The institutionalization of sustainability in real estate valuations: a study on the Dutch logistics market.

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Management summary

Institutional real estate investors are increasingly considering the sustainability performance of their investments. The specific basis on which investors arrive at different price levels on targeted acquisitions, and specifically how sustainability is taken into account in this consideration, is however often unclear. Meanwhile, appraisers are requested to reflect the market in preparing their valuation. An increased interest and reflection of sustainability in pricing could imply that appraisers should also increasingly focus on sustainability parameters. It is therefore relevant to know the extent to which real estate appraisers assess sustainability parameters, and to what extent this is aligned with the perspective of institutional investors. Existing studies do not provide clear insights in this.

This study therefore aims to bridge the qualitative gap on sustainability and pricing. Whereas many studies have focused on the quantitative relation between sustainability and real estate values, there is a lack of understanding how sustainability is actually taken into account. In order to study this subject, the case of logistics real estate in The Netherlands is studied, applying theories on institutional change. Logistics real estate in particular have distinctive characteristics, mainly in terms of a relatively high amount of scope 3 emissions due to the tenants' transportation and distribution of goods. Simultaneously, logistics buildings generally benefit of large roofs that are qualified for photovoltaic panels. This makes logistics buildings an interesting case for investors to explore improvement possibilities, which could potentially also impact pricing decisions. On the basis of theories of institutional change, a few important conclusions can be drawn.

The starting point of institutional change is the current institutional framework in which valuations are conducted. This consists of existing regulations by valuation institutes to which appraisers should adhere, but also of the understanding of the market dynamics by real estate appraisers and how this impacts value. Due to increasing external societal and political pressure, a growing number of real estate investment companies is considering sustainability in their investment underwriting and management process. Meanwhile, the actors in this market, investors, are increasingly reflecting upon the status quo. In both instances, appraisers start recognizing this. Sustainability performance is recognized by appraisers as (becoming) important in the mindset of investors. This has resulted in a first window of opportunity to include sustainability metrics as a value determinant in Dutch logistics real estate valuations. In order for a first window of opportunity to become a critical juncture in which institutional change occurs, both a shared perception of the issues and problems at stake, and relevant ideas and solutions, should be present. This is more complicated. Even if appraisers recognize sustainability as gaining importance in the pricing assessment of investors, it is in many cases relatively hard to understand and quantify the exact impact this has. This also seems to be difficult for investors. Sustainability is simply still in the process of being discovered. A clear perception on the issues and problems and the ideas and solutions at stake to include this in logistics real estate valuations, is therewith missing. And as a result, a critical juncture, implying institutional change, is not (yet) reached.

No short term recommendations to improve the existing alignment between the real estate appraisers and institutional investors have been identified. This has to do with the phase of institutionalization; the market itself is still developing its perspective on sustainability. A critical juncture can therewith simply not be reached. We should hence acknowledge that the process of institutional change is not finalized yet. And in order for a critical juncture to be reached, the market itself should first have a clear perspective on the impact sustainability parameters have on pricing. Given that the knowledge on sustainability and logistics real estate is still evolving, this requires a bottom-up approach in which the reasoning of investors on their pricing decision is studied. Only then, a real understanding of where the logistics investment market is going in terms of the impact of sustainability on pricing, can be identified and adopted as such in the real estate valuation industry.

Management samenvatting

Institutionele vastgoedbeleggers kijken in toenemende mate naar hun prestaties op het gebied van de duurzaamheid van beleggingen. Het is echter vaak onduidelijk op basis van welke specifieke uitgangspunten het prijsniveau van transacties van deze beleggingen wordt bepaald, en hoe duurzaamheid in de overwegingen wordt meegenomen. Taxateurs worden echter wel geacht om de markt te reflecteren in hun taxatierapport. Een toegenomen interesse en reflectie van duurzaamheid in prijsbepalingen door beleggers, zou derhalve kunnen impliceren dat taxateurs zich meer moeten richten op duurzaamheidsparameters. Vanuit deze hoedanigheid is het relevant om te weten in welke mate taxateurs duurzaamheidsparameters meenemen in hun overwegingen, en hoe dit zich verhoudt tot het perspectief van institutionele beleggers. Bestaande onderzoeken bieden hier onvoldoende inzicht in.

Dit onderzoek heeft derhalve tot doel om het kwalitatieve gat inzake duurzaamheid en prijsbepaling te dichten. Diverse bestaande onderzoeken zijn gericht op de kwantitatieve relatie tussen duurzaamheid en vastgoedwaarden. Hoe duurzaamheid in prijsbepaling door beleggers wordt meegenomen en hoe dit zich relateert tot taxaties, is onbekend terrein. Om dit te onderzoeken is de casus van logistiek vastgoed in Nederland onderzocht. Karakteristiek voor logistiek vastgoed in het specifiek, is de relatief hoge mate van scope 3 emissies als gevolg van het transport en de distributie van goederen. Tegelijkertijd hebben logistieke gebouwen over het algemeen relatief grote daken die zich goed dienen voor zonnepanelen. Dit maakt logistieke gebouwen voor beleggers een interessante casus om verbeteringsmogelijkheden op te onderzoeken, hetgeen mogelijk ook impact heeft op prijsoverwegingen. Op basis van theorieën over institutionele verandering, kunnen een aantal belangrijke conclusies worden getrokken.

Het startpunt van institutionele verandering is het bestaande institutionele raamwerk waarin taxaties worden verricht. Dit bestaat uit regulaties van taxatie instituten waar aangesloten taxateurs zich aan moeten houden, maar ook uit het begrip van marktdynamiek door taxateurs en hoe dit waarde beïnvloedt. Als gevolg van toenemende externe maatschappelijke en politieke druk, neemt een toenemend aantal vastgoedbeleggingsinstellingen duurzaamheid mee in de investeringsbeslissingen en het beheerproces. De actoren in deze markt, de beleggers, reflecteren ook in toenemende mate op de status quo. Taxateurs beginnen dit te herkennen. Duurzaamheidsprestaties worden (in toenemende mate) herkend als belangrijk voor de overwegingen van beleggers. Dit heeft geresulteerd in een eerste mogelijkheid om duurzaamheidsfactoren mee te nemen als waarde-bepalende invloed in de taxaties van Nederlands logistiek vastgoed. Institutionele verandering vereist echter dat er ook een gedeelde perceptie is van problemen en oplossingsrichtingen. Dit blijkt complexer. Zelfs als taxateurs duurzaamheid herkennen als toenemende invloed in de prijsbepaling van beleggers, blijft het in veel gevallen lastig om de exacte invloed hiervan te begrijpen en kwantificeren. Dit blijkt momenteel tegelijkertijd ook lastig te zijn voor beleggers. De invloed van duurzaamheid op prijsniveaus wordt op dit moment simpelweg nog onderzocht. Een duidelijke perceptie van problemen en oplossingsrichtingen om duurzaamheid mee te nemen in vastgoedtaxaties, ontbreekt hierdoor. En als resultaat hiervan, heeft er nog geen institutionele verandering plaatsgevonden.

Op de korte termijn zijn er geen aanbevelingen om de verhouding tussen vastgoedtaxateurs en institutionele beleggers te verbeteren. Dit relateert zich tot de fase van institutionalisering; de markt ontwikkelt momenteel zelf nog haar perspectief op duurzaamheid. Institutionele verandering kan derhalve niet worden bereikt. Dit zal men moeten erkennen. Om institutionele verandering te bereiken, moet de markt eerst een duidelijk perspectief hebben op de invloed van duurzaamheidsparameters op prijsniveaus. Gegeven dat het kennisniveau inzake duurzaamheid en logistiek vastgoed zich momenteel nog ontwikkelt, vereist dit een bottom-up benadering waarin de overwegingen van beleggers in prijsbepalingen worden onderzocht. Alleen dan kan echt worden begrepen waar de beleggersmarkt naartoe gaat inzake duurzaamheid, om vervolgens zodanig te worden opgepakt in de vastgoed taxatie-industrie.

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1. Introduction

1.1 Motivation

Following the Paris agreement of 2015, compounded by the 2030 Agenda for Sustainable Development, there has been a growing interest of the real estate industry in sustainability (Ionascu et al., 2020; GRESB, 2020a; UN, 2015). Being considered a milestone in the field of sustainability and sustainable development, the 2030 Agenda has set out a framework dedicated to environmental, social and economic pillars of sustainability (Goubran & Cucuzzella, 2019). The relation between sustainability and real estate is specifically relevant to the institutional investment sector, who own and manage the majority of global commercial real estate (Pi Labs, 2020). The real estate sector as a whole contributes to circa 40 percent of the worlds carbon emissions (Deloitte, 2020).

Institutional real estate investors are hence increasingly considering the sustainability performance of their investments (CBRE, 2021a; Ionascu et al., 2020; Christensen et al., 2018; ULI, 2016). This accounts to their standing investments, as well as to potential acquisitions. The specific basis on which investors arrive at different price levels on targeted acquisitions, is however often unclear. As some scholars point out, the benefits of sustainability on real estate (prices) are in many cases assumed to exist, whilst specific empirical evidence is often lacking (Kucharska-Stasiak and Olbinska, 2018).

Meanwhile, appraisers are requested to reflect the market in preparing their valuation (RICS, 2015). This market comprises of parties involved in buying or disposing assets. An increased interest and reflection of sustainability in pricing could imply that appraisers should also increasingly focus on sustainability parameters. However, it is currently unknown which specific sustainability parameters are considered by institutional investors in their decision making process on pricing. This complicates the incorporation of sustainability attributes by appraisers. It is therefore relevant to know the extent to which real estate appraisers assess sustainability parameters, and to what extent this is aligned with the perspective of institutional investors. Existing studies do not provide clear insights in this.

In order to study this subject, the case of logistics real estate in The Netherlands is analyzed. Aside from locational differences, newly built logistics real estate have rather similar physical building qualities. This provides an opportunity to study the subject excluding potential influences on the outcomes due to other qualitative aspects of buildings. Furthermore, the logistics investment market is mainly covered by institutional investors, providing a solid basis to study the alignment between appraisers and institutional investors. In terms of its relation to other sectors, logistics real estate generally provides a relatively high share of scope 3 emissions due to its relation to tenant transportation and distribution of goods. Both appraisers and investors are in many cases also active in other sectors than logistics. The results of this study can therefore be compared to studies on other real estate sectors, to see whether differences apply.

1.2 Relevance of the study

The social relevance of this study is twofold. On the one hand, there is currently a lack of knowledge on why and how appraisers consider sustainability in their valuation decisions. On the other hand, this is also the case for the institutional investment sector; it is unclear why and how they integrate sustainability in their pricing decisions. Gaining a better understanding of the two provides a basis which may lead to a more solid and consistent approach towards the integration of sustainability in real estate valuations.

From a scientific point of view, this study will provide a more qualitative and policy oriented approach towards sustainability and real estate. Many existing studies focus on how sustainability impacts pricing, by quantitatively assessing the impact of certification schemes and therewith assuming a certain impact to exist. What is often neglected, is the rationale behind decisions. This study provides insights into this aspect of the spectrum.

1.3 Problem statement and research questions

The purpose of this study is to gain insights into how sustainability is reflected in the decision making processes of appraisers, and to what extent this is aligned with the considerations of institutional investors. In order to provide insights on this topic, the following research question has been composed:

'To what extent do appraisers in The Netherlands consider sustainability factors when assessing logistics property values, and how does this relate to institutional investor considerations?'

This research question will be answered using a conceptual model (figure 1). Furthermore, several sub questions have been established on the basis of which the research question will be answered.

1. What are traditional Market Value indicators for real estate?

2. To what extent do appraisers in The Netherlands consider sustainability factors in assessing logistics property values?

3. To what extent do institutional investors in The Netherlands consider sustainability factors in assessing logistics property values?

4. How do the considerations of appraisers and institutional investors relate to each other?

5. Are there recommendations to improve the alignment between appraisers and institutional investors?

Hypothesis

The hypothesis is that appraisers currently limitedly assess sustainability in their valuations of logistics properties, and that there is a gap in perspective on how to include sustainability in values between appraisers and institutional investors. The following conceptual framework is applicable to this thesis. This conceptual framework acts as a guideline for the structure of the thesis.

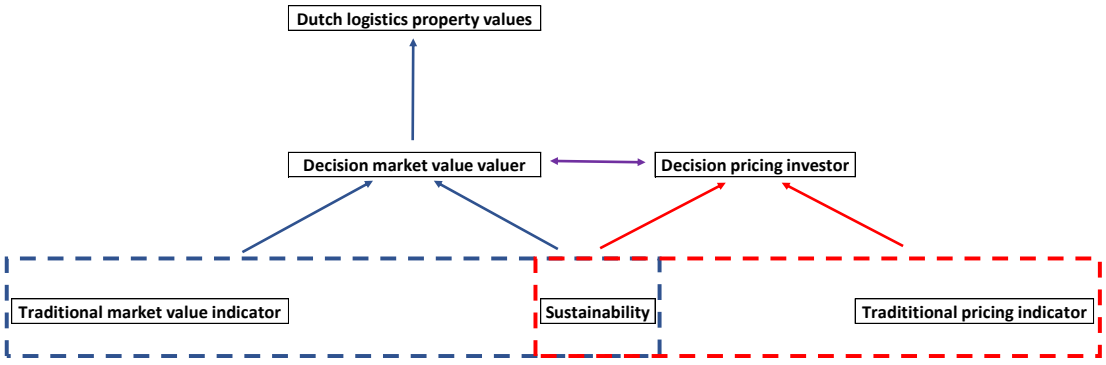

Figure 1: Conceptual Framework.

1.4 Research methods

This thesis has a qualitative character. The first empirical exercise comprises a questionnaire amongst both real estate appraisers and institutional real estate investors active in the Dutch logistics market. The outcome of this questionnaire is analyzed via descriptive statistics as well as via a non-parametric Wilcoxon Rank Sum test, in order to test how the two groups of respondents statistically relate. The second empirical exercise of this thesis consists of semi-structured interviews which are based on the outcome of the questionnaire. The interview results are thematically coded and labelled, which enables to identify, analyze and report occurring themes in the interviews. A further explanation on the research methodology can be found in chapter three.

1.5 Chapter overview

The thesis begins with a theoretical framework, in which insights are provided in the concept of sustainability in real estate, the basis of property value and how the two relate. Furthermore, the idea of sustainability in real estate as part of an institutional change is explained. After this, the research methodology will be described. In the following chapters, the results of the survey and interviews will be discussed. The thesis ends with a conclusion in which the research question will be answered, followed by a reflection and a recommendation for further research.

2. Theoretical framework

In this chapter, insights will first be provided in sustainability and how this is integrated in commercial real estate. An important focus herein will be on the assessment of sustainability parameters in real estate. It will thereafter be explained on what basis Market Value arises, after which insights will be provided in existing studies on sustainability and real estate values. This chapter concludes with the notion that theories on institutional change provide important insights into the extent to which appraisers and institutional real estate investors are related when assessing the influence of sustainability on the value of logistics real estate. This provides important first insights, and sets the basis for the empirical part of the study.

2.1 Real estate and sustainability

Defining a sustainable building

Over the last decades, the number of studies on 'sustainability' has witnessed a surge in science (Purvis et al., 2019). With this, many understandings and perceptions on the definition of sustainability have come to existence (White, 2013). In this thesis, sustainability is viewed from a corporate perspective and defined to consist of three pillars: social equity (people), environmental protection (planet) and economic viability (profit) (Purvis et al., 2019):

1) Social equity (people): the pillar of social equity covers people. It implies that business should strive to deliver an outcome that leads to social equality, rather than social inequality.

2) Environmental protection (planet): this pillar is the most well-known sustainability aspect and covers our planet from an environmental perspective. Environmental protection implies that business should strive to protect our planet, for instance by reducing the amount of carbon emissions.

3) Economic Viability (profit): this pillar implies that business should strive to be economically sustainable (i.e. profitable) and have good governance.

This perspective on sustainability transcends the historical perspective on sustainability as solely consisting of environmental matters. Many existing standards and tools on sustainability and real estate have rather been largely focused on environmental matters (Goubran & Cucuzzella, 2019). But what does a sustainable building consist of, and how does this relate to the three pillars? In this thesis, the definition of Berardi (2013: 76) is used, who defines a sustainable building as:

'a healthy facility designed and built in a cradle-to-grave resource-efficient manner, using ecological principles, social equity, and life-cycle quality value, and which promotes a sense of sustainable community

This definition clarifies that sustainable buildings comprise more than solely a green building (for instance a logistics building with photovoltaic panels), but it also makes clear that a precise definition is relatively difficult to provide (Berardi, 2013). This is amplified by the uncertainties in reaching a common perspective on what should be perceived sustainable, and the evolvement on this over time. The provided definition should therefore be considered more of an umbrella definition.

Assessing a sustainable building

Certification

The sustainability performance of a logistics asset can be assessed in several ways, of which the outcomes are often also interrelated. The most commonly used approach to define the sustainability performance of an asset, is via certification schemes focused on the general sustainability of an asset, or energy labels focused on the operational efficiency of an asset. The most widely adopted certification scheme in The Netherlands is BREEAM (Building Research Establishment Environmental Assessment Method (Mangialardo et al., 2019). This certification scheme evaluates both development projects and standing investments on different environmental categories such as energy, water, use of materials and waste. Based upon the aim, target and benchmark, assets are rated from Acceptable, to Pass, Good, Very Good, Excellent and Outstanding (BREEAM, 2021). Certification schemes such as BREEAM provide a consistent, reliable and comparable overview on environmental metrics. Other widely adopted certification schemes, similar to BREEAM, are, amongst others, LEED (Leadership in Energy and Environmental Design), Green Star, DGNB (Deutsche Gesellschaft Nachhaltiges Bauen) and HQE (Haute Qualité Environmentale) (Mangialardo et al., 2019). These certification schemes mostly focus on environmental matters. Photovoltaic panels on the roof of a logistics building for instance result in a better score. Social equity is however not covered by these certificates. With the increased interest of the real estate investment market in social equity, social certification schemes have therefore also come to existence. The most well-known social certification scheme, is the WELL Building Standard (Danivska et al., 2019). This certification scheme assesses the impact of a building on human health and well-being. In the case of logistics real estate, the presence of employee facilities such as a canteen with healthy food, results in a better WELL score.

Energy labels such as Energy Performance Certificates (EPC) solely focus on providing insights on the extent of energy efficiency of an asset. Since 2021, EPC certification in The Netherlands has been replaced by BENG (Bijna Energie Neutrale Gebouwen), which is considered a more solid instrument to assess the energy efficiency of an asset (RVO, 2021).

The main benefit of certification schemes and energy labels, is that they provide consistency in the assessment of sustainability. They also provide a relatively easy understanding on how a property scores compared to the target or benchmark score. This practically implies that even people without a background in sustainability, are still able to assess the performance of an asset by simply consulting its score. It should acknowledged that the absence of a sustainability certificate does not imply that a building is not sustainable; it could simply be that this certificate is not required and hence not available whilst the building itself is sustainable.

Efficiency measures

Efficiency measures consist of measures that have been undertaken to improve the energy efficiency of a building, therewith contributing to its sustainability performance. On this matter, the Global ESG Benchmark for Real Assets (GRESB), distinguishes between efficiency measures on energy, water and waste (GRESB, 2021a). Efficiency measures on energy for instance include wall insulation, on-site renewable energy (for instance photovoltaic panels) or smart building technologies. Water efficiency measures for example comprise of smart irrigation systems, leak detection systems and reuse of storm water (for example to be used for the sprinkler installation of a logistics building). Examples of waste efficiency measures are, amongst others, composing food waste, recycling measures and waste

management. It should be noted that efficiency measures develop over time and are also country-specific. Furthermore, compared to certification schemes and energy labels, the assessment of efficiency measures generally requires more technical knowledge.

Utility performance

Utility data performance is increasingly being tracked. One of the global leading real estate ESG tracking platforms, Measurabl, distinguishes between energy, water and waste (Measurabl, 2021). Energy can be subdivided into electricity, fuel and district heating, and waste can be subdivided into different types of waste. On each of the components, real estate investors are able to submit whether the usage is via renewable energy sources, or for instance generated on-site. Based upon the utility data, the amount of carbon emissions can be calculated. Eventually all this (historical) data can be used to compare a specific asset on its utility performance, compared to benchmark assets.

Important to consider with regards to utility performance, is the difference between landlord and tenant controlled data. In case of landlord controlled data, the landlord is responsible for purchasing or handling the specific utility. This also implies that the landlord should receive all data on this directly from the utility provider. In case of tenant controlled data, the tenant is responsible for purchasing or handling the specific utility. Implication of this is that the tenant receives all data, and it depends case by case whether a tenant is willing or able to share this data (GRESB, 2021b). In practice this can lead to data inaccuracies, hence utility data is increasingly (requested to be) audited in order to ensure the quality of the data.

Utility usage eventually results in a certain amount of greenhouse gas emissions. Three scopes of emissions can be identified, which helps landlords to delineate the source of emissions (GRESB, 2021c). Scope 1 emissions consist of direct emissions that physically occur from sources of an asset owned or controlled by a landlord. Emissions are in this case released on-site. Examples of this for logistics real estate are natural gas that is combusted in a boiler on-site, but also emissions being released due to the burning of fuel in production related activities.

Scope 2 emissions are considered indirect emissions, and consist of emissions from purchased utilities, emissions therewith being released elsewhere. In the case of logistics real estate, electricity is for example purchased to provide energy for lighting.

Scope 3 emissions, referred to as other indirect emissions, are released as a consequence of the operations of an organization that are not directly owned or controlled by an organization (Carbon Trust, 2021). Examples are the emissions being released from the tenants' transportation and distribution of goods, waste generated in the operations of an asset and employee commuting. Scope 3 emissions are therefore highly relevant for logistics buildings, as these buildings form the hubs within a wider transportation network.

Climate related risks

Climate related risks have become of increasing importance in the assessment of the sustainability of an asset. A distinction can be made between physical climate risks, and transitional climate risks (MSCI, 2020). Transitional climate risks cover risks that arise from the (dis)ability to be able to (financially) meet decarbonization targets. A recent tool that has been developed with funding from the European Union, is CRREM (Carbon Risk Real Estate Monitor). This tool aims to provide insights in the stranding risks of an asset and the retrofit actions that can be undertaken in order to prevent stranding from

happening, considering expected future energy performance (CRREM, 2020). CRREM (2021) defines stranded assets as *'properties that will not meet future energy efficiency standards and market expectations and might be increasingly exposed to the risk of early economic obsolescence'.* Tools such as CRREM also assess expected future energy performance of an asset, specifically the amount of carbon emissions that are expected to be emitted, and link this to economic consequences. This is an important difference compared to just benchmarking assets based upon their historical utility performance, as it provides guidance on when to act on an assets' energy performance, in order to prevent stranding from happening. It furthermore considers the lifetime performance of an asset, rather than solely considering historical performance. Considering the need for decarbonization, and the role of the real estate market in reaching this, it can well be expected that tools such as CRREM will play a more important role in strategic real estate decisions going forward.

Physical climate risks consist of risks that are related to extreme weather conditions and the potential physical impact this has on a building. This for instance covers wildfires, water stress, earthquakes, floods, heat stress, hurricanes and typhoons and sea level rise (De Bruin et al., 2019). Based upon indicators evolved from climate science, insights can be provided on the extent to which a particular asset is facing a particular physical climate risk. It is of course highly location dependent which specific climate risk is more at stake. Based upon the analyzed level of risk at stake, landlords may pursue a specific risk management strategy (De Bruin et al., 2019). There are of course also risks that cannot be managed. In those instances, it becomes a more strategic decision whether an asset should be held in a portfolio. From a financial perspective, it is highly likely that if certain risks are relatively high and cannot be mitigated, this has an impact on the value assessment of the asset. This does require that there is an understanding of the physical climate risks at stake. The recent floods in the summer of 2021 in Germany, Belgium, Switzerland, Austria, Luxembourg and The Netherlands have amplified the understanding of the existence of this risk, with also logistics real estate being damaged.

What about social equity?

Most of the discussed ways to assess the sustainability of an asset, cover environmental topics. Social equity deals with how companies can reach social equality instead of inequality. Compared to indicators related to utility usage and carbon emissions, this is more difficult to measure. On this topic, INREV (2020: 12) concludes the following: '*Indeed, there may not be any appropriate indicators available within existing measurement frameworks for a specific real estate impact strategy. In such case indicators will need to be defined and described as part of developing the investor's own processes*'. The United National Sustainable Development Goals (SDG's) can be used to categorize social equity of real estate investments (INREV, 2020). Yet, the measurement and the extent to which is contributed to the SDG's, still remains rather interpretative. Although WELL certification provides an standardized approach to measure health and well-being, the measurement of metrics that relate to social equity generally seem to be a more interpretative process, that also relates to the specific targets that a company has set. Indeed, topics such as well-being and health are relatively subjective compared to for instance the amount of electricity that is used over a year. An overarching issue with measuring social equity compared to measuring environmental issues, therefore seems to be subjectivity versus objectivity. Standardization of measurements on more subjective data, such as for instance the idea of a standardized approach to calculate a Social Return on Investment (Watson & Whitley, 2016) could help in improving this comparability.

2.2 The basis of property value

The sections above have clarified that there are several ways to assess the sustainability of an asset. The question is how this potentially fits into the valuation of a building. In order to get insights in this, we first need to understand the basis of property value.

Market Value is a widely and internationally accepted concept within commercial real estate. According to IVS 104, paragraph 30.1 (IVSC, 2020), Market Value is defined as:

'the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion'

Although there are different methods of estimating the Market Value of real estate, it is primarily the reflection of supply and demand (Wyatt, 2013). This supply and demand covers real estate that is held as an investment and subsequently leased to a third party, and real estate that is held by owner-occupiers. The most commonly used methods to determine Market Value of logistics real estate, are income capitalization and vacant possession value based upon direct comparison (Van Gool et al., 2013). As Van Gool et al. (2013: 316) state, the outcome of an appraisal should in essence not be related to the applied methodology to arrive at this outcome; there is just one Market Value. Most important with regards to this study is to understand that Market Value is largely related to a play of supply and demand. Several value determinants can be distinguished that relate to this play of supply and demand in logistics real estate. These explain why certain assets are considered more expensive than others. In the next section, this will be explained in more depth.

Traditional value determinants

Market-related (macro-/meso)	Property-specific (micro)
Inflation	Building size
Household disposable income	Plot size
Consumer spending	Building age
Political circumstances	Accessibility
Access to employment	Ownership (leasehold/freehold)
Production costs	Zoning possibilities
Availability of finance	Physical condition
Demographics	External appearance
Quality of infrastructure	Load-bearing capacity
Development pipeline	Clear eaves height
Existing stock	Ease of access
Existing supply	Number of loading docks
	Divisibility
	Weighted Average Lease Length (until break)
	Tenant covenant strength
	Operational expenditures
	Capital expenditures
	Rental income versus rental value

Table 1: Traditional Value Determinants (based upon Wyatt, 2013 and Van Gool et al., 2013).

For both rental levels, capitalization rates and capital values, several determinants can be distinguished that impact the perceived quality and value of a logistics asset. In this respect, Wyatt (2013) distinguishes between property-specific factors and market-related factors. Property-specific factors for instance consist of physical quality, legal conditions or annual operational expenditures. Market-related factors include the broader market environment in which an asset is situated, such as consumer spending, cost and availability of finance, crime rates or inflation. Van Gool et al. (2013: 307) distinguish between (1) macro-factors: factors that concern the wider economic circumstances of an asset that cannot be impacted directly by the asset owner, such as for instance employment opportunities, (2) meso-factors: factors that concern the direct surroundings of an asset that can also not be impacted directly by the asset owner, such as for instance crime rates, and (3) micro-factors: factors related to the specific qualities of an asset itself that can be impacted directly by the asset owner, for instance the state of repair. One could argue that macro-factors and meso-factors relate to the market-specific factors as mentioned by Wyatt (2013), whilst micro-factors relate to the property-specific factors. Using both the distinction of Wyatt (2013) and Van Gool et al. (2013), a framework can be used to distinguish between different value determinants that are recognized as important in the market. The traditional determinants as mentioned in table 1 are based upon literature by the aforementioned. Cells highlighted in grey comprise of determinants that are specifically relevant to the logistics sector. Important to consider is that these indicators could well influence capitalization rates, capital values as well as expectations on rental income.

Market circumstances of logistics real estate

Before continuing, it is important to understand the current market circumstances of logistics real estate. In this thesis logistics real estate is defined as a building that is used for storage, order picking and distribution of goods, of at least 10,000 sqm (Maschinenmarkt, 2019). A fundamental driver for the performance of logistics real estate is location (INREV, 2017). Half of the costs of logistics operators consist of transportation from and to a location. Hence, a good location is considered essential in order to manage these costs.

The Netherlands is considered to be a key location for logistics operations in Europe, benefitting from its national distribution system and links to the international network. In 2020, the total logistics real estate stock in The Netherlands consisted of 41 million sqm (CBRE, 2021c). Of the ca. 2,480 BREEAM certified assets in The Netherlands in 2020, 816 certifications (33%) belong to the logistics sector (CBRE, 2021c).

In recent years, the demand for logistics real estate has witnessed an increase. This is mainly driven by urbanization, e-commerce, and a general economic uplift (Prologis, 2020). As a result, vacancy levels have been decreasing, whilst rental levels have been on the rise (Prologis, 2020). Meanwhile, occupier take-up is considered to currently exceed the availability of space (Cushman and Wakefield, 2021).

This is also reflected in the logistics investment market, with yields decreasing and investment levels increasing (Cushman and Wakefield, 2021). Over 2020, about EUR 4 billion has been invested in logistics real estate in The Netherlands, which is considered to be a record (CBRE, 2021b). As a result of the high demand, core logistics properties have become more scarce. Investors are therefore also increasingly considering core+ and value-add logistics investment opportunities (Cushman and Wakefield, 2021). These opportunities generally reflect a higher anticipated investment risk compared to core strategies, and generally require more asset management activities in order to perform. With

regards to sustainability, this could for instance imply a strategy to purchase a building that is obsolete in terms of sustainability, with the aim of improving this, hence improving its attractiveness.

Of the ca. EUR 3.4 billion of investments in the Dutch logistics sector in 2020, ca. 12% was invested by Dutch investors, whilst the remaining 88% was invested by foreign investors (NVM Business, 2021). This largely comprises of institutional investors, who are increasingly considering the sustainability performance of their investments (CBRE, 2021a; Ionascu et al., 2020; Christensen et al., 2018; ULI, 2016).

2.3 Sustainability and real estate: outcomes of existing studies

Historically, sustainability factors have not been specifically reflected as being a value determinant. This explains why these are absent in the overview of table 1. It should however be acknowledged that sustainability factors could have already been indirectly reflected in the traditional value determinants. In recent years, there has been an increase in studies on the relation between specific sustainability attributes and the value of an asset. These studies have primarily been conducted on office properties, and industrial properties are not reflected. This is likely related to the availability of data on certificates and assets, historically high investment volumes in office buildings and the significance of office space in the urban environment.

In a paper on the economic value of green office buildings in the U.S., Eichholtz et al. (2010) found the first credible evidence on the economic benefits of green building certification. The focus of this study was on LEED and/or Energy Star labels. Controlling for the quality and location of a building, rental rates were found to be three percent higher. Premiums in rents were found to be more than six percent higher, and selling prices about sixteen percent higher. It should be acknowledged that this study was conducted in the office market in the United States in 2010, hence this is not fully comparable to the subject of logistics real estate in The Netherlands in 2021. The approach of this study has been rather top-down. The decision making process itself is not studied, rather a certain relation between green building certification and economic benefits was assumed to exist and thereafter studied.

Mangialardo et al. (2018) have analysed 55 office development projects in Milan on the premium price that is generated in certified projects, relative to non-certified projects. They found that high levels of sustainability present a premium price, and also reflect less time to be leased. Properties certified at the highest LEED certification level (Gold/Platinum) for instance show a premium of 7% and 11%. They also expect non-certified assets to suffer increasingly compared to certified assets. An important limitation in the study of Mangialardo et al. (2018) is that they do not properly explain how they have considered other asset characteristics and the impact that this has on a potential premium price. This could potentially interfere with the assumed separate impact of sustainability attributes. This is for instance shown in a study on 160 European office properties by Ott and Hahn (2017), who relativize green pay-off evidence. They found that including ‘Super Trophy’ characteristics significantly reduces the positive impact of strong certification on values and rents. A second limitation is that the approach of Mangialardo et al. is relatively top-down; the starting point of their study is the assumed benefit of certified projects versus non-certified projects. Although this perspective is understandable, it lacks sufficient qualitative understanding of what is actually included in the decision making process of the actors at stake. A third limitation of their study is that it focuses on green buildings. Although this was also the purpose of their study, it should be noted that social attributes are also considered more relevant in today’s real estate market (Danivska et al., 2019).

Where Mangialardo et al. (2018) focused on transaction premiums on office buildings in Milan, Chegut et al. (2020) studied valuation premiums of energy efficiency on residential properties in England and The Netherlands, and to what extent this changed between 2010 and 2015. This is an important difference, as Mangialardo et al. (2018) essentially studied the market, whilst the appraisers that are studied by Chegut et al. (2020) should reflect the market. Chegut et al. (2020) found that energy efficiency, specifically assessed by analyzing energy labels, has increased in its significance in the valuation of residential properties. They conclude with several alternative explanations for this increased significance, but are not able to provide a comprehensive conclusion. This can be explained by their approach, which is also rather top-down, quantitatively assessing the impact of EPC labels on value. This is an important limitation in the study of Chegut et al. (2020). Although Chegut et al. (2020) did try to specify and include other asset characteristics in their analysis as well, their approach remains relatively top-down, and it is therefore questionable to what extent the results can be solely attributed to energy efficiency.

Christensen et al. (2018) performed a study on the influence of energy considerations on decision making by institutional real estate landlords, in the U.S.. This study is one of the few examples which has a bottom-up approach. The purpose of this study was to provide insights in drivers and motivations of institutional investors in their energy considerations. Rather than quantitively assessing this, Christensen et al. (2018) concluded several semi-structured interviews. The first conclusion is that most of the respondents believe that certification and labelling adds value. However several respondents question whether certification and labelling actually can be fully trusted upon as an indicator for the outcomes that they claim. A second outcome of the study is that the respondents increasingly track utility performance. This data can be used for management processes. A third conclusion is that the motivation for the respondents to improve sustainability performance, is mostly a financial decision rather than a noble decision. This implies that investors are looking more at the financial return on investment and the applicable pay-back periods of their investments to improve the energy efficiency of an asset. A last and important conclusion is that the respondents witness a lack of knowledge and understanding on how to improve the sustainability performance of their assets and what this actually costs and returns. Christensen et al. (2018) therefore state that overcoming this gap in knowledge should be prioritized by government agencies, universities and industry researchers. From a different angle, this is also underpinned in a study by Ionascu et al. (2020) on the European real estate market. A conclusion of this study is that whilst many European real estate companies have large aspirations when it comes down to sustainability, in particular in reaching the UN SDG's, in many cases this remains a rather qualitative commitment, as most ambitions cannot be measured quantitatively.

Leskinen et al. (2020) have reviewed over 70 peer-reviewed studies on the impact of green building certification on cash flows and values of commercial properties. They specifically focus on the perspective of investors. Based upon the reviewed literature, the overall conclusion is that sustainability is a significant success factor for real estate investors, positively impacting cash flows and values. Leskinen et al. (2020) do state that the extent to which this is considered a success factor, differs per reviewed study. An interesting outcome of this study is that the considered key to motivate property investors to enhance the sustainability of their properties, is to understand how appraisers consider green premiums in their valuation. Leskinen et al. (2020) argue that this obstacle is partially the consequence of currently used valuation methods and the definition of Market Value, which do not include sustainability. This conclusion seems contradictory to the role of appraisers as stated by

leading valuation institutions such as the RICS (2015: 5), who argue that appraisers should reflect the market instead of leading the market:

'The role of appraisers is to assess Market Value or fair value in the light of evidence normally obtained through analysis of comparable transactions. While appraisers should reflect markets, not lead them, they should be aware of sustainability features and the implications these could have on property values in the short, medium and longer term.'

The inclusion of sustainability in real estate values therewith becomes a so called chicken and egg problem, which is dependent on the assumed role of appraisers, either leading or following the market.

Even though there is an increasing interest of the commercial real estate sector in sustainability (Ionascu et al., 2020), this does not automatically imply that this is also reflected in pricing. Theoretically, it is relatively easy to include assumptions on sustainability in a real estate valuation. One could for instance alter expectations on rental levels, operational expenditures, capital expenditures, entry cap rate and/or exit cap rate. However, as appraisers should reflect the market, this should be well-underwritten; there should be evidence. And this is where things get difficult, also given legislation and knowledge on sustainability still evolving. In a recent paper on the impact of sustainability on the value of office buildings by Jones Lang LaSalle (2021), this challenge becomes evident. Although the expected impact of sustainability in terms of rental levels, capital expenditures, discount rates and exit yield is well-described, there is no overall hard evidence on the impact this currently has. One of the suggestions of Jones Lang LaSalle is, that appraisers should have access to bidding data trends, as this provides an understanding of where demand is strong or weak, rather than solely focusing on comparables. This suggestion might also have to do with the institutional phase in which sustainability currently is in the real estate market. Indeed, with many actors, of which investors, currently still figuring out the impact of sustainability on their decision making process, it could be argued that sustainability is not fully institutionalized in the real estate market economics yet.

Reflection on existing studies

Focused studies on sustainability and the value of logistics real estate in particular, have not been conducted to date. This is important to consider. Indeed, what sets logistics real estate apart from other types of real estate, is the high amount of scope 3 emissions due to the transportation and distribution of goods. Simultaneously, logistics buildings generally benefit of large roofs that are qualified for photovoltaic panels. This makes logistics buildings an interesting case for investors to explore improvement possibilities, which could potentially also impact pricing decisions. The exposure to logistics real estate in institutional real estate portfolios has also increased. Insights on the dynamics at stake in terms of sustainability in logistics real estate, and how this relates to other asset classes, are however limited.

In the described studies, there is also no clear perspective on how appraisers and investors reflect sustainability in their value assessment. Most studies have a rather top-down approach; it is assumed that a certain relation between sustainable building attributes and pricing exist, after which this is studied. The actual drivers and motivations behind pricing decisions, and how the perspectives of appraisers relate to these, are underexposed, whilst these should be considered important. Indeed, this does not provide insights into if higher or lower prices due to sustainability attributes are the reflection of purposefully made decisions, or if this is rather the result of subconscious motivations or

other related factors. This also limits the possibilities of appraisers to rely on the outcome of the studies.

2.4 Sustainability in real estate economics: institutional theory

Institutional theory and institutional change

A bottom-up approach is thus preferred to study the incorporation of sustainability in logistics real estate valuations. This bottom-up approach can be well explored via institutional theory, which provides an explanation for the actions of both individuals and organizations (Dacin et al., 2002). Institutions are informal and formal rules that reduce uncertainty and improve efficiency of human and organizational behavior (Hall et al., 1996; North, 1990). Institutions provide certainty on how to act, they provide 'the rules of the game'. Formal institutions consist of (written) norms, rules, laws and regulations, whereas informal institutions comprise (unwritten) values, believes and behavioral codes (Buitelaar et al., 2007; Kiser & Ostrom, 1982). Importantly, institutions can be created deliberately, but they can also come to existence spontaneously over time due to certain behavioral patterns (Buitelaar et al., 2007; Alexander, 2002). Existing institutions result in an institutional path, implying that the existing structure of human and organizational behavior limits the scope for future variation (Buitelaar et al., 2007). Institutions can however also change.

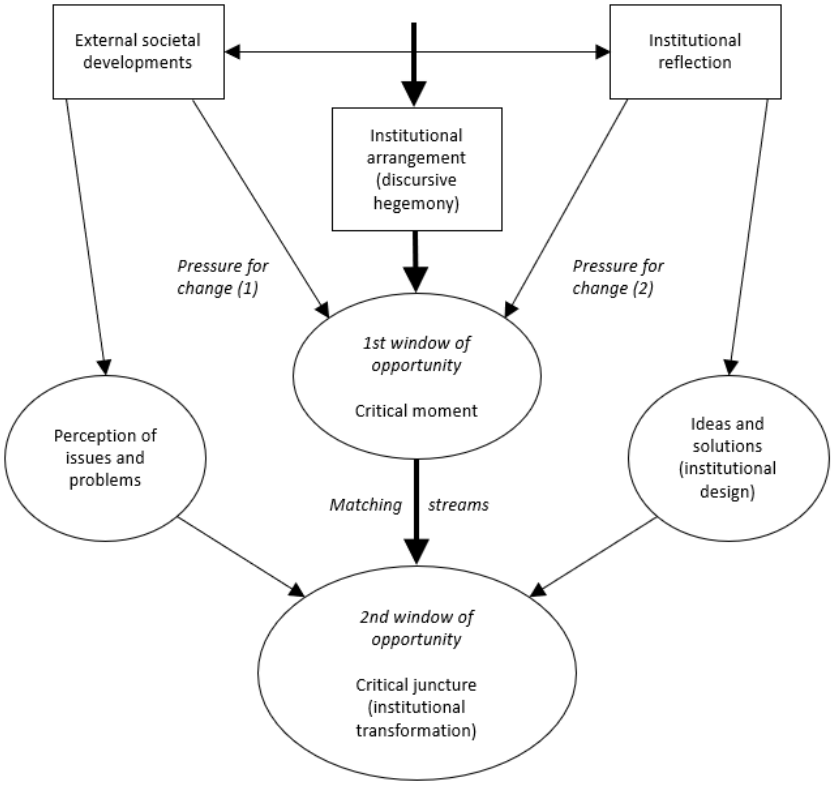

Figure 2: A model on institutional change. Source: Buitelaar et al. (2007).

Based upon work by Burch et al. (2003), and including the perspective of Kingdon (1995) on policy transformation, Buitelaar et al. (2007) have developed a model on institutional change (figure 2). The starting point of their model is an existing institutional arrangement. This institutional arrangement becomes challenged due to external societal developments (external pressure) and/or institutional reflection by existing actors (internal pressure). Whereas internal pressure consists of a critical reflection of actors on the status quo, external pressure comprises an event that affects the status quo,

for instance a financial crisis (Burch et al., 2003). This results in pressure for change, eventually leading to a critical moment. At this point in time, the existing institutional arrangement becomes challenged (Buitelaar et al., 2007). These are also referred to as periods of rupture. This does not automatically result in institutional change. Indeed, as Buitelaar et al. (2007) argue, the extent to which this eventually leads to institutional change, is dependent on the perception of issues and problems and the ideas and solutions at hand. A problem-solution combination is required. This is where a second window of opportunity, or critical juncture, comes to existence. This point is considered important; it is where institutional change occurs.

Informal and formal institutions in logistics real estate valuations

Formal institutions in real estate valuations are mainly related to the process oriented regulations of valuation institutes in order to adhere to certain external reporting requirements. The most important and widely acknowledged institute in The Netherlands is the 'Nederlands Register Vastgoed Taxateurs', also known as the NRVT (translated: Dutch Register of Real Estate Appraisers). From an international perspective, the most widely known and acknowledged institute is the Royal Institution of Chartered Surveyors (RICS). Both institutes adhere to the International Valuation Standards (IVS) as general guidance for real estate valuations (RICS, 2020; NRVT, 2020). Hence, appraisers are expected to assess their valuations in accordance with the IVS, which should provide more consistency among valuations of different appraisers. This provides a clear example of a formal institution; appraisers need to follow certain rules in preparing their valuation. This is also relevant for investors who – for instance – require external financing. In such cases, banks require valuation reports that adhere to certain valuation standards. Internal investment committees of investors also often require an external valuation to be undertaken that provides sufficient confidence on the proposed purchase price.

The international valuation standards are mainly process-related, and therewith also leave room for interpretation regarding valuation exercises. This becomes clear when looking at the definition of Market Value: *"Market Value is the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion"* (IVSC, 2020). According to this definition, appraisers should reflect the market. But 'the market' cannot be regarded as a formal institution of written rules; a market consists of certain values, believes and behavioral codes, that affect pricing. As the RICS argues (2015: 7), appraisers should provide the best qualitative assessment based on the best quantitative information that should reasonably be available. This implicates a certain level of understanding, which on its own is affected by existing norms and conventions which are embedded in valuation practice. What makes this particularly difficult, is that the market itself also consists of actors that also have their own formal and informal institutions. Appraisers are hence requested to mimic the rationale of these actors, which on its own may also be subject to change.

In this regard, it is relevant to understand the difference between price and value. Whereas price reflects the actual observable exchange point in the open market, value reflects an estimation of the price that would be achieved in the open market (French, 2000). According to the leading valuation institutes, valuations should be assessed based upon price levels that were reached in the past (RICS, 2020; NRVT, 2020). These price levels are determined by the buyer and seller of the property, whilst an appraiser should reflect their estimations on what would be paid by a buyer and seller. The considered importance of sustainability is, however, relatively new, and it seems unclear at this point

on what basis investors consider this in their pricing. This could complicate the inclusion of sustainability in logistics real estate valuations. From the perspective of Market Value, appraisers should simply follow the market. The question is if and how the market, in this particular case the institutional investment market, has institutionalized sustainability in their pricing of logistics assets. Any attempts on including sustainability in valuation practices, which is part of an institutional change, should therefore first focus on qualitatively understanding the decision making processes of investors.

Institutions are also subject to change. As Buitelaar et al. (2007) argue, this change is first dependent on a period of rupture as a consequence of both external societal developments, and institutional reflection. Historically, sustainability has been considered less important in real estate. Increasing societal pressure, market developments, regulatory requirements and the developing reflection of appraisers on their value assessment, has resulted in increasing importance, with institutional real estate investors considering the sustainability performance of their investments (CBRE, 2021a; Ionascu et al., 2020; Christensen et al., 2018; ULI, 2016). These societal developments may have also resulted in appraisers being increasingly conscious of sustainability and the need to reflect this in real estate valuations. A so called 'critical moment' may have arisen. In order for this critical moment to become a critical juncture, resulting in a shared believe on how sustainability should actually be reflected in valuations, there should be a clear perception of the issues and problems at stake, and the ideas and solutions at hand.

2.5 Conclusion on the theoretical framework

In this chapter, insights have been provided in traditional Market Value indicators. A distinction is made between market-related and property-specific factors. Insights have furthermore been provided in sustainability and different ways via which this is assessed in commercial real estate. Importantly, this chapter has also provided a theoretical perspective on how real estate appraisers and institutional investors relate. All of the above forms the basis for the following empirical chapters, in which the extent to which sustainability is included in the value assessment of both appraisers and institutional investors, and the relation between the two groups, is studied.

3. Methodology

As stated earlier, the purpose of this study is to gain insights into how sustainability is reflected in the decision making processes of appraisers, and to what extent this is aligned with the considerations of institutional investors. The following research question has been composed:

'To what extent do appraisers in The Netherlands consider sustainability factors when assessing logistics property values, and how does this relate to institutional investor considerations?'

Several sub questions have been established on the basis of which the research question will be answered.

1. What are traditional Market Value indicators for real estate?

2. To what extent do appraisers in The Netherlands consider sustainability factors in assessing logistics property values?

3. To what extent do institutional investors in The Netherlands consider sustainability factors in assessing logistics property values?

4. How do the considerations of appraisers and institutional investors relate to each other?

5. Are there recommendations to improve the alignment between appraisers and institutional investors?

3.1 Research design and data collection

To provide an understanding of the basis on which sustainability is (or is not) included in logistics real estate valuation decisions, this thesis has a qualitative character. As the studied topic is currently underexposed in literature, the study has an exploratory basis. Part one of the study consists of a questionnaire among real estate appraisers and institutional real estate investors that are active in the Dutch logistics market.

Eighteen appraisers and ten real estate investors have completed a questionnaire in which they were asked to provide their opinion on several metrics that can be considered of influence on real estate values/prices. This reflects a response rate of respectively 75% and 59%. In order to improve the external validity, the respondents have been selected based upon their sector focus (logistics), their country focus (The Netherlands), and on their employer in order to provide a good mix of company backgrounds. The respondents are all active and experienced in the Dutch logistics real estate market, either as an appraiser or as an investor. More information on the respondents can be found in chapter four.

The metrics are partially based upon the outcome of the theoretical framework, but respondents were also open to submit their own metrics. Importantly, the respondents are not informed on the topic of the study in order to prevent that the outcome of this part of the study becomes biased. The respondent are therefore approached with the question whether they would like to contribute their insights in a study on value determining factors in logistics real estate. The pre-determined value indicators have been kept limited to the more well-known and used factors, in order to prevent that the respondent would still get to know to purpose of the thesis. This also implies that the number of sustainability factors that were asked to be scored, is relatively low compared to the more traditional – non-sustainability related – factors. Via open text boxes, the respondents were able to provide other

factors than the factors provided, providing the possibility to include metrics that they consider important, which were not included in the pre-determined list.

Part two of the study consists of semi-structured expert interviews based upon the outcome of the questionnaire. For this purpose, four respondents are interviewed in order to be able to provide an in-depth explanation on the results of the questionnaire. Out of the questionnaire respondents, who were already selected based upon certain criteria, the interview respondents have been selected based upon their company background. Given that employees working for the same company might have a certain 'company approach' in how they assess logistics real estate, different company backgrounds improve the external validity. The main purpose of the interviews is to provide a better understanding on the outcome of the survey. The interviews better enable to answer 'why' questions. To provide consistency between the interviews, a set of topics, included in an interview schedule, acts as a guideline.

3.2 Methods of analysis

The results of the questionnaire are assessed via an analysis on the frequency of mentioned factors that are considered important for values. This is done via descriptive statistics. Importantly, in doing this, the difference between appraisers and investors is studied. This acts as a guideline for the interview schedule of the in-depth interviews, but also provides part of the answers on the research questions. This thesis is exploratory in character, and the insights provided via descriptive statistics are mentioned to provide a basis for further studies. In order to test how the groups statistically relate, a non-parametric Wilcoxon Rank Sum test has been conducted, which enables to test ordinal data given two independent samples (Meek & Ozgur, 2007).

The interview results are thematically coded and labelled using software from ATLAS.ti. Thematic analysis is a method that enables to identify, analyze and report themes within data (Braun & Clarke, 2006). The labels are based upon the outcome of the questionnaire, the interviews as well as on the theoretical framework. This serves as a basis for the analysis and interpretation on occurring themes. A general limitation of thematic analysis is that the results cannot be generalized. Given the exploratory basis of the study, the main focus is on explaining how and why questions, rather than generalization. As such, this method is considered to fit the purpose of the study.

4. Assessment of logistics properties in The Netherlands

4.1 Respondents: an overview

Eighteen respondents employed by a valuation company, and active in the valuation of Dutch logistics assets, have completed the survey, which reflects a response rate of 75%. The respondents have been selected based upon their sector focus and company in order to provide a good mix of company backgrounds. The respondents are employed by six of the most well-known real estate valuation companies active in The Netherlands. In their day-to-day job, all respondents are involved in the valuation of logistics real estate. The respondents are relatively experienced in the valuation industry, with 28% representing 5 to 10 years' experience and 44% representing more than 10 years' experience. In terms of client type, the respondents serve a range of different clients, representing institutional investors, private investors, developers, private equity, banks and governments.

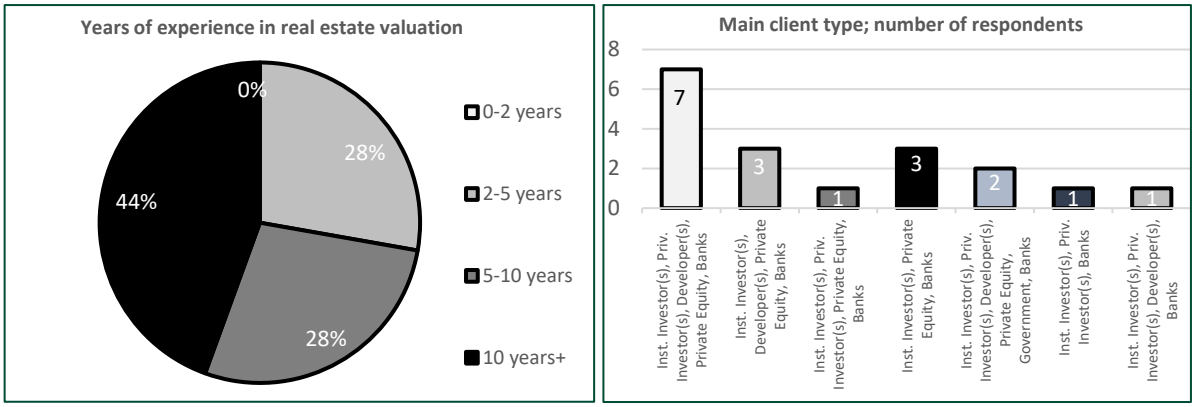

Figure 3 & 4: main characteristics of the respondents.

In the group of institutional investors, ten respondents active in the Dutch logistics market, have completed the survey, which reflects a response rate of 59%. The employers of these respondents are all internationally focused. These respondents have again been selected based upon their sector and country focus as well as upon their company, in order to provide a mix of company backgrounds. All respondents are either (or both) involved in the asset management and/or transactions of logistics real estate. The respondents are relatively experienced in the logistics investment market, with 40% representing 5 to 10 years' experience and 50% representing more than 10 years' experience. Most of the respondents pursue a core investment strategy, although other investment strategies – or a combination hereof – such as core+, value-add and opportunistic – are also pursued to a lesser extent.

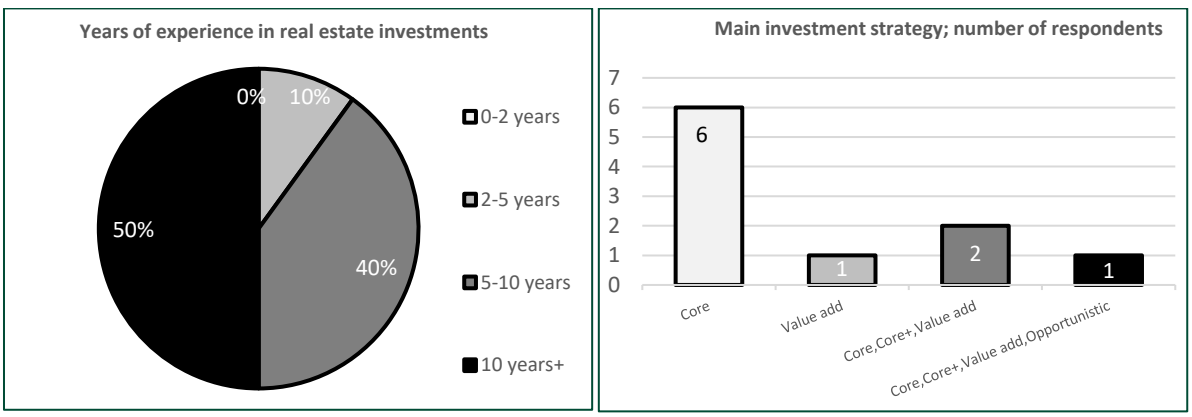

Figure 5 & 6: main characteristics of the respondents.

4.2 Property-specific indicators in logistics real estate

Consideration of property-specific factors

The respondents were provided with a list of property-specific logistics factors, which is based upon the theoretical framework. It should be noted that the group of appraiser respondents is 1.8 times bigger than the group of investors respondents, and that the total number of appraisers/investors active in Dutch logistics real estate is bigger than the sample size of this study. Although no information is known on the exact number of appraisers and investors active in the Dutch logistics real estate market, this does potentially affect the external validity of the results. However, since this study is exploratory in character, it does not have the purpose of generalization of results, but rather to provide first insights on the basis of which further studies can be conducted. The respondents were first asked to rate these factors to the extent that they are considered in their value determination of logistics real estate. In doing so, the respondents had to choose between 1) 'this does not affect my value determination', 2) 'this barely affects my value determination' and 3) 'this greatly affects my value determination'. Figure 7 represents a comparison between the considered importance of property-specific factors related to logistics real estate by appraisers and investors. The results of this graph are summarized in table 2. By attaching points to a specific answer, an average score per factor has been calculated. 0 points are attached to 'no impact' of a certain factor, 50 points are attached to 'bare impact' of a certain factor and 100 points are attached to 'high impact' of a certain factor.

Average score per factor = (*n* 'no impact' * 0) + (*n* 'bare impact' * 50) + (*n* 'high impact' * 100)

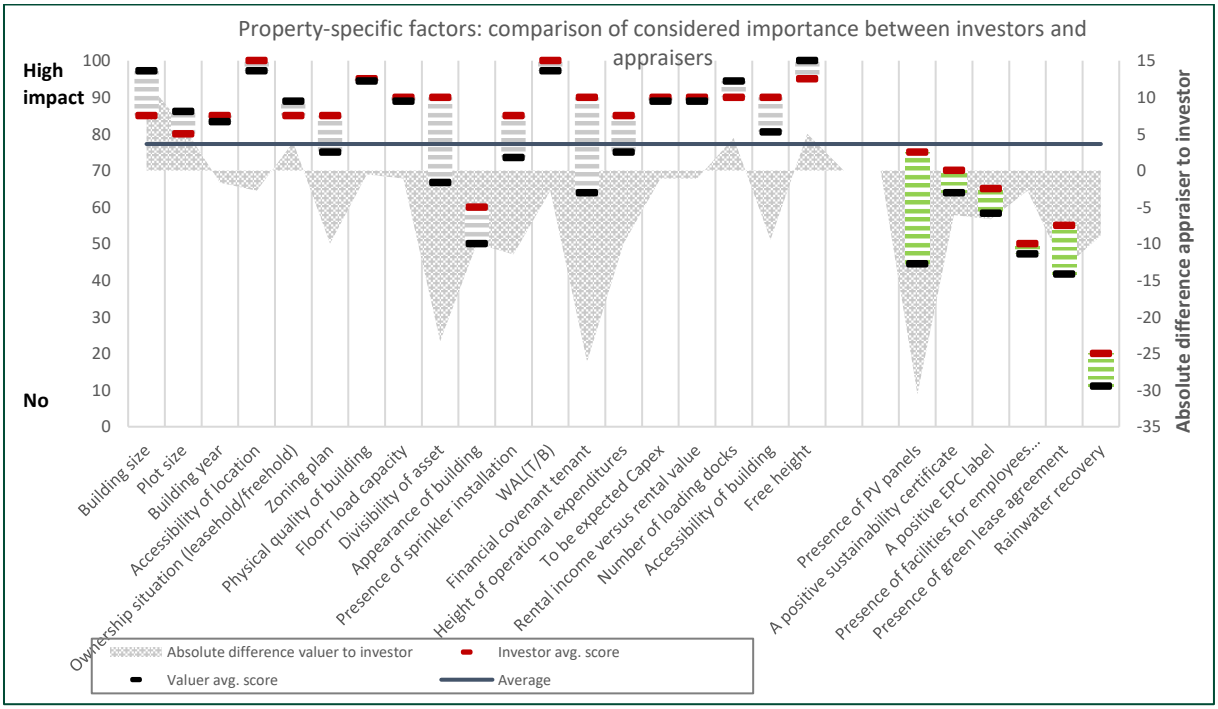

Figure 7: Importance of property-specific factors: a comparison between appraisers and investors.

The total combined average score of the assessed factors, on a range from 0 (low impact) to 100 points (high impact), amounts to 77.2 points, with the average score of the investors being 80.2 points and the average score of the appraisers being 74.3 points. Hence, on a combined level, the spread between investors and appraisers amounts to 6.0 points on a range from 0 to 100 points. It should be noted that the weight of the sustainability related factors is 24% (6 factors) compared to 76% (19 factors) of

weight for the traditional factors. This different weight is to prevent bias. Including too many pre-determined sustainability factors, that are currently not used a lot in practice, could result in the respondents becoming aware of the purpose of the survey, and therewith in a biased outcome.

Considering traditional property-specific factors related to logistics real estate, the total average score amounts to 85.8 points on a range from 0 to 100 points. This implies a positive delta to the total average score (77.2 points) of +8.6 points, which means that on average the assessed traditional property-specific factors are considered to be of greater importance than the sustainability factors. The difference between investors and appraisers appears to be limited. The average score of investors on traditional property-specific factors amounts to 87.9 points, whilst the average score of appraisers amounts to 83.7 points. The spread between the two therefore amounts to 4.2 points on a range from 0 to 100 points. It should be taken into account that some factors ('Divisibility of asset' and 'Financial covenant tenant') show a higher spread than others, herewith impacting the outcome (see figure 7). Excluding these two factors, the average spread amounts to 1.8 points (87.6 points for investors versus 85.9 points for appraisers). Importantly, for both investors and appraisers, there is a positive delta to the combined score of respectively +7.7 points and +9.4 points. Both groups therefore consider the traditional property-specific factors to have a greater impact upon value than the sustainability factors.

This indeed becomes clear from the average score on the sustainability related factors. The average score on the assessed sustainability factors amounts to 50.1 points. This is well-below the combined average of 77.2 points. For investors, the average impact of sustainability related factors comprises 55.8 points, whilst this is 44.4 points for appraisers. This reflects a spread of 11.4 points on a range from 0 to 100 points. It should be considered that the spread for the individual factor 'presence of PV panels' is relatively large (30.6 points), which impacts this outcome (see figure 7). Would this be excluded, then the spread would amount to 7.6 points (52 points for investors versus 44.4 points for appraisers). For both investors (-24.4 points) and appraisers (-29.8 points) a negative delta for sustainability related factors compared to the total average score for each of the respective groups, has been found.

Importance of factors	**Combined**	**Total average investors**	***Δ to combined***	**Total average appraisers**	***Δ to combined***
Total	77.2	80.2	*3.0*	74.3	*-3.0*
Traditional (19)	85.8	87.9	*2.1*	83.7	*-2.1*
Δ to total	*8.6*	*7.7 (+10%)*		*9.4 (+13%)*	
Sustainability (6)	50.1	55.8	*5.7*	44.4	*-5.7*
Δ to total	*-27.1*	*-24.4 (-30%)*		*-29.8 (-40%)*	

Table 2: Importance of property-specific factors: a comparison between appraisers and investors.

On the basis of these results, it can be argued that – of the assessed factors – both appraisers and investors active in Dutch logistics real estate, consider traditional factors to be of greater impact on value, than sustainability factors. There are differences between appraisers and investors, although these differences appear to be limited, and are partially the result of certain individual factors that show a relatively high spread. In order to test how the groups statistically relate, a non-parametric Wilcoxon Rank Sum test has been conducted, which enables to test ordinal data given two independent samples (Meek & Ozgur, 2007).

The two samples, appraisers and institutional investors, have been compared based upon their survey results on assumed importance of property-specific factors. The purpose of the test is to assess

whether a difference in outcome on each of the specific factors between appraisers and institutional investors is statistically significant, given $\alpha = 0.05$ (two-tail). The null hypothesis (H_0) is that there is no significant difference between the two samples.

Each of the factors has been tested on the null hypothesis, given an alpha of 0.05. The W critical value is based upon a pre-provided Wilcoxon Rank-Sum table purposed for sample sizes of 3 to 25 (Real-statistics, 2021).

Property specific factors	Alpha level	W	W'	W-crit	Reject null hypothesis?
Building size	0.05	123	167	103	No
Plot size	0.05	134	156	103	No
Building year	0.05	154	136	103	No
Accessibility of location	0.05	150	140	103	No
Ownership situation (leasehold/freehold)	0.05	134.5	155.5	103	No
Zoning plan	0.05	159.5	130.5	103	No
Physical quality of building	0.05	146	144	103	No
Rainwater recovery	0.05	161	129	103	No
Floor load capacity	0.05	147	143	103	No
A positive sustainability certificate	0.05	154	136	103	No
A positive EPC label	0.05	155.5	134.5	103	No
Divisibility of asset	0.05	183	107	103	No
WAL(T/B)	0.05	150	140	103	No
Financial covenant tenant	0.05	188	102	103	Yes
Height of operational expenditures	0.05	159.5	130.5	103	No
To be expected Capex	0.05	147	143	103	No
Rental income versus rental value	0.05	147	143	103	No
Number of loading docks	0.05	145	145	103	No
Accessibility of building	0.05	162	128	103	No
Presence of PV panels	0.05	195	95	103	Yes
Appearance of building	0.05	160	130	103	No
Presence of sprinkler installation	0.05	163.5	116.5	100	No
Presence of facilities for employees (canteen, sports facilities etc.)	0.05	149.5	140.5	103	No
Presence of green lease agreement	0.05	164.5	125.5	103	No
Free height	0.05	136	154	103	No

Table 3: Wilcoxon Rank Sum test: outcome on property-specific factors.

The results show that – in most cases – the null hypothesis cannot be rejected. This implies that the difference between appraisers and institutional investors is not considered significant for most assessed factors (see table 3). Differences between the investors and appraisers indeed appear to be limited. A few outcomes become clear from the above:

1. On an average basis, the investors and appraisers show a similar division on the extent to which the assessed sustainability and traditional factors are considered to impact value.
2. The assessed sustainability factors are in both cases – on average – considered to be of less importance in their impact on value. Looking at individual factors in figure 7, it becomes clear

that this is also the case for most of the individual factors. Appraisers and investors seem to be aligned on the division of importance between traditional and sustainability related factors.

3. Differences between the investors and appraisers on individual factors appear to be limited. On most factors, the null hypothesis cannot be rejected. This indicates that the two groups are relatively aligned on the extent to which they believe property-specific factors are important in value determination.

A general limitation is that the factors that were scored by the respondents, were pre-determined based upon the theoretical framework. Of course, it could be the case that certain metrics were not provided, but are however still considered important by the respondent. The respondents were therefore also asked to provide metrics that were not included in the pre-determined list.

Figure 8 shows a comparison between appraisers and investors on the considered missing property-specific logistics factors. 20 of the 28 respondents, provided a total of 67 factors. Of these factors only 3 factors are considered directly sustainability related, which were provided by only 1 respondent (investor).

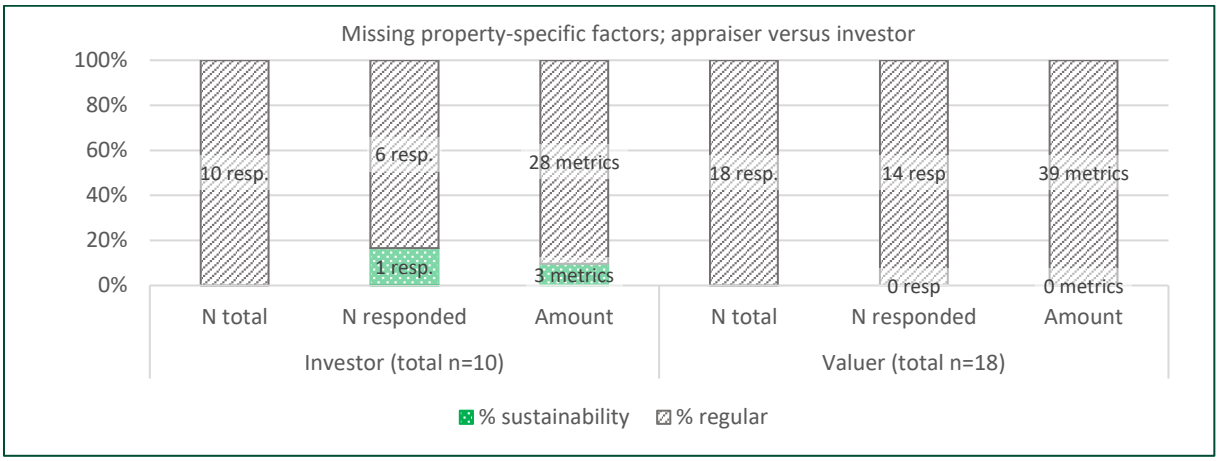

Figure 8: Missing property-specific factors: a comparison between appraisers and investors.

This result is more or less aligned with the outcome of table 2 and figure 7. In their value determination of logistics real estate, both appraisers and investors seem to be more interested in non-sustainability metrics, than sustainability metrics.

4.3 Market-related indicators in logistics real estate

Consideration of market-related factors

The respondents were also provided with a list of market-related logistics factors, based upon the theoretical framework. As a second assessment, the respondents were asked to rate market-related factors to the extent that these are considered in their value determination of logistics real estate. Again, the respondents had to choose between 1) 'this does not affect my value determination', 2) 'this barely affects my value determination' and 3) 'this greatly affects my value determination'.

Figure 9 represents a comparison between the considered importance of market-related factors related to logistics real estate by appraisers and investors. Again, the results of this graph are summarized in table 4. 0 points are attached to 'no impact' of a certain factor, 50 points are attached to 'bare impact' of a certain factor and 100 points are attached to 'high impact' of a certain factor.

Average score per factor = (*n* 'no impact' * 0) + (*n* 'bare impact' * 50) + (*n* 'high impact' * 100)

The total combined average score of the assessed factors, on a range from 0 (low impact) to 100 points (high impact), amounts to 65.8 points, with the average score of the investors being 74.3 points and the average score of the appraisers being 57.4 points. Hence, on a combined level, the spread between investors and appraisers amounts to 16.8 points on a range from 0 to 100 points. It should again be noted that the weight of the sustainability related factors is 14% (2 factors) compared to 86% (12 factors) of weight for the traditional factors, as the purpose of this question was to verify whether – already existing and used factors – are scored differently. Including too many pre-determined sustainability factors, that are currently not used a lot in practice and that are not applicable to physical risk circumstances in The Netherlands, could result in the respondents becoming aware of the purpose of the survey, and therewith in a biased outcome.

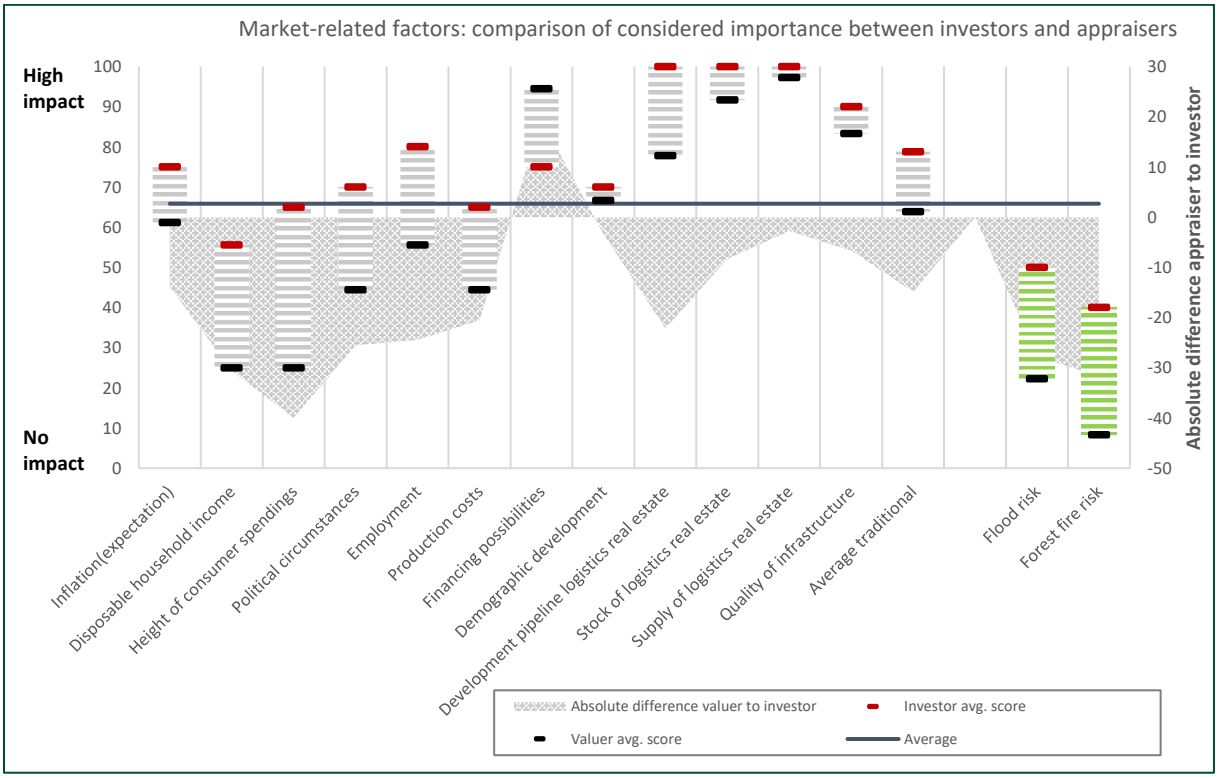

Figure 9: Importance of market-related factors: a comparison between appraisers and investors.

With regards to the traditional market-related factors related to logistics real estate, the total average score amounts to 71.3 points on a range from 0 to 100 points. This implies a positive delta to the total average score of +5.5 points, which implies that the assessed traditional market-related factors are considered to be of greater importance than the sustainability factors. The average score of investors on traditional market-related factors amounts to 78.8 points, whilst the average score of appraisers amounts to 63.9 points. The spread between the two therefore amounts to 14.9 points on a range from 0 to 100 points. For both investors and appraisers, there is a positive delta to the combined score of respectively +4.5 points and +6.5 points. Both groups therefore consider the traditional market-related factors to have a greater impact upon value than the sustainability factors.

The average score on the assessed sustainability factors related to logistics real estate amounts to 30.1 points. This is well-below the combined average of 65.8 points. For investors, the average impact of sustainability related factors comprises 45 points, whilst this is 15.3 points for appraisers. This reflects

a spread of 29.7 points on a range from 0 to 100 points. For both investors (-29.3 points) and appraisers (-42.1 points), a negative delta for sustainability related factors compared to the total average score for each of the respective groups, has been found. Although the height of the number of points between market-related and property-specific factors differs, there are similarities. In both cases, the assessed sustainability related factors are considered of less importance, and in both cases investors show a relatively higher considered importance than appraisers on both traditional and sustainability factors.

Importance of factors	Combined	Total average investors	*Δ to combined*	Total average appraisers	*Δ to combined*
Total	65.8	74.3	*8.4*	57.4	*-8.4*
Traditional (12)	71.3	78.8	*7.5*	63.9	*-7.5*
Δ to total	*5.5*	*4.5 (+6%)*		*6.5 (+11%)*	
Sustainability (2)	30.1	45.0	*14.9*	15.3	*-14.9*
Δ to total	*-35.7*	*-29.3 (-39%)*		*-42.1 (-73%)*	

Table 4: Importance of market-related factors: a comparison between appraisers and investors.

On an average basis, the results of the market-related logistics factors are similar to the property-specific logistics factors. Both appraisers and investors active in Dutch logistics real estate, consider traditional factors to be of greater impact on value, than the assessed sustainability factors. The spread between appraisers and investors appears to be higher in the case of market-related factors. In order to test how the groups statistically relate, a non-parametric Wilcoxon Rank Sum test has again been conducted.

The purpose of the test is to assess whether a difference in outcome on each of the specific factors between appraisers and institutional investors is statistically significant, given $\alpha = 0.05$ (two-tail). The null hypothesis (H_0) is that there is no significant difference between the two samples. Each of the factors has been tested on the null hypothesis, given an alpha of 0.05. The W critical value is based upon a pre-provided Wilcoxon Rank-Sum table purposed for sample sizes of 3 to 25 (Real-statistics, 2021).

Market related factors	Alpha level	W	W'	W-crit	Reject null hypothesis?
Inflation(expectation)	0.05	169.5	120.5	103	No
Disposable household income	0.05	166	86	87	Yes
Height of consumer spendings	0.05	197.5	92.5	103	Yes
Political circumstances	0.05	183	107	103	No
Employment	0.05	187	103	103	Yes
Production costs	0.05	174	116	103	No
Financing possibilities	0.05	118	172	103	No
Demographic development	0.05	155	135	103	No
Flood risk	0.05	180	110	103	No
Development pipeline logistics real estate	0.05	157.5	94.5	87	No
Stock of logistics real estate	0.05	139.5	112.5	87	No
Supply of logistics real estate	0.05	130.5	121.5	87	No
Quality of infrastructure	0.05	140	112	87	No
Forest fire risk	0.05	161.5	90.5	87	No

Table 5: Wilcoxon Rank Sum test: outcome on market-related factors.

As in the case of property-specific factors, the results show that – in most cases – the null hypothesis cannot be rejected. Hence, the difference between appraisers and institutional investors is not considered significant for most assessed factors (see table 5). A few insights become clear from these results, which are to an extent comparable to the results on the property-specific factors:

1. Compared to property-specific factors, investors and appraisers show a more diverse division on the extent to which the assessed sustainability and traditional factors are considered to impact value.
2. The assessed sustainability factors are in both cases – on average – considered to be of less importance in their impact on value. However, there are relatively more individual traditional factors that also score relatively low compared to the average. In the case of property-specific factors, most scores are situated around the average.
3. The two groups of respondents are relatively aligned on the extent to which they believe market-related factors are important in value determination.

As in the case of the property-specific logistics factors, the respondents have also been asked to provide market-related logistics factors that were missing from the pre-determined list and that are considered important. Figure 10 shows a comparison between appraisers and investors on the considered missing market-related factors. On an overall basis, 7 of the 28 respondents provided a total of 17 factors. Of these metrics, none are considered directly sustainability related.

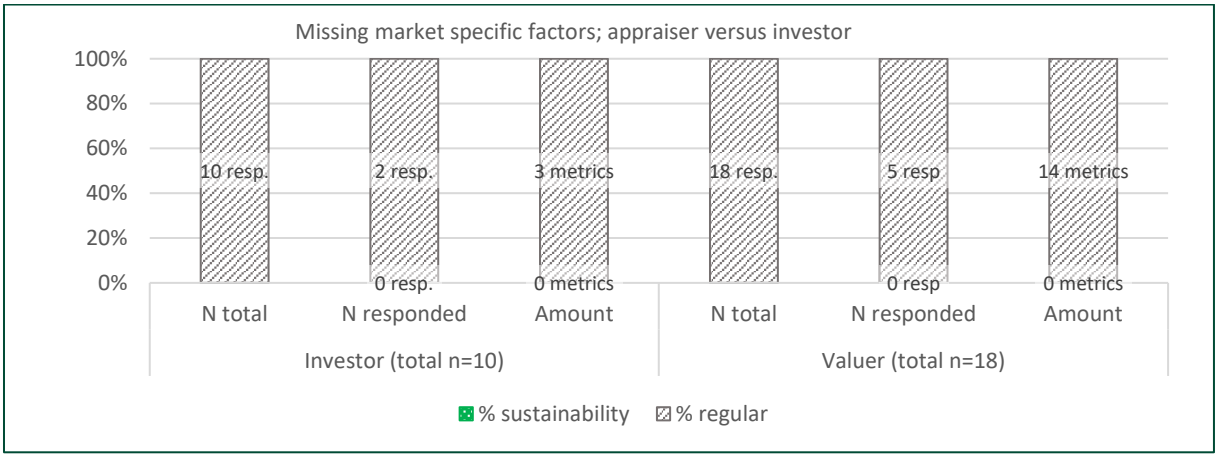

Figure 10: Missing market-specific factors: a comparison between appraisers and investors.

This result is relatively aligned with the previous outcome on the property-specific factors and also in line with table 4 and figure 9. Both appraisers and investors again seem to be more interested in non-sustainability metrics, than sustainability metrics.

4.4 Underrepresented value indicators and future value indicators

Underrepresented factors

It is also important to consider whether respondents believe that certain factors, to be provided in an open text box, are under-represented in the current value determination of logistics real estate.

The respondents were therefore asked to provide insights in factors that they currently consider underrepresented, and in factors that they expect to become more important in the future. An important difference with the previous sections is that that this also includes factors that are not included in value determination of logistics real estate at all, but that should be, or are expected to be,

according to the reasoning of the respondent. In figure 11, a comparison between appraisers and investors on currently underrepresented factors is shown. 12 out of 28 respondents provided a total of 28 factors. Of these 28 factors, 6 factors are considered directly sustainability related, provided by 3 respondents.

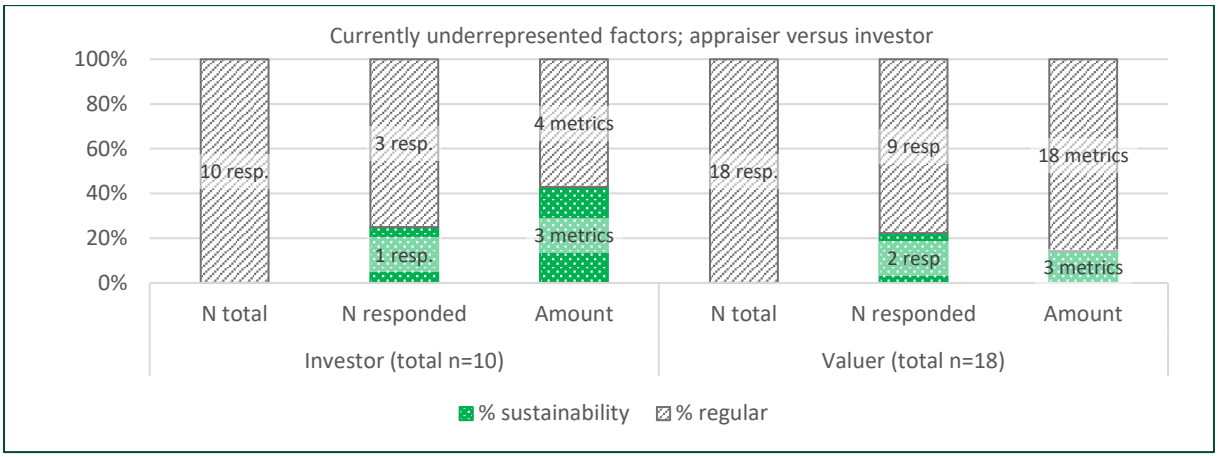

Figure 11: Currently underrepresented factors: a comparison between appraisers and investors.

Future important factors

The respondents were finally asked about indicators related to logistics real estate that they expect to become more important in the near future. Figure 12 shows a comparison between appraisers and investors on factors that are considered to become more important in value determination of logistics real estate, going forward. 24 out of 28 respondents provided a total of 54 factors. 13 factors, provided by 9 respondents, are directly sustainability related. No noticeable overlap on specific metrics has been found between the two groups of respondents. However, in the group of appraisers, 'sustainably' as a general factor on its own is mentioned the most, which is important to note.

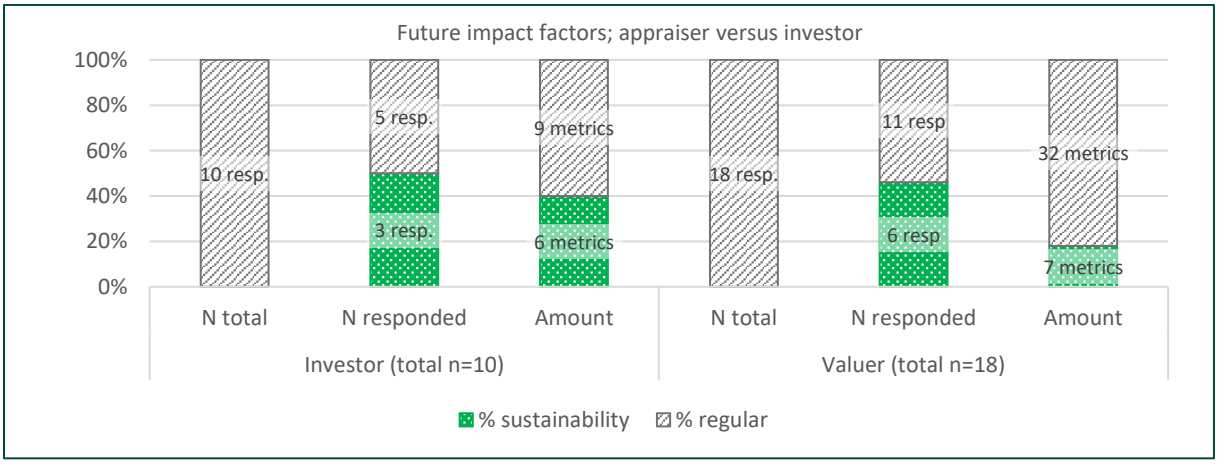

Figure 12: Future impact factors: a comparison between appraisers and investors.

4.5 Concluding on the survey results

There are a few important outcomes of the survey.

1. Differences between traditional and sustainability related factors

The results indicate that traditional factors are generally considered to be of more importance on the value determination of Dutch logistics real estate, than sustainability related factors. This is the case for both appraisers and investors. When asked about missing factors, relatively limited sustainability factors are mentioned by the respondents. This suggests that sustainability is less on top-of-mind than more regular, non-sustainability, factors.

2. Differences between market and asset related factors

There are differences in the scoring of the market and property related factors. Property related factors score higher than market related factors in their assumed impact on values.

3. Alignment between appraisers and investors

In absolute terms, both sustainability and traditional factors score higher in the group of investor respondents, than in the group of appraiser respondents. However, the statistical significance of this difference is found to be limited, suggesting that the two groups are relatively aligned in their perspectives on what determines value.

4. Increasing future importance of sustainability

Both appraisers and investors believe sustainability factors related to logistics real estate to gain importance in the future value assessment of logistics real estate. Considering this and the above stated reflection, this indicates that the process of institutionalization has not yet been reached for both parties.

5. A lower spread for several factors

Looking at individually assessed factors, it is notable that ‘a positive sustainability certificate’, ‘a positive EPC label’ and ‘presence of facilities for employees (canteen, sports facilities etc.).’ show a relatively lower spread between appraisers and investors, compared to the other factors. This is particularly interesting for the certification schemes, of which the effect on value has been studied by several scholars.

6. Sustainability factors blended with traditional factors

In the survey, a clear distinction has been made between sustainability factors, and traditional factors. It should be acknowledged that in reality, the two may blend. This implies that sustainability factors are indirectly already reflected in the traditional factors, for instance in the assessed importance of expected capital expenditures, operational expenditures or physical quality. This limitation is applicable to any study on sustainability and real estate; exactly deciphering sustainability and its impact is a challenge, given its interconnectedness with many other aspects of real estate. By clearly defining several more sustainability related factors that are less obviously interconnected to traditional factors, the limitation has been reduced in the survey.

The above suggests that institutional change has not yet been reached, this is still ongoing. This is an important finding. Indeed, existing literature – although not specifically focused on the logistics sector – already suggest the existence of green premiums and/or brown discounts (Chegut et al., 2020; Leskinen et al., 2020, Mangialardo et al., 2018; Christensen et al., 2018; Eichholtz et al., 2010). This could imply that whereas academic studies indeed show the existence of green premiums and/or brown discounts, the market players itself are not aware of this existence or do not purposefully reflect this as such. Investors and appraisers are furthermore relatively aligned. Although both sustainability and traditional factors score higher in the group of investor respondents, no statistical significance has been found on these results. This could again have to do with the phase of institutionalization; it might be the case that perspectives on the impact of sustainability are still being developed. Insights in the systemic characteristics of real estate valuations might provide more clarity on this, and its further implications for the future of logistics real estate valuations.

5. Understanding systemic characteristics of real estate valuations

Thus far, the focus has been on the alignment between appraisers and investors active in the field of Dutch logistics real estate. A comprehensive perspective on why this is or is not existent, is however still missing. Therefore, several semi-structured interviews have been conducted. The purpose of these interviews is to provide a better understanding on the outcome of the survey. Out of the questionnaire respondents, four interview respondents have been selected based upon their company background. The respondents consist of three appraisers working for three different valuation companies and one investor. To provide consistency between the interviews, a set of topics, included in an interview schedule, acts as a guideline. This mainly evolves around 1) the assumed relation between appraisers and investors, 2) factors that impact logistics value assessments, 3) the historical development of logistics value assessments and 4) the future expectations on logistics value assessments. The interviews have been thematically coded and labelled. The focus of the interviews is twofold, covering the topic of sustainability in logistics real estate valuations, but more importantly, also the topic of systemic features of logistics real estate valuations, consisting of the market (and market players) in which the valuations are conducted. Understanding the systemic features of logistics real estate valuations provides a better understanding of the institutional framework in which the valuations are conducted.

5.1 Systemic characteristics of logistics real estate valuations

The role of informal institutions

A first important systemic feature of logistics real estate valuations, is the assumed role an appraiser has. Should an appraiser follow the market, or lead the market? General consensus is that appraisers should follow the market. This also has to do with the definition of Market Value and the required processes in place to arrive at this Market Value (IVSC, 2020). Appraisers should provide the best qualitative assessment based on the best quantitative information that should reasonably be available (RICS, 2015: 7). On this topic, respondent 2 (investor), for instance argues the following:

'I believe that there are more than enough transactions to just simply look at the evidence, and follow the market, rather than that an appraiser has to lead the market, that is just not going to happen. Too many transactions take place for that. Eventually, it is just market participants that decide if a price level goes up or down. And an appraiser can assess a higher or lower value, that is all nice, but eventually it is the market that determines the value of an asset.'

Following the market implies understanding the market. And with this, informal institutions, consisting of (unwritten) values, believes and behavioral codes, come into play (Buitelaar et al., 2007; Kiser & Ostrom, 1982). Ultimately, all logistics real estate valuations are conducted within the context of a market environment. The understanding of this market environment is affected by existing norms and conventions embedded in valuation practice.

For the purpose of this study, it also relevant to know if the perspective on logistics real estate differentiates from other asset classes. When asked about how logistics real estate relates to other asset classes, all respondents state that the logistics real estate investment market is currently 'hot'. This is in line with research figures (Cushman and Wakefield, 2021; CBRE, 2021b). The respondents agree that there currently is a high occupier and investment demand for logistics real estate. This has

resulted in a decreased yield spread in logistics real estate. Quality differences are considered to have become less important in their impact on yield levels.

'Newly built logistics used to be in very high demand in the past, and it still is, but due to a lack of product, you need to look at secondary, dated buildings. So the spread between good, newly built, modern logistics and secondary warehouses, has decreased. And that is mainly caused by the lack of logistics space.' (Respondent 3, appraiser)

Market circumstances are hence considered to be of impact on the pricing considerations of investors. The general convention is that when there is high demand, and low supply, quality differences become less important in pricing decisions of investors. This is also reflected as such in valuations. This notion is particularly meaningful when assessing the considered importance of sustainability on logistics real estate. The most important question is whether or not sustainability attributes are thought to outweigh market circumstances. With regards to BREEAM certification, respondent 4, an appraiser, states:

'I believe it (BREEAM certification) can be an argument that is used internally to push a deal through. It is of course beneficial for your internal position that you possess a BREEAM certificate, but yes… The competition is currently so high, that I believe that this will not be considered of big influence.'

Market circumstances are thus thought to outweigh the importance of a sustainability metric such as BREEAM certification. This provides an important insight in one of the systemic characteristics of logistics real estate valuations. The 'market', and the understanding of the 'market', either limits or enhances the perceived impact of certain asset characteristics on values. Simultaneously, this does require an understanding on the importance of certain characteristics. It could well be the case that this understanding differentiates per person, due to different believes, perspectives or knowledge. Informal institutions therewith impact the perceived importance of sustainability on value. This is important to be aware of. The purpose of institutions is to reduce uncertainty and improved efficiency of human and organization behavior (Hall et al., 1996; North, 1990). In the case of the impact of sustainability on logistics values, it seems that there is still much uncertainty around. The appraisers recognize that investors might include sustainability assessments in their investment decision, but it is often unclear what is exactly considered important, and how this affects pricing of logistics real estate. This limits the development of a shared perspective on the issues, problems, ideas and solutions at hand. And therewith, this limits the development of a critical juncture (Buitelaar et al., 2007).

'That sustainability aspect is still hard to quantify. So that makes it difficult for an appraiser. Yes, those (sustainability metrics) are factors that play a role in a transaction, because certain buyers could have a policy on the basis of which they decide to buy or not to buy an asset. And for an appraiser, that is difficult to decipher, because you often do not have that information.' (Respondent 1, appraiser)

The role of formal institutions

Formal institutions consist of (written) norms, rules, laws and regulations. In this regard, it is also relevant to consider the role that valuation institutes play. The most recognized valuation institutes for the valuation of commercial real estate in The Netherlands, the NRVT and RICS, both adhere to the International Valuation Standards as a guidance for real estate valuations (RICS, 2020; NRVT, 2020). Market Value as defined by the IVS (IVSC, 2020), is however by definition an estimation on how a willing buyer and a willing seller would engage in an arm's length transaction. Values and believes of a

specific appraiser on how the market would behave, which are rather subjective, are therewith integrated in this estimation. And although appraisers should adhere to the IVS regulations in preparing their valuation, these rules are rather focused on the processes in place, than on the content and the origination of a Market Value itself. Respondent 3, an appraiser, states:

'The NRVT only states: you need to determine the Market Value. And they do not restrict or advice how we should decide what this Market Value is. The NRVT is really an independent party, and they do not influence appraisers. The only thing which the NRVT does, is imposing rules that we need to adhere to. But that is more related to the process, than that it impacts our value estimation.'

It is mainly considered important that an appraiser adheres to the required processes of either the NRVT of the RICS (depending on what the requested standard in a valuation report is). The actual origination of the value assessment, remains rather subjective. As respondent 1 (appraiser) argues, appraisers can 'get away' with certain assumptions, as long as they are able to support this in the valuation report:

'If I would value an asset on a prime location, which possesses a BREEAM Very Good and for example a WELL certificate, on the basis of which I would believe that it is future proof, I would apply a sharper yield than I would normally do, I believe. I would dare to do that. And I believe I would be able to support that in the valuation report, you will get away with that.'

This makes clear that the estimation of Market Value is not an exact science, and regulations in place are mainly process focused. Implication hereof is that it can be requested to report on sustainability attributes in valuation reports, simultaneously not meaning that appraisers should also include this in their value assessment. Formal institutions are from this perspective less important in their impact on the assessment of sustainability on a Market Value. However, regulations on processes do have the risk to impact existing believes of appraisers. An example better illustrates this. When an appraiser is required to report on sustainability certificates, it may well be that this is thereafter also consciously or subconsciously included in a Market Value assessment, whilst this would perhaps not be the case if no reporting requirements on this were applicable. When appraisers have to adhere to such processes over a longer time span, this could result in consensus among appraisers on the impact of sustainability certificates on Market Value. In reality, it could meanwhile well be that market players themselves look at this differently. In this example, formal institutions induce a misalignment between appraisals and the Market. This is something that should be considered.

5.2 Sustainability in logistics real estate valuations

Impact of sustainability: why and how

But what do appraisers then actually look at in terms of sustainability and the impact that this has on a real estate valuation? In the theoretical framework, different ways in which the sustainability performance of a logistics assets can be measured have been described. These are certification schemes, efficiency measures, utility performance, an assessment of climate related risks and social equity. When asked about ways to assess the impact on value of sustainability, the respondents all mostly refer to certification. This can be explained by the nature of certification. As described in the theoretical framework, a benefit of certification schemes is that they provide a relatively easy understanding of how a property scores compared to a target or benchmark score. This means that even without a background in sustainability, the sustainability performance of an asset can still be relatively easy assessed. This improves the perception of appraisers on how an asset performs.

However, in order for this to lead to a rupture, knowledge is also required on how this actually affects Market Value. This remains unclear. Respondent 1 (appraiser), states the following:

'I do believe, that if you compare investment evidence, and one asset has been built much more recently than another, and also benefits from many sustainability attributes, that you would consider it to be a better asset. That is what you can do. But that remains at the surface, because as an appraiser you do not possess all information. If you try to decipher a transaction, you just don't know everything, because not everything is publicly available.'

This is agreed upon by the other respondents. Respondent 2, an investor, argues the same in terms of the difficulty to assess sustainability and its impact on pricing. This respondent also makes an important statement on sustainability being part of the overall building quality assessment:

'I believe it (sustainability) is included in the pricing assessment, but this is limitedly assessed. The question is: what do you consider to be sustainability related? For example, if an investor pays more for a completely new building, which is also energy efficient, is this then due to the energy efficiency, or because you expect less maintenance. And that less maintenance, is that sustainability, or is it just maintenance? I find it particularly difficult to decipher individual parameters (…).'

It is thus difficult to assess the exact impact of sustainability on logistics real estate valuations. BREEAM certification and the likes are often mentioned as a way to assess sustainability performance of an asset. But at the same time, the respondents agree that it is difficult to actually assess the value of such a certificate, and this is also often interlinked with building quality.

Another way in which sustainability performance is assessed, is by including a correction to 'greenify' a building. An important question is why this correction should be included. Respondent 3, an appraiser, provides the example of office buildings in The Netherlands, which in order to be leased, should at least possess an EPC label C as from 1 January 2023:

'And if it (the EPC label) is worse than C, which is mainly applicable to office buildings, then it should of course be considered a limitation of the asset, because you know that you need to invest. In those cases, we do include capital expenditures in order to make the asset more sustainable.'

This is an interesting example of the impact a formal institution has, namely the governmental rule imposing the need to possess label C, on the incorporation of sustainability in real estate valuations. Indeed, if there is no necessity to 'greenify' given regulations, or if a landlord does not provide a Capex schedule to an appraiser which includes relevant costs to 'greenify', appraisers will most likely not consider this in case this is not recognized as having an impact on market pricing. This implies that in order to have sustainability impact reflected in valuations, it should either be recognized as an important factor in pricing considerations and should be possible to be deciphered as such, should be provided externally by landlords or should be imposed through regulations which provides a basis to include certain capital expenditures. The latter is currently not applicable to logistics space in The Netherlands.

It is relevant to consider as well, that none of the respondents mention specific elements that set logistics real estate apart in terms of sustainability, compared to other asset classes. This could well have to do with the fact that parties are still figuring out the exact impact of sustainability on pricing in general, not just on logistics real estate. As mentioned in the theoretical framework, logistics real estate have distinctive characteristics, mainly in terms of scope 3 emissions due to the tenants'

transportation and distribution of goods. It can therefore be expected that if sustainability becomes more important in value assessments, this will set logistics apart from other asset classes. However, in order for this to occur, there should be a shared understanding of these scope 3 emissions.

5.3 The future of sustainability in logistics real estate valuations

The survey results show that the respondents believe sustainability to become more important in the value assessment of logistics real estate going forward. This indicates the probability of increasing pressure for change, which might cultivate a shared perception on the impact that sustainability performance has on values of logistics assets. But why is this thought to become more important? In the investment market, there is increasing regulation which provides an explanation. Examples of this are the EU Taxonomy for sustainable activities (European Commission, 2021a), which is a classification system on which economic activities are to be considered environmentally sustainable, and the EU Sustainable Finance Disclosure Regulation, which is a reporting framework for financial products and entities (European Commission, 2021b). When asked about the future of sustainability in real estate valuations, respondent 4 (appraiser) states the following:

'I believe that the road that has been paved now, will be followed. Besides law and regulations, you of course also witness many societal changes. So where we thought sustainability to be a container definition five years ago, it has now become a license to operate (…).'

This statement is interesting from an institutional perspective. The road pavement that is referred to, actually refers to the beginning of an institutional path. As argued by Buitelaar et al. (2007), this institutional path implies that an existing structure of human and organization behavior limits the scope for future variation. It hence suggest that institutional change is expected to happen. Respondent 1, also an appraiser, argues:

'Those type of things (in this case the usage of renewable energy in a building and the importance of this for investors) will become more important yes, and that is just mainly caused by societal responsibilities and (the assumed importance) by the constituency of investment managers.'

It is clearly believed that sustainability will gain more importance going forward. If applying this to the framework of institutional change by Buitelaar et al. (2007) both external societal developments, as well as an institutional reflection of the players that comprise the market, are mentioned as being important factors leading to this change. The recognition that sustainability will gain more importance going forward, indicates that the process of institutionalization has not yet been reached, both for investors and real estate appraisers. On the other hand, as respondent 2 (an investor) argues, the question is whether this process of institutional change, ever stops:

'Well, I do believe that the factors that either positively or negatively impact value, will always continue to evolve over time, I am sure about that. I mean, 100 years ago, a parking space next to a building was not considered that important (…). Today it is. (…) I can probably think of other things that will become more important in the future, things of which we are not aware today, that might become really important in 40, 50 or 60 years' time from now, whatever that may be. Maybe you even require something for flying cars, I don't know.'

This is an important statement. One of the characteristics of the real estate market is that it is indeed always evolving. Hence, where institutional change on one topic might be reached, there could be other topics that are yet to be institutionalized.

5.4 Times are changing

As described in the theoretical framework, the inclusion of sustainability in logistics real estate valuations, is part of a story of institutional change. The starting point of this institutional change is the current institutional framework in which the valuations are conducted. This consists of existing regulations by valuation institutes to which appraisers should adhere (RICS, 2020; NRVT, 2020), but also of the understanding of the market dynamics by real estate appraisers and how this impacts value. Due to increasing external societal and political pressure, a growing number of real estate investment companies is considering sustainability in their investment underwriting and management process (CBRE, 2021a; Ionascu et al., 2020; Christensen et al., 2018; ULI, 2016). Meanwhile, the actors in this market, investors, are increasingly reflecting upon the status quo. In both instances, appraisers start recognizing this, as has become clear from the interviews. Sustainability performance is recognized by appraisers as (becoming) important in the mindset of investors. This has resulted in a first window of opportunity to include sustainability metrics as a value determinant in Dutch logistics real estate valuations.

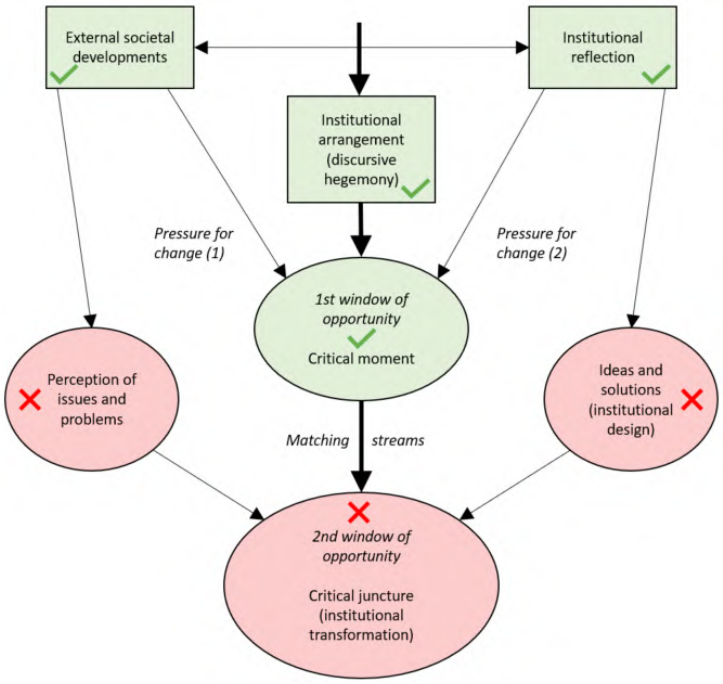

Figure 13: A model on institutional change. Source: Buitelaar et al. (2007). Amended by author.

In order for a first window of opportunity to become a critical juncture in which institutional change occurs, both a perception of the issues and problems at stake, and relevant ideas and solutions, should be present (Buitelaar et al., 2007). This is more complicated. Even if appraisers recognize sustainability as gaining importance in the pricing assessment of investors, it is in many cases relatively hard to understand and quantify the exact impact this has. This also seems to be difficult for investors. Sustainability is simply still in the process of being discovered. A clear perception on the issues and problems and the ideas and solutions at stake to include this in logistics real estate valuations, is therewith missing. This limits the emergence of a shared understanding. Applying the above in the model of Buitelaar et al. (2007), this implies that even though a critical moment is reached, the perception of problems, and the ideas and solutions at hand, are not yet well defined. This means that the crucial step to reach a critical juncture, cannot be reached. This process is depicted in figure 13.

6. Conclusion

The purpose of this study was to gain insights into how sustainability is reflected in the decision making processes of real estate appraisers, and to what extent this is aligned with the considerations of institutional investors, in the Dutch logistics real estate market. In order to provide insights on this topic, the following research question was composed:

'To what extent do appraisers in The Netherlands consider sustainability factors when assessing logistics property values, and how does this relate to institutional investor considerations?'

Several sub questions were composed. The first sub question was aimed at providing insights in traditional Market Value indicators for logistics real estate. Based upon the theoretical framework, a number of indicators have been distinguished. These can broadly be divided into market-related (macro/meso) and property-specific (micro) factors. Some of the factors are solely applicable to logistics real estate. Important to acknowledge is that sustainability metrics are in some cases already indirectly reflected in the traditional factors.

The aim of the second sub question was to describe and decipher to what extent appraisers in The Netherlands consider sustainability factors when assessing logistics property values. Sustainability related factors are considered to be of less importance on value assessments, than the identified traditional factors. This holds true for both property-specific as well as market-related factors, which are both generally perceived to barely or not impact Market Values. Importantly, based upon the survey results, almost half of the appraisers who responded, believe sustainability related factors to become more important going forward. This indicates that the process of institutional change is still ongoing in the logistics real estate valuation market.

Besides appraisers, the survey was also set up to describe and decipher the extent to which institutional investors in The Netherlands consider sustainability factors when assessing pricing of logistics real estate. The third sub question was therefore aimed at resolving this. Generally, the institutional investors believe that the traditional factors are more important in their pricing decision, than sustainability related factors. This again holds true for both property-specific and market-related factors. When assessing future pricing decisions, half of the investors who responded, believe sustainability related factors to gain importance in the future. Importantly, this indicates that market players themselves do also still not consider sustainability to be fully institutionalized in their pricing decisions; the process of institutional change seems to be still ongoing.

An important resulting fourth question then is how the considerations of appraisers and institutional investors relate. On the basis of the results, appraisers and institutional investors seem to be relatively aligned in their perspectives on value determining factors, both traditional and sustainability related. Interesting is that none of the respondents mentioned specific elements that set logistics real estate apart in terms of sustainability, compared to other asset classes. This could well have to do with the fact that parties are still figuring out the exact impact of sustainability on pricing in general, not just on logistics real estate. As mentioned in the theoretical framework, logistics real estate have distinctive characteristics, mainly in terms of scope 3 emissions due to the tenants' transportation and distribution of goods. The results however also indicate that sustainability related factors are expected to become more important going forward. This potentially impacts the alignment between the two. In order to understand this, theories on institutional change provide insights.

The extent to which sustainability is included in real estate valuations, is related to the institutional arrangements in place and their ability to change. These institutions consist of regulations by valuation institutes, but more importantly the understanding of market dynamics by real estate appraisers, and the subsequent assumed impact on value. This also requires an understanding of the rationale of real estate investors. With increasing external societal and political pressure, a growing number of these real estate investors is considering sustainability in their investment underwriting and management process (CBRE, 2021a; Ionascu et al., 2020; Christensen et al., 2018; ULI, 2016). Sustainability performance is recognized by appraisers as (becoming) important in the mindset of investors. This has resulted in a first window of opportunity to include sustainability metrics as a value determinant in Dutch logistics real estate valuations. However, in order for this critical moment to become a critical juncture, leading to institutional change, a perception of the issues and problems at stake, and relevant ideas and solutions, should be present (Buitelaar et al., 2007). This requires sustainability parameters to be able to be recognized and deciphered. Real estate appraisers should from that perspective be able to relate value (either positive or negative) to sustainability factors, if (considered) applicable. And this consideration itself proves to be difficult, with the results showing that the market itself (i.e. the investors) also not having fully discovered the impact of sustainability on pricing yet. A clear perception on the issues and problems and the ideas and solutions at stake to include this in logistics real estate valuations, is therewith missing. And as a result, a critical juncture is not (yet) reached.

This leads to the last sub question; are there recommendations to improve the alignment between appraisers and institutional investors? No short term recommendations to improve the current alignment between the two have been identified. This has to do with the phase of institutionalization; the market itself is still developing its perspective on sustainability. A critical juncture can therewith simply not be reached. We should hence acknowledge that the process of institutional change is not finalized yet. And in order for a critical juncture to be reached, the market itself should first have a clear perspective on the impact sustainability parameters have on pricing. A recommendation would therefore be to have a bottom-up approach in which the reasoning of investors is studied, instead of applying a top-down approach, assuming a certain relation to be existent between sustainability attributes and price levels. Only then, a real understanding of where the investment market is going in terms of the impact of sustainability on pricing, can be identified and adopted as such in the real estate valuation industry.

Hypothesis

The hypothesis of this study was that appraisers currently limitedly assess sustainability in their logistics real estate valuations and that there is a gap in perspective on how to include sustainability in pricing between appraisers and institutional investors. This hypothesis can be accepted, but only with a pinch of salt. Appraisers indeed limitedly assess sustainability in their logistics real estate valuations, but the market itself, in this case institutional investors, is also still developing their perspective on the impact of sustainability metrics on pricing. Real estate appraisers can and should therefore not be blamed in any disability of recognizing the impact that sustainability has on pricing.

7. Reflection

The incorporation of sustainability in value assessments is dependent on formal and informal institutions in place. With regards to formal institutions, this implies that the decision to include sustainability metrics in logistics value assessments, depends on regulations in place that directly impact the performance of an asset, for instance the requirement to possess an EPC label C. Formal institutions such as process regulations – for instance the International Valuation Standards – could indirectly also impact the conventions of appraisers on the longer term. Informal institutions on themselves have an important role in the value assessment of logistics. It is these informal institutions, i.e. the conventions and believes of appraisers, that influence the appraisers understanding of a market. With regards to sustainability, this implies the requirement to be able to recognize and decipher the impact sustainability has on pricing. This proves to be difficult.

A remaining question is how the alignment between investors and appraisers can be improved. Before reflecting upon this, it should be acknowledged that there currently seems to be an alignment between the two, both on traditional value indicators as well as sustainability value indicators. However, the process of institutional change is still ongoing. And with increasing regulatory pressure in the investment market such as the Paris agreement of 2015, the EU Sustainable Finance Disclosure Regulation (SFDR), and the EU taxonomy, this institutionalization is expected to progress further. It can therefore be expected that the question of alignment between the two groups becomes more important going forward. Institutional change, and therewith the development from a critical moment to a critical juncture, is dependent on a shared perception of the issues and problems at stake, and relevant ideas and solutions at hand (Buitelaar et al., 2007). What makes the case of logistics real estate valuations particularly difficult, is that investors are also still developing their understanding of the impact that sustainability has on pricing. And before appraisers are able to develop a shared perception on the issues, problems, ideas and solutions, this should first be existent in the investment market itself. This hampers the development of a critical juncture. It should also be questioned whether it is possible to always have an alignment between appraisers and investors. One of the key differences between appraisers and investors, is that where appraisers tend to look backward in their value assessment, investors look forward. With this, misalignment seems unavoidable in the beginning phase of institutional change. However, this misalignment can be prevented to a certain extent. And this requires a bottom-up approach. This bottom-up approach implies that the focus should be on understanding the motives behind pricing decisions of the investors. By being aware of these motives, it becomes easier for appraisers to mimic this in their value assessments. The earlier stated suggestion from Jones Lang LaSalle (2021) to provide appraisers access to bidding data trends therefore seems logical from this perspective. This does require that appraisers will indeed be more aware of the basis of investment decisions, and how sustainability is integrated in pricing decisions. With a market that is known for not being transparent, and with investors also figuring out the impact, this could prove to be challenging. Further research on how to specifically structure this is therefore required. An important lesson for academical researchers is that they should be careful with top-down studies on the assumed economic impact of sustainability characteristics. Even though this might exists, the results of this study show that in the case of logistics, market players themselves are not always aware of the existence, or how to decipher and reflect this in a value assessment. These studies run the risk of influencing the conventions of investors. Given that they are based upon transaction behavior of the same investors, this seems a rather controversial circular reference.

A few caveats should be considered with regards to the methodology and sample size of the subject study. This study has an exploratory basis, with a total sample size on the questionnaire of 28 respondents. Although the aim is not to provide any generalization, it could well be that a bigger sample size provides a different result. Important to also acknowledge here is that the group of appraiser respondents is 1.8 times bigger than the group of investor respondents. Both could impact the external validity of the results.

Important with regards to any topic that is studied, is that bias should be prevented as much as possible. In this study, the respondents were not informed on the topic of the study, but rather with the question whether they would like to contribute to a study on value determining factors in logistics real estate. Any pre-determined value indicators in the questionnaire have been kept limited to the more well-known and used factors. This also implied a relatively small amount of pre-determined sustainability related value indicators. Although the respondents were able to provide any other indicators via open text boxes, it could well be that out of time constraints or other reasons, respondents have put less effort in providing answers in these open text boxes.

Lastly, the questionnaire responses could in reality deviate from the actual decisions that are made in practice by both appraisers and investors. This could potentially be overcome by studying actual pricing decisions and outcomes of valuation reports. However, as stated earlier, academical researchers should be careful with top-down approaches on the topic, as no insights in actual motivations behind decisions can be provided. A potential interesting methodology that could be pursued in a follow-up study, is to provide both appraisers and investors with a set of logistics assets with different characteristics, asking them to assess the value of these assets. Important to consider here is that when doing this anonymously and not in the name of the company that respondents work for, different outcomes might still result from this compared to practice. This remains a general vulnerability.

8. A reflection, limitations and recommendations for further research

This study has specifically focused on the logistics real estate market in The Netherlands. It should be acknowledged that a general limitation of this approach is that the outcome of the study is related to the sector that was chosen. A first recommendation for follow-up research would therefore be to study different sectors. This could provide insights into whether the results of this study are also applicable to the wider real estate market, which would simultaneously improve the external validity of the outcomes.

At the same time, studies on logistics real estate and sustainability seem to be lagging behind studies on other sectors conducted to date. It would therefore be interesting to extend the knowledge on the specific case of logistics real estate and sustainability, in the context of different countries.

The focus of this study was on the relation between real estate appraisers and institutional investors, given that institutional investors own the majority of global commercial real estate. It would be interesting to study whether the same outcomes apply if studying other types of investors. It would furthermore be interesting to study how building tenants assess sustainability and how this relates to the perspectives and decisions of appraisers and investors.

As concluded in this study, the process of institutional change has not yet been finalized. Many existing studies that focus on the impact of sustainability metrics on pricing, have a top-down approach, starting with the assumption of an assumed relation between the two. It is questionable to what extent this approach should be followed, given that institutional change is still taking place. Therefore, a recommendation for further research would be to have a bottom-up approach on the topic. Although being more qualitative, this enables to provide insights in what is actually considered relevant when it comes to sustainability and pricing decisions. After this has been identified, top-down, quantitative studies become more relevant to conduct.

A last recommendation for further research, is that follow-up studies should be conducted on the medium- to longer term. It would indeed be interesting to explore whether the results of this study will change over time, given the current institutional phase that has been identified. This could improve the external reliability of the outcomes.

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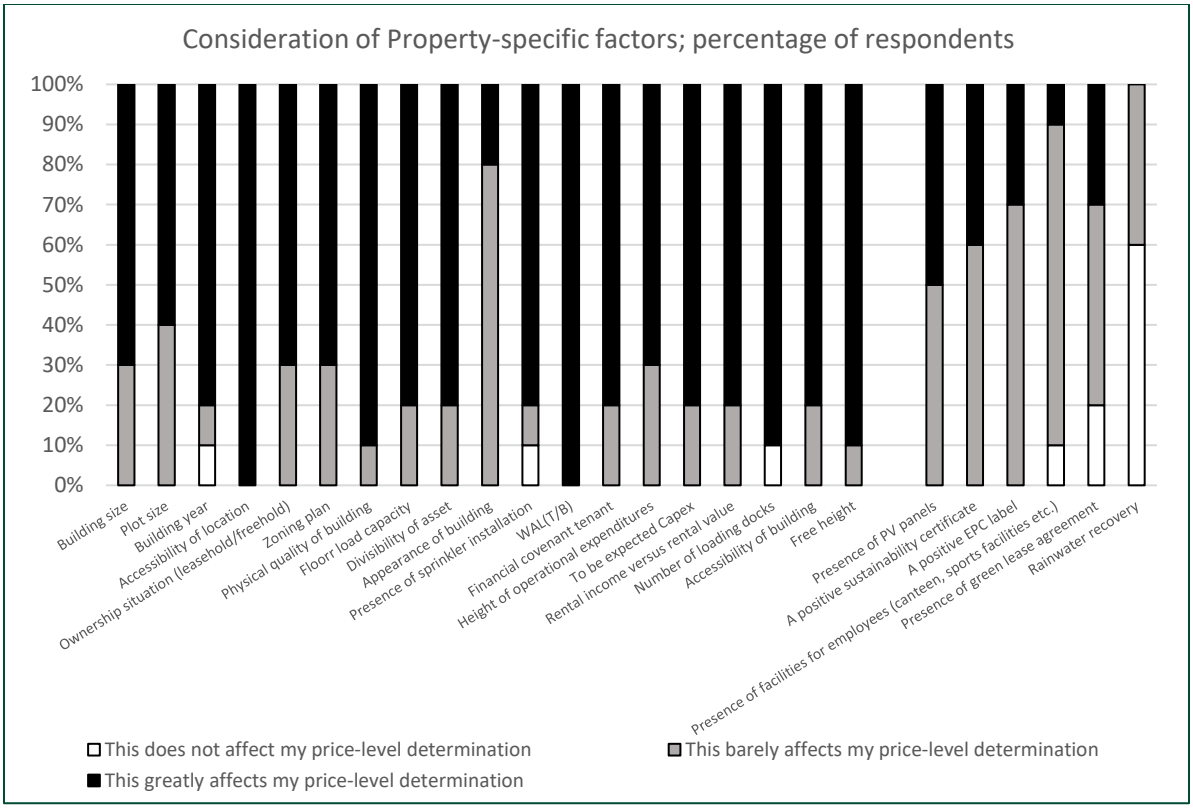
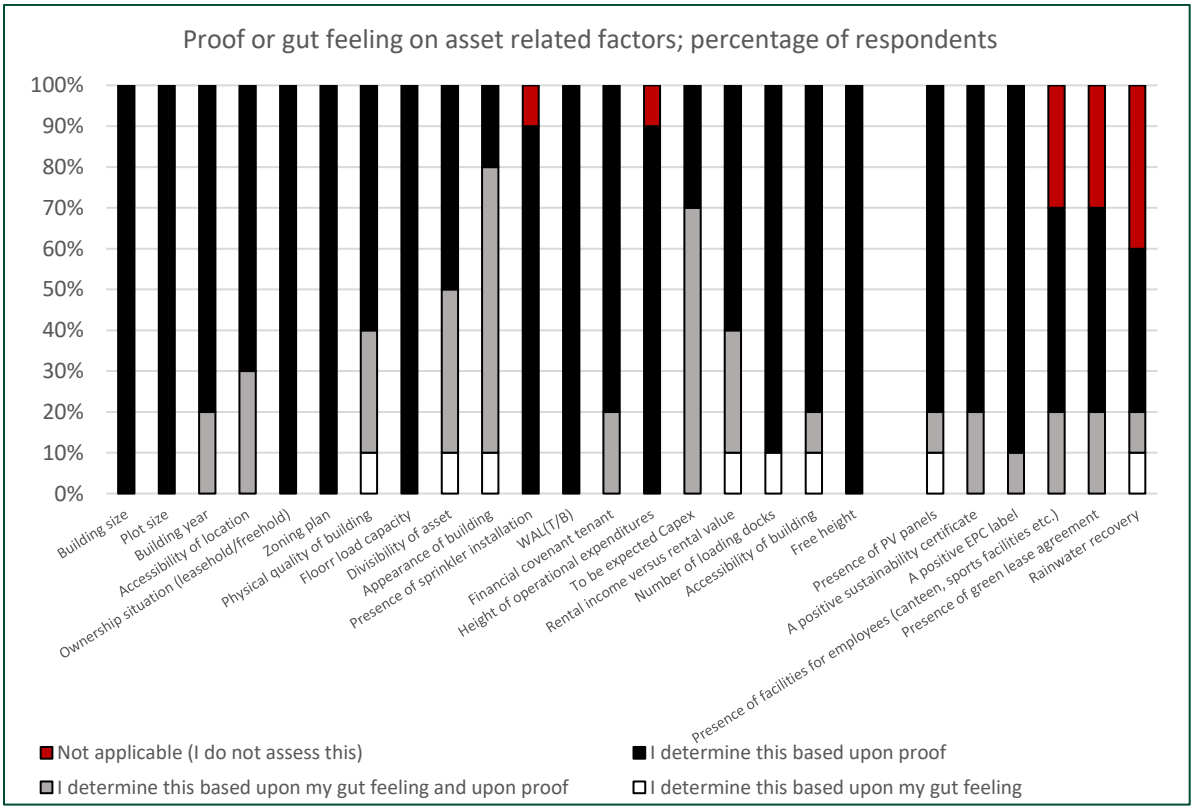
10. Appendix

10A. Consideration of Property-specific factors: appraisers



10B. Proof or gut feeling on Property-specific factors: appraisers



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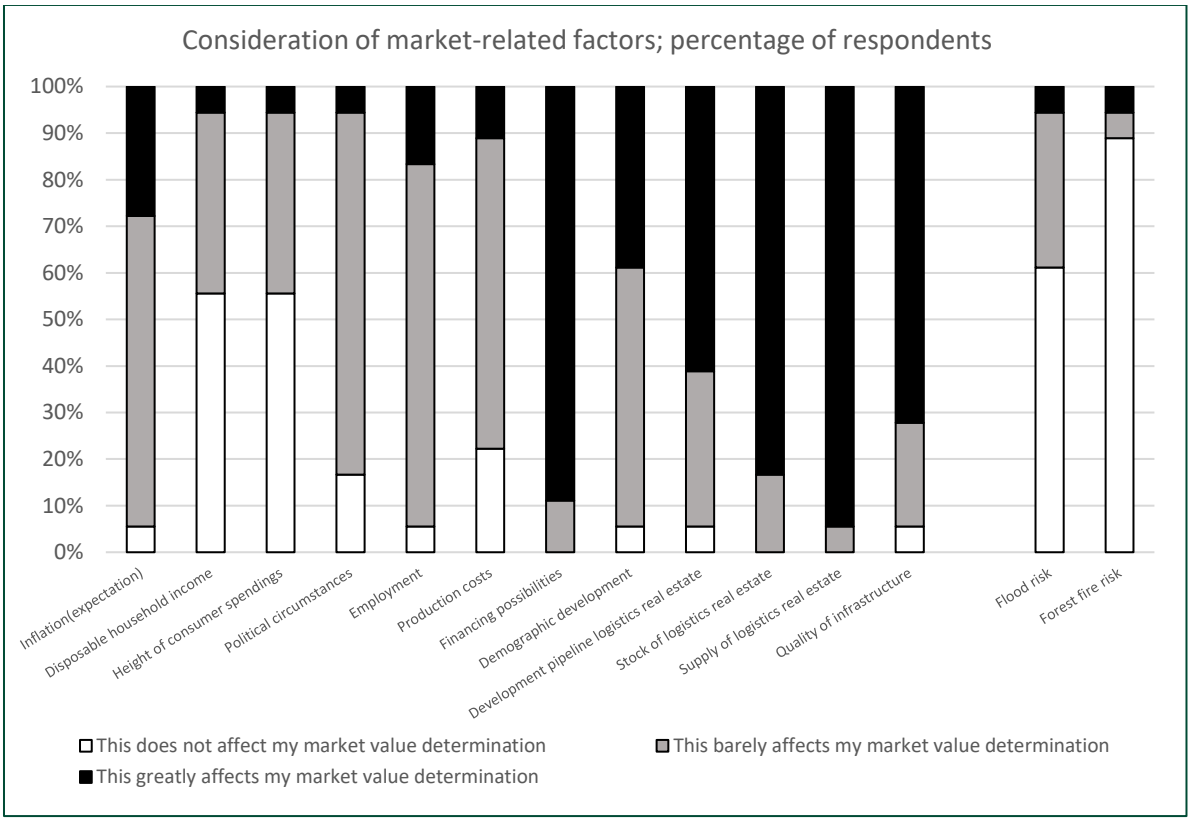

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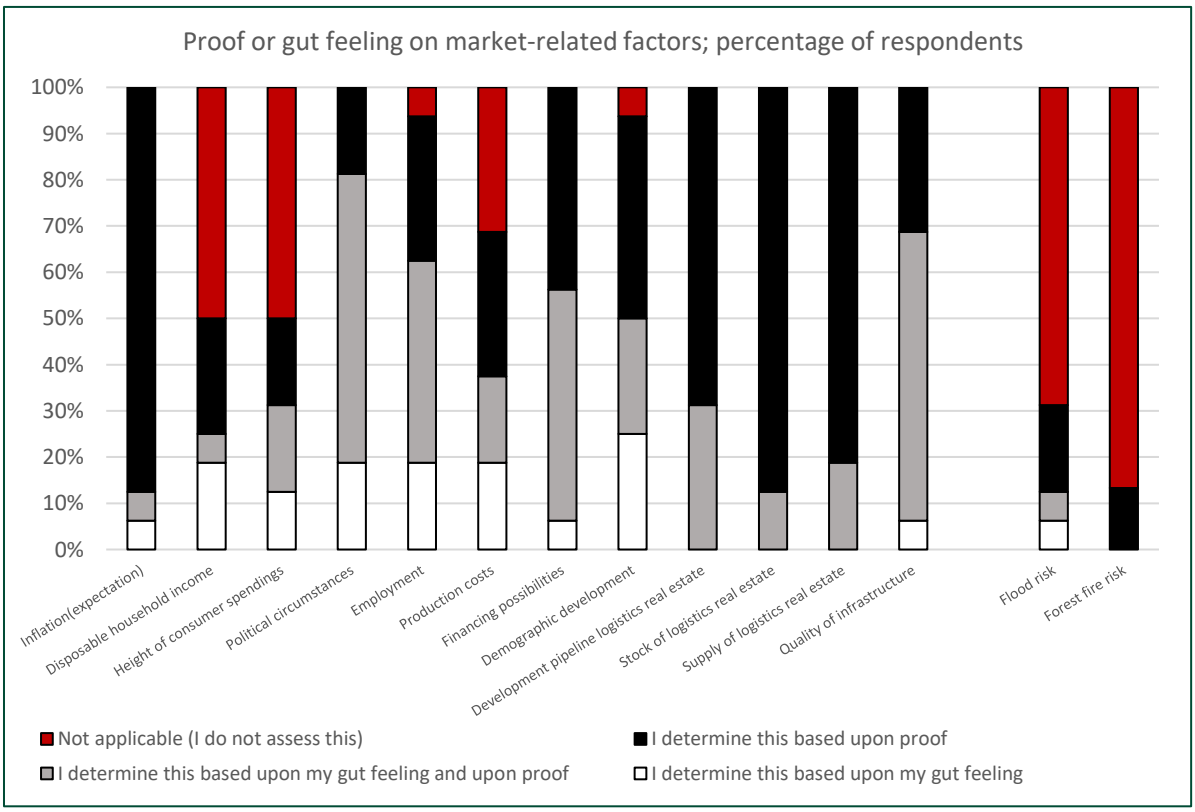
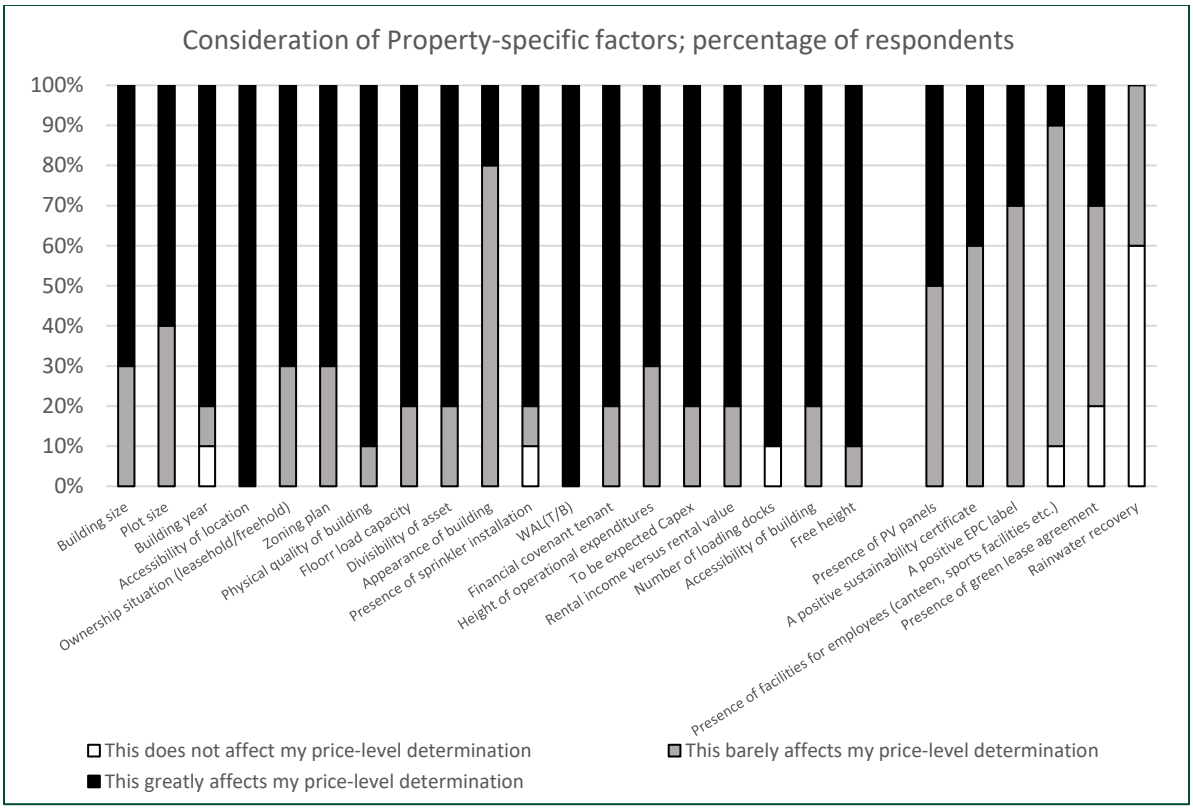
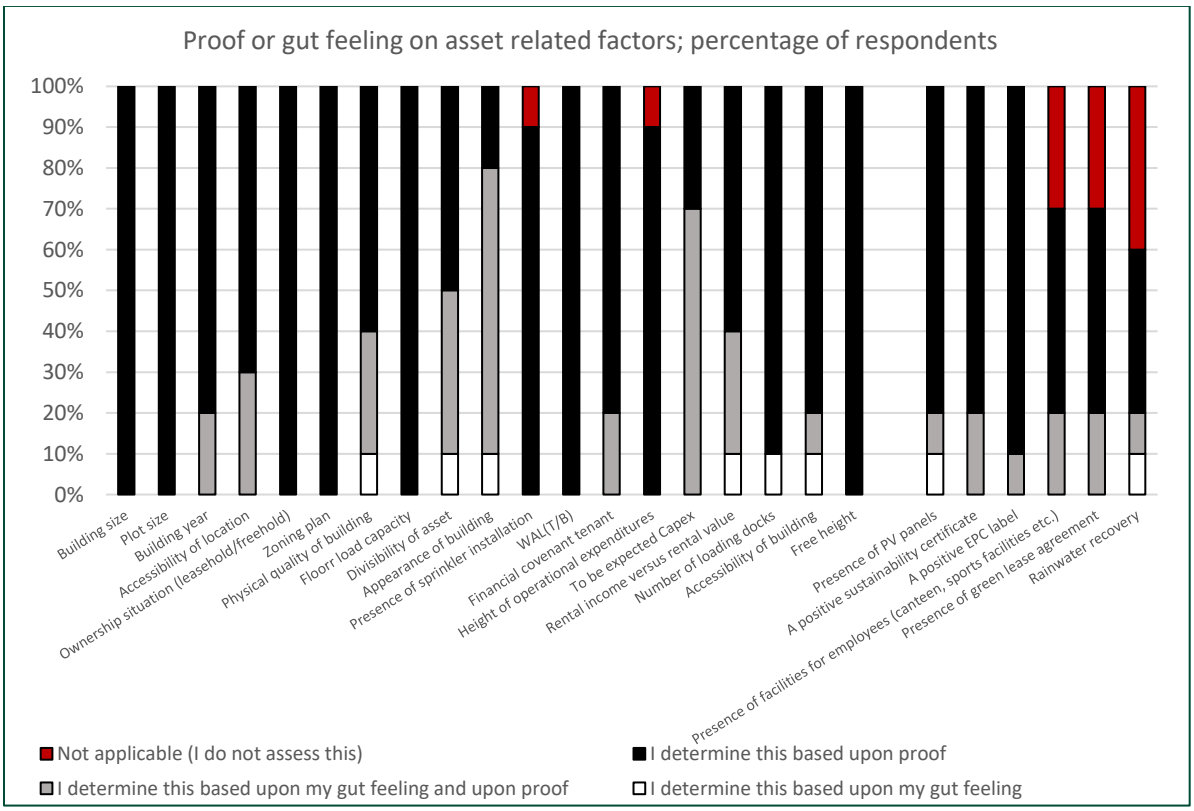


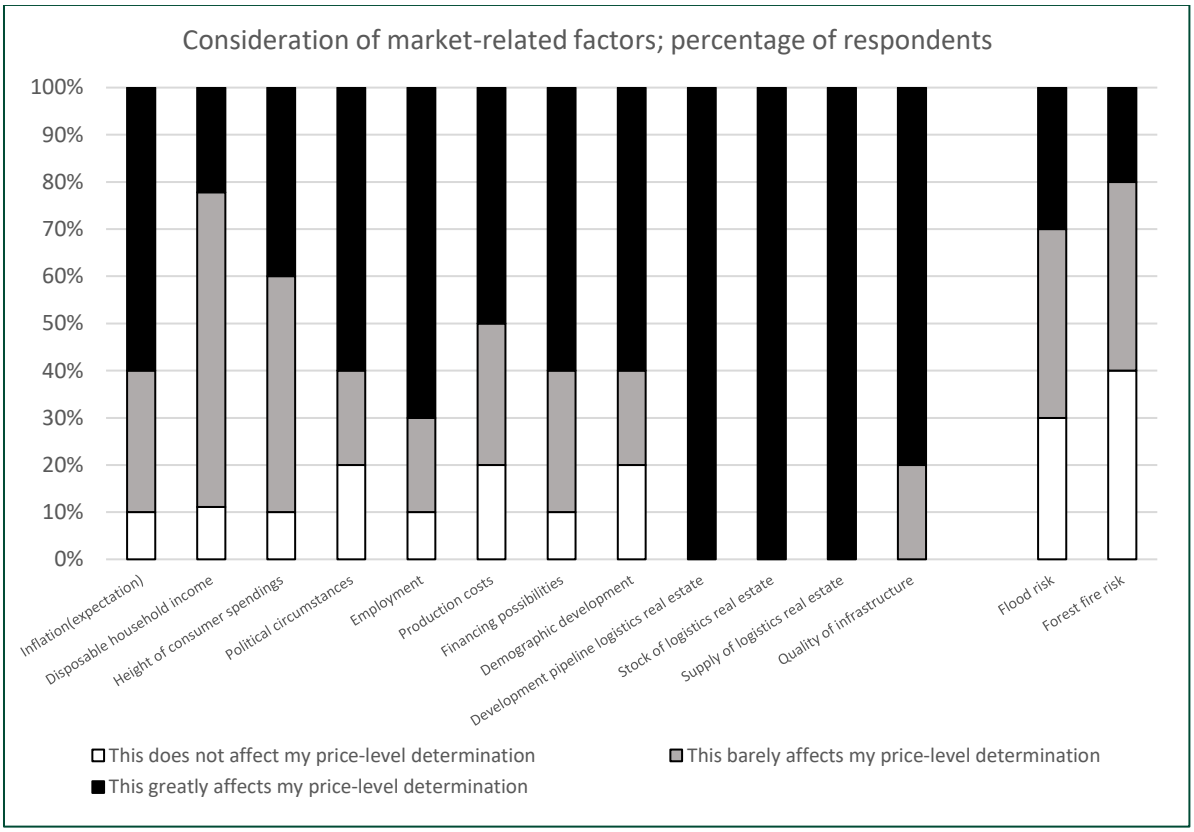
10E. Consideration of Property-specific factors: investors



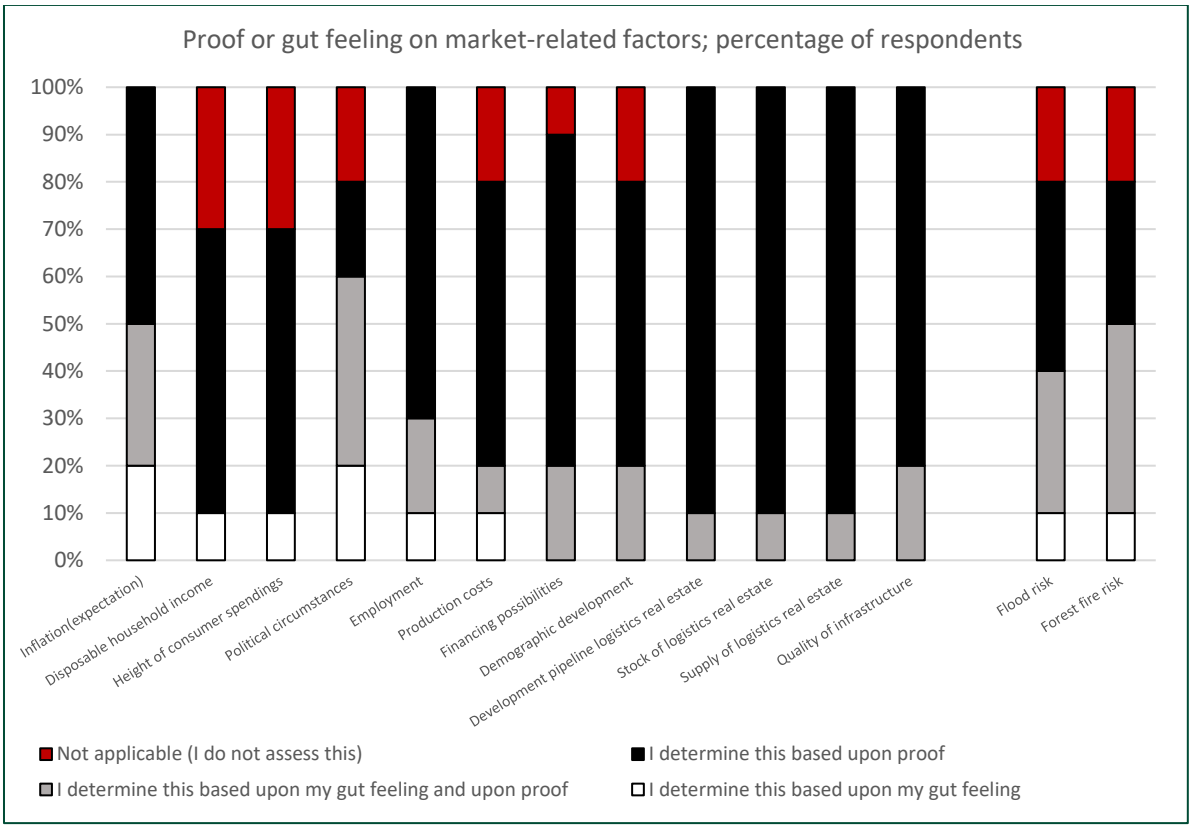
10F. Proof or gut feeling on Property-specific factors: investors



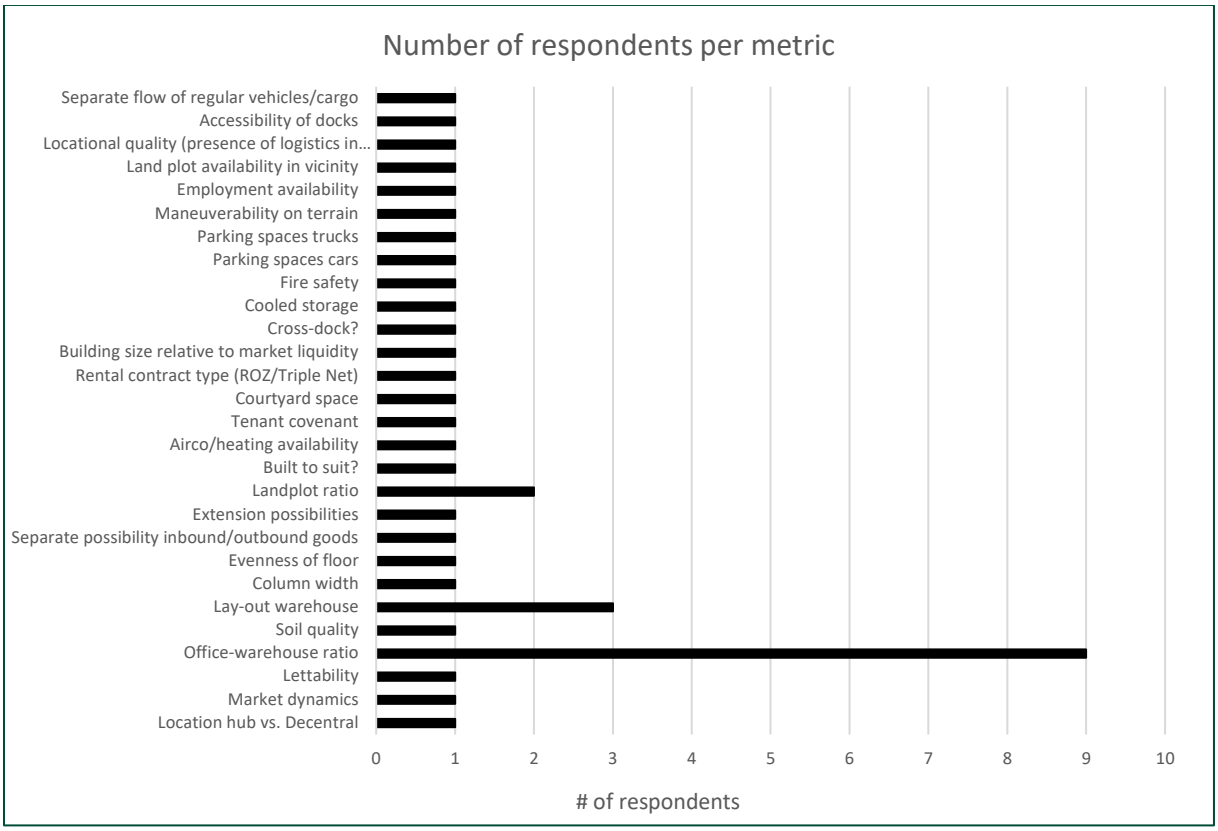
10G. Consideration of market-related factors: investors



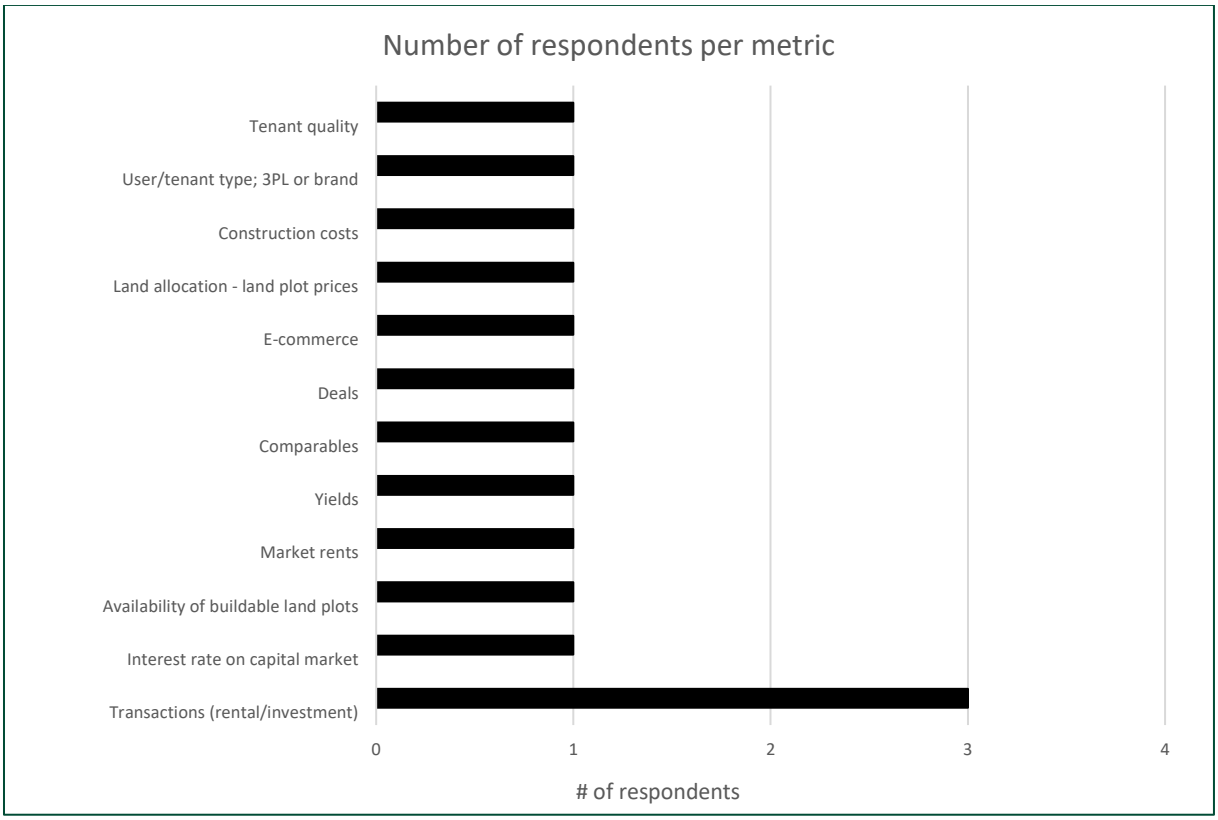
10H. Proof or gut feeling on market-related factors: investors



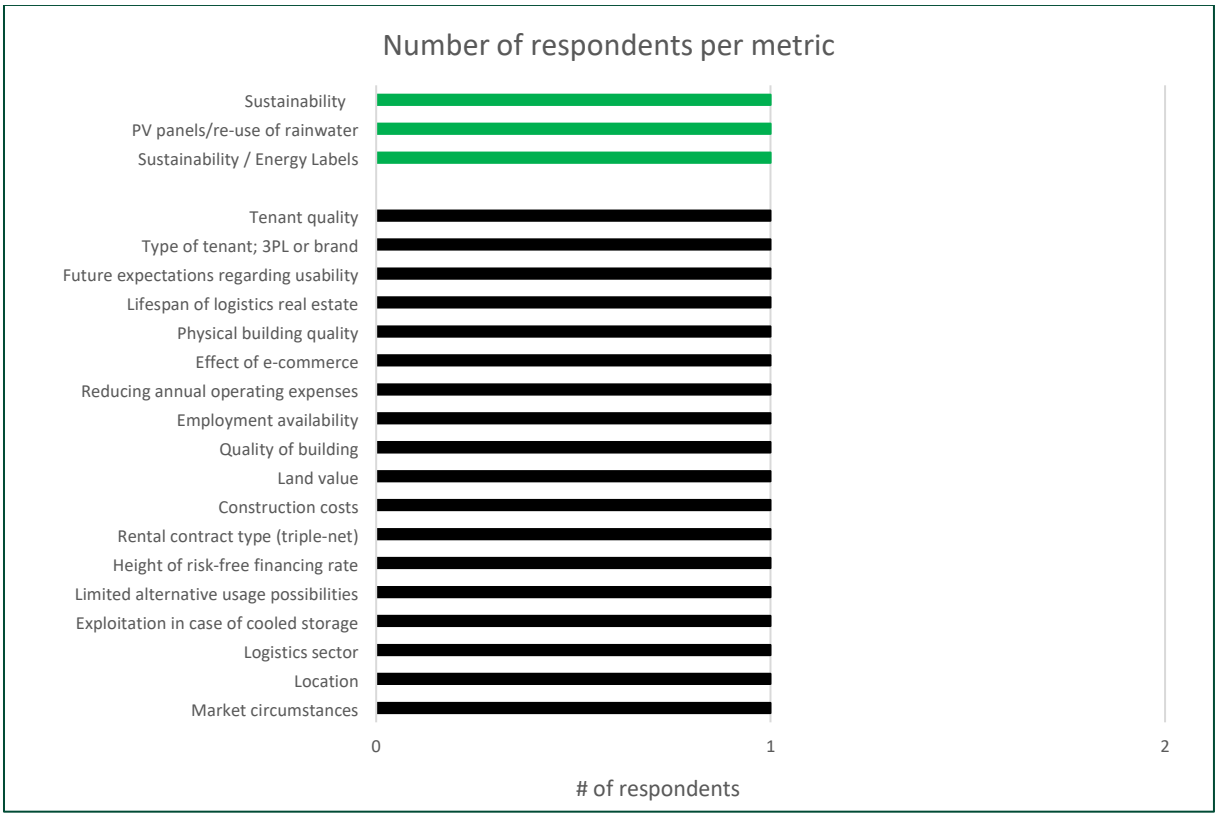
10I. Missing Property-specific value indicators: appraisers



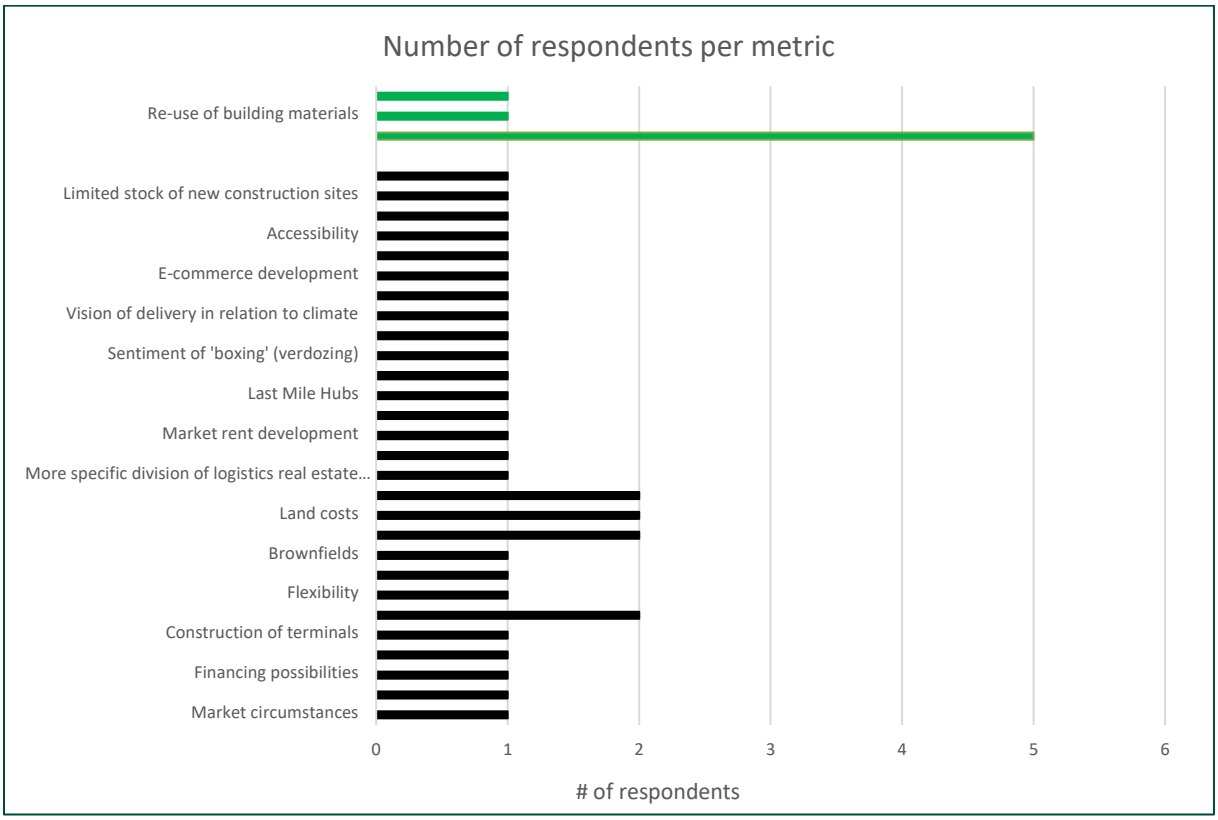
10J. Missing market-related value indicators: appraisers



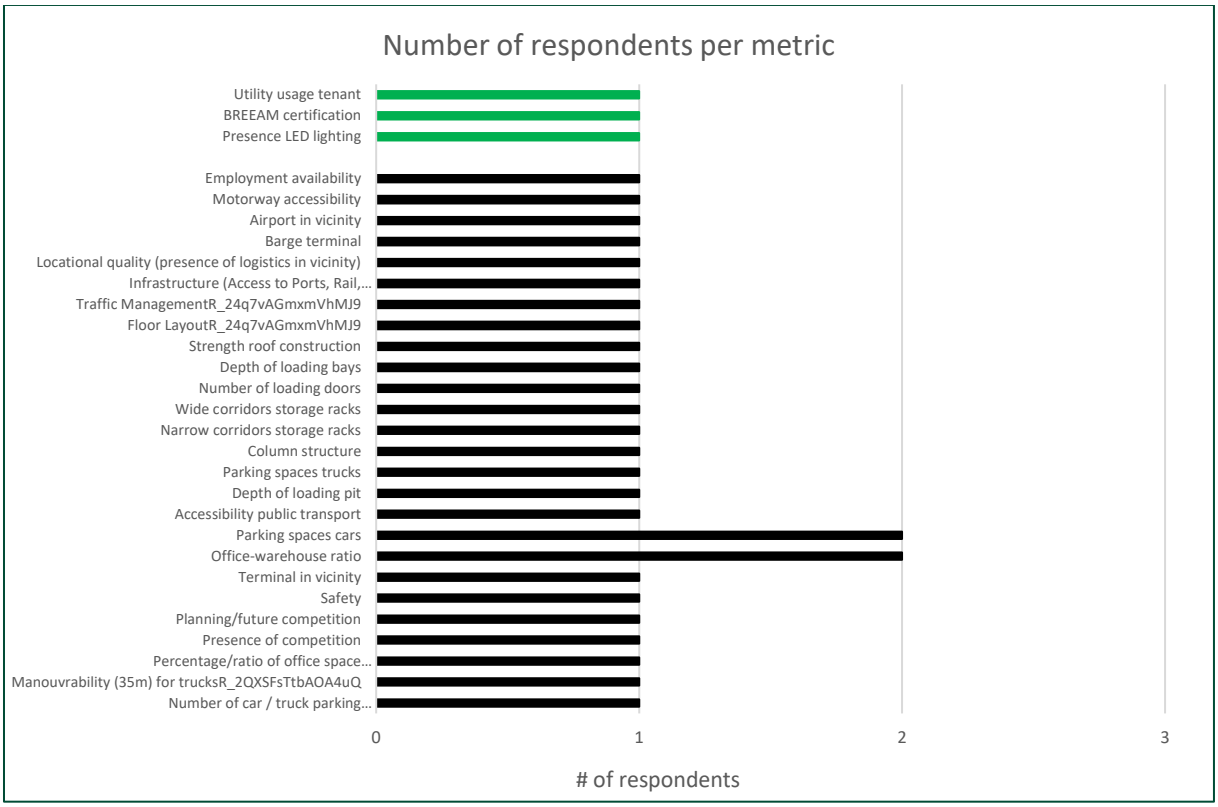
10K. Currently under-represented value indicators: appraisers



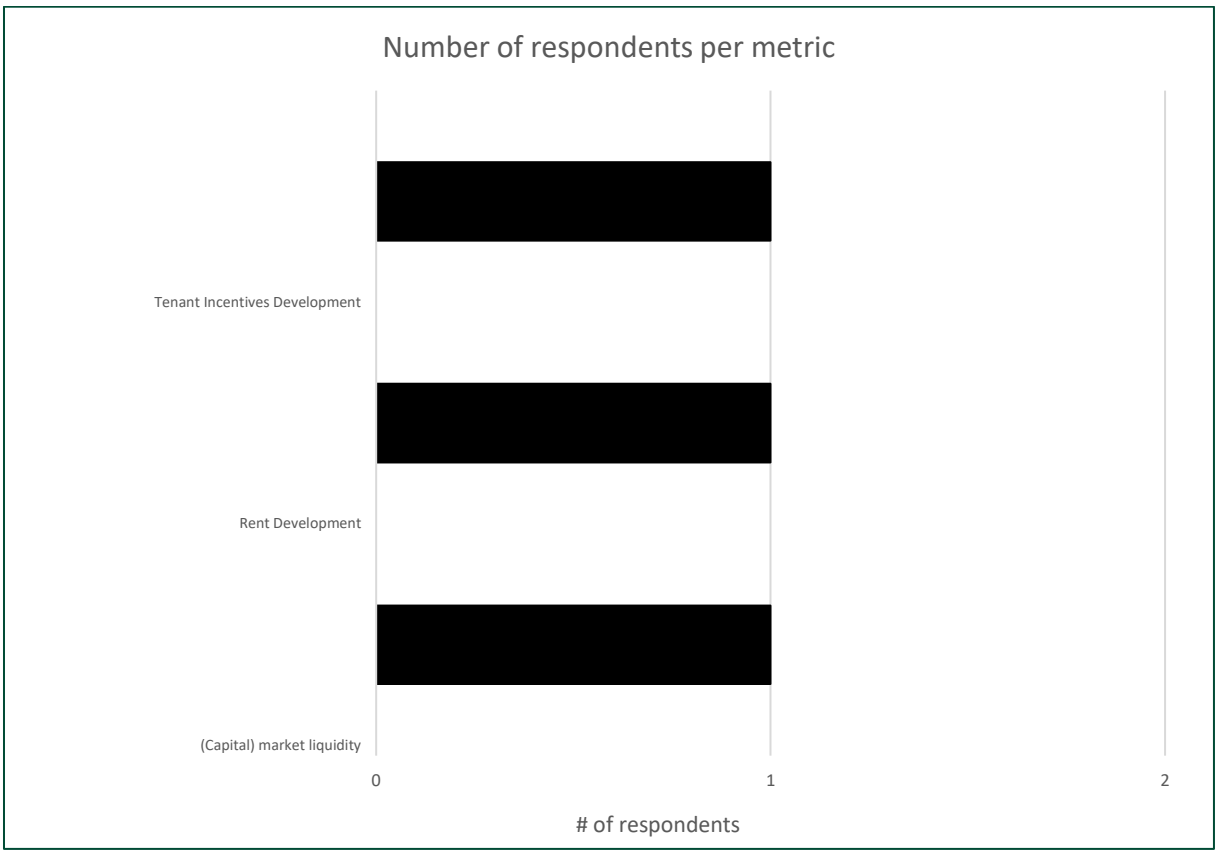
10L. Value indicators that are considered to become more important going forward: appraisers



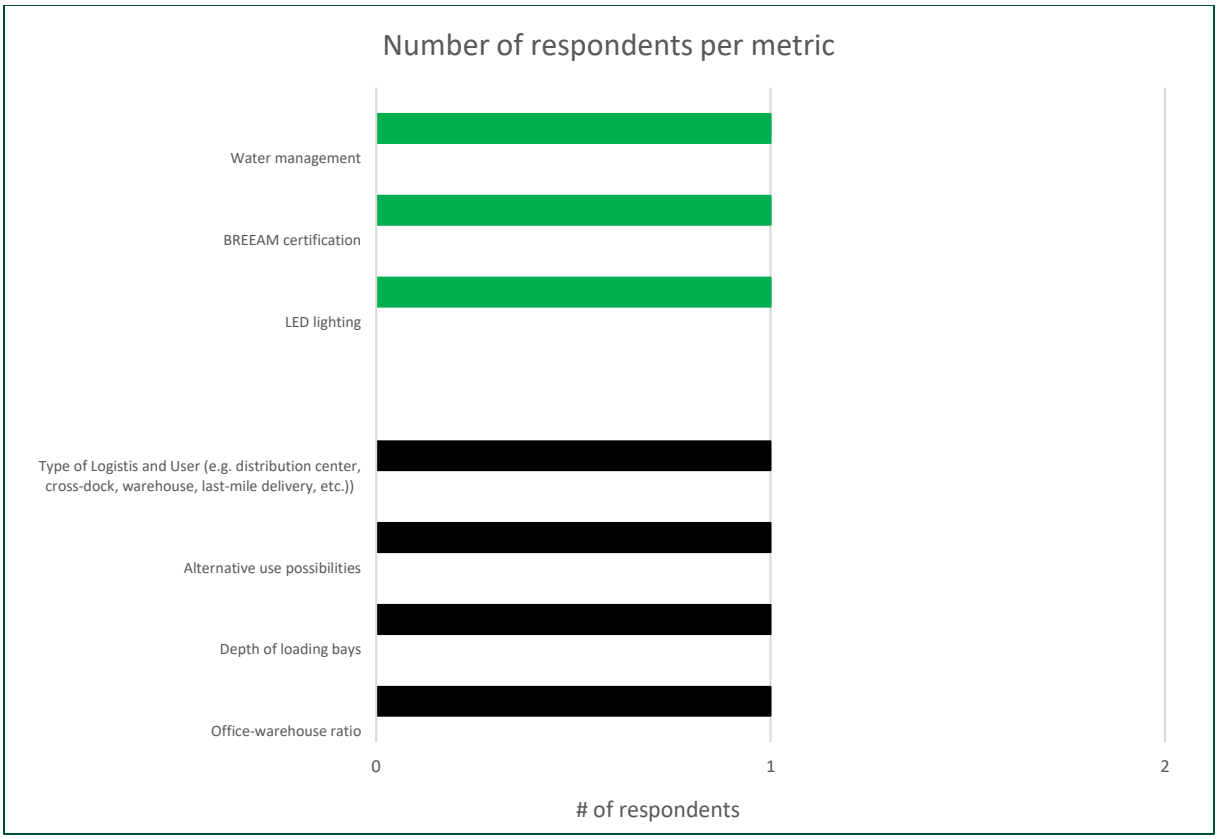
10M. Missing Property-specific price indicators: investors



10N. Missing market-related price indicators: investors



10O. Currently under-represented price indicators: investors



10P. Price indicators that are considered to become more important going forward: investors