committee fly in, and they look at the property. If someone's gut feeling is bad, especially because they feel uncomfortable with the location, it's very difficult to completely change their mind with facts and figures. I think it's very difficult to assess a location in real estate, except that I can say it's 500 metres or two kilometres to the next underground station - it's very difficult to quantify locations. We need personal views to really evaluate a property.

I14: I always rely on my gut feeling, my gut. I guess that comes with experience. [...] It's not about numbers all the time. Of course, when I look at an investment, I don't first look at the numbers. I check whether it fits the criteria. Yes or no. Do I like it. [...] If I don't feel right about the investment, I'm not doing it. I need to feel comfortable with it, from my gut feeling.

I21: For example, the feeling when you walk into an entrance hall, there are no real factors that you can describe in terms of attractiveness. And I think that gut feeling has always played a significant role and always comes from experience.

I22: I do think that gut feeling is relevant for every acquisition decision. If it doesn't feel right, the deal will most likely not work out.

I21 noted that relying only on previous experience in a certain location might not always be the best approach to an investment decision. While acknowledging the relevance of personal views, *I21* pointed out that it was necessary to reflect on the impact of previous experience on the current investment opportunity:

I21: I have a lot of colleagues who have been in transaction management forever, and they feed their gut feeling from experience. You just have to be careful that you always recalibrate it and don't get stuck somewhere with your gut feeling and your experiences. There is a danger that this personal view will simply be prescribed in the future. They have to think again, have to allow new input.

Within this context, *I18* noted that they preferred to use the term "experience with the market", while most other participants specifically mentioned "gut feeling" in their responses, which resulted in the final attribute wording *personal judgement / experience*.

Several previous publications have dealt with personal judgement. The relevance of personal views has been shared by most of them: because of "the uniqueness of each property, human judgement will always be required" (Isaac & O'Leary, 2012, p. 2). The authors noted that personal views impacted how a property's value was assessed, including which comparables to choose (Isaac & O'Leary, 2012).

In addition, other authors have specifically assessed the impact of personal views and how they impacted real estate investment decisions. This was the main topic in the paper from Gallimore and Gray (2002). The authors distinguished between attributes concerning *facts* when conducting an investment decision, such as prices, rents and inflation, and attributes concerning *views*, including publicly available forecasts and personal impressions or feelings. The authors concluded that decision-makers relied on their sentiment, alongside hard facts, when conducting investment decisions – a finding which was in line with the participants’ views. However, the authors also pointed out that this bore the risk that the ultimate investment decision did not necessarily improve through the use of personal judgement.

Other research on real estate decision making has also included personal views in lists of attributes. For instance, Hutcheson and Newell (2016) incorporated *personal judgement* as one of two factors into their *qualitative techniques* group. Similarly, Reddy (2012) assessed the relevance of both *judgement* (“*gut-feeling*”) and *experience* in her *qualitative* factors impacting asset allocations. French (2001) noted that “personal intuition” (p. 402) plays a vital role in the real estate decision-making process. Results from Worzala and Bajtelsmit (1997) suggested that *general experience / intuitive diversification* was the by far most-often used asset allocation decision-making technique among pension funds with 54%, followed by return correlation calculations with 37%.

Several participants noted that due to the considerable changes in the real estate environment in the previous years and because of the Covid-19 pandemic, people assign higher relevance to their personal feelings in a transaction. For example, *I20* noted that both factors led many market participants to believe that forecasting future rents and prices increased in difficulty. Thus, “how do we know what will happen in the future? Gut feeling has perhaps even become more important in the current environment”. This is in line with Isaac and O’Leary (2012), who depicted that especially in a market with high volatility, such as the real estate market, personal views increase in relevance.

Interestingly, other respondents shared the view that through improved real estate data availability in the past years (see Section 4.3.2 for a discussion on information availability), both actual figures, such as previous deals in the market or rental developments, and personal judgement were more relevant for their decisions. Stated differently, they argued that both *facts* and *views* have a higher impact on the investment decision. For instance, *I20* explained that “I do believe that with more information, many people are switching to combine their

rationale with their personal views. Who knows how the rental market will develop over the next two years or so, so that's why head and gut have become even more important than before".

4.2.9.1 Summary: Personal Judgement / Experience

This section has dealt with the relevance of personal judgement or experience for investment decisions. The respondents shared the view that gut feeling, which usually develops from previous experiences, has always played a crucial role in investment decisions; for instance, when assessing a submarket or seeing the property in reality for the first time. However, they also noted that only relying on past experience was not the proper approach as it disregards potential market movements and changing environments. In light of increased data availability, the respondents indicated that personal judgement did not decrease in relevance. On the contrary, some respondents stated that they thought that the pandemic and the real estate market development have resulted in higher importance of personal views. The high relevance of "gut-feeling" was also expressed by previous researchers on this topic.

4.2.10 Property Quality / Features

The respondents mentioned a range of different favourable property features and discussed the perceived property quality. This section is divided into various aspects related to this attribute, which were discussed in the interviews and are partly interrelated: property quality, landmarks, innovation, technical equipment and building age.

4.2.10.1 Property Quality

All respondents agreed that property quality plays an essential role in investment decisions. However, the required state of quality differed by type of investor and could be divided into two groups: on one hand, most respondents reported that good or excellent building quality at the time of the acquisition was one of their main purchase criteria. For instance, *II* revealed in the interview that quality is the second-most relevant criterion for the investment decision. Other respondents also put a great emphasis on property quality for their investment decision:

II: Quality comes second for us, directly after location.

I15: In this submarket [Su], it is the property with the best quality you can find there – a very nice asset.

I17: Quality is the be-all and end-all for us.

Similarly, other respondents mentioned the relevance of property quality in the interviews. However, their statements indicated that quality was relatively important but not extraordinarily significant for the ultimate investment decision.

I11: In addition, we were able to invest not only in the submarket but also get an incomparable asset quality.

I13: We want to buy very good quality in B-markets like [Su].

I16: The property was in good condition. The anchor tenant developed their areas by themselves. In other words, we were relatively satisfied with the quality of the building.

All of the statements presented above indicated that the respondents required a high level of property quality. Interestingly, not only core investors preferred to invest in excellent quality, but also value-add investors, who by definition spend money on refurbishing the properties. Despite their interest in finding properties and add value to them, many value-add investors also focus on high quality of the property at purchase.

On the other hand, other respondents stated that they preferred to acquire lower-quality properties, invest in their refurbishment, and then sell the property at a higher price. All of these participants were part of the value-add asset class. However, as mentioned before, not all value-add investors preferred lower and ‘improvable’ quality over a high level of building quality. *I9* pointed out that for value-add investors, the main leverage derived from the building quality, as the property’s location is a fixed parameter, while it was possible to acquire a property with relatively low quality, refurbish it and sell it for a higher price. Another respondent stated that they looked for less “nice-looking” properties to invest into their appearance:

I19: Whether it has the best appearance because it is simply made of steel and glass and by the latest star architect, that is less relevant. When we bought it, [O] was not really nice-looking, but that’s exactly our concept.

In the interviews, I also asked the participants what affected their impression of the property’s quality. The main criterion was the first impression when seeing the property or entering it for the first time, as explained by *I17*.

I17: For me, the quality is mainly determined by the first impression at the viewing, and of course by the furnishing.

In accordance with the respondent's views, several real estate decision-making researchers have accounted for building quality. For instance, Armonat and Pfnür (2004) included *appearance* into the *marketability* in their assessment of real estate asset allocation decisions. Reddy (2012) added *asset quality* into the *qualitative* group in her paper on allocation decisions among Australian fund managers. Roulac (2000) accounted for property quality with three sub-factors: *design / architecture*, *construction quality* and *property inspection*. Their results indicated that all three factors were less relevant than *location* and *tenant quality*.

4.2.10.2 Technical Equipment

As mentioned before, several respondents pointed out that they associated the *technical equipment*, including central heating and air conditioning systems, with the property's quality. In general, technical equipment played a vital role for the participants. They often named excellent building equipment as one of the reasons for purchasing a property in the interviews.

According to the respondents, the following list presents the factors positively impacting the assessment of the property quality and the corresponding purchase decision. Interestingly, while ventilation and cooling were the most often mentioned factors, several respondents specifically addressed features that were also included in the green certification assessment, such as room brightness and access to fresh air:

- ventilation
- cooling units
- ceiling height
- number of shafts for optimal floor partitioning
- design of underground car park
- existence of gym / access to sport activities
- potential third-party usage
- existence of a wayfinding system
- good brightness
- windows, and

- access to fresh air.

I4: We have had clients who have demanded that the open-plan office either has a complete gym in it or at least some kind of sports facilities.

I8: But the equipment of the property is relevant, the ceiling heights, the number of shafts, the layout of the underground car park. [...] Higher ceilings are particularly attractive for the tenants at the moment, just like good brightness, windows. [...] There are also issues like the lobby. These are all things that, if they don't exist, you have to ask yourself, can they be installed and what will it cost us?

I19: Ceiling height, light and the ability to use the space for other purposes are important.

When the respondents discussed technical building equipment, they addressed cooling and heating most frequently. *I13* pointed out that this was a common request by “a modern office user” and even acknowledges that this equipment is not beneficial to the environmental balance of a building. *I22* mentioned the high standard of the property’s technical equipment, including cooling, as one of the participant’s purchase criteria.

I13: The property has to be suitable for a modern office user. For example, it is important to us that the buildings have air conditioning or cooling. This is nothing particularly great from an environmental point of view, but we see that this is something that the tenants simply need and demand at the moment. We require that the practical benefits for the tenants outweigh the disadvantages.

I22: Because there are no such well-equipped buildings in the immediate vicinity. [...] For example, this is a building that has a very high standard of technical equipment. That means all the ventilation units and the refrigeration system are all designed in such a way that you get proper indoor air quality.

In this context, *I2* pointed out that retrofitting the ceiling and enhancing its height to meet their building height standards could be very expensive. Thus, several respondents revealed that they would not purchase a property without cooling, or without having the ability to retrofit this equipment at low cost. This implies that the respondents weigh the cost of retrofitting against return. From their perspective, it does not make sense to retrofit all building qualities and equipment aspects.

I2: The ceiling height is also important. It is extremely important as many buildings, depending on the year of construction, have a ceiling height of 2.60m. We would not buy that. We only buy 2.75m and upwards. I could leave the ceiling open, but then it probably costs twice as much as if you close it. So that's one of the things we pay attention to.

I10: The technical equipment must enable me to install ventilation or air-conditioning, which modern office buildings need today. It must be possible to do so without having to reconstruct the whole building.

Moreover, I2 added that the reason for the high costs resulting from retrofitting a property derives from the low space capacity in many German office properties:

I2: What we always look at is: Is it even possible to retrofit cooling? That's a big question. The bays are often so narrow that you can't even retrofit cooling in some properties. The space capacity in the shafts is always relevant, of course, similar to the power supply, that they can support such a cooling system at all.

4.2.10.3 Landmark Property

Several participants mentioned the term *landmark property* as a favourable property attribute. While this term is not officially defined, it often refers to well-known, high-quality properties usually located in prime areas of large cities with good visibility, with a unique form or style and a considerable number of floors (Moon et al., 2010; Ott & Hahn, 2018). Ott and Hahn (2018) also refer to these properties with the term *Super Trophy*.

While a landmark did not constitute a strict criterion for the interviewees' purchasing decision, several respondents noted that they favoured a landmark property, as they "like to have a nice-looking property which we can print on the first page of our brochure" (I17). I2 mostly looked for landmark buildings in the largest cities, which the participant branded "main-in-main".

I2: Our fund strategy is more or less main-in-main, which means we mainly buy landmark assets in large cities.

I6: And of course it will become a landmark.

I15: But for some investors, it does make a difference – they want to have a great property that somehow makes it into the prospectus.

Moreover, I5 pointed out that it is often easier to convince the investment committee of the acquisition if it concerns a landmark property but sees this criterion as a plus instead of as a strict purchase criterion.

I5: We are happy about that – it's great that it is capable for a prospect. But that was not a decisive point. It is more of a nice side effect. But it helps to convince the investment committee, if necessary.

4.2.10.4 Innovation

The interviews revealed that innovation was another relevant factor for real estate investment decisions. The respondents often referred to smart offices or smart buildings, which are

aimed “at providing safe, healthy, comfortable, affordable, and beautiful spaces in a carbon and energy-efficient way” (Jia et al., 2018, p. 1680). The participants argued that the “property of the future” (I3) should be able to modify temperature, cooling and heating efficiently. In the interviewee’s words, the property should “think with us” (I8). It should be able to turn on the lights by itself and assess and analyse data and improve the tenant experience.

I7: Technology, or how smart a building is, is a very important criterion.

I10: Maybe it will also have an effect on the fact that we will get better air conditioning systems so that instead of smart homes, smart offices will become more important.

I20: Everyone is trying to develop the smart property right now. We are too. We are involved with construction companies that are also working in this field and [P] is one of the pioneers. Functioning autonomously. The property thinks for itself. Which rooms are occupied, where do I have to turn on the light, where do I have to heat? In a way, this has already existed in the past, if you like, via motion detectors. But it was not evaluated, not processed.

The respondents also noted the importance of obtaining and interpreting tenant information, for instance, by analysing mobile data:

I8: The building should know how many people are in today. How many people are coming tomorrow. And when it has to heat, when it has to cool, what it can do as a building to reduce the final energy consumption.

For example, I11 pointed out that a purchasing argument was state-of-the-art sensors used in the whole office property and provided the tenants with transparency about their energy consumption or other corresponding key performance indicators (KPIs). I22 provided less universal examples, such as self-opening doors and water dispensers. This was especially relevant in light of the Covid-19 pandemic, during which people tried to avoid touching door handles as much as possible. For I8, innovation also includes monitors in the elevators that show the current Covid-19 regulations.

I8: A good example is our property here. When you enter downstairs, we have a concierge, a digital screen where you can read general information, there is also a bit of advertising, but more information about the property. During the pandemic, we have been able to use this incredibly well, simply by always playing up-to-date information, including the rules of conduct: wear the mask, keep your distance, wash your hands.

I11: It is very innovative. [...] Therefore, it had such a technological aspect and asset quality that we found very special.

4.2.10.5 Building Age

The pilot interview partner suggested that I inquire the participants about potential ‘hard’ purchasing criteria, including building age. Similarly, *I11* noted that building standards change relatively quickly and that even if a property was built to a high standard two decades ago, this standard has changed in the meantime.

I11: The property is already 20 years old, but at least it is of a very high standard. That means it has a reasonable structure. [...] A new building always meets the current requirements. If you look at how tight the façade is, or at the insulation, it’s just a completely different standard today than for a building that was built 20 years ago.

However, not surprisingly, most participants did not consider the building age to be of high relevance compared to other attributes. The participants’ responses indicated that investors only seldomly declined to invest in a property older than a certain threshold. An exception is *I5*, who noted that a client of theirs is internally restricted to only invest in properties that were built in or after the year 2000. In addition, *I15* mentioned that they know investors who sell every asset which has been constructed before a specific date.

I5: Most investors have no specifications regarding the building age. And since we also have a relatively great affinity for technology, we are not shocked by buildings built in the 50s.

I15: I think some investors now even have criteria like that. Or they say: we sell everything that is older than year X. That’s not the case with us.

Apart from this, most respondents stated that the building age was of minor importance, especially as the building age was not as meaningful if renovations have taken place. If a property has been established in 1980 but was completely renovated in 2010, the original construction date decreases in relevance. However, a relatively new property is an indicator for relatively low maintenance costs, as *I13* pointed out.

I7: Of course, age plays a role. But usually, the location is more important. You can renovate a building so that it can be rented out again.

I8: We then look at the use type. Is it a building from a time when ceiling heights were generally too low? That would be more of a rejection criterion than pure age. Just looking at the age doesn’t help. We also have older properties, but they were extensively renovated and refurbished a few years ago. If that was done well, that wouldn’t be a criterion for not buying per se.

I13: They were quite modern buildings, built between 2008 and 2014. It was important for us to have a very good year of construction and not too many CapEx issues.

Previous research on real estate decision-making assigned mixed relevance to the property age. Research from Pfnür and Armonat (2001) suggested that only 33% of investors diversify their portfolio by property age. Fuerst and McAllister (2011b) controlled for the building age to analyse the impact of voluntary certifications on real estate prices. Ott and Hahn (2018) also added *building age* as a control variable, which they defined as “the actual construction year, not the economic building year” (p. 111) in order to avoid including the effect of refurbishments more than once in their assessments.

4.2.10.6 Summary: Property Quality / Features

This section has presented the relevance of the property quality and its features for the participants. They generally agreed that a higher property quality was a favourable attribute for their investment decision, similar to high-quality technical equipment. However, some value-add investors preferred to acquire lower-quality properties to refurbish and add value to the building, thereby enhancing its quality. Innovation was a relevant factor for the participants, who increasingly paid attention to smart offices – a concept which they expected to increase in relevance in the future.

Some participants explicitly noted that they were looking for landmark properties. Although the exact definitions of this term were unclear, they mostly referred to properties located in the CBD with outstanding architecture or quality. The building age did not constitute a relevant criterion for the majority of participants.

4.2.11 Quantitative Evaluation / Return

Not surprisingly, the quantitative evaluation or property return calculation of a transaction was crucial in the respondents’ investment decision-making processes. Their investments had to meet specific return targets, which depended on the type of transaction. Thus, the investment decision was based on return expectations, dependent on current rent and future rent expectations, expected capital expenditures, purchase price, and expected sale price, the holding period and financing assumptions.

My impression as an interviewer was that quantitative return was a critical criterion for all respondents. This is not surprising, as a company conducting uneconomical investments will not survive in the long term. Thus, the ultimate goal of all respondents was to achieve a return. This impression was enhanced by the following statements, inter alia:

I15: In the end, it's about how much money you earn - whether the house is really beautiful or just a little bit beautiful is not so important.

I17: In the end, return is the most important criterion. This in turn is logically influenced by the amount of rental income, the purchase and sales price and, of course, any leverage.

I20: All in all, it always has to fit together. The purchase price per square metre, financing etc. should still leave room for manoeuvre, so that later I earn money with a margin.

Research from Pfnür and Armonat (2001) has led to similar influencing factors on real estate investments. The researchers found a few additional factors impacting the cash flow which the participants in my research did not address, such as taxes and maintenance costs. In addition, the authors assessed the prediction accuracy of these variables. Their results showed that investors had most prediction difficulties with the sale price, followed by taxes and non-refundable extra costs. Purchase costs, future rental income and capital expenditures could only be predicted with deviations of between 35% and 38%. Thus, real estate decision-makers have a significant challenge in conducting a quantitative evaluation, making it even more critical to assess all the input factors properly. This section deals with several components and related terms of the quantitative assessment of a property, including KPIs, vacancy, financial considerations, and the investment time horizon.

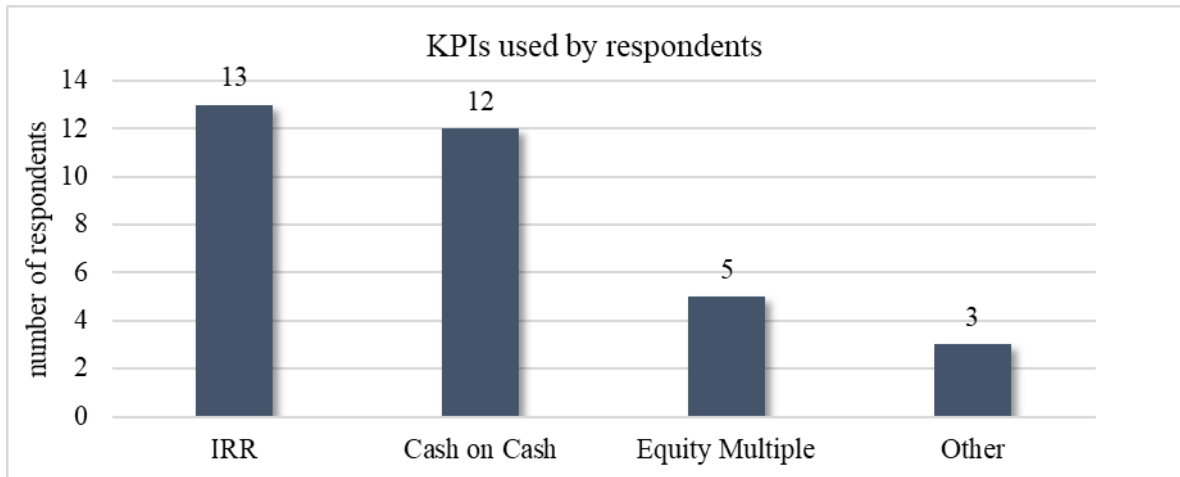
4.2.11.1 Key Performance Indicators

When the respondents discussed their return targets, they mentioned specific KPIs that measure the return. The respondents used a range of KPIs and corresponding return targets, both of which depended on the investors' investment vehicle and risk style. The following list provides an overview of the most frequently mentioned KPIs, all of which are commonly used in real estate practice:

- IRR
- cash-on-cash, derived by dividing the before or after-tax cash flow by the initial equity (Webb & McIntosh, 1986)
- equity multiple, derived by dividing the equity return by the equity commitment (Fisher & Hartzell, 2016), and
- other KPIs, such as total return or yield on costs.

Figure 31 presents the return measures by the number of participants using them as the primary return criterion. Interestingly, the respondents used both IRR and cash-on-cash

almost equally often, but usually for different types of properties. The equity multiple was the third most popular KPI among the participants.



Source: Own presentation

Figure 31: KPIs Used by Respondents

The evaluation measures real estate investors use were already a concern of the earliest papers on the real estate decision-making process from the 1980s. Chapter 2 presents an overview of their findings. Between 1980 and the 2000s, IRR and cash-on-cash have already been popular return measures for real estate investors and often belonged to the most-frequently-used KPIs (Farragher, 1982; Farragher & California, 2008; Farragher & Kleiman, 1995; Ginevičius & Zubrecovas, 2009; Roulac, 2000; Webb & McIntosh, 1986; Wiley et al., 2008; Wiley, 1976).

However, in contrast to these findings, the respondents in my research have not mentioned the NPV – a measure closely related to the IRR, but that shows the return in absolute figures instead of percentages. Similarly, Altshuler and Magni (2012) noted that while the NPV was often used in academics, real estate practitioners preferred the IRR. According to the authors, the reason lay in the IRR being “more intuitively compelling” (p. 219). This finding is in line with results from De Wit (1996), which revealed that 100% of Dutch institutional investors preferred the IRR over the NPV.

As the cash-on-cash is a cash flow-reliant return measure that does not consider the property’s sales price, investors using this KPI often conducted long-term investments where the annual dividend was more important than a fast sale. Long-term investments are often core deals, which is why core investors most often mentioned cash-on-cash as their main KPI. The real estate market report from Catella (2020) also underlined this preference among core investors. An example among the participants was *I20*, who pointed out that “you have

to differentiate, in the short term you rather look at the IRR and in the long term you rather look at the cash-on-cash - what kind of current return do I get on my invested equity”.

I14: For our institutional investors it's important to have a good cash-on-cash return. I think that's probably number one in terms of return KPIs. It depends on how much financing you require, but if you assume a 50 percent LTV after fees, the cash-on-cash requirements are starting at 4 percent over 10 years to probably 4.5 percent. That's probably the most important criterion.

I16: We are very cash-on-cash driven. We are not a total return investor, but we need the longest possible cash flow. We need regular distributions, especially against the background that the property was handed over fully let with well-known tenants.

I21: We have relatively long-running funds, which means that IRR is not the right KPI for us. We use the cash multiplier. How much money can I get from the deal in a certain period of time?

On the contrary, investors active in the value-add risk class mentioned IRR as their main performance measure. For short holding periods, IRR is more dependent on the final payment. As a result, most value-add investors and some core investors put their focus on the IRR. The respondents agreed that, with less steady return expectations and more capital expenditures, development exposure, or general investment needs, the reliance on IRR increased.

I11: Essential for decision-making is what financial KPIs are achieved. We find IRR particularly important.

I14: Cash-on-cash is not the only criteria, obviously. Investors also focus on IRR. If you're looking a little more in the direction core-plus or even value-add, then IRR becomes a lot more important than the cash-on-cash. It depends on the risk profile.

I17: As we try to sell our value-add properties within a few years, we care more about the IRR. Especially for our developments.

I20: In the short term, you rather look at IRR and in the long term, you rather look at the cash-on-cash, what kind of current return do I get on my invested equity.

The respondents often considered the equity multiple as an additional KPI for conducting a quantitative evaluation of a property. For instance, *I4* and *I1* pointed out that their focus lay on the IRR or the cash-on-cash, and the equity multiple was the second-most important attribute. *I6* noted that they “have to pay an equity multiple of 1.8 to 2, post-tax, post-fees. Ideally, the investor gets between EUR 18m and EUR 20m back from an initial investment of 10 million within three years”. *I5* stated that most funds do not consider the equity multiple. Still, they have experienced a few times that an investor did not purchase the property because the equity multiple was below expectations.

Other return measures used by the respondents were the absolute profit, mentioned by two participants, and the stabilised yield on cost – all of which are less commonly used in real estate practice:

11: Core-plus is primarily about cash-on-cash, i.e. distribution, and then in the second instance equity multiple and absolute profit. Of course, not so many people are looking at the latter.

12: Apart from IRR, cash-on-cash and the equity multiple, the most relevant measurement is stabilised yield on cost - the central variable. If we buy at X EUR, invest Y EUR CapEx, then we receive rental income and ask ourselves what is the factor or the yield of the property.

18: Absolute profit must be interesting.

4.2.11.2 Return Targets

In addition to asking the respondents about their KPIs, I have discussed the return targets with every participant. Obviously, the return targets differed by risk class: riskier investments involved higher return targets (Bodie et al., 2014). In addition, return targets were dependent on the investment time horizon, which I will discuss in the next section. Nonetheless, the consensus among the participants was that core assets should yield 3 to 6% IRR and less than 4% cash-on-cash, while value-add investments required an IRR of 10 to 15%, an average cash-on-cash of 10% and an equity multiple of 2. Table 33 presents the results.

Table 33: Return Targets by Measure and Type of Investment

Type of measure	Core investments	Value-add investments
IRR	3.0% – 6.0%	10.0% – 15.0%
Cash-on-cash	3.0% – 3.5%	9.0% – 11.0%
Equity Multiple	n/a	2.0

Source: Own presentation

The above return targets are in line with findings from previous reports. However, academic literature on this topic is scarce. In a market report, Catella (2018) stated that the average return for core properties and value-add properties are 5 to 8% and 8 to 12%, respectively. The German real estate investment platform Bergfürst (2020) specified on their website that core investors can expect to receive an IRR of only 2 to 4%, while return targets for most value-add investments amount to 6 to 10%. According to real estate broker Colliers

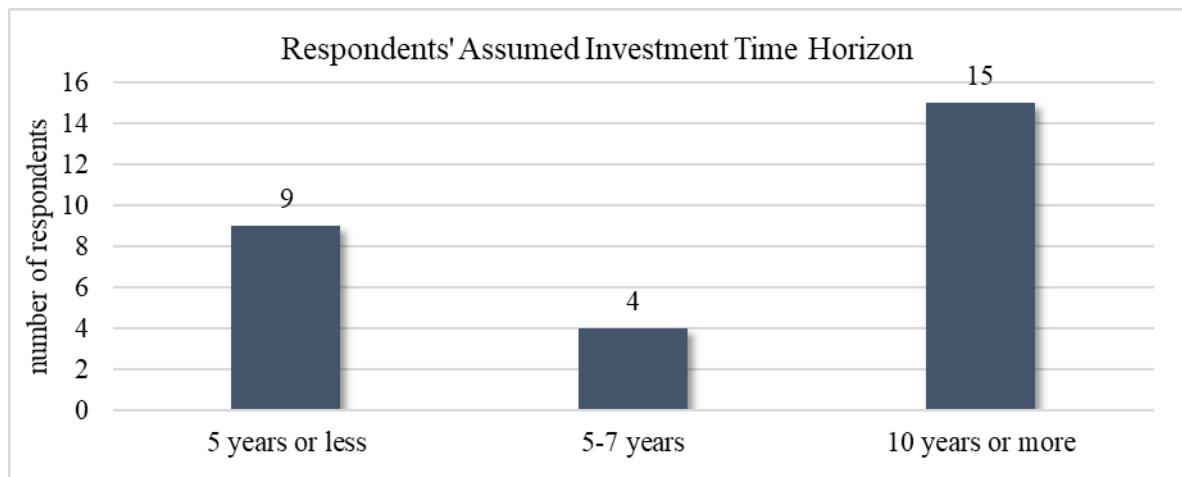
International (2021a, 2021b), core and value-add investors can expect a return of 4 to 6% and 8 to 11%, respectively.

An excellent comparison for cash-on-cash returns are the yields achieved in the German office market, as yields effectively illustrate the annual return, which is the net rental income, divided by the purchase costs (RIWIS Online, 2021b). As mentioned before, market reports indicated that the prime yields amount to between 2.5% and 3.0% in the most relevant German cities for the office market (BNP Paribas Real Estate, 2021a; CBRE, 2021a; Jones Lang LaSalle, 2021b; Savills Research, 2021c). Moreover, as core investors also usually invest in large cities' urban locations, the expected cash-on-cash rate is supported by market reports.

4.2.11.3 Investment Time Horizon

During the interviews, I asked most respondents about the investment time horizons underlying their quantitative evaluations. Similar to return targets, holding period assumptions differed by risk type: participants active in both core and value-add asset classes mentioned that their investment time horizon depended on the property type. They usually set a business plan time horizon of ten years for core investments and a time horizon of three to five years for value-add investments. This distinction of holding period between risk types makes sense, as value-add deals per definition often involved purchasing a rather decrepit property before renovating and refurbishing the building, and ultimately selling it within a few years. On the other hand, core properties were often purchased for steady long-term income; thus, longer holding period assumptions made sense (Catella, 2018).

Figure 32 shows the chosen investment time horizons by the number of participants. With a total of 15 out of 22, the majority of respondents conducted at least some of their return assessment based on a ten-year business plan, while nine interviewees chose investment horizons of less than five years. Only four respondents used holding assumptions of between five and seven years.



Source: Own illustration

Figure 32: Respondents' Assumed Investment Time Horizons

In the *10 years or more*-group, the majority of respondents referred to the holding period as being “standardised” and often set to ten years. Although assumed time horizons for most value-add investments were rather short-term and for core investments more long-term, exceptions existed. For instance, *I14* and *I12* used ten years as a base case for both value-add and core properties, “and then, depending on the risk curve of the investment or the strategy of the investor, we always adapt that time period” (*I14*). This procedure makes sense to the degree that fund holding periods often amount to 10 years, while value-add properties are usually sold after a shorter period of time (Catella, 2018).

Several respondents also assumed holding periods of much more than 30 years but still used 10-year business plans. For instance, *I8* and *I7* noted that they sometimes held real estate properties in their portfolio for more than 30 years. On the contrary, some respondents mentioned that they had fund durations of ten years but conducted decisions based on a business plan covering five to seven years.

Findings from previous researchers on the investment time horizon differed. For instance, results from Wiley (1976) indicated that 50% of insurance companies based their return analysis on investment periods less than five or more than 20 years. A ten-year business plan was only the second-most often chosen option by the participants. According to Webb (1984), no pension manager regularly assumed holding periods exceeding ten years, with the exception of 5% of respondents, regularly calculating with holding periods of 31 to 40 years. Farragher and California (2008) concluded that institutional investors have an average investment time frame of 7.8 years, which was only marginally longer than that of developers with 7.6 years.

4.2.11.4 Forecasting the Cash Flow

All respondents based their quantitative property assessment on a cash flow analysis. “Investors invest for anticipated future returns, but those returns rarely can be predicted precisely” (Bodie et al., 2014, p. 10). This statement shows how crucial financial forecasts are for investors and how difficult it is to conduct predictions properly. Thus, the respondents spent considerable effort in forming and testing assumptions. Research from Pfnür and Armonat (2001) revealed that real estate investors showed forecast diversions of 38% and 47% for the rental income and the sale price, respectively.

I4 demonstrated the relevance of future rental income and capital expenditures as well as the exit price for the cash flow. This section deals with the operating cash flow, including rents and expenditures to refurbish and improve the buildings. The financing aspect of the cash flow will be discussed in the following section.

I4: The main influencing factors in our area are rent forecasts, CapEx, and of course, the planned sales price.

From the respondents’ point of view, the most often-mentioned cash flow-impacting factors were as follows, as exemplified by the statements from *I17* and *I14*:

- the rental income, which depends on vacancies and expected lease price developments
- capital expenditures, such as improvements or refurbishments of the building (Ghosh & Petrova, 2017)
- potential expenditures to obtain a green certificate, and
- the purchase and sale price.

I14: If you have a 20-year-old building and you’ve got three years left on the lease, the tenant is due to go and we want to reposition that building, then we will plan with our CapEx assumptions and an extra fee for the building to be credited.

I17: Decisive factors are rental income and the sales price, as well as CapEx for conversion and refurbishment - which may also include costs for certification.

Pfnür and Armonat (2001) have used similar cash flow-impacting factors and added maintenance costs, other non-recoverable costs and taxes. Similarly, Ginevičius and Zubrecovas (2009) indicated that project maintenance and taxes are second- and third-most relevant factors in the *financial criteria* group, following *net incomes*. The latter term is not further defined but likely referring to the rental income. Interestingly, the importance weight

assigned to the sale price is half of that assigned to taxes, and a quarter of the weight of maintenance expenditures. While both taxes and other expenditures were relevant to the participants in my study as well, the interviews revealed that they were of subordinate importance.

Apart from the capital expenditures, which depend on both risk type of investment and business plan, I identified the (expected) operating rental income as one of the most relevant parts of conducting a quantitative evaluation based on the interviews. As discussed before, return estimations are heavily contingent on forecasts of rent developments, including future vacancies. As *I7* pointed out, "the assumptions about future rental income from the property itself are of course super important. These, in turn, depend on how quickly and on what terms we can let the property".

Furthermore, the participants acknowledged the relevance of lease terms for the operating cash flow. This makes sense because rent-free periods¹⁹ significantly delay the timing of the rental income. In addition, research from Chegut et al. (2014) suggested that rent-free periods are on average three months longer for properties with green certificates, which makes this point even more relevant in light of the increasing popularity of ESG criteria in real estate.

Another cash flow-impacting factor is the vacancy of the property and the remaining lease duration. Jackson and Orr (2011) have assessed the period to lease expiry as an influencing factor for a real estate purchase decision and found that their respondents significantly preferred remaining lease periods of more than ten years over shorter remaining lease periods.

However, respondent preferences on this topic in my research varied with the risk and return profile. For example, core investors by definition preferred fully-let properties with long lease terms. In contrast, value-add investors often preferred higher vacancies or lower remaining lease durations to refurbish, rent the property and sell it at a higher price. Thus, per definition, value-add investments involve redevelopment potential or vacancies (Catella, 2018).

A related term worth mentioning at this point is the Weighted Average Unexpired Lease Term (WAULT) (Sanderson, Shakurina, & Lim, 2019). As the name suggests, the WAULT

¹⁹ Rent-free periods are commonly used in office real estate to encourage a tenant to sign a lease contract (Chegut et al., 2014).

indicates how many years of existing leases remain. Thus, a low WAULT implies that a large proportion of the building will potentially vacate soon.

II: And therefore, the property was a perfect fit because it had a WAULT of six years and was fully let. In addition, in our opinion, it still had potential for rent increases.

I5: Vacancy, WAULT, it fits, it feels right. I have more access to the vacancy and a shorter WAULT than if I'm somewhere downtown.

II6: With a WAULT of just under eight years, the investment made a lot of sense.

4.2.11.5 Financial Feasibility

In addition to the financial environment, which was discussed in Section 4.2.2.5, the financial feasibility, including financing assumptions in the business plan of a property, played an essential role in the quantitative evaluation of a property. In this context, leverage is crucial for most real estate decision-makers. Leverage indicates to what degree a property acquisition is financed with debt and is usually derived by dividing the amount of debt by the asset's market value (Alcock, Baum, Colley, & Steiner, 2013; Shilling & Wurtzebach, 2012). This ratio is also referred to as the LTV ratio and is commonly used in real estate (Bian et al., 2018). Higher leverage implies more risk, resulting in higher return potential (Shilling & Wurtzebach, 2012).

Similar to the expected return, leverage varies between different risk and return profiles. While core investments usually have a leverage rate of 0 to 60% (Colliers International, 2021a), value-add transactions often have higher leverage of up to 65% (Shilling & Wurtzebach, 2012) or 70% (Catella, 2018; Colliers International, 2021b). Thus, some core investors purchase properties with pure equity, while others take on a loan amounting to 50% of the property's market value.

The respondent's leverage requirements were in line with market practice, as described above. Three core investors stated that they usually purchased properties with no debt at all, while three value-add investors often used leverage of 70%. The remaining investors used leverage ratios of between 30 and 70%, depending on the risk class and the investor's requirements. A single investment manager often covered multiple funds with varying leverage requirements.

II: Our funds or vehicles have different financing characteristics. There are funds that are allowed 0% LTV, others allowed 50%, some 65%. The financing of a property also plays a big role in the ultimate decision.

Apart from internal preferences and guidelines, German insurance companies are bound to regulations from the Bundesanstalt für Finanzdienstleistungsaufsicht of BaFin (Federal Financial Supervisory Authority). The BaFin set the maximum allowed leverage ratio for real estate investments for German insurance firms to 60% (BaFin, 2017). Thus, several potential investors are restricted in the amount of leverage and corresponding risk.

The respondents agreed that the financing conditions, including the amount of debt, interest and amortisation, and the availability of debt in general, were particularly relevant for real estate investment decisions. *I17* underlines this finding:

I17: Financing is really important. We work with assumptions for the amount of financing, interest rates, possible repayments – all of which influences the business plan a lot.

Furthermore, several participants pointed out that the “financial feasibility” (*I1*, *I17*) of a property has increased in importance through the Covid-19 pandemic. During this time, they reported that it was more challenging to obtain satisfying financing conditions, especially for non-core investments. Section 4.3.1 goes further into detail with the impact of the pandemic on the perceived financing feasibility from the participant’s point of view.

I5: This year, especially since the pandemic started, the financing environment has become significantly more challenging.

Roulac (2000) assessed the impact of several financial factors on the investment decision. The author identified expected future rental income as the third-most relevant financial factor, marginally more critical than the LTV ratio of an investment. Similarly, Ginevičius and Zubrecovas (2009) identified debt demand and the time to repay debt as crucial in their investment decision-making analysis.

4.2.11.6 Summary: Quantitative Evaluation / Return

This section has dealt with the relevance of the quantitative evaluation for real estate investment decision-makers. Return assessments were crucial for the respondents’ acquisition decisions. Most respondents measured their return with the IRR or cash-on-cash KPIs. Depending on the risk type of the investment, their return targets varied between an IRR of 3 to 6% and 10 to 15% for core and value-add, respectively, while target cash-on-cash rates amounted to between 3 and 11%, which is in line with the findings from other sources. Most participants modelled the business plan over a ten-year horizon, while value-

add holding periods were shorter, and some core investors assumed investment periods of up to 30 years.

My research revealed several factors that impact the participants' financial return. For example, the cash flow of a property was mainly affected by the expected rental income and future vacancies, potential capital expenditures to refurbish the building and purchase and sale prices. In addition, the financial feasibility, including the availability of debt and interest rates, played a relevant role in the respondents' quantitative assessments.

4.3 Other Interview Findings

This section deals with interview findings that the attributes of the MAU model did not capture. Thus, I discuss topics that were mentioned in addition to the attributes leading to the decision-making model, but which are also very interesting and novel. Resulting from the timing of the interviews, which took place amid the Covid-19 pandemic, the interviews produced unique insights into the impact of the pandemic. Section 4.3.1, therefore, discusses the pandemic's impact on the real estate and financial environment. The next section discusses information availability, followed by current trends in the industry in Section 4.3.3.

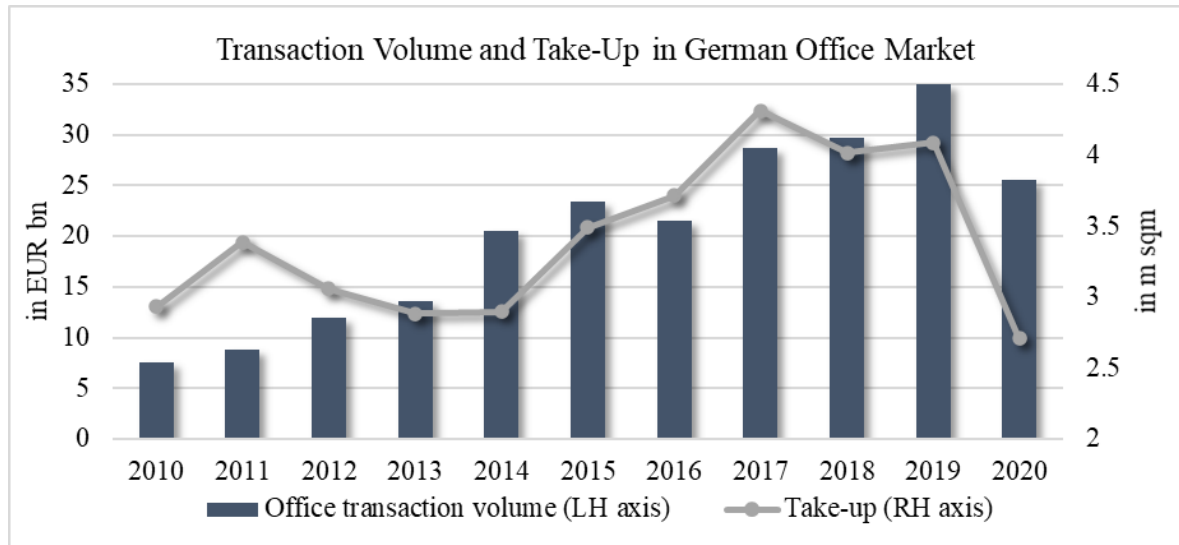
4.3.1 Impact of Covid-19 Pandemic on Investment Decision-Making

This section deals with the impact of the Covid-19 pandemic on the German office market and the work of the participants in my study. As mentioned before, the interviews were conducted between August and October 2020, when all aspects of life were affected by the Covid-19 pandemic, and the end of the pandemic was not in sight. Thus, the interviews revealed valuable and novel insights into the perceived changes to real estate investment decisions and the expected long-term market transitions resulting from the pandemic.

4.3.1.1 Impact on the German Office Market

Similar to other sectors, the Covid-19 pandemic has impacted the office market. According to a representative survey from Hans-Böckler-Stiftung (2021), 27 and 24% of employees in Germany worked exclusively or predominantly from home in April 2020 and January 2021, respectively, compared to only 4% in the time before the pandemic. This led to severe impacts on annual transaction volumes and space take-up, as illustrated in Figure 33. In

2020, the investment volume and take-up decreased by 36 and 34% compared to 2019 values, respectively (BNP Paribas Real Estate, 2021b; RCA, 2021e).



Source: Own illustration based on data from RCA (2021e) and BNP Paribas Real Estate (2021b)

Figure 33: Transaction Volume and Take-Up²⁰ in German Office Market

Schattenberg (2020) suspected that working from home will continue to play a relevant role in the future. The author suggested that hybrid work models will dominate. Furthermore, he pointed out that several firms have identified the cost-saving potential of working from home, which might reduce demand for office properties in the medium term. However, working from home is not always possible for and desired by employees, and office spaces will most likely not become redundant (Schattenberg, 2020). Similarly, according to a report from the German Economic Institute (2021), only a minority of firms plans to reduce their office space; instead, most firms plan to refurbish their existing areas and adapt them to post-pandemic requirements.

The respondents shared the view from Schattenberg (2020) and the German Economic Institute (2021) that offices will remain crucial throughout and after the pandemic. IZI pointed out that “we continue to need places to work because this exchange is simply becoming more and more important in order to have creative ideas in the daily life”. While they acknowledged that working from home was a suitable short-term solution for the pandemic, they pointed out that the physical office was not replaceable. It is the primary location to interact with colleagues and to encourage their exchange.

²⁰ The take-up figure shows the consolidated office space take-up in Berlin, Cologne, Düsseldorf, Essen, Frankfurt, Hamburg, Leipzig and Munich.

In addition, the participants noted the importance of office space to ensure that employees remain committed to the company and feel like they belong to the respective firm. Moreover, they shared the understanding that it was much more challenging to train new employees and integrate them into teams if most employees work from home. In a recent market report, CBRE (2021b) shared this view and stated that “Physical office premises have been shown to be more practical and efficient in promoting spontaneous communication in contexts not determined in advance. Employees will look for office space to do precisely this” (p. 12). The report also depicts the role of offices in promoting the well-being of the tenants.

All in all, it was interesting that the respondents had relatively similar views on the future relevance of office properties, although many noted that “expert opinions widely vary on this subject” (I12). This surprising agreement may result from a respondent bias: I interviewed investment decision-makers active in the office asset class whose job consists of investing in offices, and they all signalled that they think offices will remain crucial. If I had interviewed other parties, e.g. tenants, opinions on this topic might have been different.

The following statements underline these findings.

I10: We try to design the office in such a way that it becomes a place of creativity, that exchange is promoted, because that will become the main reason for going to the office. You cannot promote creativity via a video conference, you cannot train young people, or at least not in the way you would perhaps expect. You can't really bring the team spirit to life via video. And all that is important for a company to move forward and be successful.

I13: We also see the issue when new employees join. You can hardly integrate them into the team if no one is there. It is also a question of employee satisfaction.

I14: And home office does have its benefits. People realised that they can work from home. The IT works. But the question I have is, is this really a sustainable solution in the medium to long term? Because at the end of the day, I think it's human nature. People need interaction with other people, not only in terms of productivity but in terms of creativity.

I21: We are now in a discussion that is overshadowed by the short-term spotlight on the current situation and the view that home office already works. But I don't think it's a long-term effect. I don't believe that we don't need offices anymore - maybe they look a bit different in the future.

I22: I think office is extremely important. The office is not just a place where you go to open invoices and somehow send numbers back and forth, but the office is ultimately the only element that binds a company to its employees.

Another interesting finding from the interviews is respondents' views on the future of office space demand. The participants agreed with the projection from Schattenberg (2020), that

future work models differ from work models before the pandemic, with most employees working a few days from home and the remaining days in the office.

In contrast to the opinion from Schattenberg (2020), the respondents did not assume a significant negative impact on future office prices or demand for all office properties. Instead, they suggested that properties in an excellent location or with outstanding quality will most likely face similar demand. However, according to most respondents, offices in a suburban location or which are not well connected to public transport or highways will suffer in demand. They noted that before Covid-19, “even bad properties were sold at an incredibly high price, factors were paid that we could no longer comprehend, and the gap between excellent properties and really mediocre to bad properties was relatively narrow. Now the spread widened. For a perfect property, the price is at pre-Corona levels, and if you have a bad property, then they are hardly sellable anymore” (I21).

The increasing gap between centrally located, high-quality properties and all other properties was also addressed in a market report from CBRE (2021b). The report suggests that as a result of the pandemic, especially core properties in prestigious locations will be in investors’ focus. In this context, I18 noted that certain large corporates might cancel their tenancy agreements in peripheral locations and instead rent smaller, high-quality areas in prestigious locations, which would lead to less demand in secondary locations with worse access. The following statements from the participants underline this “run-to-quality” (I10):

I2: Everyone is back to the core principles; now, people suddenly look at tenant quality again.

I8: And that’s why there’s a demand for good, high-quality space, which sometimes constitutes a showpiece to companies.

I11: And we came to the conclusion that we have to focus even more on the quality of the property and the location.

I19: B-locations or decentralised locations that are not well connected will suffer. Campus locations that have completely disappeared in the last 15 years or were no longer sought after by tenants might probably come back into the spotlight because large companies then say, real estate is a large item of our costs and want to reduce these costs.

I22 adds to this by stating that, because of the pandemic, they placed higher importance on ensuring a rental cash flow over the short term. The respondent wants to take more time to implement repositions and lease vacant areas than prior to the pandemic.

I22: So all properties, no matter in which location, no matter in which structural condition the houses are, vacancy is not a deal driver at the moment. So, even if we buy now - and we are very cautious in this area - we make sure that we have a solid cash flow at least over the next one or two years. We make sure to take the time to work on a property for the next two years or maybe even longer, to reposition the property, but don't have to expect any loss of rent in the next two years.

For high-quality properties in good locations, most participants suggested that more working from home and corresponding lower space demand will be offset by increasing space demand for each employee and different space usage concepts, for instance, with more break-out rooms. These views are in line with results from a study on the effects of working from home in Germany. The German Economic Institute (2021) study indicated that only 6.4% of firms planned to reduce their office space in Q4 2020, for instance, by relocating or subleasing, while 16.9% preferred to refurbish their office areas to make them more “pandemic-friendly”. This implies that the negative impact on future take-up might not be as severe as feared. In addition, this emphasises the intention to adapt the areas to the new requirements resulting from the pandemic.

Several participants shared the view that higher individual space requirements in open-office work environments and lower space requirements resulting from more working from home might level out in the future, resulting in no overall change in space requirements. However, they suggested that how space is used will change:

16: I personally believe that there is no significant change in office space demand because the effects of home office with less office space demand versus the fact that office workplaces that remain require more space in between will somehow level out. However, I can't prove it, it's difficult to predict.

18: Some of these tenants come to us and talk to us about reducing the space. And there are also others who have profited from Corona, who now need more space because they are simply growing. We see both. To be honest, I can't see any real trend at the moment. We also see that despite the Corona crisis, great and large leases have been signed.

111: And we continue to believe that there will always be a degree of office workers. It may well be that in Germany there will be a tendency for more people to work from home, but at the same time, the counter-impact is that people need more space.

113: Let's see what happens in terms of area use. Open space implies that everyone sits close together. That doesn't really work anymore, so maybe the demand for space will even increase in the short term in some areas. [...] We think that this will play out reasonably well in the next few years. Maybe it won't be this massive growth that we used to have, but we don't think that there will be a complete crash in the office market.

I22: The ratio of employees to square metres will increase again. Last year it was always as few square metres as possible for one employee. Now it's more the other way around. We will give people the opportunity to work remotely one or two days a week.

That way, it's balanced out again. That means we have the same space requirement as before the crisis.

In light of changing space use for office properties, as suggested by several respondents, they also noted the advantage of remaining flexible and easily adapting to changing office space requirements. I14 pointed out that tenants increasingly ask, “Is the office space flexible enough? Can we accommodate potential future change if we have a reletting situation in the short to medium term?”. In addition, I8 noted that they see a lot of tenants inquiring about changes to the space layout, while “tenants tend to be more impatient and need changes quickly, so it's worth it if you can turn office spaces around quickly” (I8).

I10: For me, the keyword is that it is becoming more flexible.

Interestingly, some respondents were of the opinion that flexible work environments and more focus on digitalisation had been a trend even before Covid-19, but were catalysed by the pandemic. This is also in accordance with the market report from CBRE (2021b), pointing out that the pandemic has led to a shift towards technological advances across all asset classes. The following statements underline this finding:

I13: It is a basic trend that will perhaps accelerate now. People will work more data-based as soon as they can. And as soon as there are people in positions who live in the new world and make decisions, that will come over time.

I21: I don't think anything has changed much because of Corona. There is no game changer that we see. [...] Corona is really just an accelerator, it's just a catalyst for all the trends that we've seen before. The home office topic was there before. Now it has simply been catalysed, it has become much faster.

4.3.1.2 Impact on Financial Environment

Another interesting finding in the context of the Covid-19 pandemic, which numerous respondents addressed, is the change in financing conditions. Several respondents pointed out that it has become significantly more challenging to obtain financing due to the pandemic. As “banks were the first to bury their heads in the sand” (I20), the participants believed that the financing environment has become more challenging. Some reported that banks completely denied financing during the pandemic, which led to them not signing any new deals. These all-or-nothing experiences signal the relevance of sufficient funding for the respondents.

The financing environment used to be different, as I20 pointed out: “A year ago, the banks were throwing money out and said, I’ll definitely do it. Now, it has become hard“. Moreover, I9 explained, “you have to have the financing question answered before you buy the property. You can’t rely on the fact that it’s going to work out, but the business plan is even more dependent than it used to be on the ability to keep the assumptions in the financing, especially with more aggressive investment-style transactions”. Thus, the respondents signalled that the pandemic significantly impacted financing possibilities.

I6: In the first week of Corona, we were about to go to the notary with two deals, but the banks cancelled. I’ve spoken to others, they experienced exactly the same problem. Today I just don’t go to the notary without sufficient debt capital. In the past, we took that risk, but we won’t anymore.

I22: We approached 40 banks, and one bank out of these 40 would have provided financing at the conditions we signed.

The respondents detected several specific changes resulting from the Covid-19 pandemic. First, leverage rates have decreased, which had a significant effect on most respondents’ business plans. Higher LTV rates imply that real estate investors require less equity for their acquisitions and that they will generate higher returns (Alcock et al., 2013). If banks decide to offer only 50% instead of 70% LTV, many investors will not be able to maintain their return targets.

I6: We used to conduct deals for 300 million with 15 million equity in it. That’s over. Of course, if you put in more equity, the return automatically suffers in percentage terms. [...] You have to get a feeling that we are planning realistically in terms of loan amounts, loan conditions, maturities, etc.

I12: The main difference is whether you get an LTV of 55 or 70 percent.

I13: But that makes it difficult to start something new. And in the value-add office sector you certainly get 10 percent less leverage. Earlier, you might have been at an LTV of 70, comfortably, now you’re at 60.

I19: We get a lower LTV. If you can borrow less money from the bank, you have to use more equity. That reduces the return, the IRR, because more equity has to be used. This affects almost all market players at the moment.

The second change identified by the participants was concerned with financing conditions. As liquidity costs have increased through the pandemic, banks have passed through higher liquidity costs and often added an additional premium. In fact, according to Jones Lang LaSalle (2020b), debt prices for core and value-add properties have increased by 30 to 60 basis points and 150 to 200 basis points, respectively, as a result of the pandemic. However, the respondents indicated that higher liquidity costs were not as critical to their deal as lower

LTVs. The following statements underline their views on changing real estate financing conditions.

I2: At the moment, financing is actually an issue all over Europe. Liquidity costs have increased. The CDSs of the banks have increased.

I7: It has become a bit more expensive than originally planned. But that was understandable during that time.

I12: Where it gets more difficult is the whole issue of financing conditions. We note a very strong difference between Pfandbriefbanks and banks that finance through their own balance sheet. The conditions of the banks that finance via their own balance sheet are on average 100 basis points different from those of the Pfandbriefbanks. We notice that very clearly.

I13: And the margins have certainly moved up 50 basis points, depending on the quality.

I14: We saw an increase in liquidity costs on the financing side. Interest rates in some markets went up by 100 basis points over a few weeks. That's now come down a lot to pre covid levels. In certain markets, we're even seeing all-in rates lower than they used to be before Covid-19.

I19: In the last six months we have already seen a clear signal that financing prices were a bit higher - not very much, but still a significant premium.

Third, the degree of change in financing conditions differed between risk types. Most respondents did not see any significant changes in financing interest from the banks for core properties with long-term contracts and high-quality tenants. However, properties with lower quality, a less central location or other drawbacks were significantly more challenging to finance. “The gap between the financing feasibility of high-quality properties and all other properties is definitely widening, and financing for the latter has become almost impossible at times” (I17).

I11, an investor who often acquires properties without any leverage, noted, “being an all-equity buyer was certainly not such a big competitive advantage before the pandemic. Now, it might be a competitive advantage”. In turn, this implied that obtaining suitable debt financing was extremely difficult for investors with high leverage requirements. I6, I9 and I10 noted that they used to bridge the purchase price with their own equity and obtain debt after acquiring the property. As an effect of the Covid-19 pandemic, both said that they would not take the risk of not having debt financing available at the time of signing the purchase agreement.

I5: The higher the vacancy rate, the more difficult the location, the more difficult the property, the more difficult it is to obtain financing. In other words, risk factors are being categorised and priced higher again by banks than they were a year ago.

I16: The problems are not brand-new, fully let properties. But anything where work has to be done and where there is a certain risk that certain issues can also go wrong, there are financing problems.

I19: A year ago, almost everything worked. Today, for high-quality properties, it is still possible at the same conditions or better. But, for the worse half of the market in combination with worse types of use, like retail in general, it is disproportionately more difficult to obtain financing or refinancing by the bank. [...] You have to have the question answered before you buy the property. You can't rely on it working out – the business plan is now more dependent on the ability to get the financing, especially with more aggressive investment style transactions.

I15: Super core stuff still works and we receive good terms. We've just bought a property for which we're closing terms right now that are great – we didn't expect that at all.

I19: Yes, there are more difficulties on the market.

I21: What can be seen is that there is also a divergence between super-safe core properties and B properties. [...] Either you have a very good property, then the price is significantly higher, like before Corona, or you have a bad property, then they are hardly sellable anymore. And it's similar with the financing, which is still very good for high-quality buildings, but for bad properties, it is almost no longer possible. [...] It is difficult, extremely difficult to get financing.

In this context, several respondents pointed out that their excellent relationships with banks were advantageous during the pandemic. With good, long-term relationships with banks, several respondents reported that they profited from good financing conditions, even in spite of the pandemic. One respondent (I12) said that they were especially pleased about their real estate debt finance department in the pandemic, which arranged for financing due to their good relationships with financiers.

I12: Then, the banks are approached for the financing indication. We have a financing department that does that. We are very grateful for this team, especially nowadays.

I22: Only a single bank would finance it because we have a very good relationship with the bank. That was a deal that we priced quite high, with quite a lot of risk.

4.3.1.3 Excursus: Impact on Other Asset Classes




While this dissertation focuses on office properties, some participants revealed interesting views on the impact of the Covid-19 pandemic on other asset classes, which I briefly discuss in this section.


In line with market reports from well-known consultancies and real estate market researchers (CBRE, 2021b; DZ Hyp, 2020; Savills Research, 2020), the respondents suggested that retail will be less sought-after, as many people have purchased most goods online. The respondents

identified logistics as one of the pandemic’s key winners, also resulting from the increased relevance of online shopping. Their views on hotels varied: on one hand, they recognised that purchasing hotels in the Covid-19 pandemic was difficult because most senior lenders refused to provide loans, and due to the complexity of forecasting post-pandemic (business) travel. On the other, they saw the potential in this asset class to profit from significant price reductions in combination with the eventual recovery of the travel industry.

Although multi-family housing or residential assets were sought-after in the pandemic (CBRE, 2021b; Savills Research, 2020), the respondents’ outlook on the attractiveness of this asset class was rather negative. Their reserved attitude towards the asset class mainly resulted from the rental control as well as potential reputational issues arising from a value-add approach involving the cancellation of existing lease agreements, refurbishments and renting the property at better rates. The rental control was introduced in parts of Germany in 2015 and specifies the maximum increase of rental rates for apartments, which has driven many participants out of the market (Deschermeier, Haas, Hude, & Voigtländer, 2014). Table 34 illustrates the respondents’ views on the respective asset classes.

Table 34: Expected Impact of Covid-19 on Other Asset Classes

Asset Class	Expected Impact on Investor Interest	Corresponding Statements
Retail		<p><i>I6: I used to be a big fan of retail. We have done a lot of retail. Great deals - but today: Don't touch it.</i></p> <p><i>I20: Retail is very difficult at the moment.</i></p> <p><i>I21: And apart from that, this issue of retail, e-commerce retail, already existed before Corona, but has now of course become much more acute.</i></p>
Hotel		<p><i>I6: I find hotels super exciting. One of my favourite asset classes apart from office. The difference between hotel and retail - hotel will recover, but only in the medium term.</i></p> <p><i>I14: Under the current circumstances, we are observing the hotel sector because I think there could be some significant price corrections. I don't think prices have moved enough for certain asset classes, particularly hotels.</i></p> <p><i>I19: Hotels are a big loser in Germany. For continental Europe, Germany is the hub for trade fairs, very customer-oriented from a business point of view. These business customers will travel less due to the economic and structural situation.</i></p>
Residential		<p><i>I6: Housing is one of the things that I see as a bit difficult in perspective.</i></p> <p><i>I13: We have only looked at housing very selectively. But we have a hard time with that. There are already some political risks in Germany and also from the reputation in the press, so I think the Bild newspaper</i></p>

		<p><i>will be very pleased.</i></p> <p><i>I17: Prices will likely rise, but the problem with the residential asset class in the medium term are rental price brakes and reputation problems, so we won't invest in this asset class.</i></p> <p><i>I21: Residential will also function differently.</i></p>
Logistics		<p><i>I8: We still see it as a stable investment and logistics is indeed a new addition to our investment spectrum.</i></p> <p><i>I19: My view on logistics is positive, especially for Germany.</i></p> <p><i>I20: No one goes shopping anymore – they order online. Logistics is becoming even more relevant than before.</i></p> <p><i>I21: Logistics has gained further momentum as an asset class. There are no game-changers, it has simply accelerated.</i></p>

Source: own presentation

4.3.2 Information Availability and Sources

Another interesting topic that was discussed in the interviews was the change in information availability in the German real estate market. Research from Schulte et al. (2005) indicated that data transparency in German real estate has significantly improved since the 1990s. Their research revealed that while only a few broker reports were available in the late twentieth century, by 2005, most brokers and banks published market reports.

The respondents explained that information availability has been improving significantly since then. In their view, the real estate sector underwent a process of “professionalisation” (I21). Thus, much more information is available compared to a few years earlier. This also led to the respondents being able to base their decisions on more solid data. As a result, respondents premised their decisions on both intuition and actual figures. However, the participants also noted that data availability still lacks compared to other sectors. This is in consonance with findings from Vornholz (2017), who mentioned heterogeneity and the location dependency of the assets as reasons for the insufficient data transparency in Germany.

I5: I would definitely say the industry has become more professional. It's still not comparable to other industries in terms of data and analysis tools. But today you can get research material much more quickly, e.g. comparables, which are provided by brokers. That has become more professional. The whole issue of value-add investments used to be more of a discipline for a few exceptional market players. That has also increased significantly. But at the end of the day, no, investing is not that different today compared to 20 years ago.

I12: Databases and overviews enable us to underline our decisions with data. It also helps to prove individual comparables.

I13: It is already a bit more transparent. In the past, if you wanted to, you could find information out or somehow estimate relevant figures for the buildings.

I14: Sometimes information which comes from a database, is not always available yet.

I21: It may still seem far away because if you compare it with financial products, where all the figures, ratios, Sharpe ratios, betas, everything is known, real estate is still lagging behind. And it's getting better, but it's not getting as much better as you'd like it to. Especially in Germany.

Information availability in Germany was considerably worse than in other countries, which was also underlined by Vornholz (2017) and Schulte et al. (2005). For instance, the respondents mentioned databases in the UK and the US, which cover most of the real estate market and are used to obtain market information and comparables. Compared to this, many firms in Germany still do not disclose deal information. To give an example, as mentioned in Section 4.2.7.2, out of more than 400 transactions in the German real estate office market captured in the database RCA (2021d), less than half published the purchase price, and only 10% provided information on the NIY. This database also gives no insight into the availability of green certificates.

In comparison, the largest publicly available real estate database of the US, CoStar, comprises more extensive descriptive information, including potential LEED certificates, covering 2 million real estate properties (Fuerst, Kontokosta, & McAllister, 2014). In this context, the participants depicted that the German real estate market still significantly lacks international data coverage. According to I15, this results from higher data protection laws in Germany. The difference in data availability was also addressed in Chapter 2 of this thesis.

I15: A good database would certainly be great. But I think that in Germany it's always difficult because of data protection, confidentiality. In England, for example, you can get the information directly. In Germany, nothing, unless you get it through a broker.

In the context of a lack of data transparency, the participants discussed from which source they obtained information on real estate transactions. They mentioned three sources: first, most respondents conducted their own research to the extent that this was possible. For instance, they searched for comparable deals via RCA (2021a) or other internet sources.

I12: I believe that the industry is already developing in this direction. At some point, you might also find rental comparables via certain databases.

Second, the majority of respondents received additional insights into the real estate market from their brokers. The respondents revealed that large brokerage firms in Germany usually provide information on market transactions which is both public and non-public. They also

noted that large real estate consultancies tend to exchange non-public information on specific transactions for their own databases. Thus, most respondents considered non-public and public evidence from German brokers as reliable sources of information.

I13: In fact, we usually go to brokers, typically the seller's broker, plus maybe we get someone on the buy-side. But then we can really make sure that we know the competition and the comparable vacancies and the comparable deals and investments. We already have a relatively quantitative mindset, but we are hungry for data. And we make sure that we get the information.

I14: We know the market well and we rely on our professional advisors to deliver us comparable information. [...] The local professional agent can give you the exact sort of terms of the deal, which aren't necessarily available to the wider public.

Third, some interviewees also used their own database, consisting of non-public transaction data and information revealed through their network. A few respondents also indicated that they have their own research department, providing them with information about market developments and comparables. *I18* pointed out that their internal research team often conducts more conservative assumptions compared to external brokers. Research from Reddy (2012) indicates that fund managers put a significance score of 5 out of 5 on the advice of the internal investment team, while external advice was only rated with an importance score of 4.

I14: But we also have an in-house research department that is independent of us, and produces comparables, rent comparables and investment comparables.

I18: In the last crisis we created our own research team, which is also very much involved in the process. They have always looked at the trends in the market more long-term and have been a bit more cautious. If you compare that with the guidance from brokers, we were always much more conservative.

4.3.3 General Trends in the Real Estate Industry

The participants mentioned three major trends which they have identified over the past few years. First, they recognised the increased relevance of ESG factors for real estate investors – one of the main concerns of this thesis. With increased regulations in place and significant growth in sustainability awareness, several respondents concurred with this statement: “this is not a short-term thing – it's a long-term trend which will change the industry” (*I8*). I extensively discussed ESG criteria in Section 4.2.6.

I3: Yes, there are two issues – the first is green, and the second is sustainability. These are the big topics for offices of the future.

I19: ESG factors are a structural change and at the same time a trend. The structural change is here to stay and there is no stopping it, while the trend is becoming a reality. A trend for me means that in a way it is "in" before it is real. But the structural change is unstoppable because it is also driven by the regulation of capital.

I14: I see two big changes. First of all, as you mentioned, environmental certification, that's very high on the priority list for us. More than it has been five years ago. That's just the way it is industry-wide.

I17: ESG is the main trend I see in the industry.

Second, the respondents noted the increased relevance of digitalisation and technological advances and their role in improving data transparency. As discussed in Section 4.3.2, the respondents noted that there is much more information available today compared to a few years ago. Databases are better informed and real estate data is more transparent. This enhances machine learning but also enables decision-makers to make more informed decisions (*I17*). In relation to this, the respondents noted that it is easier to assess sustainability benchmarks and energy efficiency figures of buildings today. *I8* pointed out that they regard “digitalisation as an enabler, as a tool for reaching climate neutrality”. In line with this statement, research from Ionasçu and Anghel (2020) underlined the significance of technological advances in transforming the real estate industry to become more sustainable.

Using this improved data availability in the form of artificial intelligence has been identified as “a real game changer” in academic literature (Cajias, 2020). Cajias (2020) and the participants mentioned two channels through which the significance of artificial intelligence became prevalent. On one hand, artificial intelligence transforms the property acquisition process. Machines can learn to identify the right property based on specific parameters, such as location or quality, or to forecast market developments. Investment decision-makers can rely on machines to assist them with the acquisition decision. However, as *I17* noted, “artificial intelligence will not replace us as decision-makers. My intuition and views still play a major role in the decision”.

In addition to supporting their decision-making process, the respondents also noted the increasing use of technological advances among brokers: another improvement of the acquisition process was related to property site visits. *I16* pointed out that most properties can be visited online with the help of high-class videos instead of in-person site visits.

I16: The broker or advisor landscape has certainly become more professional. For instance, now brokers offer a virtual tour through the building in order to save the classic site visits for most sale processes. Innovation is a relevant topic now.

On the other hand, the participants regarded artificial intelligence as an enabler for improving tenant satisfaction, “enhancing the user experience” (I11). For example, property owners now have the option to analyse and use mobile phone data, track energy usage and air quality (Cajias, 2020). Several respondents reported using these advanced techniques. They mentioned that properties should be intelligent and make use of technological advances to become greener and better. As I20 pointed out, “Everyone is trying to develop the smart, digitalised property right now. We are too“.

The respondents also noted that digitalisation is a trend that is not unique to the real estate industry but is apparent across several sectors. In fact, they felt that real estate lagged behind the technological advances of other sectors: “I would say that the car industry is certainly quantum leaps ahead today than it was 20 years ago – this is not comparable to our industry. But we are getting there” (I15).

I13: The sector is perhaps a little slower because there is probably less pressure to innovate than in the tech or IT sector. And anyone who has had a property in a good location in recent years could have managed it very poorly, but still have achieved an increase in value. And that’s why there hasn’t been as much selection as elsewhere.

I18: AI in relation to investment decisions is very important to us. Just like advanced building technologies (analysing mobile phone data...) – also very relevant.

I20: The real estate industry has been analogue and ‘stupid’ for thousands of years. We still put bricks on top of each other. But it has improved, as you see for example with brokers and how decisions are made.

I have already introduced the term ‘smart office’ within the context of innovative technologies. In fact, smart offices combine both long-term trends identified in my research. The office of the future is smart in the sense that it adapts to the tenants’ requirements, improves their office experience and is energy-efficient (bulwiengesa AG & Baasner Stadtplaner GmbH, 2020; Jia et al., 2018).

I8: Digitalisation in itself is not a value, stand-alone. Instead, it serves to achieve our climate goals. We want to make our buildings smart. We want our buildings to think for themselves.

The first two trends are related to the third: the *social* aspect of ESG factors is increasingly moving into the focus of real estate decision-makers. Therefore, they address the tenants’ needs and degree of satisfaction. Section 4.2.6.1 concerning ESG aspects discussed the

emergence of certificates that deal with the degree of tenant well-being and satisfaction. According to the respondents, this goes hand in hand with the increasing interest in tenants' well-being – a trend that is likely to stay in the German office real estate market. This finding is also in line with the results of the global survey on ESG efforts in real estate from Jones Lang LaSalle (2021a), indicating that European tenants see an improvement of their employees' health and well-being as the primary driver in their attempts of increasing their ESG standards.

I18: This feel-good factor, the health aspect is also becoming more important – not only for offices but also residential buildings. I really believe that this makes a difference.

I21: This topic is becoming increasingly important. The users will decide what is a good property, not the investors.

4.3.4 The Investment Decision-Making Process

At the end of each interview, I inquired about the respondents' investment decision-making processes. The investment decision processes were relatively similar for most participants, with only a few differences. The majority of respondents were part or head of the transaction or investment team, which screens investment opportunities and decides which opportunities might be attractive. Afterwards, the responsible investment manager creates an overview of the property, “a one-pager illustrating the key facts with locations and pictures, very high level” (I14). After discussing the investment opportunity in more detail, the respondents continue to “produce a more comprehensive assessment of the investment, including tenants, locations, but also a business plan which we then check with all the various departments internally, financing, structuring, tax, asset management” (I14).

At this point, some respondents pointed out that they required a first committee approval to invest the due diligence budget to conduct an in-depth analysis of the property and its environment and create the business plan. Others did not require authorisation to invest up to a certain amount into their due diligence, “which fastens the ultimate decision and sometimes even provides a competitive advantage” (I17).

Several respondents noted the value of including asset management colleagues in the investment decision-making process, as they were responsible for conducting realistic and feasible rent assumptions and implementing them. Some respondents with smaller teams covered both investment management and asset management. In the final step, the ultimate acquisition decision was dependent on a vote from an investment committee. This committee

is responsible for ensuring that ethical regulations and the company's investment guidelines are met (Bailey & Richards, 2017). It often consisted of company shareholders (for respondents working at a privately-owned company), fund managers or members of the management board, depending on the type of company. This is in line with findings from Reddy (2012), who noted that the investment committee usually consisted of between four and 12 people. The timing of the committee's involvement varied – while some respondents included the committee “within one week of knowing of the deal” (I13), others present the deal to them at a later stage in the process (for instance, I8 and I11).

The following statements illustrate the respondents' investment processes.

I2: The involvement of the investment committee is very high, but we only have a final committee meeting two or three days before the signing. Everyone is already briefed by then.

I5: When we enter into exclusivity and trigger the due diligence budget, we always have the green light from the investment committee. They then approve - provided that the due diligence, for which they approve a budget, does not show any red flags.

I8: We have different stages in the purchasing process. The first stage is a fact sheet, where we present the properties, the deal, the opportunity, to the committee.

I10: We prepare the teaser, and there is a call with the colleagues on a daily basis. We don't need a release for the due diligence budget, we have a certain amount always approved.

I11: First you start with a strategy fit. Then there is usually an initial profitability calculation, based on standard assumptions and our own experience. And if the profitability is still right, then you start to involve other departments at an early stage, including asset management. [...] Then you reach a point where you get a 'licence to hunt', as we call the due diligence budget approval internally.

I14: Typically, it starts with the investment manager responsible for the respective market.

I18: The next step is a weekly call at the global level, where everyone from the investment committee is involved. That means that if we say the deal is exciting, they will have heard about it within a week, at the latest.

I21: The first analysis is done in the transaction management team. Does it fit into an existing fund? [...] Then asset managers come in. Our property and asset managers are managing directors of the individual companies holding the properties. They sign off that they approve this rent or price, and that they can rent out the empty spaces.

4.4 Responses to First Interview Question

As depicted in Section 3.7, the first interview question after the introduction was similar for every participant. I prepared for each interview by researching recent office acquisition deals in Germany conducted by the firm (and person, if possible). After the introduction phase, I

started the interview with “Tell me about this specific deal” or slight variations of this phrase. This approach enabled me to obtain insights into the most prevalent attributes without biasing their responses by hinting towards specific attributes. While importance scores measured their actual preference in Research Phase 2, the respondents’ prompt answers indicated their most prevalent purchase criteria for this specific property.

In order to assess their responses relative to the ten attributes presented in this chapter, I used the Matrix Coding Query of NVivo. This enabled me to compare the first three attributes mentioned by the respondents across the set of participants. Table 35 shows the responses to the first interview question by order of response.

Of 22 participants, 12 mentioned criteria belonging to the *area usage, tenant(s), location within submarket* or *quantitative evaluation, return* attributes as their first response to the question. The attributes *quantitative evaluation, return* and *area usage, tenant(s)* were mentioned most often among the first three participant responses to the first question.

Interestingly, attributes related to ESG were only mentioned once among the first three employee responses. The following statement exemplifies this: “We had already looked at it a year earlier in an off-market constellation because we had already had a lot to do with the seller. [...] We believe in the location because [C] was booming – steadily increasing number of inhabitants, good university, many young people. [...] And of course, it was also a risk-return profile where we felt comfortable" (I20). Thus, the response from I20 indicates that *deal access, relationship to seller, economic, financial environment* and *quantitative evaluation, return* as first, second and third attributes, respectively.

Table 35: Responses to First Question

Attribute	First attribute	Second attribute	Third attribute	Total
Economic, Financial Environment	1	1	1	3
Letting, Transaction Market Environment, Pipeline	1	4	2	7
Area Usage, Tenant(s)	4	4	3	11
Deal Access, Relationship to Seller	2	1	1	4
ESG Criteria	0	0	1	1
Leasing, Transaction Comparables	1	1	2	4
Location within Submarket	4	3	2	9
Personal Judgement, Experience	3	2	2	7
Property Quality, Features	2	1	5	8

Quantitative Evaluation, Return	4	5	3	12
Total	22	22	22	

Source: own presentation

4.5 Assessment of Interview Findings Compared to Literature

This section deals with the classification of the results considering existing literature on this topic. While most relevant research findings were mentioned in each respective section, I aim to provide an overview of the most pertinent concurrences and discrepancies compared to previous studies on this topic.

As mentioned before, my research is the first to thoroughly assess the role of ESG criteria for real estate investment decisions and to explore real estate decision-making in Germany. Nonetheless, several previous researchers have attempted to study real estate investment decisions, although their focus varied. For example, Roulac (2000) concentrated on due diligence processes and De Wit (1996) and Pfnür and Armonat (2001) on portfolio planning, as introduced in Chapter 2. None of these studies aimed to develop a real estate decision-making model based on the MAU theory. Most studies did not focus on German decision-makers. Furthermore, most studies were conducted several years ago, and – as confirmed by the research participants – the real estate industry has changed in the meantime. To add to this, my study is the first to differentiate between the decision-making process for core and value-add investors.

Several attributes identified in this research have been mentioned by the majority of previous researchers as well. For instance, economic and financial environment, rental income and return analysis, location and tenant quality were included by most previous researchers (Armonat & Pfnür, 2004; Gallimore & Gray, 2002; Ginevičius & Zubrecovas, 2009; Hutcheson & Newell, 2016; Jackson & Orr, 2011; Reddy, 2012; Roulac, 2000). Another topic that has attracted the interest of previous researchers was personal judgement or the decision-maker's 'gut-feeling' (Gallimore & Gray, 2002; Reddy, 2012; Roulac, 2000).

However, a few subjects were only scarcely or not at all addressed by previous studies. First, ESG factors were the main topic of this research. While no respondent was informed about this specific focus of my research until after the interviews in order to avoid potential response bias, all respondents were aware of ESG criteria in general and acknowledged the rising relevance of green criteria in real estate. However, out of the above-mentioned studies,

only Jackson and Orr (2011) addressed the BREEAM certificate in their investment decision-making analysis. This shows that sustainability has only emerged as a relevant topic in the past decade. In addition, my research revealed that the relationship to the seller and (special) access to the deal was an important attribute for investment decision-makers in Germany. With some exceptions, this attribute was not addressed by earlier studies.

Moreover, one topic was highly prevalent in every interview in my First Research Phase – the Covid-19 pandemic. Due to the timing of the interviews, the pandemic was a predominant factor in my research, and my study is the first to produce first-hand insights related to the impact of the pandemic to this degree.

On the contrary, there were also a few findings in the literature, which the respondents did not mention in my research. This indicates that these aspects are not relevant to them, which might be due to industry-wide changes or market specifics in Germany. For instance, several researchers have included rent clauses, including indexation and next rent review dates, as a relevant attribute to their studies (Jackson & Orr, 2011; Roulac, 2000). While current and expected future rental income were very important for the respondent's assessments, the rent clauses were not discussed. In addition, the degree of computer usage was largely addressed by researchers in the 1980s and 1990s (Page, 1983; Webb, 1984; Webb & McIntosh, 1986; Wiley, 1976) – today, it is evident that all investment decision-makers work electronically.

At this point, it is worthwhile to point out that, compared to previous literature, methodologies widely varied, often with pre-defined sets of survey responses. For instance, Hutcheson and Newell (2016) used AHP to assess investment allocation decisions, with attributes including core to opportunistic and personal judgement to industry peer comparison. This process resulted in identifying *risk adjusted* as the most important factor, followed by *direct property* and *core*, without accounting for multiple factors impacting a real estate investment decision. Similarly, most other researchers did not explore multi-faceted real estate investment decisions but instead constructed relevance rankings of isolated attributes impacting the decision.

4.6 Word Cloud Analysis

Before summarising the interview findings discussed in Chapter 4, I present a word cloud of my interview results generated by NVivo in Figure 34. A word cloud visualises the 100 most-often used words, excluding fill words, in the form of a cloud, thereby providing “an

intuitive and visually appealing overview of a text” (Heimerl, Lohmann, Lange, & Ertl, 2014, p. 1833). The size of the words indicates the frequency of their use. Thus, a word cloud helps obtain an overview of the most frequently used words, or validates the findings based on a brief textual analysis. In the following, I attempt to do the latter.

As 21 of 22 interviews were conducted in German with German transcripts, the word cloud output is German, too. In order to enhance the usability of the output, I translated the German word cloud into English. Some most-often used words are phrases resulting from the general topic of my research concerning decision-making expertise from German office investors and investment managers – including ‘Deutschland’ (Germany), ‘Immobilie’ and ‘Gebäude’ (both words for property or building), ‘Investoren’ (investors), ‘wichtig’ (important) and ‘buy’ (acquire).

Apart from this, Corona (Covid-19) was mentioned frequently, underlining that the pandemic was highly prevalent at the time of the interviews. Other often-used words were ‘Markt’ (market), ‘Banken’ (banks) and ‘Mieter’ (tenant) – all of which were relevant terms discussed in this chapter. ‘Nachhaltigkeit’ (sustainability), ‘ESG’ and ‘Zertifizierung’ / ‘Zertifikat’ (certification) were also among the most frequently mentioned words. Similarly, the terms ‘Bauchgefühl’ (gut-feeling) and ‘Gefühl’ (feeling) can be found in the word cloud. The participants also used the phrases ‘Leerstand’ (vacancy), ‘Qualität’ (quality), ‘return’ and ‘Lagen’ (location).

All in all, the word cloud shows that large parts of the content of this chapter were among the 100 most frequently-used words. Although the translation issue between German and English complicates direct comparisons to the ten attribute terms, the word cloud illustrates that the attribute terms were appropriate and reflect most of the most-often discussed terms in the interviews.

My explorative research approach revealed that real estate decision-makers attempt to forecast developments in rent and prices as precisely as possible. Their investment decisions are dependent on both regional analyses and an assessment of comparable properties in the submarket. Furthermore, property quality and features and the return evaluation play an essential role in real estate investment decisions. All these factors were addressed by previous research on this topic, too. However, my study also revealed several new findings: first, the participants regard ESG criteria as a topic that increases in relevance, but do not consider green certificates as a value driver or as a prerequisite in the German office market. This contrasts with previous studies discussed in Section 2.5. Second, the relationship to the seller and special deal access was widely discussed among the participants, which was not addressed in academic literature so far. Third, my study was conducted in the second half of 2020, a time that was significantly impacted by the Covid-19 pandemic. Chapter 4 also addressed changes for the German office market resulting from the pandemic.

In the two final sections, I confirmed the relevance of the derived attributes with an analysis of the first terms mentioned after starting each interview with a question about a specific transaction in the German office market concluded previously by the respondent's firm. Moreover, a word cloud analysis underlined the relevance of the derived terms. To summarise, Chapter 4 presents the results which led to fulfilling Research Objective 1, "To explore attributes that describe real estate investment decisions in the German office market" as well as to Research Objective 2, "To derive the attributes that describe real estate investment decisions."

5. Research Findings: Research Phase 2 and the MAU Model

5.1 Introduction

This chapter deals with the results of Research Phase 2. The Second Research Phase was concerned with the development of the OffIn-MAU model. To devise the model, I sent the set of attributes to the participants via email and asked them to assign importance scores to each attribute. A crucial assumption to enable unbiased responses is the need to avoid over-defining the terms in this step of the process by encouraging the respondents to rely on their personal views on the respective attribute. Because Research Phase 1 indicated differences between core and value-add investment types, I decided to distinguish between core and value-add transactions.

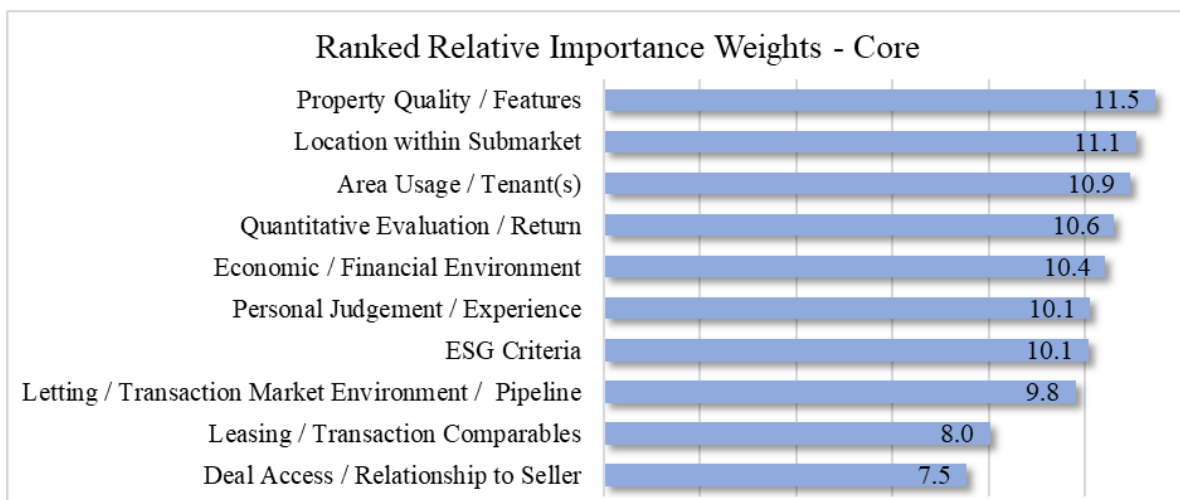
This chapter presents an overview of the feedback from the respondents. Nineteen participants evaluated each of the attributes and assigned an importance score between 0 and 100 for each attribute, with 0 implying ‘not attractive’ and 100 implying ‘very attractive’. These attribute scores were weighted relative to the total sum of points allocated by the respondent to derive importance weights. I then used the average of the importance weights of all participants as a weighing basis in the OffIn-MAU model.

In the first section, I present the relative importance weights for core properties, followed by an analysis of the results for the value-add risk class. Both sections discuss the aggregated relative importance weights of the ten attributes and the ranges of the respondents’ individual importance weights. The following section compares results for core and value-add investments. Afterwards, I discuss the importance weight results to findings from earlier studies.

In the final section of this chapter, I present the OffIn-MAU model, which enables real estate decision-makers to assess various alternatives at once and thus improves decision-making. Apart from the alternatives and the attribute values, which the decision-maker assigns upon using the model, a primary input factor is the relative importance weights and the attributes derived in the research phases. If the user prefers to use their own attributes or importance weights, the model offers sufficient flexibility to overwrite default values.

5.2 Relative Importance Weights – Core

This section deals with the relative importance weights assigned by the respondents for core investments. I derived the industry importance weight by averaging the importance weights from every respondent. Thus, I reveal the relative importance of the ten attributes identified and validated in Research Phase 1 by averaging investment decision-makers' expert opinions. Figure 35 provides an overview of the importance scores, ranked from most to least important. The results are presented in percentage points and not as decimal numbers to increase the graph's readability.



Source: own presentation

Figure 35: Ranked Relative Importance Weights – Core

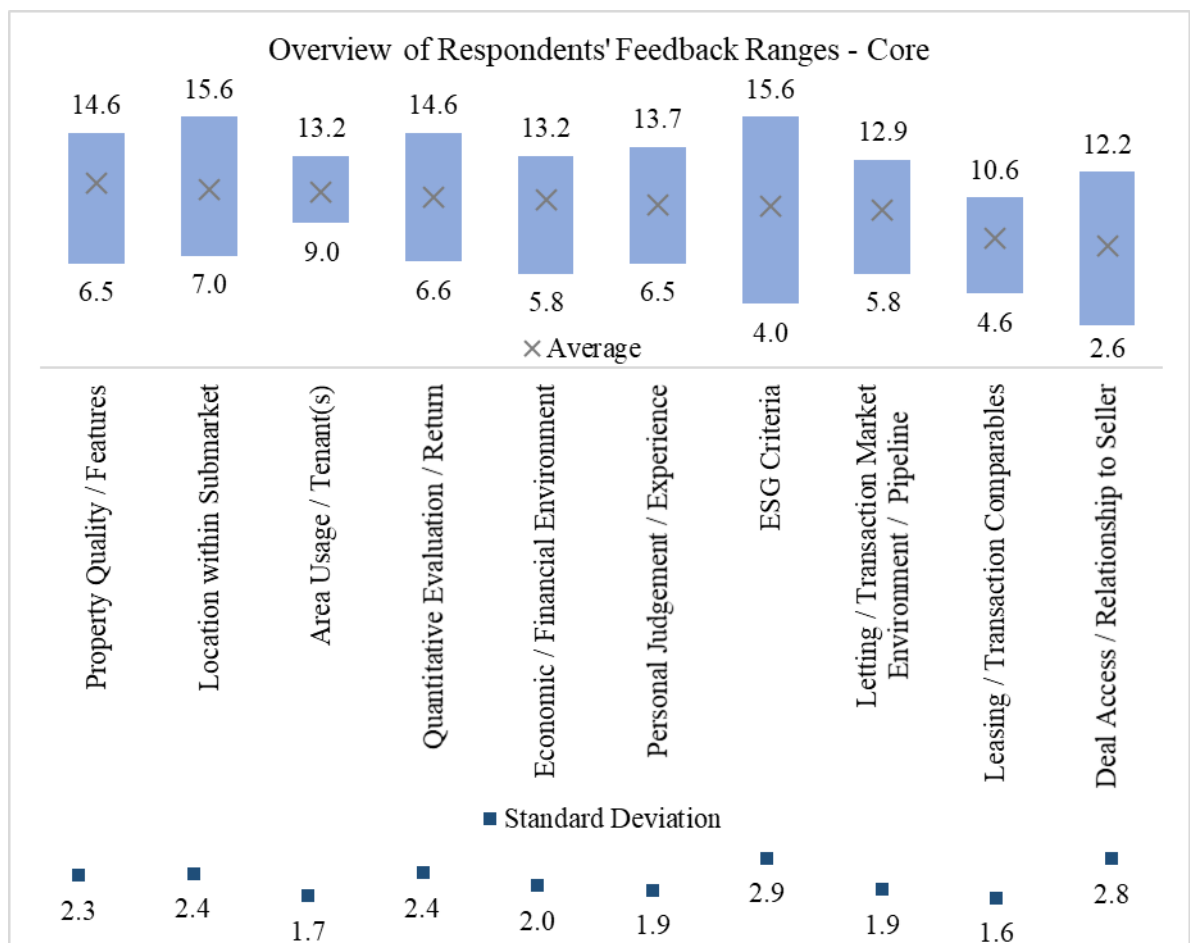
The maximum ranking is 11.5; the minimum is 7.5 percentage points. This indicates that the attributes were all useful to describe the investment decision. If all attributes were equally important, the importance weight would amount to 10. Only three attributes are below this average value. *Deal access / relationship to seller* and *leasing / transaction comparables* were ranked lowest with weights of around 8. This implies that, for investment decisions concerning core properties, decision-makers consider access to the deal and seller, as well as a comparables analysis relatively unimportant.

On the contrary, the participants considered *property quality / features* as most important, followed by *location within submarket* and *area usage / tenant(s)* – all of these attributes received an average weight of 11. Interestingly, *ESG criteria* ranked sixth out of the ten attributes. With a rating of just over 10, the respondents considered this attribute of average importance for core investments. Given the respondents' focus on quantitative evaluation as a deal driver or deal-breaker, what was discussed in Section 4.2.11, the average score of 10.6

for *quantitative evaluation / return* surprised me by being lower than what I had expected from the interviews.

Figure 36 presents the ranges of the relative importance weight from the respondents, sorted by average weight score, and the standard deviation of the participants' responses. All attributes were rated between 3 and 16 percentage points. This indicates that no respondent assigned 'extreme' importance scores. For example, no respondent allocated a score of 0 to any attribute, or a score of 100 to one attribute and scores of 5 to the others. The relatively low divergence again underlines the conclusion that the set of attributes is useful for exploring and describing investment decisions.

The importance weight ranges for each participant averaged 7, implying that the best-ranked attribute was on average evaluated 7 ranking points higher than the worst-ranked attribute. This is not surprising amid the different expert opinions and firm policies, which I discussed in Section 4.2.6. The average divergence between the lowest and highest weight scores for a single attribute was 8.



Source: own presentation

Figure 36: Overview of Respondents' Feedback Ranges – Core

Interestingly, despite the relatively low average divergence of respondents' allocated weights, *ESG criteria* was the attribute with the highest variability in importance scores and the highest standard deviation of responses. Consequently, the respondents showed the greatest difference in opinions on environmental measures and how they impact their purchase decision. As mentioned in Section 4.2, I am confident that the general understanding of the term *ESG Criteria* was shared among participants. Therefore, I do not think that the large variability is a result of significant differences in the interpretation of the term itself. Instead, I think that the range of importance weights was a sign of the high variability of the perceived importance of the attribute. Put differently, even in the core asset class, investment managers had such a high divergence in the relative importance of *ESG criteria* that their feedback range amounted to 12 percentage points.

This result also highlights the changing role of ESG factors in commercial investment decisions and I am confident that the same setting would result in a different outcome and potentially a more unified answer in relation to the importance of ESG if repeated in 5 years. Some investment managers considered green certificates as significantly more critical than the average, and even allocated the highest score of the complete set of attributes of 15.6; others were of the opinion that this attribute only has a marginal impact on their investment decisions. All in all, *ESG criteria* is slightly more important than the average.

Another attribute with relatively large divergences in assigned importance scores and a high standard deviation was *deal access / relationship to seller*, ranked overall as least relevant for core investors. The low ranking does not surprise me, as this attribute was most often mentioned by value-add investors who see upside potential by bilateral deal access. On the contrary, based on the findings from the interviews, I expected core investors to conduct on-market transactions more frequently. Nonetheless, Figure 36 shows that a few respondents still assigned above-average importance to this attribute.

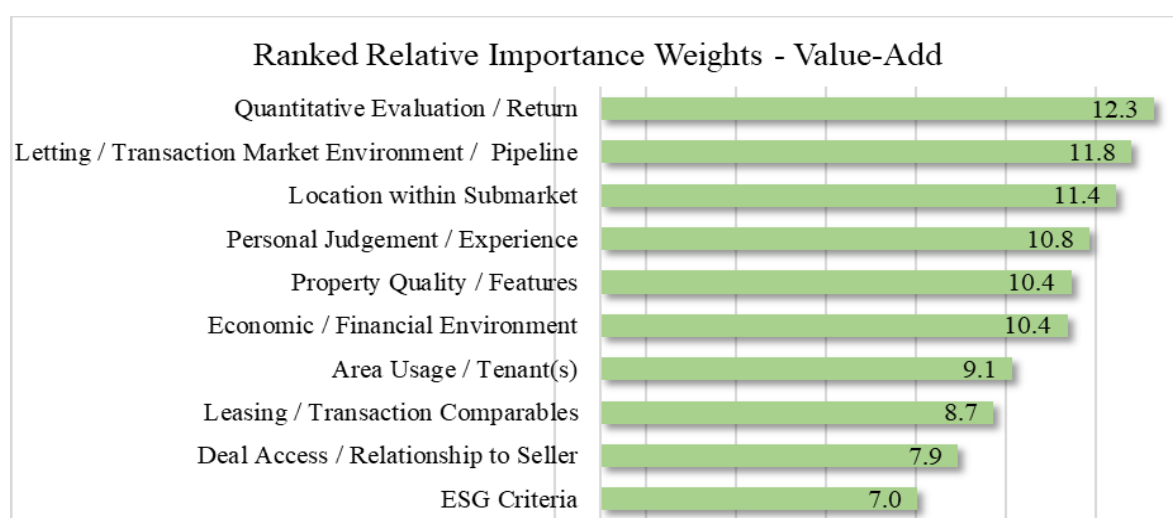
5.3 Relative Importance Weights – Value-Add

This section presents the results from the first step of Research Phase 2. Figure 37 illustrates the average importance weights resulting from the respondents' feedback, with average weights ranging between 7.0 and 12.3 percentage points. The participants considered *quantitative evaluation / return, letting / transaction market environment / pipeline* and

location within submarket as the most relevant attributes with importance scores amounting to more than 11.4.

In contrast, the respondents classified *ESG criteria* as the least relevant attribute. With an importance weight of 7, this attribute was ranked 3 percentage points below average. Given that no value-add firm required investments to be certified or certifiable at acquisition, as discussed in Section 4.5, the relatively low importance decision-makers placed on this attribute is to be expected. *I1* and *I7* also noted the low significance of green certificates for value-add investments and explained this with relatively low holding periods and high costs for the certification schemes. However, because of the high cross-industry attention placed on ESG factors, I did not expect this attribute to be ranked last overall. Furthermore, the significant difference between the average importance weight of *ESG criteria* and *quantitative evaluation / return* confirms the findings from the First Research Phase that the participants do not perceive a strong connection between certifications and a positive effect on returns. Thus, the participants did not seem to connect a positive impact on the cash flow with green certificates, which is in contrast to the earlier studies presented in Section 2.5.

Similarly, *deal access / relationship to seller, leasing / transaction comparables* and *area usage / tenant(s)* showed average importance weights of less than 10. Furthermore, the low importance experts placed on *deal access / relationship to seller* struck me as interesting as a value-add investor specifically requested that this attribute be included in the set. The interview results indicated that value-add-oriented respondents placed a high degree of importance on this attribute as they were most often introduced to new possibilities via their brokers' and sellers' network.



Source: own presentation

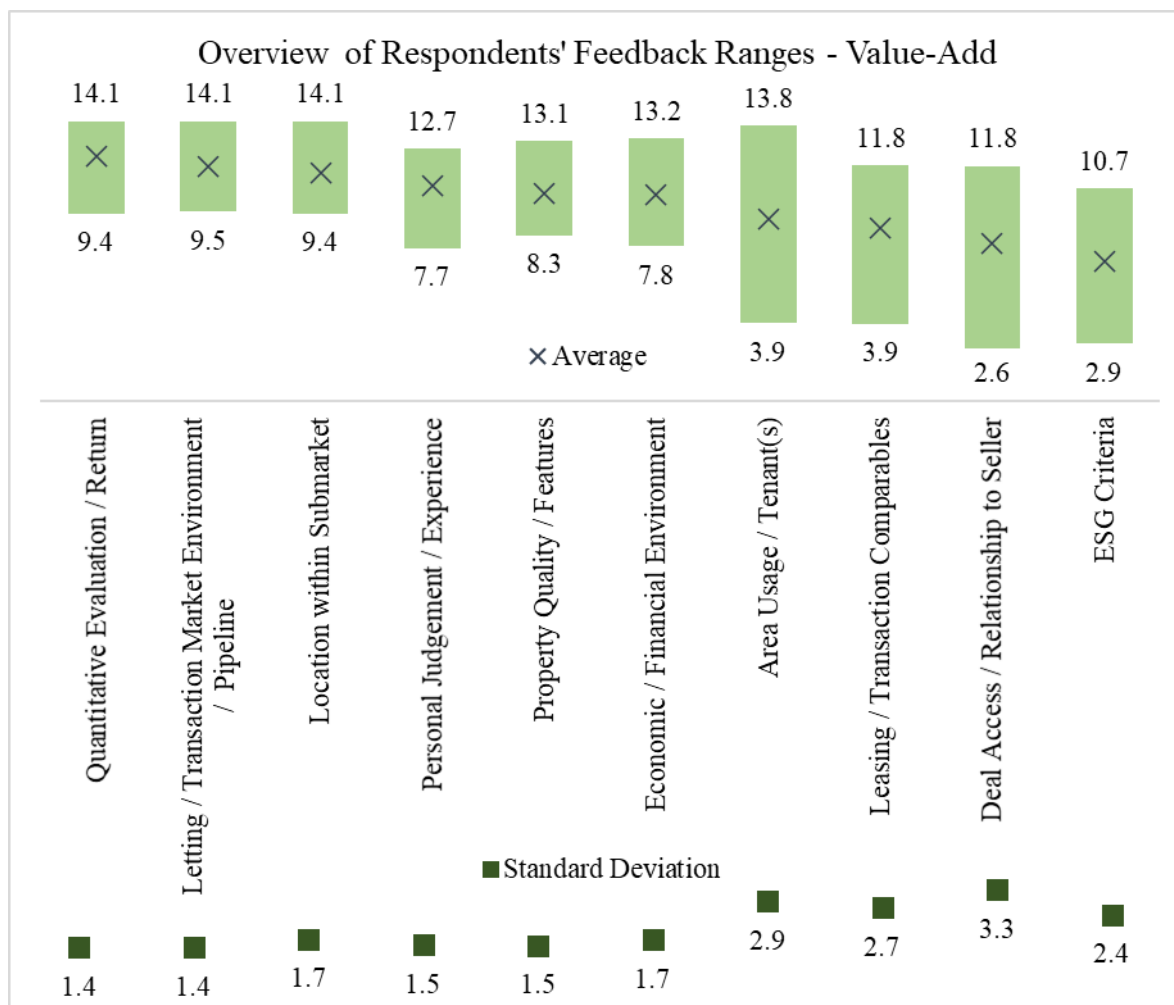
Figure 37: Ranked Relative Importance Weights – Value-Add

Moreover, Figure 38 shows the ranges of the respondents' individual importance weights assigned to every attribute as percentage points as well as the standard deviation of their responses. The maximum weight allocated to an attribute was 14.1 percentage points; the minimum was 2.6. Similar to the results described in the previous section on core properties, this means that no respondent assigned an importance score of 0 or rated only two or three attributes very high and the others very low. Instead, this result implies that the mix of attributes made sense to the respondents – otherwise, they would have assigned more extreme scores. Nonetheless, while the respondents considered all attributes somewhat important, as confirmed by the results and the findings of Research Phase 1, the degree of importance for the investment decision varied.

The three top attributes, *quantitative evaluation / return*, *letting / transaction market environment / pipeline* and *location within submarket*, received scores ranging from 9 to 14 percentage points and had relatively low standard deviations of below 1.7. Thus, the divergence in the results is only marginal. All participants agreed that these three attributes were mostly of above-average importance.

The divergence of scores was significantly higher for attributes with lower average importance scores. For instance, scores for *area usage / tenant(s)* and *deal access / relationship to seller* differed by up to 10 and 9 percentage points, respectively, with standard deviations of 2.9 and 3.3 percentage points. This implies that respondent views on the relative importance of these factors varied more than for the other attributes: this is interesting, as the interviews in Research Phase 1 suggested that the respondents' views on both topics were relatively aligned. The average divergence across the set of attributes was 6 percentage points for value-add investments.

Interestingly, *ESG criteria* did not receive such a high divergence in importance scores from value-add investors compared to core investors. However, the divergence across the set still amounted to almost 8 percentage points: While the lowest importance weight was only 2.9, a few respondents even assigned above-average importance to this attribute. The standard deviation amounted to 2.4 percentage points, the fourth-largest figure among the value-add results. This shows that ESG aspects were also an ambiguous topic in the value-add group, whereas the participants in this group considered this attribute to be of relatively low importance overall.



Source: own presentation

Figure 38: Overview of Respondents' Feedback Ranges – Value-Add

5.4 Comparison of the Results – Core and Value-Add

Following the discussion of the relative importance weight results for core and value-add investments individually in the two previous sections, this section elaborates on the comparison between the results for the two risk types. Figure 39 shows the average importance weights for core and value-add transactions, sorted by the highest to the lowest difference between the two risk types' importance weights.

The results reveal that the *ESG criteria* attribute shows the largest absolute difference between core and value-add indications with more than 3 percentage points. Thus, the low average ranking of *ESG criteria* among the value-add set is in contrast to the findings from the core set, which suggests average importance of ESG factors. Consequently, green certificates and other ESG aspects are considerably more relevant for core investments compared to value-add investments. This is an interesting finding: investment managers

seem to incorporate ESG criteria more into their decisions when they purchase core properties, which are usually located in excellent locations and are often fully let (van der Spek, 2017). Accordingly, so far, I conclude that the emerging topic of ESG factors mainly affects core investments. On the contrary, it was the least relevant attribute for value-add investments. As mentioned previously, this is in line with the discovery that no value-add oriented firm required real estate investments to be green, as discussed in Section 4.2.6.

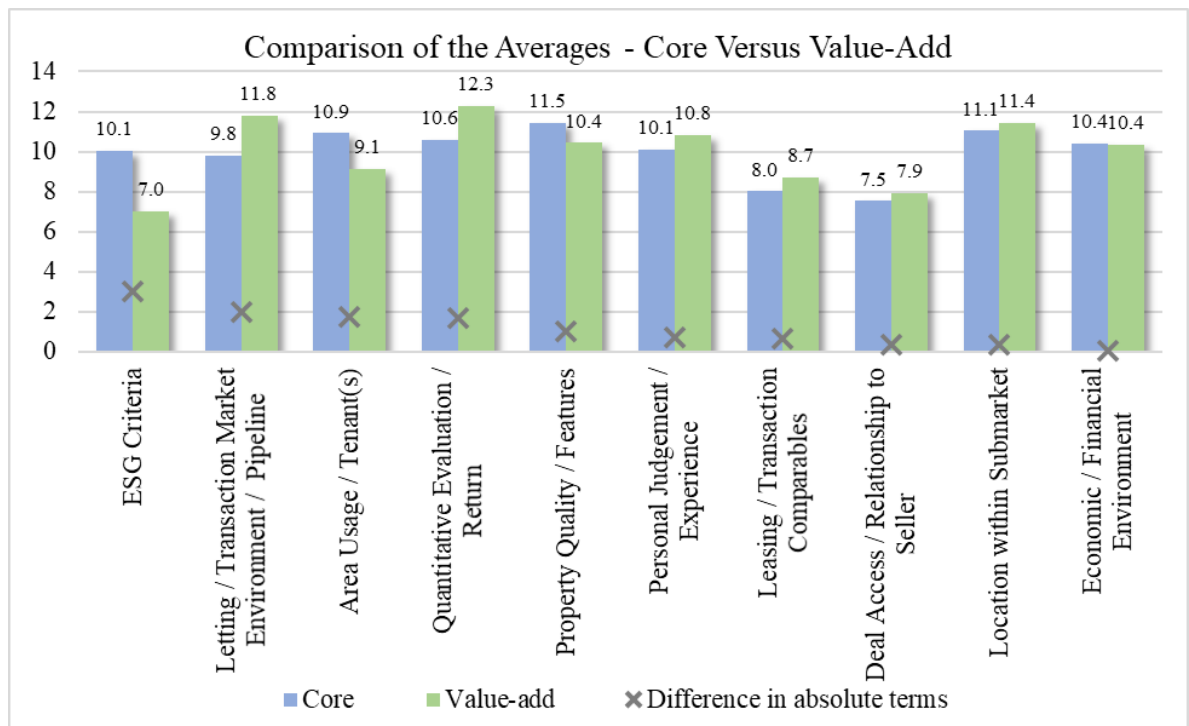
Similarly, *I7* expressed that ESG criteria were considerably less relevant for value-add investments. The respondent explained this with lower holding periods of value-add investments and different price ranges: “It’s just difficult as value-add investors just don’t have the money for something like that. When you buy value-add buildings or assets that have passed through a value-add investor three times, every investor only holds the property for two years. In this case, the whole topic of sustainability has been completely ignored, because you can’t really do anything in two or three years. In a core fund, I’m looking at the long term. And if you depreciate the costs for a green certificate over several years, it’s ok, because it’s a cash-on-cash property and not an IRR property”. *I1* added that “if you express it as a formula, the better the location and the more expensive the rent and the higher the quality of the building, the more important a certification becomes”.

Thus, the high difference between the views from core and value-add investment managers on green certificates became evident in Research Phase 1. Furthermore, Section 4.5 revealed that while several core investors required an existing or prospective green certificate for their office investments, no firm focusing on value-add investments had ESG requirements in place.

The importance weight of *letting / transaction market environment / pipeline* and *quantitative evaluation / return* is almost 2 percentage points higher for value-add properties than for core properties. This makes sense as core investments are, by definition, usually conducted in excellent locations within the CBD. In these areas, the real estate market environment is not as crucial for the decision-maker, as most investors do not expect significant changes in rents and prices. In contrast, for properties located in other areas with higher vacancies, value-add investors assign higher importance to their real estate market development expectations. Similarly, core decision-makers still place a high significance on the financial return, but a core business plan does not reflect as much upside potential as a value-add business plan. Instead, for core investors, the micro-location and property quality

are of higher importance, while *quantitative evaluation / return* is the most crucial attribute for value-add investments.

Against this background, it makes sense that respondents considered a favourable impression of *area usage / tenant(s)* and *property quality / features* to be significantly more critical for core investments. The difference between both risk types is lowest for *economic / financial environment* and *location within submarket*. Both attributes were of above-average importance for investment decisions in core and value-add investment types.



Source: own presentation

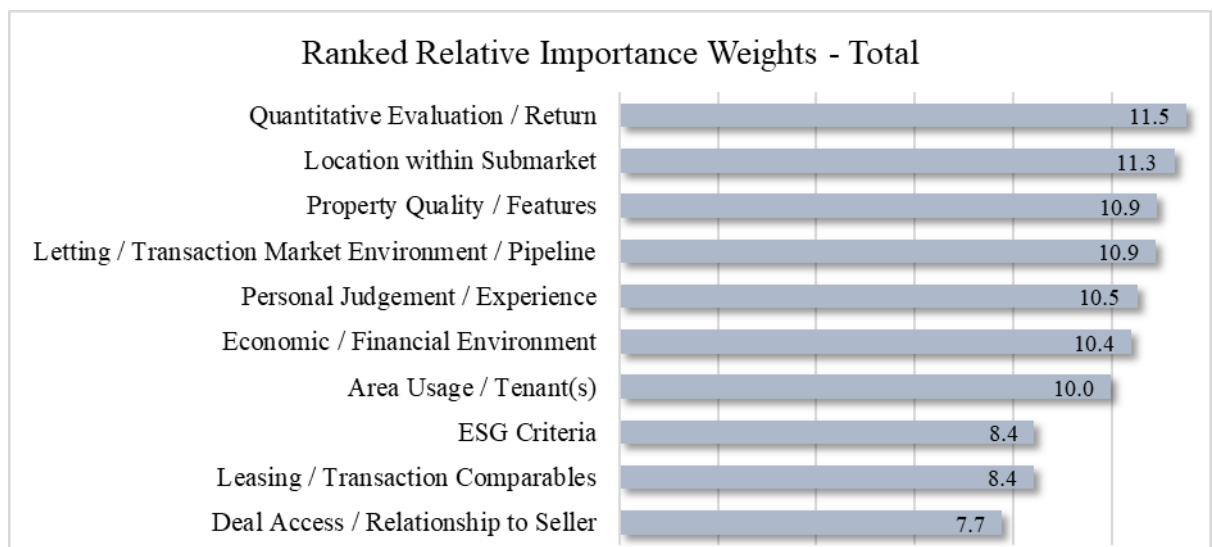
Figure 39: Comparison of the Averages – Core Versus Value-Add

All in all, the above results indicate that it made sense to distinguish between the two types of risk. Several attributes were weighted differently for core and value-add. Thus, I conclude that the OffIn-MAU model best distinguishes between the two asset classes as well in order to create a decision-making model that is as useful as possible.

Figure 40 presents the relative importance weights across all participants, both in the core and the value-add segment. Only three attributes are considered to be of below-average importance for investment decisions. The least relevant attribute with a total rating of 7.7 percentage points is *deal access / relationship to seller*. *Leasing / transaction comparables* is marginally less relevant than *ESG criteria*, which ranks seventh out of the set of ten attributes. Thus, although the latter attribute is ranked tenth in the value-add risk class, the

overall importance of ESG factors is still only 1.6 percentage points below average across the ten attributes.

Overall, the most relevant attribute is *quantitative evaluation / return*. The high importance weight is not surprising because it is their job to make money with their investments. In the long run, no investment manager who does not generate a return would last in the job. The respondents underline this finding as they pointed out that “in the end, it’s about how much money you earn” (I15) and “return is the most important criterion” (I17).



Source: own presentation

Figure 40: Ranked Relative Importance Weights – Total

5.5 Comparison of Importance Weights Results to Literature

This section critically assesses the relative importance weights resulting from other studies on real estate decision-making considering my study results. No other researcher has attempted to explore decision-making in Germany to the degree I did in this study. However, due to varying methods, geographical and time settings and sets of participants, my research results are not fully comparable to other studies. Nonetheless, this section attempts to provide an overview of similarities and differences to previous studies on this topic.

Results from Jackson and Orr (2011) indicated that *location* was the most relevant attribute for a set consisting of 51 UK fund managers, followed by *economic and functional obsolescence*, which the authors defined as the degree of *area flexibility and internal configuration*. These attributes received a total importance weight of 17.1 and 22.7 percentage points, respectively. Thus, compared to my research, the top two characteristics

received higher relative importance weights. On the contrary, *sustainability rating* as measured by the BREEAM certification level was the second least important attribute. The authors concluded that “The results reveal that ‘fixed’ property characteristics (location and obsolescence) are dominant in the decision-making process, over and above ‘manageable’ tenant and lease characteristics which can be explicitly included within models of probabilities of income variation“ (p. 317).

The authors were the only researchers who distinguished between core and value-add investments when allocating attribute utilities. For core investments, *sustainability rating* only received an importance rating of 8.2, making this attribute the least relevant for core investments. In contrast to my research findings, *sustainability rating* received a higher score of 9.6 for value-add investments. This might be explained by the relatively small number of respondents for value-add investments in their study – while 25 respondents evaluated the relative importance of the attributes for core investments, only nine participated for the value-add asset class. In addition, in 2011, the awareness of ESG criteria was at a considerably lower degree than today, which explains why importance ratings were significantly below average.

Apart from this, research results from Jackson and Orr (2011) suggest that *location* and *economic and functional obsolescence* are more important for core investments, while *credit worthiness of the tenant* is significantly more relevant in value-add investments. Again, the latter finding contrasts the results of my research, which indicate that the tenant profile is more relevant for core investors. Furthermore, in the *location* category, the authors only distinguished between *in town or city centre*, *suburban* and *out of town* with and without access to public transportation. Apart from these factors, the authors did not provide for further location assessments. This diverges from my research approach, as respondents and future users of the OffIn-MAU model could incorporate their personal interpretation in the respective attribute.

In addition, Jackson and Orr (2011) did not distinguish between the economic and financial or real-estate environment and the location within the submarket. They also did not address comparable analyses and quantitative evaluations. Another attribute that I addressed in my research but which Jackson and Orr (2011) disregarded in their study was personal judgement and relationship to the seller. On the contrary, I did not account for lease specifics such as the period to lease expiry or rent review clauses as individual attributes in my research, as the respondents did not seem to be interested in these factors in the First

Research Phase. Thus, my findings are more profound as they are based on extensive interviews on real estate decision-making. Table 36 provides an overview of the results from Jackson and Orr (2011).

Table 36: Research Findings from Jackson and Orr (2011)

Jackson and Orr (2011)			
Attributes	Total (%)	Core (%)	Value-Add (%)
<i>No. of Respondents</i>	51	25	9
Location	22.7	21.7	19.9
Economic and functional obsolescence	17.1	16.9	15.8
Credit worthiness of the tenant	12.6	13.2	16.0
Rent review clause	12.1	11.4	10.3
Single or multi-let	11.3	11.7	12.3
Period to expiry/break	8.5	9.0	7.8
Sustainability rating	8.3	8.2	9.6
User/ assignment clause	7.9	7.9	8.3

Armonat and Pfnür (2004) discussed the findings from their 2001 survey of 91 institutional investors in Germany, an earlier study conducted in German (Pfnür & Armonat, 2001). Thus, geography-wise, this paper is most similar to my research. Analogous to Jackson and Orr (2011), they concluded that *location* is the most relevant attribute for real estate investment decisions, yielding a total importance score of 6.4 out of 7. However, in contrast to my approach, the authors did not further distinguish between criteria for investing into a specific city or submarket and factors for assessing the location within the submarket. Several return-related criteria, including *sales price*, *rental income* and its *marketability* received average scores of more than 5.6. While the location was not as highly ranked by the participants in my research, the return assessment was considered as the most relevant decision-making criterion.

In contrast to my research findings, *economic environment* as well as *real estate finance* was only of subordinate importance for the participants in my research. In addition, in the interviews, the participants did not assign any relevance to fees and operating costs. In fact, this factor was of intermediate importance with an importance rating of 4.9 in the study from Armonat and Pfnür (2004). Moreover, the authors did not account for the decision-makers' personal views or access to the deal – both attributes that participants in my research considered to be relevant.

Table 37: Research Findings from Armonat and Pfnür (2004) and Pfnür and Armonat (2001)

1) Pfnür and Armonat (2001)
2) Armonat and Pfnür (2004)

Due diligence elements	Importance rating (out of 7, with 7 meaning 'very important')
Location	6.39
Provisioning of property	5.83
Sales price	5.67
Marketability of real estate (income)	5.65
Cost-effectiveness of real estate (expenses)	4.92
Capital market yields	4.84
Economic environment	4.81
Cost of equity	4.59
Real estate finance	3.78

Furthermore, contrasting the high importance Armonat and Pfnür (2004) and Jackson and Orr (2011) assigned to the location of a property, *geographical location* only ranked fifth out of five factors with an importance score of 16% in the study by Hutcheson and Newell (2016). The authors conducted AHP analyses with 14 Australian fund managers across several asset classes. They commented that one respondent noted that they “considered demographics rather than geography when deciding on what property to invest in” (p. 14).

This extensive divergence from the two above-discussed studies’ findings depicts the relevance of choosing the set of participants and how the method might affect the outcome. Hutcheson and Newell (2016) noted that, for office properties, location is indeed ranked first without providing an importance score – however, this only included two responses. Furthermore, the authors included *investment style* as one of five factors, and further divided it into *core*, *value-add* and *opportunistic*. By contrast, I assessed the importance of the attributes for a core investment and a value-add investment separately. These factors did not impact the decision as an attribute, but rather described the strategic orientation for an investment vehicle in general.

Strategic decision making received the highest importance weight. This factor included return and risk analyses. Consequently, the high importance of this factor is supported by the high ranking of *quantitative evaluation / return* in my research. *Qualitative techniques* included *personal judgement*, and was ranked fifth out of 14 sub-factors, with an importance weight of 11.6, while *industry peer comparison* only received an importance weight of 4.9. Similarly, my research revealed that personal views were of above-average importance. However, *leasing / transaction comparables* still received a total importance weight of 8.4 percentage points, indicating that the respondents in my study considered these factors to be more relevant than the participants in the study from Hutcheson and Newell (2016).

Table 38: Research Findings from Hutcheson and Newell (2016)

Hutcheson and Newell (2016)	
Due diligence elements	Importance weight (%)
Strategic Decision Making	29.41
Investment Style	19.14
Type of Real Estate Vehicle	18.58
Qualitative Techniques	16.52
Geographical Location	16.34

Ginevičius and Zubrecovas (2009) studied attributes that affect the evaluation of a real estate investment opportunity. Their results indicated that *financial efficiency criteria* were most important for investment decisions. Although the authors further broke this attribute down into IRR and NPV (amongst other KPIs as discussed in Section 4.2.11.1), this finding confirms the high importance of return analyses, which were ranked highest in my research. However, cash flow and net income were included in the *financial criteria* attribute, which received lowest importance. This demonstrates inconsistency, as the authors were unclear how they distinguish between cash flow-impacting factors, such as leverage and rental income, and KPIs and why these factors are weighted differently.

Ginevičius and Zubrecovas (2009) addressed the economic environment, including GDP and consumer prices, in their attribute *criteria determining business perspectives*. Both this attribute and *territory attractiveness criteria (depend on project type)* were ranked below average, which amounts to 16.7 percentage points for six attributes. On the contrary, the results from Jackson and Orr (2011) and my research show the high relevance of location-related determinants in real estate investment decisions. An attribute that was not discussed in my research but which was of equal importance in the paper from Ginevičius and Zubrecovas (2009) was the *legal environment*.

Table 39: Research Findings from Ginevičius and Zubrecovas (2009)

Ginevičius and Zubrecovas (2009)	
Attributes	Importance weight (adds up to 1)
Financial efficiency criteria	0.24
Financing criteria	0.24
Criteria determining business perspectives	0.14
Territory attractiveness criteria (depend on project type)	0.13
Criteria determining legal environment	0.13
Financial criteria	0.12

Roulac (2000) assessed the relative importance of several due diligence tasks for real estate investment decisions. Their results indicated that *legal / documentation* activities were most relevant, with a score of 8.3 out of 10. Among this group, the highest importance score was

achieved by *environmental reports*. While this term is often related to a firm’s sustainability or a property today, the author was then most likely referring to reports on the economic and/or real estate environment.

The author also identified *market* factors to be relatively important, including rental prices, comparables, and the pipeline. This is in accordance with my research, which identified *letting / transaction market environment / pipeline* and *leasing / transaction comparables* as relevant attributes. Similarly, *property characteristics*, including property quality, its micro-location and tenant quality were of high importance, which was also the case for the corresponding attributes in my research.

As opposed to the study from Roulac (2000), my research did not incorporate borrower or developer-specific tasks. In contrast to the results of Research Phase 2, *financial* and *investment* criteria were only ranked fifth out of seven. These factors incorporated the forecasted rental income as well as *market knowledge*, which were relevant factors in my research. However, the different importance weight might derive from the different settings and methods of the two studies. While Roulac (2000) attempted to rank 68 pre-defined due diligence tasks, my approach was to explore the attributes that affect real estate investment decisions while avoiding the provision of too many definitions.

Table 40: Research Findings from Roulac (2000)

Roulac (2000)	
Due diligence elements	Importance rating (out of 10, with 10 meaning ‘very influential’)
Legal / documentation	8.32
Property characteristics	7.90
Market	7.86
Investment	7.64
Financial	7.39
Economic	6.68
Borrower / developer	5.06

Gallimore and Gray (2002) concentrated on the role of personal views in real estate investment decisions. According to their analysis, *actual transaction prices/rents/yields* were the most relevant information sources for conducting investment decisions. This is roughly in accordance with my findings; all participants agreed that comparables and real estate market developments have a significant impact on the investment decision.

Out of the criteria under investigation by Gallimore and Gray (2002), *personal ‘feel’ for state of property market, based on experience rather than current data* achieved a rating of 5.9 out of 7. Thus, most participants included their personal views in their investment

decision. The authors concluded that sentiments were a relevant source of acquiring information. Similarly, the respondents in my research allocated above-average importance to the attribute *personal judgement / experience*.

Table 41: Research Findings from Gallimore and Gray (2002)

Gallimore and Gray (2002)		
	Types of Information	Importance rating (out of 7, with 7 meaning 'always used')
Facts	Actual transaction prices/rents/yields	6.28
	Floor-space supply/demand indicators	5.59
	Money market returns/interest rates	5.70
	Property price inflation indicators	4.13
	General price inflation indicators	4.05
Views	Personal 'feel' for state of property market, based on experience rather than current data	5.89
	Views of general economic commentators	4.72
	Publicly available forecasts of property market trends	4.63
	Publicly available forecasts of economic trends	4.56
	Views of property market commentators	4.22

To summarise, findings from previous studies on the relative importance of decision-impacting factors varied. The literature comparison revealed that criteria related to the location and the economic environment received relatively high importance weights. However, previous researchers did not differentiate between measures impacting the selection of a city or submarket and the location within the submarket. Previous studies also accounted for the relevance of return analysis and quantitative assessments. Thus, in accordance with my research findings, they put relatively high importance on factors related to the location, the economic and real estate environment, and the quantitative assessment.

However, the studies discussed different sets of attributes, varying research focuses, and different settings regarding timing and geography. Thus, comparing the relative importance of studies from the early 2000s or from Australia to findings from today is difficult. Compared to my research findings, previous studies also showed higher variability between individual importance scores. Similarly, previous researchers did not assess the relevance of the relationship to the seller or ESG assessments. This underlines the fact that sustainability characteristics have increased in significance in the last few years.

5.6 Development and Testing of the OffIn-MAU Model

In the last two steps of my research, as presented in Section 3.6, I developed the OffIn-MAU model. Based on all the steps I have taken so far, including exploring decision-making

expertise, deriving ten attributes and the industry consensus on the average importance weights, I had all relevant input factors for my model. The only exception was the alternatives themselves, which depend on the individual decision task the investment manager faces.

To create the model, I established an Excel spreadsheet that is as intuitive and easy to use as possible. I set up four tabs, which can be seen in Appendix 6. The first tab introduces the model and its purpose. As most research participants were native Germans and the model was to be used for investment decisions in Germany but by Germans and non-Germans, I provided instructions in English and German. In three easy steps, the user can fill in and use the model.

The following two tabs were the input tabs. In the first, decision-makers could add up to 10 properties, select their risk type (core or value-add) and rate each attribute for each alternative with a rating between 0 (not achieved) and 100 (fully achieved). The procedure and rating scale and the sheets' design were similar to the Excel tool I sent to the respondents to derive the attribute scores at the beginning of Research Phase 2. The respondents could either stick with the default attributes I identified in Research Phase 1 as well as the average attribute weights I derived in the previous section, or overwrite the default attributes and values according to their own preference in the third tab. In order to enhance the interpretability of the attribute weights, I multiplied them by 100. If the user decides to overwrite the attribute weights manually, they must add up to 100. If they do not, a 'check' box at the bottom of each weighted sum turns red and shows the message 'weights have to add up to 100'. I have also added a macro button that, when pressed, restores default attributes and weights.

The fourth tab presents the results. I show the total scores for the respective properties as well as their ranking from best to worst. The three best-rated attributes are then visually presented in a radar chart.

To validate the usefulness of the OffIn-MAU model, I sent it to five research participants and asked them to test it. All of them confirmed that the model was helpful for their investment decisions. *I17* responded that "I like the fact that you have all the attributes at a glance. It definitely adds another dimension to our normal decision-making process". The respondents' feedback also indicated that the model is easy to use and the result interpretation is straightforward. *I4* noted that they think an "at-a-glance model" supported their decision-making process and made it tangible and defensible in front of the investment

committee. They also liked the flexibility of the model and its ability to overwrite the default values, if necessary.

Consequently, the respondents' feedback on the OffIn-MAU model was positive throughout, which underlines the quality of the model and its attributes. The positive reactions also enhance the conclusion that my research positively contributed to both academic research on decision-making in real estate and the current state of real estate practice in Germany.

5.7 Summary: Research Findings: Research Phase 2 and the MAU Model

This chapter presented the research findings of the Second Research Phase. This research phase started with the participants' assigning importance scores to each of the ten attributes. In the next step, I transformed the importance scores into importance weights and calculated the weighted average importance weight for each attribute by risk type.

The importance scores did not vary significantly. In percentage terms, importance weights ranged between 7.5 and 11.5% for core properties and 7.0 and 12.3% for value-add properties. No participant assigned extreme scores of 0 or two high scores for one attribute and only low scores for the remainder. Consequently, the importance weights underlined the finding that all ten attributes are relevant for the investment decision.

The three attributes the participants considered least important overall were *deal access / relationship to seller*, *leasing / transaction comparables* and *ESG criteria*. *ESG criteria* stands out as the attribute with the highest range of importance weights of almost 12 percentage points within the core responses, while the range of answers is also high with 8 percentage points among the value-add group. The standard deviations of this attribute amounted to 2.9 and 2.4 percentage points. I doubt that this range in answers is due to a different understanding or interpretation of the term. Instead, this divergence is a sign of the variety of opinions on the importance of *ESG criteria* for real estate investment decisions, illustrating that green certificates are currently highly relevant for some investment managers but relatively unimportant for others, even within a specific asset class. This finding also underlines the changing decision-making environment and the developing relevance of sustainability in real estate.

Interestingly, *ESG criteria* received an above-average weight for core investments but the lowest average weight for value-add products. Thus, this attribute had the highest discrepancies between core and value-add risk types. This finding indicates that green certificates and related topics are especially relevant for centrally located, long-term let properties, as opposed to properties with refurbishment potential. Furthermore, the relatively significant difference between core and value-add risk classes demonstrates the necessity to distinguish between these two types of investment. Consequently, with this analysis, I achieved Research Objective 3, “To evaluate the relevance of green certificates for investment decision-making”.

Among both asset classes, *quantitative evaluation / return* reached the highest importance weight. This is not surprising as the respondents noted the overall relevance of a property’s return for their ultimate investment decision in the interviews as well. In addition, *location within submarket* and *property quality / features* were sought-after attributes. *Letting / transaction market environment / pipeline*, *personal judgement / experience*, *economic / financial environment* and *area usage / tenant(s)* were ranked slightly above average. While *letting / transaction market environment / pipeline* achieved an importance weight of 2 percentage points higher for value-add investments, *area usage / tenant(s)* was considerably more relevant for core opportunities. Apart from this, many attributes were ranked relatively closely for both risk classes.

The literature analysis revealed that previous studies also addressed the asset’s location and the economic environment. However, my research addressed several new aspects of real estate decision-making. For instance, I included green certificates and ESG criteria in my list of ten attributes. I also distinguished between the real estate environment, the economic and financial environment, and the location within a submarket – a differentiation that most previous researchers did not provide. However, due to divergences to earlier studies, especially in relation to the geography, time period, research focus and method, previous research was not directly comparable to my research.

To achieve Research Objective 4, “To derive a MAU model for estimating the relative value of a real estate investment opportunity”, I set up the OffIn-MAU tool in Excel. The aim was to establish a model which was easy to implement and offered flexibility in its use. In four tabs, I enabled the user to assess up to ten alternatives for the ten attributes defined in Research Phase 1. The user could either rely on the above-derived attribute weights for core

and value-add properties, respectively, or fill in their own attributes and attribute scores. The OffIn-MAU model presents the results both numerically and in a radar chart.

6. Conclusion

6.1 Introduction

Real estate decision-making is a complex and multi-faceted task. It also changes with various internal and regulatory requirements, greater information availability and different decision-making environments. This research explored the real estate decision-making expertise of experts in the German office market.

Chapter 2 presented the current state of literature and revealed a range of shortcomings that this thesis attempted to fill. For instance, the literature review indicated that no existing study explored real estate investment decisions. Most studies dealing with this topic conducted a quantitative assessment involving questionnaires and did not focus on the German market. In addition, my study is the first to apply the MAU theory and develop a decision-making model that adds to the current state of literature and real estate practice. Based on these shortcomings, I developed the research objectives that formed the basis of this thesis.

My research followed the ontological and epistemological perspectives outlined in Chapter 3. OOO allowed me to centre my research around objects in the setting of a flat ontology. That way, I was able to explore expertise without having to over- or undermine the object. My phenomenological epistemology enabled me to assess the essence of real estate decision-making experiences.

Based on these ontological and epistemological assumptions, I split my research into two phases. In the First Research Phase, I conducted semi-structured interviews with 22 real estate investment professionals. That way, I was able to explore their decision-making experiences and derive a set of ten attributes.

In the Second Research Phase, the respondents assigned importance scores to the list of attributes. I transformed the importance scores into importance weights. The average importance weight informed me about the relative importance of the ten attributes, including green certificates. In the final step, I developed the OffIn-MAU model, allowing decision-makers to assess up to ten alternatives at once. A final test confirmed the usefulness and applicability of the model for real estate decision-making practice. Overall, my research approach forms the basis for my strong confidence in the validity of my research.

Chapter 4 presented the results of the First Research Phase. I discussed my interpretations of the interview outcomes by elaborating on each of the ten attributes. Furthermore, the interviews revealed insights into the changing relevance and perceptions of green certificates, the need for a consistent green evaluation system, the increasing importance of technology in office real estate, and the impact of the Covid-19 pandemic on the German office market.

Chapter 5 discussed the results from the Second Research Phase. The differing results between core and value-add assessments reinforced that the distinction between the two risk classes made sense. For instance, while *ESG criteria* were of above-average importance for core investments, they received the lowest importance weight in the value-add group. Furthermore, the results confirmed that all ten attributes were indeed relevant for the investment decision. The list of attributes and their relative importance weights were the “key ingredients” for the functional OffIn-MAU model. In the final step, five decision-making experts tested and validated the model with real alternatives.

My conclusions about the research objectives are summarised in Section 6.2. In Section 6.3, I discuss the contributions of this thesis to theoretical knowledge and to practice. Section 6.4 exhibits the limitations of this thesis, and I present avenues for future research in Section 6.5. This thesis concludes with a personal reflection on my research journey in Section 6.6.

6.2 Conclusions on the Research Objectives

As suggested by Sandberg and Alvesson (2011), I deduced my research objectives based on gaps identified in the extensive literature analysis presented in Chapter 2. By exploring real estate decision-making in Germany through in-depth interviews, I derived ten attributes that describe decision-making. In the Second Research Phase, the participants assigned importance scores to the ten attributes, depending on the perceived attractiveness of each attribute. I then transformed the scores into weights. The weighted average of the importance weights provided information on the respondents’ relative preference of each of the ten attributes. In the final step, I created the OffIn-MAU model. Based on the respondent’s relative importance weights or individually selected attributes and attribute weights, the user can assess up to ten alternative investment possibilities with this model.

6.2.1 Conclusion on Research Objective 1

The First Research Objective was concerned with the elicitation of real estate decision-making expertise in Germany:

RO1: To elicit the expertise of real estate investment decision-makers in Germany.

To achieve this research objective, I conducted semi-structured interviews with 22 real estate decision-makers active in the German office market. I started every interview with the same question, encouraging the respondents to recall their most recent office investment experiences. Instead of following a strict questionnaire guide, I prepared thematical complexes which I discussed in each interview. That way, I was able to assess which topics real estate decision-makers are currently concerned with and what affects their decisions.

The chosen research approach, OOO, allowed me to assess decision-making expertise as an object by itself, without over- or undermining the term (Harman, 2018a). Consequently, I was able to analyse expertise without seeing it as a sum of its parts or describing it only by its impact and relationship to other objects. Applied to my research topic, I did not attempt to assess the decision-makers impact on tenants, politics, investors or society, or try to break down their expertise. Instead, I focused on describing the essence of decision-making expertise and knowledge with the help of a set of attributes.

After completing the interviews, I transcribed, coded and analysed them. Chapter 4 presented the results of the extraction of expertise. In addition to the derivation of the essence of real estate decision-making knowledge and the resulting list of ten attributes, leading to the achievement of RO2, Research Phase 1 revealed several other interesting phenomena. For instance, due to the timing of the interviews (from August to October 2020), the Covid-19 pandemic was prevalent. The pandemic impacted all aspects of life, including the work environment and how real estate experts expected their decision-making environment to change. I concluded that most experts expect future office space to change and become more flexible to adapt to tenants' requirements.

Furthermore, my research revealed that the respondents see three significant trends in the real estate industry in Germany that will most likely alter their decision-making environment in the long run: first, the emergence of ESG factors and green certificates; second, increasing attention to digitalisation and artificial intelligence; and third, the growing relevance of tenant satisfaction and well-being.

To summarise, through the extensive process of conducting and analysing interviews with real estate experts, supported by OOO and phenomenological epistemology, I was able to extract the essence of real estate decision-making in Germany. Therefore, I have strong confidence that I achieved RO1.

6.2.2 Conclusion on Research Objective 2

Research Objective 2 is based on the findings of Research Objective 1. After exploring real estate decision-making, this Research Objective is concerned with the generation of a set of attributes that capture investment decisions:

RO2: To derive the attributes that capture real estate investment decision-making expertise.

Based on an extensive, iterative coding process, I derived ten attributes that describe real estate investment decisions. Ten was the minimal number of attributes that fulfils the purpose of the MAU model for real estate investment decision-making without impeding the model's applicability and usefulness. Thus, a lower number of attributes would not capture investment decisions thoroughly. Previous literature supported me in this decision as the number ten is relatively intuitive, and experts are capable of accounting for up to ten attributes at once (Ryan, 2019). The derived attributes were *economic / financial environment, letting / transaction market environment / pipeline, area usage / tenant(s), deal access / relationship to seller, ESG criteria, leasing / transaction comparables, location within submarket, personal judgement / experience, property quality / features* and *quantitative evaluation / return*.

I derived the attributes based on an iterative, extensive interview analysis process. I coded the transcribed interviews and clustered the findings, resulting in the list of ten attributes. Chapter 4 presents the attributes in detail. Every participant discussed several aspects of their real-estate investment decision, which I clustered. In line with my chosen research ontology and epistemology, I acknowledged my role as a researcher and described the respondents' expressed views and my interpretations of their statements and the interviews themselves.

I validated my findings on the attributes using several techniques. For instance, I analysed the respondents' answers to the first interview question. In addition, a word cloud analysis enabled me to assess the words that the respondents used most frequently, providing insight into often-discussed topics. Furthermore, I cross-checked the final list of attributes with an expert who did not participate in my research.

Moreover, at the end of Research Phase 1, I approached the respondents with these ten attributes and asked whether they thought they were understandable and sufficient to describe their investment decisions. Their feedback confirmed that the attribute wording was easy to comprehend and adequately characterised their investment decision. This proves that the attributes derived through my analysis process properly represent the decision-makers' views. Based on the different channels I used to validate the list of attributes, I am strongly confident that I successfully achieved Research Objective 2.

6.2.3 Conclusion on Research Objective 3

The third Research Objective deals with green certificates and how relevant they are for real estate decision-makers.

RO3: To evaluate the relevance of green certificates for investment decision-making.

Green certificates and ESG criteria constituted a focus topic of my study. In Chapter 2, I analysed previous literature on green certificates, most of which confirmed that green certificates positively impact the emissions of a property. I identified an evident lack of literature about the impact of green certificates on real estate investment decisions.

The participants revealed that they considered ESG factors to be an overarching topic, while green certificates are a way of signalling the degree of sustainability in the real estate industry. As they preferred the term ESG over sustainability, I named one of the ten attributes *ESG criteria*, but often used sustainability interchangeably.

To achieve this research objective and Research Objective 4, concerning the derivation of the OffIn-MAU model, I sent the complete set of attributes to the participants and asked them to assign each one with an importance score between 0 and 100. The respondents could choose to fill in the core or value-add investments part, or both. I selected this scale as it is intuitive, and offered participants sufficient choices. In the next step, I calculated importance scores for each attribute and participant by dividing the importance score of the respective attribute by the total sum of importance scores assigned by that participant.

The weighted average of all respondents' importance weights provides insight into the cross-industry preferences of the ten attributes. I noted that all attributes received importance weights of between 7.0 and 12.3 percentage points. An analysis of the responses indicated that the respondents considered all attributes to be relevant, as no 'extreme' scores were

assigned to a single attribute. This confirms my findings from the First Research Phase on the representativeness of the attributes.

Research Phase 2 revealed several new findings on the relative importance of attributes. As expected, the relative importance differed between core and value-add investments. Interestingly, *ESG criteria* only received an average importance weight of 7.0 percentage points and was ranked last in the value-add investments group. In comparison, decision-makers in the core asset class allocated an importance weight of 10.1 percentage points, which is slightly above average. Thus, *ESG criteria* showed the highest difference between the two groups of investors among all the attributes.

The average importance weights show the respondents' consensus on the importance of the respective attribute. However, the importance weights assigned by the respondents for *ESG criteria* differed significantly: the range of responses amounted to 12 and 8 percentage points with standard deviations of 2.9 and 2.4 percentage points for core and value-add properties, respectively. This divergence in importance weights underlines the different views on the perceived importance of ESG factors for real estate. Furthermore, this result suggests that green certificates are an emerging trend topic and will continue to increase in relevance.

The importance weights indicate that green certificates play a much more crucial role for core investments. In Research Phase 1, my findings revealed that no participant focusing on value-add investments was required to invest in only certified or certifiable properties. Similarly, almost all pure core investors required some kind of green certificate due to regulatory and internal firm policies. This illustrates the significant gap between the perception and handling of ESG factors among distinct types of investors.

The total average importance weight of *ESG criteria* among both sets of participants resulted in an importance score of 8.4 percentage points. Thus, the attribute ranked ninth out of ten in the set of attributes. I conclude that green certificates are not as relevant as many other aspects of real estate decision-making. From my point of view, the relatively low relevance of green certificates is in contrast to what the literature review suggested on this topic, especially regarding the high investment sum spent on certified properties and their increased regulatory requirements.

However, my research also showed that the importance of green certificates has significantly increased in recent years, with especially core firms focusing on purchasing only certified office properties. Due to more core investors requiring green certificates and higher ESG

awareness among regulators and investors, it is likely that value-add investors will follow and integrate them more into their investment decisions, too. Based on the findings described above, I am strongly confident in my achievement of Research Objective 3.

6.2.4 Conclusion on Research Objective 4

The fourth Research Objective is concerned with the creation of a MAU model:

RO4: To derive a MAU model for estimating the relative value of a real estate investment opportunity.

In order to establish the final MAU model, which I named the OffIn-MAU model, I required the list of attributes and the industry consensus of relative importance weights across the set of ten attributes. Consequently, research objectives 2 and 3 were prerequisites for achieving the Fourth Research Objective. I set up the OffIn-MAU in Excel, as this software is widely used by every real estate professional.

The final model consists of four tabs. The first tab provides an introduction of the model's purpose and instructions in German and English. The second and third tabs are the input tabs. Per default, the model includes the set of attributes identified in Research Phase 1 and the respondents' average importance weights resulting from Research Phase 2. The model also offers the possibility to amend the attributes and the weight scores for core and value-add investments. I deposited the default values via an Excel macro, which can be triggered by clicking the 'Restore Default Values' button.

The model allows for the simultaneous assessment of up to ten value-add or core real estate alternatives. The user assigns a value between 0 and 100 following the alternative's degree of achievement for each alternative and attribute, and the model then calculates the outcome. The final tab presents the results of the MAU assessment. The model automatically identifies and marks the three best scores, which are then plotted in a radar chart showing the scores each of the top three alternatives yielded on each of the attributes.

After I finalised the OffIn-MAU model, I sent the final version to five respondents to test it with real investment alternatives and to see if that they found it intuitive and helpful. They confirmed both and noted that the model generates a distinct perspective on real estate investment decisions. Moreover, they reported that the OffIn-MAU model supported their real estate investment decision-making by providing an overview of the extent to which each

alternative achieved the attributes. With the model, the user can conduct an acquisition decision based on all relevant decision-impacting factors at a glance. Based on this feedback, I concluded that I am strongly confident in achieving Research Objective 4.

6.3 Contributions of this Dissertation

This research adds to both the current state of knowledge and to practice. It provides essential insights into real estate decision-making expertise and the role of green certificates. It is the first work to conduct an in-depth assessment of expertise in the German real estate market and the first study to develop a decision-making model that simultaneously adds to academia and practice. My research enhances the understanding of real estate decision-making in Germany. This section presents my study's contributions to knowledge and to practice.

6.3.1 Contributions to Knowledge

This study adds to the current state of the literature about real estate decision-making in several ways. In Chapter 2, I reviewed the literature basis on my research topic. The analysis revealed several shortcomings, most of which I addressed in this thesis.

First, my study considerably contributes to knowledge as it is the first study to explore real estate investment decisions. Many previous decision-making researchers have concentrated on a pre-defined set of attributes based on earlier studies. With my approach, I was able to obtain detailed insights into real estate investment decisions and what impacts them. Instead of sending a strict questionnaire that does not allow respondents to discuss their own experiences, I entered the interview with open-ended, guiding questions. That way, I explored their individual expertise and obtained valuable insights into aspects decision-makers considered most relevant.

Relatedly, my research adapted the ontological position of OOO, which puts the object into the focus of the researcher. It allowed me to view decision-making expertise as an object, thereby making it possible for me to reach my research aim. Applying this methodology to commercial real estate decisions is novel, and creates potential for further adaptations into decision-making situations.

Second, my study is the first to adopt the MAU theory in the field of commercial real estate investment decisions. Multi-Attribute Utility is based on Edwards' (1954, 1977) research

and was further influenced by von Winterfeldt and Edwards (1986). The multi-criteria decision model allows the user to account for multiple attributes at once when making a decision. In addition, the theory has the benefit of transforming personal preferences into numbers which are key to making an educated investment decision. The participants confirmed that the final decision-making model emerging from Research Objective 4, the OffIn-MAU model, is useful in supporting their acquisition decisions for both core and value-add investment types. The model also leaves sufficient flexibility for the respondent to put in their individual attributes and relative weights. This model is the first to fulfil these criteria and will hopefully prove helpful for future investment decisions and related research.

Furthermore, my thesis significantly contributed to knowledge by providing a technique of deriving a MAU model for investment decisions that is transferable to other decision-making problems. In other words, my study provides a generalisable process for developing a decision-making model that can be applied to other investment decisions. It also underlines the applicability of simple models to complex decision-making problems, thereby adding weight to existing literature about the relevance of MAU theory and the dominance of simple, but not simplistic models.

Third, it is the first study to analyse the impact of green certificates on investment decisions. As described in Section 2.3, green certificates increased in relevance within the past years. For example, Germany's leading certificate provider, DGNB, was only founded in 2009. Similarly, the studies addressed in Section 2.5 suggested that tenants and future buyers pay a premium for certified buildings, therefore decision-makers might incorporate ESG criteria in investment decisions to some degree. In this context, my study significantly contributed to knowledge by specifically accounting for green certificates and ESG factors and their relevance for real estate investment decisions. The interviews revealed that while most core-focused companies required an existing green certificate or the potential to certify at acquisition, the relative importance of *ESG criteria* differed significantly within the responses in both asset classes.

Furthermore, most value-add focused participants regarded the importance of ESG criteria for their investment decisions as low. Consequently, my research identified a gap between the two risk types, which might derive from the changing perception of ESG factors in the current environment. The high ranges of importance weights for both risk classes are a sign of the stark differences between respondents' individual views on the attribute's importance. In addition, they signal the change in overall importance assigned to sustainability in the

industry, indicating that ESG factors will likely become more relevant for all real estate players in the future.

Fourth, my study shed light on real estate decision-makers' current views on decision-making, ESG criteria and green certificates. Starting in the late 2000s, a few studies presented in Section 2.4.5 assessed the role of green certificates for the regulatory environment, from the decision-makers' personal perspective or by adding them to a pre-defined questionnaire. However, with very high public awareness and frequent new regulatory requirements, ESG is a topic that changes fast. Therefore, my study captures market players' opinions on ESG factors in 2020/21. That way, I revealed that only a specific group of decision-makers thoroughly addresses green certificates in their decision-making processes. Thus, my study presents a snapshot of how decision-makers now see ESG factors, and therefore provides a valuable basis for future research on the relevance of ESG criteria. Moreover, my findings also indicate that there is significantly more change to come, and that green certificates and other aspects of ESG will continue to increase in relevance for all real estate decision-makers.

Fifth, my study is the first to conduct a detailed assessment of real estate investment decisions in Germany. I elicited real estate decision-making expertise and derived ten attributes to devise the OffIn-MAU model. As discussed in Section 2.4, many previous studies on real estate decision-making and ESG factors concentrated on the UK and the US, where data availability is much higher. They did not focus on deriving a set of decision-making attributes. By focusing on the German market, I excluded geographical differences and fully explored decision-making expertise in Germany. Furthermore, many decision-making studies date back to the 1980s and 1990s. In contrast, my study was concerned with decision-making in 2020.

Sixth, another valuable contribution to knowledge derives from the respondent's views on the impact of the Covid-19 pandemic. The literature analysis on Section 2.3 showed that, not surprisingly, the pandemic has had a negative impact on the German real estate market in terms of volumes and number of deals. I did not plan to address the effects of a pandemic when I started my research journey in 2019. However, the timing of the interviews between August and October 2020 resulted in the pandemic being prevalent in both the interviews and the respondents' lives. On the one hand, this might have led to some degree of Covid-19 bias in the participant's responses, which I addressed in Section 3.10. On the other, it provided valuable insights into the expected future characteristics and trends in the German

office market. The combination of decision-making expertise and the respondents' views on the impact of the pandemic is unique and provides an additional valuable contribution to knowledge.

6.3.2 Contributions to Practice

In addition to my thesis's contribution to knowledge, my research revealed several new insights which contribute significantly to real estate decision-making practice.

My study provided an understanding of the industry consensus of the attributes that affect real estate investments. I went further into detail with the type of investments and distinguished the real estate investors into core and value-add risk classes. Thus, this dissertation provides insights into the relative importance potential competitors place on attributes describing their decision-making from a practical perspective.

Moreover, the ultimate aim of the novel OffIn-MAU model is not only to enhance the understanding of real estate decision-making expertise but also to assist with real estate investment decisions. The model can assess up to ten alternatives on up to ten attributes simultaneously. In the final stage of Research Phase 2, five respondents tried and tested the model and concluded that it is useful for supporting their investment decision. They also confirmed that the model, illustrating multiple facets of decision-making at a glance, shed new light on their decision-making process. The OffIn-MAU model allows decision-makers to transform their personal views into numbers, thereby adding a new perspective to their purchasing decisions. The participants pointed out that the model positively contributes to their decision-making practice, and I hope that it will be of use in future investment decisions.

Another contribution to practice emerging from my research are the trends I have identified based on the interviews. First, the role of ESG features in real estate investments is changing. Sustainability is a topic that affects all industries and is increasing in relevance due to growing political awareness. My study revealed the lack of consistency across different real estate companies, with core investors paying considerable attention to this topic. In contrast, value-add investors often do not account for green certificates at all. Many respondents agreed that a consistent approach to green real estate investments would be valuable for their industry practice.

The other two trends that became evident through my research are the increasing importance of technology and digitalisation for the real estate industry and the rising relevance of tenant satisfaction and well-being. For real estate investment practitioners, this implies that it might be worthwhile to invest in technological advances and ‘smart’ offices that are able to efficiently regulate temperature, among other conditions. Furthermore, many investment managers are increasingly shifting their focus to the tenants’ needs. For instance, it is becoming more important to ensure that tenants have bright, well-ventilated places to work, and enough space for bicycle storage. These are trends that are likely to change the priorities of real estate investment decision-makers in practice.

6.4 Limitations of the Research

My research procedure developed from extensive literature analysis and a careful process of assessing and reviewing my research approach and myself as a researcher. Nonetheless, I have identified a few limitations that I address in this section, and these provide avenues for future research.

First, a limitation of my research derived from the set of research participants I used. Hundreds of real estate players have invested up to EUR 40bn in the German office investment market annually (BNP Paribas Real Estate, 2021a). It is almost impossible to account for all real estate market players for my research. Nonetheless, I am confident that my group of participants is well diversified across the different types of real estate investors and represents the German real estate office market.

Second, and related to the first limitation of my research, I decided to distinguish between core and value-add real estate investments as a result of the diverging responses in the First Research Phase. That way, I was able to assess the difference between the views of core and value-add investors. Furthermore, the relatively balanced number of participants belonging to each of the risk types confirmed the diversity across different investment types among the participants. However, in order to deduce a clear message on different real estate decision-making styles by risk type, I probably could have accounted for every investment type and style. This procedure would also have enabled me to provide a MAU model suitable for all real estate office transactions in Germany, and not only the core and value-add risk classes. Nonetheless, I addressed a broad set of real estate market players and received data saturation

for the two most relevant risk classes, leaving the extension to all, or the restriction to a single investment type, to future studies on this topic.

Third, in hindsight, it might have made sense to mix the list of research participants between the two research phases. That way, I would have been able to fully eliminate respondent bias resulting from participating in both research phases. Furthermore, it would have allowed me to increase the number of participants in the Second Research Phase and further validate my findings. However, I mitigated respondent bias by validating results and methods with an external expert, which provided me with confidence that the approach and results made sense. Furthermore, as mentioned before, the set of participants was well-diversified, and the results from the Second Research Phase indicated that the individual participants were relatively similar in their views on the significance of each of the attributes.

Fourth, my research concentrated on the real estate market in Germany. As the real estate market environment differs significantly between various countries, I decided to restrict my study to participants in the German market. This might have resulted in a limited diversity of findings. Nonetheless, the geographical restriction made sense as I excluded country-specific criteria such as the more centralised real estate markets in France and the UK.

Fifth, as an explorative researcher, I included my personal views when I collected and analysed data. As described in Section 3.10 on biases resulting in my research methodology and methods, this might have changed the outcome of my study. I was aware of this researcher bias and carefully self-reflected throughout the whole research process in order to mitigate the issue.

Sixth, another limitation of my study resulted from the fact that I conducted the interviews during the Covid-19 pandemic. The timing brought valuable insights into the respondents' views on the changes to the office market environment caused by the pandemic. However, this might have impacted the participants' responses in both research phases. While it is not possible to completely eliminate this pandemic-related bias, I took it into consideration when analysing and interpreting the data. Furthermore, the participants were aware of changes resulting from the pandemic and assessed and articulated the decision-impacting factors that changed because of the pandemic. Overall, I think that the benefit from including the respondents' views resulting from the pandemic outweigh the potential risk of their responses being biased.

6.5 Future Research Directions

One goal of my exploratory research approach is to suggest avenues for future research. The recommendations for future research partly derive from the limitations (Saunders et al., 2019) I described in the previous section.

I discussed the changing perceptions on green certificates and ESG factors in real estate in this dissertation. In light of the altering market environment, it would be very interesting to assess the change in market practice over time and repeat this study in the future. This might be especially appealing as it sheds light on my presumption that real estate certificates might become more relevant for value-add investors in the future. It would also be interesting to assess why and to what degree the personal views of the respondents on ESG criteria still differ from their firms' official views. Furthermore, the benefit of repeating the study in the future would be that the Covid-19 pandemic will most likely not be as acute as it was in the second half of 2020, which would allow for looking into how the preferences of the decision-makers changed after the pandemic.

Another recommendation for future research emerging from my research findings is to derive a consistent ESG-evaluation system that can be used to assess and standardise ESG criteria when reviewing a property. The respondents in my study noted the lack of standardisation in this area and indicated that they felt such a model would be extremely useful.

My research demonstrated that MAU is a suitable method to assess decision-making practices in office investment decisions. My research has provided a useful approach to deriving a decision-making model that is generalisable to other similar decision-making problems. It considerably added support to the applicability of simple decision-making models. Future research might want to adopt the findings from my study and develop another decision-making model based on the process I followed. For instance, future researchers could extend my approach to other asset classes within real estate, such as logistics, hotels, or retail. Similarly, it might be worthwhile to expand my findings to different geographies within real estate. Alternatively, future researchers might want to concentrate on a single risk class or extend the results to more than two risk classes. It would be interesting to investigate how views change depending on firm specifics; for instance, by only assessing real estate decision-making for large, pan-European firms and comparing the results with small investment boutiques.

Furthermore, future research might concentrate on extending my findings with a quantitative study. For instance, it might be worthwhile to send the list of attributes to a broader set of participants to receive a statistical overview of preferences across different risk classes in the German real estate market. Alternatively, future researchers could derive their questionnaire from the results of my First Research Phase. This would result in an explanatory approach similar to several earlier studies addressed in Chapter 2, but with a different questionnaire, based on my findings.

Another point for future research would be to address the topic with real estate investment managers and other market players, such as equity investors, banks, tenants, advisors and brokers. While my research focused on investment decisions that led to decision-makers being the most obvious choice of participants, including other stakeholders in investment decisions would certainly provide new insights into investment decisions.

6.6 Reflections on my Research Journey

The last months and years have been challenging, and I was faced with several obstacles while studying real estate investment decisions and the impact of green certificates. Not surprisingly, many aspects of my research changed throughout my research journey. My research journal, which I constantly used for reflecting on thoughts and obstacles throughout my research journey, facilitated this process.

I also realised that it is essential to remain open to unexpected findings. For instance, based on my previous experiences with sustainability in real estate and its prevalence in recent market reports and regulations, I expected the impact of ESG criteria on investment decisions to be greater. In addition, while I suspected that there would be some degree of difference in the importance of green certificates between core and value-add, I did not envisage a spread of ESG criteria of over 3 percentage points.

Throughout my research journey, I have contributed to the current state of knowledge and praxis with my study and learned a lot about myself and my personal skills and weaknesses, and how to overcome them. Pursuing a Ph.D. is highly challenging and time-consuming. Through excellent time management, several sacrifices regarding my life to work/research-balance, and constant self-reflection via my research journal and regular exchanges with my first supervisor, I was able to pursue this degree next to a full-time job in private equity real estate investment management. In fact, despite the challenges, I am convinced that the

combination of academic and practical views contributed positively to the outcome of my study overall.

From my perspective, the most demanding part of my research was finding a suitable research approach. I realised that I sometimes address problems with a realist-related mindset, which is obviously unsuitable for *exploring* expertise. After encouraging myself to open up to new mindsets and views and spending time researching and reflecting on them, I became more attracted to OOO and the idea of phenomenology, which ultimately enabled me to pursue my research aim.

I also realised that doctoral research requires a high degree of self-motivation and discipline, and that it is crucial to remain open and flexible to unexpected situations and problems. Notwithstanding the obstacles, I found my research journey highly fulfilling and will definitely profit from this experience for the rest of my personal and professional life. I would recommend it to anyone who is looking to contribute to the current state of knowledge and practice and is ready to take up the challenge.

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Appendix

Appendix 1 – Interview Invitation Material

Interview Invitation Letter



Dear (...)

I am a Ph.D. student at University of Gloucestershire and currently researching the investment decision-making expertise of real estate professionals in Germany. The aim of my research is to derive a benchmark model for estimating the relative value of a real estate investment opportunity in the German core office market.

With this invitation letter, may I invite you to take part in my research? My field research is divided into two stages: In the first stage, I assess real estate decision-making expertise in the German office market. I will ask open-ended questions about your real estate decision-making experiences in a face-to-face interview either in person or via video call. The aim of the first research stage is to obtain an in-depth insight into the factors that impact investment decisions today, and to derive up a small number of attributes which are most significant for decision makers.

The second research stage follows a few months after the first stage and involves the ranking of the identified attributes and the development of a decision-making model. You will not need to take the time for an in-person meeting again, as the online questionnaire can be completed whenever it suits you in your schedule. You will receive further instructions via email. Below table summarizes the schedule and content of the two research stages.

Research Stage	Method	Content	Location	Exp. time needed	Time period
1	Face-to-face interview	Interview about your real estate decision-making expertise	In person at the location of your choice or via video-call (i.e., Skype, MS Teams, Zoom)	60 minutes	Between August and October 2020
2	Online questionnaire	Questionnaire for ranking attributes according to their relevance and	Online / no location needed	20 minutes	Between November 2020 and January 2021

The interview is expected to last not more than one hour, and can be conducted at your preferred location. Alternatively, I can propose a suitable location or we have a video call. I will begin the interview with a short introduction of myself and my research and continue with open-ended questions about your role and your experience with commercial real estate decision making and green certificates. The interview will be held in German, unless you prefer to speak English.

Unless you wish otherwise the interview will be audio-recorded. I may also take written notes. I will store transcripts and notes electronically and destroy the material after the final thesis is approved. After I have transcribed the interview, you will receive the transcript for your final sign-off.

Providing confidentiality and anonymity is an essential part of conducting research at this level and the University's rules are very strict. I will not publish any information about your person and the company you are working for. You also have the possibility to provide off-the record information which I will not use for my analysis. You can choose to withdraw from the research at any time and for your contribution to be removed from our records.

My research is conducted in line with the University of Gloucestershire's *Handbook of Research Ethics* and my research plan was approved by the University. Any views expressed derive from me as a researcher and do not represent the University's position.

Your participation in this research will contribute to a profound understanding of the expertise of real estate decision makers in Germany.

I highly appreciate your participation in my research. Thank you for your time.

Kind regards

Kim Dreger

Contact Details

Ph.D. Candidate:

Name: Kim Thalia Dreger

Address:

Contact Details:

First Supervisor:

Name: Prof. Bob Ryan

Contact Details:

Informed Consent Form



Name of Ph.D. candidate and interviewer: Kim Thalia Dreger

Name of participant:

By signing this form, I consent to voluntarily participate in the research project. I have read and understood and agree to the following:

	Informed Consent Principles of this Research	Response	
1	I understand the information provided in the invitation letter.		
2	I understand that I participate in a two-stage Ph.D. research project.		
3	I understand that personal information and those related to my employer will not be published.		
4	I understand that confidentiality and anonymity will be ensured at all time.		
5	I understand that I have the right to refuse audio-recording at any time.		
6	I understand that I have the possibility to withdraw my participation in this project at any time.		
7	I understand that all material, both electronic and physical, will be destroyed after approval of my final thesis.		
8	I agree to be audio-recorded throughout the interview.	Yes	No
9	I would like to participate in the second research stage (specific information will follow via email).	Yes	No
10	I would like to receive a copy of the research result.	Yes	No

Date:

Signature:

Appendix 2 – Interview Guide

Note: This interview guide served as support material for my interviews. The participants did not receive any questions in advance and were not presented with this guide. Instead, all questions were posed and answered orally. While all thematic complexes and topics were covered in each interview, the order and style of the interview questions differed between the interviews. If further relevant topics or questions emerged (which was especially the case for the first few interviews), this interview guide was complemented accordingly.

1) Introduction & first question

- a) [I first explained my background, my research procedure, ensured that the participant agreed to be recorded, asked the participant to sign the approval form, ask the participant whether they have any other questions, before starting the interview].
- b) Tell me about deal XY [the most recent deal the company has conducted in the German office market].
- c) What was your role in this process?

2) First thematic complex: criteria affecting real estate decision-making

- a) [I picked up criteria which the decision-maker mentioned as a response to question 1b), and partly picked up the following criteria if they were not mentioned before.]
- b) How relevant is the location / access / connection to public transport within a city / submarket / tenant profile / tenant creditworthiness / furnishing and the facilities, e.g. windows / whether the property is a “landmark”?
- c) What constitutes building quality for you?
- d) How relevant is “gut feeling” for your purchase decision?

3) Second thematic complex: current market environment and its changes

- a) Do you think that the Covid-19 pandemic has impacted the real estate office market? How?
- b) How do you assess the current funding situation? How relevant is financing in general?
- c) How would you assess the deal in hindsight in light of the pandemic?
- d) Has investment decision-making in general changed in your eyes in recent years?

- e) Can you think of any other long-term changes or trends in the real estate office market?
- 4) Third thematic complex: company investment profile
- a) Which countries and cities do you invest in?
 - b) What is your investment profile by investment style (core, core plus, value-add, opportunistic or developments) / asset class, except for office (hotel, residential, retail, logistics, industrial)?
 - c) Which countries and cities do you invest in?
 - d) What information do you use to decide on the location?
 - e) Do you have your own research department?
- 5) Fourth thematic complex: business plan and return
- a) What return measures are most important to you?
 - b) What is the time horizon of your investment business plan?
 - c) What returns do you expect from investments (depending on asset class)?
 - d) Where do you obtain the relevant information to make rent and return forecasts?
- 6) Fifth thematic complex: decision-making process
- a) How do you find new deals? Via brokers or off-market? What do you prefer?
 - b) How does the decision-making process work in your company?
 - c) How many people ultimately decide about an investment decision in your company?
 - d) How long does it take you (from initial enquiry to signing the purchase agreement) to buy a property?
- 7) Sixth thematic complex: ESG and green certificates
- a) [If ESG topics were not discussed earlier in the interview, one of the last topics addressed was the relevance of green certificates.]
 - b) How relevant are Green Certificates for your purchase decision?
 - c) Which certification do you prefer?
 - d) How relevant is the certification level?
 - e) Do you see yourself as a market leader in this respect?
 - f) Do you have your own ESG policy or sustainability team?
 - g) Would a uniform certification scheme for real estate investments be useful?
- 8) Conclusion of interview
- a) Are there any topics that were not appropriately addressed or anything that you wish to add?

- b) Description of next research steps and plan regarding Research Phase 2.
- c) How many years of relevant experience do you have with real estate investments?
- d) Based on your network, do you know another real estate decision-maker who might be interested in taking part in my research? [I asked this question only to the point where data saturation was not achieved]

Appendix 3 – Full Transcribed Interview – German (Original) Version

Kim Dreger (KD) as researcher and interviewer and Interviewee 22 (I22)

I22: Also, ich bin hier seit [...] als [...] zuständig für die Transaktionsankaufs- und Verkaufsentscheidungen für den deutschen Markt. [...] Real Estate ist eher "New Kid on the Block". [...] hat man sich entschieden, im [...] Konzern [...] diesen Bereich mit als Investmentstrategie aufzubauen, hat sich da natürlich relativ lange Gedanken gemacht. Das wurde alles aus [...] gesteuert - in welche Region man geht, in was für eine Asset-Klasse, wie sollen die Fonds aussehen, welche LPs kommen da rein und so weiter und so fort. Man hat sich dann schlussendlich dazu entschieden, ein Core Plus/ Value Add-Vehikel aufzusetzen, also im Endeffekt einen Hybrid mit Core Plus-Renditen zwischen [...] Prozent und Value Add-Renditen von [...] Prozent. Und dann bei dem Value Add eher Themen, wo man sich größere Refurbishments anschaut, und bei den Core Plus-Themen dann eher leichte CapEx-Themen und Vermietungs-Story oder Aufmietungs-Story. Das alles im ersten Fonds in [...] Regionen, in [...]. Wir haben auch in jeder dieser Region ein Team vor Ort. [...] Wir kümmern uns letztlich um Ankaufsthemen, aber auch um das Asset Management der ganzen Objekte, die wir im Endeffekt dann kaufen. Natürlich immer mit dritten Partnern, die vor Ort sind und sich um Vermietungsthemen kümmern, oder auch Architekten, die sich um Ausbauten, Umbauten oder auch Developments kümmern - da holen wir uns Partner rein. Stand heute haben wir im Immobilienbereich circa [...] Assets under Management in den [...] Regionen. [...] Der [...] Fonds investiert jetzt auch noch in [...]. Zumindest haben wir das vor. Also haben wir jetzt auch Anfang des Jahres, beziehungsweise Ende letzten Jahres ein Team aufgebaut mit zwei Leuten, die letztlich den [...] Markt für uns covern.

[...]

KD: Es gibt auch schon einige spannende Deals, die Sie gemacht haben in den letzten Jahren. Und die letzte Transaktion, zu der ich etwas herausfinden konnte, war [...]. Können Sie mir etwas zu dem Deal erzählen? Wie kam es zu dem Ankauf von [...].?

I22: Also im Endeffekt kam der Ankauf von [...] so, dass wir sehr gute Erfahrungen mit dem Standort gemacht haben. Also, wir haben durch den Ankauf von [...] das zweite Investment in [...] gemacht. Ich war immer sehr [...] -fixiert, damals schon. Ich wollte unbedingt etwas in [...] kaufen, und [...] war das zweite Objekt, nachdem wir schon mit dem Ersten ganz gute Erfahrungen gemacht haben. Und wir haben gemerkt, dass dieser Standort sich sukzessiv auch von den Interessenten, potenziellen Mietern etabliert und mehr und mehr etablieren wird. Und dann hat man natürlich auch so Themen gehabt wie Infrastruktur, auf die wir achten, und öffentliche Verkehrsanbindung. Man braucht immer eine „Story to tell“. Wenn man mit einem Investor zusammensitzt und den Fonds verkaufen will, muss immer eine Story da sein. Ja, und eine Story lebt auch davon, dass man relativ schnell den Jeweiligen catcht. Zum Beispiel, wenn man sagt, ich habe in [...] ein Objekt gekauft. Im Zweifel weiß die Person aus [...] gegenüber von mir nicht, wo [...] ist. Er weiß aber auch nicht, wo [...] ist. Aber wenn ich ihm sagen kann, dass es unmittelbar [...] ist, da sind die relativ schnell dabei und verstehen, dass es Sinn macht, denn das haben die schon mal gehört. Ich weiß, dass da die höchsten Mieten bezahlt wurden und kann das schön auf einer Karte zeigen.

Und so kam es halt dazu, dass ich mich mit dieser Location auseinandergesetzt habe. Und ich habe dann auch gesehen im Rahmen des Due Diligence-Prozesses von [...]. Ich habe gesehen, diese [...] -Straße entwickelt sich super nachhaltig. Es kommen interessante Mieter hin. Die Mieter machen nicht wie zum Beispiel in anderen Locations und anderen Objekten kurzfristige Mietverträge, sondern die committen sie schon relativ lange für diese Locations. Beispielsweise, ein [...] macht normalerweise nur Fünf-Jahres-Mietverträge, aber da haben die gleich einen Zehn-Jahres-Mietvertrag gemacht. Das heißt für mich ja auch schon, dass eine Evidence geschaffen wurde an dem Standort. Wenn ich sehe, dass sich in der Ecke gute hochpreisige Restaurants platzieren, wo halt viel Traffic kommt, wo Touristen hinkommen, dann merke ich auch, die Ecke scheint irgendwas zu haben. Und unmittelbar in der Nähe war dieses Objekt. [...] hatte damals einen kleinen Prozess gemacht. Ich kannte die Jungs ganz gut, wir haben uns ausgetauscht, Strukturierung hat gepasst. Haben wir gekauft. Und dann ist im Endeffekt die Story aufgegangen, wie wir uns das auch gedacht haben. Die Nachfrage nach so einem Produkt, nach der Ecke war sehr gut und es war vom Einstand her möglich, auch Mietflächen nicht unbedingt zu den Topmieten zu platzieren, sondern einen Sweetspot zu finden, der im Endeffekt eigentlich nur in den Outskirts möglich wäre.

Und wir haben dann natürlich gesagt, es gibt verschiedene Möglichkeiten. Wir haben unterschiedliche Mietansätze, einmal das Full Package, also wo wir den Mieter den besten Ausbau ermöglichen, die beste Ausstattung zu Miete X. Alternativ nehmen die Mieter die Fläche so wie sie ist und machen den Ausbau selbst. Das Gute war in dem Fall, dass alle Mieter, die sich letztlich für dieses Objekt interessiert haben, aus einem sehr, sehr guten Umfeld kam. Also sprich ein gutes Credit Rating hatten, reputable Unternehmen waren. Die haben sich für die Variante entschieden, lieber höhere Miete, aber dafür einen top Ausbau, ein top repräsentatives Büro. Das hat sich dann natürlich entsprechend auch auf die Durchschnittsmieten an diesem Standort niedergeschlagen. So. Und dann kam natürlich noch [...], die mit [...] unweit von dem Areal [...] Objekte gekauft hatten im Jahr [...] und da auch massive Refurbishments gemacht haben. Auch sie haben gemerkt, dass [...] dort hin gekommen ist aus [...]. Dann ist [...] dahingezogen, die am Markt waren und gesagt haben wir wollen eine coole Ecke für unsere Mitarbeiter. Das ist ein super erfolgreiches Unternehmen, das in [...] sitzt, die aber gesagt haben, wir brauchen neue Mitarbeiter, wir wollen uns internationaler aufstellen und entscheiden uns für diese Location. Das hat auch alles dazu beigetragen, dass die Mieten da leicht hochgegangen sind. Dass die Infrastruktur sich da noch weiter verbessert hat.

Und dann kam im Endeffekt die Möglichkeit. Es gab immer dieses Baufeld nebenan. [...] Ich habe damals mit [...] eng zusammengearbeitet, und ich wusste, dass [...] dieses Areal damals gekauft hat, ein Baurecht geschaffen hat und an [...] verkauft hat. Und dann sind wir in die Diskussionen gegangen mit [...] und haben gefragt, ob sie verkaufen wollen. Aber wir wollen das entsprechend strukturiert haben, sodass es für unseren Fonds Sinn macht. Und wir hatten die Insights, dass da Mieten zu erzielen sind, an die vielleicht [...] als sehr konservativer Investor nicht geglaubt hat. Wo wir dann gesagt haben, wir kaufen euch das Objekt ab, Kaufpreis X. Ihr stellt uns das Haus so hin, wie wir es gerne hätten. Ihr übernehmt das hundertprozentige Baurisiko in dem Fall, und wir übernehmen das Risiko der Vermietung. Dann ist es im Endeffekt so gekommen, dass wir da einen Deal strukturieren konnten, auch ein für beide Seiten guten Deal. [...] hätte den Kaufpreis wahrscheinlich so nicht auf dem Schirm gehabt und sind aus dem Vermietungsrisiko rausgekommen. Das heißt, sie können direkt an ihr Board gehen und sagen, wir haben eigentlich nur das Baurisiko. Wir haben einen unterzeichneten GU-Vertrag sind da hundertprozentig abgesichert, und das Vermietungsrisiko nimmt [...].

KD: Und Sie?

I22: Genau, wir haben Vermietungsrisiko. Und wir haben noch nicht verkauft. Ja, aber [...] hat auf jeden Fall einen guten Deal gemacht. Und wir haben dann zeitnah das Vermietungskonzept umgekrempelt. Wir haben die Grundrisse abgeändert, haben mit dem GU über verschiedene Ausbaustandards gesprochen. Wir haben besprochen, was er liefern kann und was das Gebäude alles kann, weil das Gebäude kann nämlich sehr, sehr viel. Das war auch wieder ein Fakt, der für das Gebäude und für das Investment gesprochen hat. Weil so gut ausgestattete Gebäude gibt es in der Location im direkten Umfeld nicht.

Ja, sowohl die neuen Häuser von [...], dann hier das Haus von [...], das Haus von uns, die haben nicht diesen Standard. Das Haus schon, also brand new. Und der Mieter, der reingeht, hat noch ein bisschen weiteren Entfaltungsspielraum, sich eine Corporate Governance zu schaffen und eine Corporate Identity. Wir sind dann mit [...] relativ früh in Kontakt getreten als potenziellen Mieter, die aus dem [...] raus wollten und haben dann mit [...] den Mietvertrag gemacht. Ja, es ist natürlich noch viel Leerstand mit einem Haus. [...] Aber der Büroteil muss natürlich jetzt auch noch weitervermietet werden. Uns war es sehr wichtig, dass wir erst mal einen Ankermieter da reinholen, in die schlechteren Flächen im Haus. Also, unsere Strategie ist grundsätzlich immer, bei Projektentwicklung oder bei Neubauten, wir versuchen immer, die untersten Etagen zu vermieten. Also versuchen dann natürlich auch mit einem guten Mietzins den Mieter anzulocken, um halt erst mal einen Namen dem Gebäude zu geben. Das heißt, wenn jemand am Markt in [...] über das Haus spricht, dass jemand sagt okay, das [...], da zieht [...] ein. Das ist so ein Catching-Thema. Und das wiederum ist auch eine gute Story den Investoren gegenüber wenn wir den Fonds verkaufen. Also erster Mieter ist ein Mieter mit Namen. Der hat natürlich dann auch eine etwas günstigere Miete, aber wir wollten halt den Mieter da drin haben. Und das zieht natürlich auch weitere potenzielle Mieter an, die dann auch direkt auf uns zukommen und sagen, wir überlegen auch gerade und gibt es noch Flächen. Wir vermieten natürlich immer sehr exklusiv. Das ist so ein bisschen die Idee [...].

Also, wir konnten vermieten. Wir hatten Insights über den Vermietungsmarkt, über den Standort, weil wir selber vor Ort erfolgreich vermietet haben, weit über dem, was wir gedacht haben. Wir hatten kein Baurisiko, was für uns damals, also alles vor Corona, für uns das größte Risiko am Markt war. Also bauen, GU einloggen, im Zeitplan bleiben, delivern zum geplanten Zeitpunkt. Ja, das muss uns der Verkäufer liefern. Da hatten wir Angst vor, und das haben die uns genommen, und wir hatten wir im Endeffekt freie Fahrt, das Haus von Anfang an so mit dem GU und mit dem Projektentwickler zu konfigurieren, um auf die Mieterwünsche einzugehen. Was natürlich auch ganz gut in die Karten spielt wiederum auch was Corona angeht, gerade bei dem Haus. Wir sind im Rohbau, sodass wir jetzt sehr viel Spielraum haben auf potenzielle Hygieneregeln, auf Konfigurationen der Mietflächen ganz gut eingehen zu können. Und zum Beispiel das ist ein Haus, was von der technischen Ausstattung einen sehr hohen Standard hat. Das heißt die ganzen Lüftungsgeräte, die Kälteanlage, die sind alle entsprechend so dargestellt, dass man eine ordentliche Raumluft bekommt. Und dass sich da auch der Mieter wohlfühlt, wenn es wieder zurück ins Büro geht.

KD: Okay, also, würden Sie jetzt sagen, im Nachhinein, wo Corona kam, hätten Sie einen anderen Kaufpreis bezahlt? Oder denken Sie, dass es trotzdem noch ein guter Preis war?

I22: Nein, ich hätte einen geringeren Kaufpreis gezahlt. Also der Deal heute so, wie [...] verkauft wurde oder wie wir gekauft haben, wäre jetzt eine andere Situation, das muss ich schon sagen. Weil jetzt ist nicht nur das Baurisiko da, sondern ist auch noch ein Vermietungsrisiko. Also wie gehen wir bei Kaufentscheidungen ran? Das ist ja genau Ihr Thema, Einflussfaktoren. Es ist ja immer so, dass wir uns immer irgendwo auch den Markt anschauen müssen. Also, wir können jetzt nicht einfach draufgehen und sagen, ich schreibe jetzt die Miete rein, und ich schreibe den Exit Faktor rein, und ich schreibe jetzt die

Kosten rein, sondern wir müssen das irgendwo benchmarken. Das Erste, was ich mache oder was auch im Endeffekt unser Investmentkomitee dann fragt, ist, wie ist denn die Vermietungsleistung in den letzten Monaten da gelaufen? Benchmarke mir das mit den letzten fünf Jahren, benchmarke mir das mit den letzten zehn Jahren. Letztes Jahr, [...] Take-Up in [...]. Spitzenmieten von [...] Euro, Leerstand von [...] Prozent - darauf habe ich gepreist. Der Leerstand ist jetzt bei [...] Prozent. Das heißt, wir haben mehr Leerstand, gut, Neubauaktivitäten sind zurückgegangen. Das heißt, es wird in Zukunft vielleicht auch ein bisschen weniger Produkt geben, aber der Take-Up ist auch um 40 Prozent abgeflacht. Das heißt, die Unternehmen, die wir da vielleicht letztes Jahr in unserem Businessplan als potentielle Interessenten vermerkt hatten, die haben erst einmal auf Pause gedrückt. Die werden dieses Jahr auf jeden Fall keine Entscheidungen machen, und die werden wahrscheinlich auch nächstes Jahr keine Entscheidung machen. Deswegen würde ich den Risikofaktor bei dem Deal, den ich damals nur auf das Thema Bauzeiten gelegt habe, jetzt beibehalten, plus Risikofaktor auf Vermietung. Und Vermietung heißt Leerstandszeiten und Mietzinsen.

KD: Okay, sehen Sie da einen Einfluss auf den Markt?

I22: Für so ein Produkt ja. Auf jeden Fall. Also alle Objekte, egal in welcher Lage, egal in welcher baulichen Verfassung die Häuser sind, Leerstand ist im Moment kein Deal Driver. Also, wir schauen schon, auch wenn wir jetzt ankaufen - und wir sind sehr zurückhaltend in dem Bereich - schauen wir schon, dass wir zumindest über die nächsten ein bis zwei Jahre soliden Cash flow drin haben. Um dann uns jetzt die Zeit zu nehmen, zwei Jahre oder vielleicht sogar länger an einem Objekt zu arbeiten, das Objekt neu zu positionieren. Aber wir gehen sicher, dass wir in den nächsten zwei Jahren erst mal mit keinem Mietausfall rechnen müssen. Das ist schon wichtig.

KD: Auf jeden Fall. Das ist ganz interessant. Ich habe im Rahmen der Interviews bereits ein paar Leute gesprochen. Und habe natürlich jeden gefragt, was wird mit dem Büromarkt passieren? Und ich habe sehr verschiedene Meinungen gehört - wenn ich das Thema google, dann kommen auch sehr verschiedene Artikel. Was denken Sie darüber?

I22: Das ist auch richtig. Ich will sicher nicht das Thema Büro grundsätzlich als obsolet hier irgendwie fassen, also ganz und gar nicht. Ich glaube, Büro ist extrem wichtig. Büro ist ja nicht nur ein Platz, wo man hingeht, um Rechnungen aufzumachen und ein bisschen Zahlen hin und her schickt, sondern Büro ist im Endeffekt das einzige Element, was ein Unternehmen an Mitarbeiter bindet. Womit identifiziert sich einen Mitarbeiter? Der identifiziert sich besser, wenn er ins Büro kommt von der Firma, als wenn er zu Hause vorm Rechner sitzt. Genauso auch das Thema Interaktion. Da muss ich nur mal bei den [...] Kollegen [...] nachfragen. Auf was achten die bei potenziellen Kaufentscheidungen von Unternehmen? Die achten darauf, wie innovativ sind die Unternehmen. Wie viele Ausgaben haben die in F und E in den Bilanzen? Das ist ein Faktor für Innovation oder ein KPI für Innovation. Und umso innovativer das Unternehmen ist, desto wertvoller und interessanter ist das Unternehmen am Kapitalmarkt. Umso mehr Profit wird langfristig gemacht. Und dieses Thema, das funktioniert nicht von Zuhause. Man braucht den Austausch.

KD: Wie bewerten Sie die Zukunft des Büros?

I22: Das Thema ist im Moment in aller Munde, und da fragt jeder irgendwie nach. Was hältst du von Büro? Und ist das noch eine Asset Klasse für die Zukunft? Natürlich muss man dafür eine Antwort finden. Aber es ist doch so persönlich gesehen, oder zum Beispiel meine

Kollegen hier [...]. Wir haben gesagt, wir haben Einzelbüros und können entsprechend Distanz halten, was langfristig auch die Unternehmen bewerten, wenn Sie Flächenbedarf haben, oder wenn sie sich nach neuen Flächen umschaauen. Die Ratio von Mitarbeiter zu Quadratmeter, die wird wieder steigen. Letztes Jahr war die Devise, so wenig Quadratmeter wie möglich für einen Mitarbeiter. Jetzt ist es eher Other Way Around. Dann gibt man ein bis zwei Tage die Woche den Leuten die Möglichkeit, remote zu arbeiten. Dadurch ist es wieder ausgenettet. Das heißt, wir sind im gleichen Flächenbedarf wie vor der Krise. Und wie gesagt, den Leuten grundsätzlich aufzudoktrieren, du darfst nur noch von Zuhause arbeiten. Das funktioniert ja auch nicht. Hat man Arbeitszimmer zu Hause? Hat man die Ruhe effizient zu arbeiten? Klar, das funktioniert. Es hat alles funktioniert in der Zeit oder funktioniert auch jetzt wieder, in der Zeit, in der die Leute gezwungen sind, das zu machen. Aber sobald es wieder heißt, ihr dürft wieder ins Büro, ihr habt die Möglichkeit, da werden die Leute das auch nutzen.

Also klar, Gebäudekonzepte oder Flächenkonzepte, die werden sich langfristig anpassen. Was aber wiederum einen extrem positiven Faktor für Immobilieninvestoren haben kann. Weil, wenn ich mit Mietern jetzt spreche über neue Mietflächen, die haben eine andere Idee von einer Mietfläche. Im Zweifel kostet es mehr Geld, wenn ich das umbau und deren Ideen darstelle. Also abhängig davon, dass die Wirtschaft wieder ankurbelt, also, dass wir jetzt nicht in den nächsten zwei Jahren einen nach dem anderen gegen die Wand fahren sehen. Dann sieht die Welt sowieso anders aus. Nehmen wir mal an, wir glauben jetzt mal den ganzen Instituten, dass wir nächstes Jahr schon wieder das aufholen, was dieses Jahr verlorengegangen ist an Wirtschaftsleistung. Dass wir das in spätestens zwei Jahren wiederkriegen. In die Richtung gucke ich. Ich glaube, dass die nächsten zwölf Monate weiterhin schwierig sein werden, aber nicht in the Long Run. Dann werden die Unternehmen kommen und sagen, ich brauche mehr Fläche. Baue mir das bitte so aus, dann kostet der Quadratmeter Ausbau nicht mehr 300 Euro, sondern 500 Euro. Die Miete ist entsprechend teurer. Im Zweifel wird dann auch das Asset wertvoller.

KD: Das stimmt. Gar nicht so schlecht.

I22: Ja. Und ein weiterer Faktor sind ja die Yields. Wir reden jetzt die ganze Zeit über Office. Ja, was ja auch interessant ist, was wir wirklich beobachten und wir auch monitoren hier - das, was die Makler sagen, was die Core Assets angeht. Also alle Deals, die wir sehen, die jetzt wirklich in den letzten Monaten getradet wurden, die haben abartige Preise erzielt. Also die Renditen gehen weiter runter. Ja, das heißt dieses Brick and Water-Geschäft ist jetzt in Zeiten von so einer Krise weiterhin extrem spannend. Das ist ja auch nochmal ein Indiz dafür, dass auch die Immobilie, die als Asset Klasse durchaus krisenresistent ist, eine weitere spannende Anlage sein wird, auch für Value Add-Investoren. Diese Investoren kaufen, um die Immobilie da hinzukriegen, wo sie jetzt teuer verkauft wird.

KD: Sie haben das Stichwort Innovation genannt, vorhin, als sie über [...] gesprochen haben. Denken Sie, dass auch ein relevantes Thema ist bei Büroimmobilien?

I22: Ja, auf jeden Fall.

KD: Inwiefern werden Flächen oder Büroimmobilien innovativer?

I22: Naja, also erstmal glaube ich, dass die Flächen großzügiger werden und dass Hygienekonzepte kommen. Hygienekonzepte, also nicht nur Desinfektionsmittel vor der Tür, sondern es sind auch intelligente Themen wie Türen ohne Türklinke. Zum Beispiel, ich stelle mich vor eine WC Einheit, dann geht die Tür automatisch auf. Es wird keine Griffe

mehr geben an den Wasserhähnen. Vielleicht gibt es Toiletteneinrichtungen oder WCs, die eigene Waschbecken in den Räumen haben. Dann wird eine Immobile vielleicht auch intelligenter dahingehend, dass wirklich gezählt wird, wie viele Mitarbeiter kommen regelmäßig ins Büro. Wie werde ich dann entsprechend langfristig meinen Flächenbedarf organisieren. Also ich glaube, solche Themen werden schon immer wichtiger.

KD: Ist das etwas, für das sie beim Bau oder beim bei der Aufwertung Ihrer Immobilien Geld ausgeben würden?

I22: Ja, auf jeden Fall. Also zum Beispiel nochmal [...]. Da ist es so. Das war im Endeffekt auch so ein Thema, was ich hier eben bereits erwähnt habe. Wir haben jetzt noch die Möglichkeit, gerade in der Rohbau-Phase, in der wir jetzt sind, dass wir wirklich auf die Bedürfnisse von den Unternehmen eingehen können, die kommen. Und die Unternehmen haben jetzt die Bedürfnisse. Die Sicherheit und die Gesundheit der Mitarbeiter sind das A und O. Wenn man den Mietern Antworten liefert, die auf jeden Fall gefragt werden, ist das ein super Plus. Da sind auch die Unternehmen sofort bereit, für zu zahlen. Zum Beispiel innovative Konzepte, wie die Sache mit der automatischen Tür bei den Toiletten. Das wird sofort abgekauft und findet jeder super. Dazu noch beste Gebäudequalität.

KD: Was macht denn für Sie Gebäudequalität aus?

I22: Immer wichtiger finde ich Raumluftechnik. Also, dass man eine vernünftige Be- und Entlüftung hat, eine vernünftige Klimatisierung der Räume. Öffnbare Fenster. Es ist zwar nur ein kleiner Punkt, aber das macht extrem viel aus, dass man die Möglichkeit halt mal die Fenster aufzumachen.

KD: Aber das ist ja nicht überall möglich.

I22: Nee, hier kriegen wir die Fenster auch nur ein bisschen geklappt. Aber dass man trotzdem die Fenster aufmachen kann und mal ein bisschen frische Luft reinkommt, finde ich wichtig. Ich finde wichtig, dass man viel Platz hat, dass man nicht wirklich eng auf eng sitzt. Es sollte Outbreak Areas geben, wo man sich mal mit den Kollegen nicht an einem Konferenztisch setzt, sondern wo man sich vielleicht auch mal gemütlich auf eine Couch setzt und da Brainstorming Session macht, das finde ich wichtig. Darauf achten wir zum Beispiel auch jetzt für unsere - also wir überlegen auch potenzielle Flächen vielleicht neu anzumieten, ist auch wichtig für alle anderen Bereiche. Nicht nur im Real Estate. Also das wollen eigentlich alle. Dann finde ich die Erreichbarkeit des Büros wichtig, also nicht nur von der Location, sondern auch vom Eintritt. Also ich finde es zum Beispiel extrem blöd, in einem Hochhaus im vierzigsten Stock zu sein. Ich gehe lieber zwei Treppen hoch, zwei Treppen runter. Aber das ist meine persönliche Meinung.

KD: Sie würden nicht mit [...] tauschen wollen?

I22: [...], die Flächen sind natürlich super, aber ich habe lieber meinen Platz, wo ich auch mal die Treppe laufen kann und nicht schon 20 Minuten am Aufzug warte.

KD: Und Sie müssten sich mit 20 Leuten zusammen in den Aufzug quetschen.

I22: Genau, das ist auch ein Problem. Das wird es sowieso nicht mehr geben.

KD: Sie haben vorhin [...] und [...] als Hauptinvestitionsstandorte erwähnt. Warum gucken

Sie sich denn eigentlich nur [...] an? Warum genau diese Städte? Warum gucken Sie sich nicht [...] an?

I22: Machen wir auch.

KD: Achso, ich habe nämlich auf Ihrer Website gesehen, dass Sie den Fokus auf [...] legen.

I22: Ja, das sind im Moment, finden wir, mit die spannendsten Städte, mit dem meisten Potential. Wie kennen uns auch dort aus und mögen beide Städte. Aber wir gucken uns auch [...] an.

KD: Was mich auch interessieren würde ist das Thema „Bauchgefühl“. Ist das für Sie relevant beim Ankauf?

I22: Ja, ich denke schon, dass das Bauchgefühl bei jeder Akquisitionsentscheidung stimmen muss. Wenn das nicht passt, wird der Deal mit großer Wahrscheinlichkeit nicht funktionieren.

KD: Verstanden. Wie sieht es aus mit Green Certificates? Wie relevant sind sie für Ihre Kaufentscheidung?

I22: Ja, es ist natürlich auch immer wichtiger. Also es ist ein wichtiger Bestandteil. Ich glaube, das Problem ist nur - wir haben ja gewisse Klimaziele. Und was sehen wir jetzt mal wieder in der Krise? Dass diese ganzen Sustainability-Themen an Relevanz verlieren. Im Endeffekt, wir zertifizieren all unsere Gebäude. Wir müssen ESG-konform investieren. Und Corporate Governance ist wichtig. Da gehört das ESG-Thema mit rein. Und wir haben ein eigenes Modell mit einem Berater zusammen ins Leben gerufen. Das wird ein Tool, wo der Property Manager und wir Informationen von Immobilien zum Ankaufszeitpunkt einspeisen und dann fortlaufend über die Haltezeit jedes halbe Jahr immer aktualisieren. Und am Ende des Lebenszyklus der Immobilie, also wenn wir in den Exit gehen, zeigen wir auf, wie hat sich der Wert oder die Analyse über die Laufzeit entwickelt? Und dadurch zeigen wir unseren Investoren, dass wir was tun für die Immobilie und für die Umwelt, und auch für die Energiebilanz im Haus. Das ist ja auch extrem wichtig.

Und da gibt es ja gewisse Verordnungen, die uns irgendwann auch treffen werden aus der EU. Und da sind wir schon relativ früh immer dran, wenn möglich, entsprechende Maßnahmen einzugehen, die die Energieeffizienz des Gebäudes erhöhen. Also wir gehen jetzt nicht an die Fassade ran und machen nicht die Dächer auf, weil das extrem viel Kosten mit sich trägt. Das zahlt der Mieter nicht. Aber wenn wir die Möglichkeit haben, an den Heizungen Radiatoren Smart Heating oder sowas zu installieren, das machen wir eigentlich an fast jedem Haus. Wir zertifizieren alle Häuser nach BREEAM oder bei Neubauten DGNB und LEED. [...] wird DGNB Gold und LEED Platin. Dann haben wir in [...] auch ein Haus mit LEED Platin zertifiziert. Das sind dann die Neubauten und bei den Bestandsbauten gehen wir eher so auf BREEAM Very Good-Zertifikate.

KD: Sie haben wirklich zwei Zertifizierungen für die [...]?

I22: Ja, das DGNB Gold-Zertifikat, das war ein Zertifikat, das wir abverlangt haben von dem Projektentwickler. DGNB ist deutschlandweit bekannt und der höchste Standard, aber auch der schwierigste und komplizierteste Standard. Weil auch viel mit den Nutzern notwendig ist, zum Beispiel grüne Mietverträge. Wir wollen aber auch ein LEED-Zertifikat draufsetzen, weil LEED im Endeffekt für ausländische Investoren wichtiger ist. Die kennen DGNB zwar

schon, aber wenn wir das Objekt irgendwann mal verkaufen an jemanden, der aus dem Ausland kommt, der sollte dann schon sehen, dass wie auch ein gutes LEED-Zertifikat dafür generiert haben.

KD: Würde es für Sie infrage kommen, ein nicht zertifizierbares Objekt zu bauen oder zu kaufen?

I22: Nein. Also wir müssen immer zertifizieren, und das ist die Aufgabenstellung, die auch natürlich [...] uns stellt und auch die Investoren uns stellen. Und die achten da auch drauf. Wenn ich überlege, wie unsere Investoren-Präsentation vor drei Jahren aussah und wie sie jetzt aussieht, also da nimmt ESG schon einen großen Platz ein.

KD: Und sehen Sie sich da ein bisschen als Vorreiter, also als Marktführer?

I22: Nein, glaube ich nicht. Das machen auch viele andere. Also was ich so von den Konkurrenten höre, ist es auch bei denen ein Topic.

KD: Was halten Sie persönlich davon?

I22: Im Zweifel denke ich, lieber so früh wie möglich investieren in solche Themen, denn irgendwann fällt es einem auf den Fuß. Wenn ich jetzt hingehe und in meinem Businessplan im Ankauf schon eine Position dafür vorsehe, um insbesondere CapEx-Themen ein Budget einzusetzen, die im Endeffekt die Effizienz des Gebäudes verbessern, sollte man das machen, wenn der Raum da ist. Weil, wie gesagt, es kommt. Irgendwann kommt es. Es gibt schon einige Länder in Europa, wo es nicht mehr lange hin ist, dass die institutionellen Käufer angehalten sind, nur sehr effiziente Gebäude zu kaufen, also die die entsprechenden Zertifikate aufweisen. Vielleicht passiert das irgendwann auch mal bei uns. Dann am Ende stehe ich da und habe dieses Zertifikat nicht bekommen, hätte aber von Anfang an eigentlich dieses Zertifikat bekommen können, wenn ich nachhaltig das Objekt gemanagt hätte und ein paar Themen berücksichtigt hätte, und ein paar Hunderttausend Euro da rein investiert hätte. Dann hätte ich im Exit kein Problem, das an einen institutionellen Investor zu verkaufen, der dann im Endeffekt keine Pönale zahlen muss für ein Haus, was diese Zertifikate nicht hat. Das ist ja schon eine Barriere, die zukünftig noch mehr da sein wird. Und deswegen es ist schon wichtig, wenn man die Möglichkeit hat, frühzeitig da zu investieren.

KD: Verstanden. Stichwort Finanzierungsfähigkeit von einem Objekt. Was denken Sie denn über die momentane Finanzierungssituation?

I22: Naja, manche Leute ärgern sich über die aktuelle Situation. Aber man muss auch bedenken, was man die letzten fünf, sechs Jahre für Deals gemacht hat und wie die Banken da gespielt haben. Also, da haben sie wahrscheinlich alle einem in die Karten gespielt, weil die Konditionen, die wir gesehen haben über die letzten Jahre waren extrem gut. Ja, da hatte jede Bank alles finanziert, mit gewissen Voraussetzungen. Also, ich spreche jetzt nur Top-6 und unsere Asset Klasse an. Ich weiß nicht, wie es bei einer anderen Asset Klasse ist. Ich kann Banken verstehen, die im Moment bei gewissen Investmentklassen und Asset Klassen sehr zurückhaltend agieren. Die haben im Endeffekt wahrscheinlich erstmal selber ein bisschen was mit ihrem Portfolio zu tun. Die wissen nicht, was kommt. Es rollt eine Pleitewelle auf uns zu in Deutschland. Das Thema der Überschuldung, das ist ja noch offen, das wird nachhaltig Deutschland treffen, Unternehmen in Deutschland treffen. Das wird auch die Cashflows der Immobilien-Halter treffen. Das sehen wir alle noch nicht, aber die

Banken, die müssen sowas antizipieren. Und deswegen sind die natürlich jetzt auch gerade ein bisschen vorsichtig. Mit Neugeschäft und mit Beleihungswerten.

Wir haben hier einen Deal Anfang des Jahres in [...] gehabt, exklusiv. Wir haben 40 Banken angesprochen, und eine Bank hätte es gemacht von diesen 40 Banken zu den Konditionen, die wir unterschrieben haben. Die Bank hätte es im Endeffekt nur gemacht, weil wir eine sehr gute Bindung zu der Bank haben [...]. Das war ein Deal, den wir ja auch mit ziemlich viel Risiko eingepreist haben. Am Ende haben die Banken Recht behalten - wir haben den Deal dann nicht gemacht, weil wir dann im Gremium daran gescheitert sind. Und wenn ich jetzt mal so in die Landschaft schaue, der Deal ist immer noch am Markt, und der wird nicht fliegen. Der Verkäufer ist jetzt schon zweimal auf uns zugegangen, und hat es immer wieder versucht. Die Banken haben da schon ein ganz gutes Feingefühl. Und da sollte man nicht immer nur Bashing machen. Und daher klar, es ist alles teurer und wie gesagt, die Banken sehen es gerade so, dass in Zukunft vielleicht das ein oder andere Asset wieder in ihr Spielfeld kommt und die das managen müssen. Und daher kann ich es auch verstehen, dass die nur wirklich gute Häuser im Moment finanzieren, wo sie nachhaltig dran glauben. Im Value Add und opportunistischen Bereich hat man derzeit teilweise Probleme, bei Core Immobilien im Moment, da kriegst du die Finanzierung hinterhergeschmissen.

KD: Ja, Core ist auf jeden Fall beliebter bei Banken momentan. Kriegen Sie momentan viele Objekte angeboten?

I22: Ja. Also es ist viel am Markt. Ich kann das gar nicht so wirklich greifen, seit wann. Aber ich würde mal sagen, in der Woche 20 Investments? Da sind natürlich viele Sachen dabei, die von vorne hinein keinen Sinn machen. Aber es ist schon verhältnismäßig viel am Markt. Viele wollen es einfach jetzt versuchen. Im September hatte es zunächst angefangen mit den mit den größeren Themen, die dann irgendwie an den Markt kamen. Die Sachen sollten wahrscheinlich so zur Expo rausgehen, das ist jetzt rausgegangen. Aber es sind viele Objekte am Markt, finde ich.

KD: Okay, sehr gut, wenn es nicht langweilig wird im Büro.

I22: Naja, gut. Aber, wie gesagt 90 Prozent der Objekte machen für uns keinen Sinn, weil die Kaufpreiserwartungen einfach noch zu hoch sind, das Profil nicht passt.

KD: Also da müssen die Makler mal besser recherchieren, bevor sie Sie ansprechen, würde ich sagen.

I22: Das stimmt.

KD: Sehen Sie viele Off-Market-Opportunitäten?

I22: Ja, ein paar mehr als früher. Wir sehen viele Marktsondierungen von potenziellen Verkäufern, die herausfinden wollen, ob sie ihre Immobilien jetzt verkaufen können.

KD: Mit Blick auf die Zeit wollte ich sagen, ich habe noch drei Fragen thematisch und danach würde ich Sie fragen, ob sie noch Kommentare haben.

I22: Klar.

KD: Und zwar, Sie hatten vorhin schon die Target IRRs erwähnt für die beiden Asset Klassen. Was sind denn generell die KPIs, auf die Sie gucken? Gucken Sie nur auf IRR oder

schauen Sie noch andere Kennzahlen, die besonders wichtig sind?

I22: Also für unsere Fonds, mit denen wir investieren oder investiert haben, gucken wir auf IRR, Money Multiple und minimal Cash-on-Cash, weil wir durch die Core Plus-Brille auch immer eine kleine Ausschüttung haben bei den Assets. Bei dem Mandatsgeschäft, das ist eher ein Thema outside vom Fonds, wo wir halt wirklich auch Core Häuser kaufen unterm Radar, da gucken wir ausschließlich auf Cash-on-Cash.

KD: Okay, verstanden. Und wenn sie einen Businessplan aufsetzen, auf wie viele Jahre rechnen Sie normalerweise so ein Modell?

I22: Das kommt ganz darauf an, unsere Fondslaufzeit ist zehn Jahre, aber normalerweise rechnen wir zwischen drei, fünf, maximal sieben Jahren.

KD: Alles klar. Eine weitere Frage, die ich noch thematisch stellen wollte, war zum Investmentprozess. Wie läuft es dann bei Ihnen ab, wenn Sie ein Objekt haben, wo Sie sagen, das finden Sie attraktiv? Wie geht es dann weiter im Haus bei Ihnen?

I22: Wir sind ja im Endeffekt ein [...], das heißt, wir gehen am Ende an unser Investmentkomitee. Das besteht aus dem Top Management von [...]. Und die entscheiden letztlich ja oder nein, also wir sind relativ ungebunden, was Due Diligence-Kosten oder ähnliches angeht. Also wir müssen uns nicht irgendwelche DD Kosten freigeben lassen, sondern können da relativ früh agieren. Sobald irgendetwas auf den Tisch kommt, diskutieren wir das im deutschen Team. Macht es Sinn? Wie sind die Erfolgchancen? Wer ist der Verkäufer? Dann wird das einmal im Business Plan durchgerechnet, wenn diese erste Runde positiv ausgefallen ist. Dann wird ein kleiner Teaser gebaut, den schicken wir an die [...] -Runde [...]. Dann diskutieren wir mit denen kurz über den Deal. Und wenn die sagen Go, dann machen wir unsere Due Diligence, arbeiten an dem Projekt. Und dann, irgendwann, kurz vor Unterzeichnung des Kaufvertrags, gehen wir ins Investmentkomitee nach [...]. Da sitzt halt das Top Management, das fortlaufend informiert wird, wenn irgendwelche Deals erfolgsversprechend sind. Aber im Endeffekt wird die Entscheidung relativ früh zwischen den Managern getroffen. Aber die höchste Riege, die will sich halt nur mit dem Thema auseinandersetzen, wenn überall Haken gesetzt werden können. Und normalerweise geht der Deal dann auch durch.

KD: Okay, ich habe jetzt meine Fragen, nicht der Reihenfolge nach und in anderer Form, alle abgehakt. Haben Sie noch Punkte, wo sie sagen das kam ja gar nicht auf. Oder wollen Sie noch etwas erwähnen?

I22: Ja, also was ich noch empfehlen würde als Einflussfaktor für Kaufentscheidungen, das ist ja Ihr Topic. Also was jetzt wieder wichtig wird auch vor dem Hintergrund von der Pandemie und Kaufpreisfindung sind Land Values und Reinstatement Costs. Das sind Themen, die jetzt wieder an Wert gewinnen, auch in der in der Thematik Rechtfertigung von Kaufpreisen - also das ist, glaube ich, ein Thema, was ich auf jeden Fall noch ansprechen oder aufnehmen würde.

KD: Meinen Sie, dass die Lage noch mehr Wert sein wird?

I22: Nein, ich meine jetzt eher was sind die Bodenrichtwerte. Wie haben die sich entwickelt? Und Bodenrichtwerte spiegeln ja im Endeffekt die Kaufpreise der Vergangenheit wider. Zu dem Bodenrichtwert hinzu kommen natürlich dann auch noch die Errichtungskosten, und

dass ich mir dann auch mal anschau okay, ich kaufe mir jetzt ein Haus in der und der Qualität. Was kostet es, das Haus in der und der Qualität wieder zu bauen? Und wenn ich diesen Preis dem Kaufpreis abzüglich der Bodenwerte gegenüberstelle, und dann schaue, ob es Sinn macht, für das Haus, wenn ich das neu bauen könnte, 20 Prozent mehr zu zahlen, oder macht das keinen Sinn? Und das genau vor der Erwartung, wohin Mietzinsen gehen. Das war ähnlich zu dem, was ich bei [...] gemacht habe, bei dem Ankauf oder was die Kollegen jetzt auch bei [...] gemacht haben.

Also im Endeffekt, die hatten im Underwriting über die fünf Jahre extremes Marktwachstum drin in den Mieten. Deswegen konnte man damals auch diese ganzen Themen wie Reinstatement Costs dem gar nicht gegenüberstellen, weil die Mieten, die ich unterstelle, die reflektieren nicht den aktuellen Wert der Immobilie, sondern ich gucke immer in die Zukunft. Und heute ist es so, dass ich eher sage, ich glaube nicht, dass die Mieten weiterhin so steigen. Vielleicht gibt es in A Top-Lagen eine kleine Steigerung. Aber ich glaube nicht, dass wir in Deutschland in den nächsten zwei, drei Jahren Marktwachstum auf der Mietseite haben. Und daher wird es immer wichtiger sein, auch mal die Wiederherstellungskosten eines Gebäudes sich anzuschauen. Das ist glaube ich noch wichtig.

KD: Guter Punkt, danke. Das habe ich mir notiert.

I22: Ja, und ansonsten, bei einer Ankaufsentscheidung das Allerwichtigste ist die Makroview, von da kommen wir alle. Von da kommen wir auch von dem Aufsetzen des Fonds, welche Regionen europaweit, weltweit sind vermeintlicher Safe Haven. Schaut euch die wichtigsten KPIs an von den jeweiligen Ländern und entscheidet darauf basierend, ob ihr in die Länder investieren wollt. Und dann geht ihr in das Land rein. Und dann schaut ihr in den Ländern, was sind die richtigen Regionen, wo sind die ganzen Blue Chips der jeweiligen Länder stationiert? Wo haben wir eine gute Anbindung an öffentliche Verkehrsmittel? Wo ist eine gute Infrastruktur vorhanden? Wo ist eine hohe Kaufkraft, in welchen Regionen innerhalb Deutschlands oder sogar innerhalb der Städte. Dann entscheiden wir uns für eine Stadt und schlussendlich fürs Objekt. Das wird ja sogar schon heutzutage manchmal Stadtgebiet-abhängig gemacht. Das sind so Faktoren, die glaube ich auch wesentlich für nachhaltige Kaufentscheidung sind, die man immer wieder heranziehen muss.

KD: Danke, das war sehr wertvoll, auch das Brainstorming am Schluss. Werde ich auf jeden Fall aufnehmen. Aber das ist immer gut, jemandem zuhören, der dann noch mal neue Ideen reinbringt. Danke für die Kommentare.

Appendix 4 – Full Transcribed Interview – English (Translated) Version

Kim Dreger (KD) as researcher and interviewer and Interviewee 22 (I22)

I22: Well, I have been a director here since [...] and am responsible for transaction acquisition and sale decisions for the German market. [...] Real estate is more of a "new kid on the block". At the end of [...], the decision was made to build up this area as an investment strategy within the [...] department. Everything was controlled from [...] - which region to go into, what asset class, what the funds should look like, which LPs come in and so on and so forth. In the end, it was decided to set up a core-plus/value-add vehicle, e.g. a hybrid with core-plus returns of between [...] percent and value-add returns of [...] percent. Within value-add, it's more likely to deal with topics where you look at larger refurbishments. Within Core Plus, it's more likely to be concerned with light CapEx themes and leasing stories or lease-up stories. The [...] -fund covered [...] regions, [...]. We also have a local team in each of these regions. [...] Ultimately, we take care of the purchase process, but also of the asset management of all the properties that we ultimately acquire.

We always work with third party partners who are on site and take care of letting activities, or architects who take care of extensions, conversions or even developments - we bring in partners for this. As of today, we have approximately [...] assets under management in the real estate sector in the [...] regions. We [...] are now approaching the end of fundraising for the [...]. The [...] is now also investing in [...]. At least that's what we intend to do. Therefore, at the beginning of the year, or at the end of last year, we built up a team with two people who ultimately cover the [...] market for us.

[...]

KD: There have also been some exciting deals that you have done in the last few years. And the last transaction I was able to find out about was [...]. Could you please tell me about this deal? How did the purchase of [...] come about?

I22: In the end, the purchase of [...] came about because we had very good experiences with the location. So, with the purchase of [...] we made our second investment in [...]. I was always very [...] -fixated, even back then. I really wanted to buy something in [...], and [...] was the second property after we had already had very good experiences with the first one. And we noticed that this location was gradually becoming established and would become more and more popular with interested parties and potential tenants. And then, of course, there were also issues like infrastructure, which we pay attention to, including public transport connections. You always need a "story to tell". So when you sit down with an investor and want to sell the fund, there always has to be a story. Yes, and a story also depends on the fact that you can catch the person relatively quickly. For example, if you say I bought a property in [...]. Yes, in case of doubt, a person from [...] opposite me doesn't know where [...] is. But he doesn't know where [...] is either. But if I can tell him that it's right [...], they're relatively quick to get on board and understand that it makes sense, because they've heard that before. I know that the highest rents were paid there and can show the location nicely on a map.

And that's how I came to try to analyse with this location. I also saw in the context of [...] due diligence process. Well, I've seen that [...] is developing in a super sustainable way.

Interesting businesses are moving there. They don't make short-term leases like they do in other locations and other properties, but they have been committed to this location with long-term lease contracts for a relatively long time. For example, [...] normally only makes five-year leases, but here they signed a ten-year lease. For me, that already means that evidence has been created at the location. When I see that good high-priced restaurants are located there, where there is a lot of traffic, where tourists come, then I also notice that the area seems to be very attractive. And this property was in the immediate vicinity. [...] had done a small on-market process at that time. I knew the guys quite well, we exchanged ideas, the structure was right. We bought it. And then, in the end, the story worked out, just as we thought it would. The demand for such a product, for the area, was very high. It was possible from the start to place rental spaces not necessarily at the top rents, but to find a sweet spot that would actually only be possible in the outskirts.

And then, of course, we said there are different options. We have different rental approaches, one is the full package, where we enable the tenants to have the best fit-out, the best equipment for rent X. Alternatively, the tenants take the space as it is and do the fit-out themselves. Alternatively, the tenants take the space as it is and do the fit-out themselves. The good thing in this case was that all the tenants who were ultimately interested in this property came from a very, very good environment. In other words, they had a good credit rating and were reputable companies. They opted for the option of a higher rent in exchange for a top fit-out, a top representative office. Of course, this had a corresponding effect on the average rents at this location.

And then, of course, there was our [...] who bought three properties with [...] not far from the site in [...] and have also carried out massive refurbishments. They also noticed that [...] had moved there from [...]. Then [...] moved there, who were on the market and said we wanted a cool corner for our employees. This is a super successful company that is based in [...], but they said, we need new employees, we want to position ourselves more internationally and decided on this location. This has all contributed to the fact that the rents have gone up slightly in the area. The infrastructure has improved even more.

And then, in the end, the opportunity came. There was always this construction field next door[...] I worked closely with [...] at the time, and I knew that [...] had bought this site, created building rights and sold it to [...]. We entered into discussions with [...] and asked them whether they wanted to sell it. But we want to have it structured according to our preferences so that it makes sense for our fund. And we had the insights that rents could be achieved there that perhaps [...], as a very conservative investor, did not believe in. We said, we'll buy the property from you for purchase price X. You give us the property the way we want it. You take on the one hundred percent construction risk in that case, and we take on the risk of renting it out. In the end, we were able to structure a deal that was good for both sides. [...] probably expected a lower purchase price and got out of the letting risk. That means they can go straight to their board and say we actually only have the construction risk. They have a signed general contractor agreement and are one hundred percent secured on the development side, and the rental risk is taken by [...].

KD: And you?

I22: Exactly, we have the letting risk, and we haven't sold yet. Yes, but [...] definitely made a good deal. And we promptly changed the letting concept. We changed the floor plans, talked to the general contractor about different standards of construction. We discussed what he could deliver and what the building could do, because the building can do a lot. That was another fact that spoke in favour of the building and the investment. Because there are no such well-equipped buildings in the immediate vicinity.

Both the new [...] buildings, and [...] don't have this standard. This property is brand new. And the tenant who moves in has a little more room for manoeuvre to create a corporate governance and a corporate identity. We got in touch with [...] relatively early on as a potential tenant who wanted to get out of the [...], and then we signed the lease with [...]. There is still a lot of vacant space with one building. [...] But the office part has to be rented out now, of course. But it was very important to us that we first get an anchor tenant in there, in the less-qualitative areas of the building. Our strategy is always the same, whether with developments or with new buildings: We try to rent out the lowest floors. And of course, we also try to attract tenants with a good rent in order to give the building a name. That means that when someone on the market in [...] talks about the building, someone says okay, that's [...] that's where [...] is moving in. That's a catching theme. And that in turn is also a good story for investors when we sell the fund. The first tenant is a tenant with a name. Of course, at a slightly lower rent, but we just wanted to have the tenant in there. And of course, that attracts other potential tenants who then approach us directly and say that we are also thinking about moving in and asking whether there is still space available. We always lease out areas very exclusively. That's a bit like the idea of [...].

So, we were able to rent. We had insights about the rental market, about the location, because we had successfully rented on site ourselves, far above what we thought. We had no construction risk, which was the biggest risk in the market for us at the time, pre-Corona. To develop, to stay on schedule, to deliver on time. That's what the vendor has to deliver to us. They took this risk away from us, and we had the flexibility to configure the house from the beginning with the general contractor and the project developer in order to respond to the tenants' wishes. Which, of course, plays into our cards quite well, again with regard to Corona, especially with the property. We are in the shell stage, so we now have a lot of options to respond to potential hygiene rules and configurations of the rental spaces. For example, this is a building that has a very high standard of technical equipment. That means all the ventilation units and the refrigeration system are all designed in such a way that you get proper indoor air quality. And that the tenants like to go into the office.

KD: Okay, so would you say now, in hindsight, where Corona came in, you would have paid a different purchase price? Or do you think it was still a good price?

I22: No, I would have paid a lower purchase price. The deal today as it was sold [...] would be a different situation now, I have to admit. Because now there is not only the construction risk, but also a letting risk.

How do we approach purchase decisions? That is exactly your topic, influencing factors. It's always the case that we have to look at the market somewhere. So we can't just go ahead and say, I'm going to write in the rent, and I'm going to write in the exit factor, and I'm going to write in the costs, but we have to benchmark it somewhere. The first thing I do, or what our investment committee asks at the end of the day, is how has the letting performance been in the last few months? Benchmark that with the last five years, benchmark that with the last ten years?

Last year, [...] m² take-up in [...]. Prime rents of [...] euros, vacancy rate of [...] percent - that's what I priced on. The vacancy rate is now [...] percent. That means we have a higher vacancy, with declined new construction activity - which is of course not good for us. That means there may be a little less product in the future, but the take-up has also flattened out by 40 percent. This means that the companies that we might have potentially been interested parties into the areas last year have first pressed pause. They will definitely not make any decisions this year, and they probably won't make any decisions next year either. That's why I would have the keep the risk factor on the construction risk, and add a risk factor on leasing.

Letting means vacancy periods and rents.

KD: Do you see an influence on the market?

I22: For such a product, yes. Absolutely. So all properties, no matter in which location, no matter in which structural condition the houses are, vacancy is not a deal driver at the moment. So, even if we buy now - and we are very cautious in this area - we make sure that we have a solid cash flow at least over the next one or two years. We make sure to take the time to work on a property for the next two years or maybe even longer, to reposition the property, but don't have to expect any loss of rent in the next two years.

KD: Definitely. That's quite interesting. I have already spoken to a few decision-makers within the frame of the interviews. I asked everyone, what will happen to the office market? And I have heard very different opinions - if I google the topic, very different opinions emerge, too. What do you think about this topic?

I22: I certainly don't want to see the topic of the office as basically obsolete here, not at all. I think office is extremely important. The office is not just a place where you go to open invoices and somehow send numbers back and forth, but the office is ultimately the only element that binds a company to its employees. What does an employee identify with? They identify better when they come to the office from the company than when they sit at home in front of their computer. The same applies to interaction. I'll just have to ask my [...] colleagues [...]. What do they look for in potential company purchasing decisions? They look at how innovative the companies are. How many expenses do they have on their balance sheets in R and D? That is a factor for innovation or a KPI for innovation. And the more innovative the company is, the more valuable and interesting it is on the capital market. The more profit is made in the long term. And this topic, it doesn't work from home. You need the exchange.

KD: What do you think about the future of office spaces?

I22: The topic is on everyone's lips at the moment, and everyone is kind of asking about it. What do you think of office? And is it still an asset class for the future? Of course you have to find an answer for that. But it is so personally seen, or for example my colleagues here [...]. We said we have individual offices and can keep a corresponding distance, which is also what companies assess in the long term when they need space or when they are looking for new space. The ratio of employees to square metres will increase again. Last year it was always as few square metres as possible for one employee. Now it's more the other way around. We will give people the opportunity to work remotely one or two days a week. That way, it's balanced out again. That means we have the same space requirement as before the crisis. And as I said, to basically dictate to people that you can only work from home. That doesn't work either. Do you have a study room at home? Do you have the peace and quiet to work efficiently? Sure, it works. It worked at the time, is working again now, when people are forced to do it. But as soon as they say you can go back to the office, you have the opportunity, people will use it.

So clearly, building concepts or space concepts, they will adapt in the long term. But this in turn can have an extremely positive impact for real estate investors. Because when I talk to tenants about new rental spaces, they have a different idea of a rental space. In case of doubt, it costs more money if I convert it. It depends on the economy picking up again, we don't want see one after the other going bankrupt in the next two years. Then the world will look different anyway. Let's assume that we now believe all the reports that next year we will

make up for the economic losses lost this year. That we'll get it back in two years at the latest. That's the hope we have. I believe that the next twelve months will continue to be difficult, but not in the long run. Then the companies will come and say, I need more space. Please convert the space like this. The square metre of expansion will no longer cost 300 euros, but 500 euros. The rent is correspondingly more expensive. In case of doubt, the asset will also become more valuable.

KD: That's right. Not bad at all.

I22: Yes. And another factor is the yields. We're talking about office all the time now. What is also interesting, what we are really observing and monitoring here, is what the brokers are saying about the core assets. All the deals that we see that have been traded in the last few months have achieved abnormal prices. The yields continue to go down. That means that this brick and water business is still extremely exciting in times of such a crisis. This is also an indication that real estate as an asset class will continue to be an exciting investment for value-add investors. These investors are buying to get the property to where it is now being sold at a high price.

KD: You mentioned the keyword innovation earlier when talking about your colleagues [...]. Do you think that is also a relevant topic for office properties?

I22: Yes, definitely.

KD: To what extent is space or office real estate becoming more innovative?

I22: Well, first of all I think that the areas will become more generous and that hygiene concepts will come. Hygiene concepts, that is, not only disinfectants in front of the door, but also intelligent topics such as doors without door handles. For example, I stand in front of a toilet unit, and the door will open automatically. There will be no more handles on the taps. Maybe there will be toilet facilities or WCs that have their own sinks in the rooms. Then a property will perhaps also become more intelligent in that it will really be counted how many employees regularly come to the office. How will I organise my space requirements in the long term? I believe that such issues are becoming more and more important.

KD: Is that something they would spend money on when building or upgrading your properties?

I22: Yes, definitely. So, for example, in [...]. That's the way it is. In the end, that was also a topic that I mentioned before. We still have the opportunity, especially in the construction phase we are in now, to really respond to the needs of the companies that are coming. And the companies now have their needs. The safety and health of the employees is the be-all and end-all. If you provide the tenants with answers to questions that will definitely be asked, that's a super plus. Companies are also immediately willing to pay for that. For example, innovative concepts like the automatic door at the toilets. That is immediately understood and everyone thinks it's great. On top of that, the best building quality.

KD: What constitutes building quality for you?

I22: I find indoor air technology increasingly important. That is, that you have sensible ventilation and air extraction, sensible air conditioning of the rooms. Windows that can be opened. It's only a small point, but it makes a huge difference to have the possibility to open

the windows.

KD: But that is not possible everywhere.

I22: No, here we only get the windows rolled down a bit. But I think it's important that you can still open the windows and get a bit of fresh air in. I think it's important that you have a lot of space, that you don't sit really close to each other. There should be outbreak areas where you don't sit down at a conference table with your colleagues, but where you can sit comfortably on a couch and have a brainstorming session. We are also paying attention to this now, for example, for our - well, we are also considering potential new rental space, which is also important for all other areas. Not only in real estate. That's what everyone wants. Then I think the accessibility of the office is important, not only from the location, but also from the entrance. For example, I find it extremely stupid to be on the fortieth floor of a high-rise building. I'd rather go up two flights of stairs, down two flights of stairs. But that's my personal opinion.

KD: You wouldn't want to swap with [...]?

I22: [...], the spaces are great, of course, but I prefer to have my own place where I can walk up the stairs and not wait 20 minutes at the lift.

KD: And you would have to squeeze into the lift with 20 people.

I22: Exactly, that is also a problem. That will no longer exist anyway.

KD: Earlier you mentioned [...] and [...] as the main investment locations. Why do you only look at [...] and [...]? What makes these cities so exciting? Why is your focus not on [...], too?

I22: We look at that too.

KD: Oh, I found on your website that you only focus on [...].

I22: We think these are some of the most exciting cities at the moment, with most potential. We like these cities and we know them. But we would also invest in [...].

KD: What I would also be interested in is the relevance of "gut feeling". Is that relevant for you when making an acquisition?

I22: Yes, I do think that gut feeling is relevant for every acquisition decision. If it doesn't feel right, the deal will most likely not work out.

KD: Understood. What about green certificates? How relevant are green certificates?

I22: Yes, of course it is also increasingly important. It is an important component. I think at the moment the problem is - we have certain climate goals. And what are we seeing again in the crisis? That all these sustainability issues are losing relevance. The bottom line is that we certify all our buildings. We have to invest in an ESG-compliant way. And corporate governance is important. The ESG issue is part of that. We have created our own model together with an advisor. This will be a tool where the property manager and we feed in information from properties at the time of purchase and then continuously update it every

six months over the holding period. And at the end of the life cycle of the property, e.g. when we go into the exit, we show how the value or the analysis has developed over the term. In this way, we show our investors that we are doing something for the property and for the environment, and also for the energy balance in the building.

That is also extremely important. And there are certain regulations that will affect us at some point from the EU. And we are always working on this at a relatively early stage, if possible, to take appropriate measures to increase the energy efficiency of the building. So we don't tackle the façade or open up the roofs, because that would be extremely costly. The tenant won't pay for that. But if we have the opportunity to install Smart Heating radiators or something like that on the heating systems, we actually do that in almost every property. We certify all properties with BREEAM or, for new buildings, DGNB and LEED. [...] is certified with DGNB Gold and LEED Platinum. Then in [...] we also certified LEED Platinum. These are the new buildings, and for the existing buildings, we tend to go for BREEAM Very Good certificates.

KD: You really have two certifications for the [...]?

I22: Yes, the DGNB Gold Certificate was a certificate that we demanded from the project developer. DGNB is known throughout Germany and is the highest standard, but also the most difficult and complicated standard. Because a lot is also necessary with the users, for example green rental contracts. But we also want to add a LEED certificate, because LEED is ultimately more important for foreign investors. They already know about DGNB, but if we sell the property at some point to someone from abroad, they should see that we have also generated a good LEED certificate for it.

KD: Would it be an option for you to build or buy a non-certifiable property?

I22: We always have to certify, and that's the task that our parent company and the investors expect from us. And they really pay attention to it. When I think about what our investor presentation looked like three years ago and what it looks like now, ESG plays a big role indeed.

KD: And do you see yourself as a bit of a pioneer, as a market leader?

I22: No, I don't think so. Many others do that too. It's also on the agenda for competitors, according to what I hear from them.

KD: What do you personally think about green certificates?

I22: In case of doubt, I think it is better to invest in such topics as early as possible, because at some point it will fall on your foot. If I already include a position in my business plan to use a budget for CapEx topics in particular, which ultimately improve the efficiency of the building, I should do that if possible. Because, as I said, it's coming. It will come at some point. There are already some countries in Europe where it is not long before institutional buyers are required to buy only very efficient buildings, e.g. buildings that have the appropriate certificates. Maybe that will happen here too at some point. Then at the end I'm standing there and I didn't get this certificate, but from the beginning I could have actually got this certificate, if I had managed the property sustainably and taken a few issues into account, and invested a few hundred thousand euros in it. At the exit I would have no problem selling it to an institutional investor, who doesn't have to pay a penalty for a

building that doesn't have these certificates. That is already a barrier that will be even more prevalent in the future.

And that's why it's important to have the opportunity to invest early on.

KD: Understood. The next keyword is the ability to finance a property. What do you think about the current financing situation?

I22: Well, some people are upset banks in the current situation, but they should think about the deals they has made over the last five or six years and how the banks have worked. Well, they probably all played into the person's hands, because the conditions we've seen over the last few years have been extremely good. Almost every bank financed everything with certain conditions. I'm only talking about the Top-6 and our asset class. I don't know how the situation is with other asset classes. I can understand banks that are very cautious about certain investment classes and asset classes at the moment. At the end of the day, they probably have a little bit to do with their portfolio themselves. They don't know what's coming. A wave of bankruptcies is rolling towards us in Germany. The issue of over-indebtedness, which is still open, will have a lasting impact on Germany, on companies in Germany. It will also affect the cash flows of real estate owners. We can't all see that yet, but the banks have to anticipate such things. And that's why they are of course being a little cautious right now. With new business and with lending values.

We had a deal in [...] at the beginning of the year, exclusively. We approached 40 banks, and one bank out of these 40 would have provided financing at the conditions we signed. Only a single bank would finance it because we have a very good relationship with the bank. That was a deal that we priced quite high, with quite a lot of risk. In the end, the banks were right - we didn't do the deal because we failed in the committee. And if I look at the landscape now, the deal is still on the market, and it won't be sold soon. The seller has approached us twice now and has tried again and again. The banks already have a high level of sensitivity about it. And you shouldn't always just do bashing. And therefore, of course, everything is more expensive and, as I said, the banks see it in such a way that in the future one or the other asset might come back into their field of play and they will have to manage it. And therefore I can understand that they are only financing excellent properties at the moment, in that they believe in the long term. Value-add, opportunistic investors may undoubtedly be upset about the current situation, but with core real estate at the moment, you have easy access to the financing.

KD: Yes, core is definitely more popular with banks at the moment. Are you seeing a lot of market opportunities at the moment?

I22: Yes. So there's a lot on the market. I don't really know since when. But I would say 20 investments a week? Of course, there are a lot of things that don't make sense from the outset. But there is a relatively large amount on the market. Many simply want to try it now. In September, it started with the larger themes that came to the market. The deals were probably supposed to go out for the Expo Real, which I now on the market. But there are many proposals on the market, I think.

KD: Okay, very good, if it doesn't get boring in the office.

I22: Well, good. But, as I said, 90 percent of the properties don't make sense for us because the purchase price expectations are simply still too high and the profile doesn't fit.

KD: I would say that the brokers need to do better research before they approach you.

I22: That's right.

KD: Do you see many off-market opportunities?

I22: Yes, a few more than before. We see many market soundings from prospective sellers. They want to find out whether they are able to sell their properties now.

KD: Looking at the time, I wanted to say I have three more thematical questions and then I would ask you if you have any comments.

I22: Sure.

KD: You mentioned the target IRRs for the two asset classes earlier. What are the KPIs that you generally look at? Do you only look at IRRs or do you look at other key figures that are particularly important?

I22: For our funds, with which we invest or have invested, we look at IRR, money multiple and minimum cash-on-cash, because we always have a small distribution with the assets through the core plus lens. In the single mandate business, which is more a topic outside of the fund, where we also really buy core properties under the radar, we only look at cash-on-cash.

KD: Okay, got it. And when you draw up a business plan, how many years do you normally calculate for such a model?

I22: It depends, our fund term is ten years, but we usually calculate between three, five, maximum seven years.

KD: Understood. And the last question I wanted to ask thematically was about the investment process. How does it work for you when you have a property that you find attractive? What happens next in your company?

I22: At the end of the day, we are a [...], which means that we go to our investment committee at the end. That consists of [...] top management. And they ultimately decide yes or no, so we are relatively unbound in terms of due diligence costs or the like. So we don't have to have any DD costs approved, but can act fairly early. As soon as something comes up, we discuss it within the German team. Does it make sense? What are the chances of success? Who is the seller? Next, if feedback in this first round is positive, we prepare a business plan. Then a small teaser is built and we send it to [...]. We briefly discuss the deal with them. And if they say go, then we do our due diligence on the project. Afterwards, at some point, shortly before signing the purchase agreement, we go to the investment committee in [...]. That's where the top management sits and is constantly informed if any deals are promising. But in the end, the decision is made relatively early between the managers. But the highest management only want to deal with the issue if they can tick all the boxes. And usually, the deal goes through.

KD: Okay, I have now ticked off all my questions, not in order and in a different form. Do you still have points where you say that didn't come up at all? Or do you want to mention something else?

I22: Yes, regarding your topic, factors impacting the purchase decision. What is now becoming important again, also against the background of the pandemic and purchase price determination, are land values and reinstatement costs. These are topics that are now gaining in relevance again, also in the light of justifying purchase prices - so I think this is a topic that I would definitely address or include.

KD: Do you think the location will be worth even more?

I22: No, I mean rather what are the standard land values? How have they developed? And standard land values ultimately reflect the purchase prices of the past. In addition to the standard land value, of course, there are also the construction costs, and that I then also look at okay, I'm now buying a house of such and such quality. What does it cost to build the house again in the same quality? If I compare this price with the purchase price minus the land value, then I see whether it makes sense to pay 20 percent more for the house if I could rebuild it, or not. And that's exactly against the backdrop, the expectation, in terms of rent. That was similar to what I did with [...], with the purchase, or what they did with [...]. The bottom line is that in their underwriting they had extreme market growth in rents over the next five years. That's why at that time you couldn't even compare reinstatement costs, because rents that I assume don't reflect the current value of the property, but I always look into the future. And today I tend to say that I don't believe that rents will continue to rise. Perhaps there will be a small increase in prime locations. But I don't believe that we will have market growth on the rental side in Germany in the next two or three years. And therefore it will be more and more important to look at the replacement costs of a building. I think that is still important.

KD: Good point, thank you. I made a note of that.

I22: Yes, and apart from that, one of the most important factors in a purchase decision is the macro view, which is where we all come from. This is also where we come from when setting up the fund, which regions throughout Europe, worldwide are supposed safe havens. Look at the most important KPIs of the respective countries and decide based on that whether you want to invest there.

And then you go into the country. And then you look at the countries, what are the right regions, where are all the blue chips of the respective countries located? Where do we have good public transport links? Where is there a good infrastructure? We look at where there is high purchasing power, in which regions within Germany or even within cities. Then you decide on the city, and ultimately the properties. Even nowadays, this is sometimes done depending on the urban area. These are factors that I think are also essential for sustainable purchasing decisions, and they have to be taken into account again and again.

KD: Thank you, that was very valuable, also the brainstorming at the end. I will definitely record it. But that's always good, to listen to someone who then brings in new ideas. Thank you for the comments.

Appendix 5 – Coding Example

Relevance of Level of Certificatio x

- § 1 reference coded [0,17% Coverage]

Reference 1 - 0,17% Coverage

Genau, LEED Gold oder Silber oder DGNB Platin. Da ist je höher, desto besser

- § 1 reference coded [0,45% Coverage]

Reference 1 - 0,45% Coverage

Also zwischen Silber Gold? Vielleicht ein bisschen. Aber noch gibt es ja keinen richtigen Wettbewerb, ob nun Gold oder Platin. Aber das mag sich ja auch ändern

- § 1 reference coded [0,90% Coverage]

Reference 1 - 0,90% Coverage

Ja, also es gibt ja wahrscheinlich immer einen Trade-Off, dass man irgendwann sagt, man müsste man jetzt so viel mehr investieren, um die nächste Stufe zu erreichen, dass es sich nicht mehr lohnt. Aber das Ziel ist nicht, irgendein Zertifikat zu haben, sondern das sinnvollste, höchstmögliche, was geht

- § 1 reference coded [4,34% Coverage]

Reference 1 - 4,34% Coverage

Also, das Level der Zertifizierung ist schon relevant, aber nicht ausschlaggebend

- § 1 reference coded [0,13% Coverage]

Reference 1 - 0,13% Coverage

Genau. Also, das für uns im Ankauf schon wichtig

- § 1 reference coded [0,17% Coverage]

Reference 1 - 0,17% Coverage

Ja, wir wollen schon die Topliga dann haben. Immer das höchste Label in der jeweiligen, ob DGNB oder LEED, oder BREEAM

- § 1 reference coded [0,79% Coverage]

Reference 1 - 0,79% Coverage

Wir sind da jetzt nicht so drauf epicht. Es ist für uns ein nice-to-have, aber es ist kein must-have. Auch die Unterkategorisierung. Es ist einfach einfacher zu transportieren zum Investor, wenn es so was hat. Ja, dann macht es die Kaufentscheidung einfacher

Name	Files	References
1 Economic, Financial Environment	21	81
10 Quantitative Evaluation, Return	22	122
2 Letting, Transaction Market Environment, Pipeline	19	85
3 Area Usage, Tenant(s)	22	78
4 Deal Access, Relationship to Seller	21	51
5 ESG Criteria	20	100
6 Leasing, Transaction Comparables	20	66
7 Location within Submarket	20	76
8 Personal Judgement, Experience	20	57
9 Property Quality, Features	21	111

Appendix 6 – The OffIn-MAU Model

Tab 1:

OffIn-MAU Model

Office Investments Multi-Attribute Utility Model

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This MAU model supports real estate decision-making in commercial real estate. It was originally established for evaluating multi-attribute investment decisions in the German office market and is suitable for core and value-add investment decisions. The model relies on the results of a field research conducted in 2020, but all default values can be overwritten as desired.

Instructions

First step: In the "Input Properties" tab, enter the property names, select their risk type (core or value-add) and evaluate the attributes with values between 1 (not achieved) and 100 (fully achieved). Up to ten properties can be assessed simultaneously.

Second step: In the "Input Attributes & Weights" tab, the results of the study are used as the default setting and can be restored by clicking the "Restore Default Values" button (please activate macros first). You can overwrite the attributes and weights as you wish - however, the sum of all weights must add up to 100.

Results: You can view the results in the "Results" tab - the higher the final value, the better the overall rating of the object according to the MAU model.

Anleitung

Erster Schritt: Geben Sie im Reiter "Input Properties" die Gebäudenamen und Risikoklassen (Core oder Value-Add) ein und bewerten Sie die Attribute mit Werten zwischen 1 (nicht erfüllt) und 100 (komplett erfüllt). Bis zu zehn Objekte können parallel analysiert werden.

Zweiter Schritt: Im Reiter "Input Attributes & Weights" sind als Standardeinstellung die Ergebnisse der Studie hinterlegt und können durch Klicken des "Restore Default Values"-Buttons abgerufen werden (bitte vorher die Makros aktivieren). Nach Belieben können Sie die Attribute und Gewichtungen überschreiben - die Summe aller Gewichte muss jedoch 100 ergeben.

Ergebnisse: Im Reiter "Results" können Sie die Ergebnisse einsehen - je höher der finale Wert, desto besser ist die Gesamtbewertung des Objekts gemäß des MAU-Modells.

Tab 2:

OffIn-MAU Model - Property Evaluation

Add properties, select the risk type and assign attribute values between 0 (not achieved) and 100 (fully achieved) to each property for each attribute

Property Name	Risk Type	Attributes									
		Economic / Financial Environment	Letting / Transaction Market Environment / Pipeline	Area Usage / Tenant(s)	Deal Access / Relationship to Seller	ESG Criteria	Leasing / Transaction Comparables	Location within Submarket	Personal Judgement / Experience	Property Quality / Features	Quantitative Evaluation / Return
Property 1	Core	10	50	75	100	60	80	58	100	20	30
Property 2	Value-Add	100	60	80	70	45	12	30	80	90	25
Property 3	Core	50	50	60	80	90	70	20	90	90	50
Property 4	Core										
Property 5	Core										
Property 6	Core										
Property 7	Core										
Property 8	Core										
Property 9	Core										
Property 10	Core										

Tab 3:

OffIn-MAU Model - Attribute & Importance Weight Input
 Can be overwritten manually, but weights have to add up to 100

	Core	Value-Add
Economic / Financial Environment	10.42	10.36
Letting / Transaction Market Environment / Pipeline	9.80	11.79
Area Usage / Tenant(s)	10.94	9.15
Deal Access / Relationship to Seller	7.54	7.93
ESG Criteria	10.06	7.02
Leasing / Transaction Comparables	8.02	8.73
Location within Submarket	11.06	11.44
Personal Judgement / Experience	10.11	10.85
Property Quality / Features	11.46	10.44
Quantitative Evaluation / Return	10.60	12.29
Sum	100.00	100.00
Check	ok	ok

Restore Default Values

Tab 4:

