The re-development value of vacant real estate

A method of analysing the financial feasibility of re-development projects from offices to housing

“It’s not hard to make decisions when you know what your values are”. Roy Disney

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Management summary

This graduation thesis presents the findings of a research on valuation and financial feasibility of transformation projects of vacant office properties to housing. This research was conducted during a graduate internship at AM Real Estate Development, a project developer involved in several transformation projects. It has been conducted in partial fulfilment of the requirements for the degree Master of Science in Real Estate and Housing at Delft University of Technology at the faculty of Architecture.

Introduction

What is the current market value of a vacant property?

This is a question often raised by parties faced with distressed real estate. Due to the economic crisis, demographic changes and a subsiding needs for office space, the supply and demand on the Dutch office market has become unbalanced. Different parties have therefore become owners of vacant properties and need to adjust their strategies to deal with this growing problem. Several options can be considered, but this research focusses on the option of re-use through transformation.

Transformation of vacant office properties to a new function can be a partial solution to the growing problem of vacancy on the Dutch office market. Public parties, private and institutional investors own vacant properties which have lost a lot of value over the past years. Acknowledging this depreciation by re-valuation, which is the establishment of the market value of properties in their current state, could potentially be devastating. Re-use through transformation can provide owners of distressed real estate with a constructive solution. However, transformation projects are often obstructed by financial infeasibility. Several reasons have been identified to cause financial infeasibility in transformation projects. The most important reason are the high prices owners are demanding for their vacant properties. This high demand price originates in the desire of owners not to sell below book value. Unfortunately the book value and market value of vacant properties has grown so far apart, that they are now obstructing transformation. Therefore this research is focussed on establishing the re-development value of vacant office properties with respect to transforming them to housing. The re-development value is the value an initiating party could pay for a vacant property in a financially feasible business case. The focus on transformation to housing was encouraged by the growing housing shortage in the Netherlands which is expected to increase especially in the “Randstad” area.

Expected result

The result of this research is a model which estimates a projects re-development value. It is expected the model will enhance the initiators insight in the projects financial feasibility and encourage the closing of the gap between the demand price and current market value.

Research proposal

This research is aimed at establishing the value of the vacant property which forms the starting point of the transformation process. The initiating parties, which are often project developers or private investor who also act as project developers, are this researches target group. To established the
value of the vacant property, the residual valuation method is applied. The costs of the transformation will be established in addition to the return on the final product, the transformed property. It is expected that elements like taxation, financing, planning, rules and regulations influence both the projects transformation costs and return on the realized property. This research will therefore include an exploration of elements which might influence transformation costs and property returns. In addition, this research is aimed at making a realistic value estimate and dealing with risk and uncertainty about future values. These aims translate into the following main research question:

*What does a transparent valuation model, that includes additional costs of transformation and estimates the most likely re-development value for transformation projects of office buildings to housing, look like?*

![Research design diagram](figure1.png)

*Figure 1 Research design, A.D. Mensing*

The figure above shows the research design which illustrates the research method, the input for the valuation model and the utility of the valuation model. A combination of literature studies and expert interviews have resulted in an understanding of valuation methods, the transformation process, real estate finance and real estate taxation, on which the model is based. To account for risk and uncertainty the Monte Carlo simulation is introduced. The model is built in Microsoft Excel and uses additional software to implement the Monte Carlo method. The model is then used to perform 5 valuations and financial feasibility analyses on case studies. These analyses will result in case specific and generalizable conclusions.
Literature review

Valuation methods
The highest and best use method is most appropriate for valuing vacant properties. This method is based on the assumption that land, or in this case a vacant property, is worth the returns from the most profitable function on the specific location, minus the construction costs. While this method suggests the consideration of multiple functions, this research includes only residential re-development projects. Therefore the residual method, on which the highest and best use method is based, will be used during this research. It will be assumed a residential function is the most suitable function for the selected case studies.

Veto Criteria
Veto criteria which exclude the option of transformation to housing are: noise restrictions, air pollution, soil pollution and external safety. Because transformation projects re-use an existing structure, the most current regulations might not apply to the project. This means the quality level of the structure for instance concerning sound insulation, is determined by the set of rules valid during the original construction period. While this can result in lower construction costs, the quality level of the product cannot be called into question.

A facilitating government
Through cooperation municipalities can positively influence the transformation process. The spatial planning act is their most powerful tool to enable but also to hinder re-development projects. It can therefore be concluded that the success of a re-development is partially dependant on a cooperative and facilitating municipality.

The built up of the model

Risk in re-development projects
Risk is the probability of an event occurring and the negative consequences which result from it. Risk and return are connected through the widely accepted notion that a higher risk should result in higher possible project returns. While real estate development and investment are entrepreneurial businesses and practitioners knowingly take risks, it is advised to actively manage risk. Risk management includes risk analysis, response and control. While not all types of risk can be controlled, risk management may reduce the probability of a negative deviation from the required return. Risks which follow from uncertainty of future values are accounted for in the valuation model through the Monte Carlo method.
The model
The discounted cash flow method is used to calculate the net present values of the different cash flows at point \( t=\text{completion} \), which represents the moment in time of completion of the transformation project. All cash flows are discounted to this moment to be able to subtract them from each other. This results in the residual value of the vacant property. When the case studies are analysed and the acquisition costs are known, these can be included in the valuation model to determine the projects profitability.

![Real Estate Transformation process](image)

Figure 3 Cash flow diagram re-development valuation model, A.D. Mensing

The Monte Carlo method
The Monte Carlo method is a method which uses probability distributions instead of static value estimates, to account for uncertainty in future value estimates. Through professional articles the usefulness of this method in real estate valuation became evident. Therefore it was applied in this research to overcome the limitations of the discounted cash flow method and to enable the risk and probability analyses of several case studies.

In depth exploration

Real estate finance
Notwithstanding institutional investors need to bring equity, real estate investments are usually financed using debt. Due to the financial crisis, loan availability decreased and loan requirements became stricter. Financers stated to be risk averse and consider project characteristics very carefully before making commitments. While some signs of recovery in the real estate investment market became evident during the first half of 2014, initiators of (re-)development projects are often still
struggling to get funding. In response to these problems creative financing structures have emerged. To protect parties from a devaluation of the collateral, a shift of focus to the cash flows and credibility of the tenant, instead of the property, has occurred.

**Taxation in (re-)development projects**

In real estate (re-)development projects, two types of taxation are important; the real estate transfer tax (temporarily reduced from a 6% to 2% rate for the transfer of dwellings) and the Value Added Tax (VAT). When the ownership of a newly constructed property is transferred, 21% on the purchase price is due. However, when the property is not qualified as new, but as an existing building, this percentage is only 2%. However, for new build projects the VAT on the construction costs is sometime deductible, while the VAT on the construction costs for transformations resulting in an “existing structure” is never deductible. In re-development projects it is therefore important to establish in what condition, ‘newly constructed’ or ‘existing structure’, the property will achieve the highest residual value. Especially since the initiator can steer the ruling in the preferred direction.

**Results**

**The property selection process**

The variables which were included in the model were chosen by exploring the property selection process for transformation projects. This process can be divided into 4 steps. By following these steps all aspects of a successful transformation project are covered. In addition all information needed for the use of the valuation model will also be extracted when following these steps. The combination on these two tools will result in a realistic bid based on a thorough financial analysis.

- **Proposed by |semi-|public party (RVOB, municipality)**
- **Inventory stock**

- **First impression property (volume, shape) and location (neighborhood)**
- **Second inspection property: technical, functional, juridical.**

- **Simple sketches of floorplans**
- **Calculations costs**
- **Calculations revenues**

- **Worst, base, best case. Risk and general conditions**

**Figure 4 Four step plan for the selection of transformation projects, A.D. Mensing 2014**

**The models results**

In this chapter the probability distributions of the following values are included: total transformation costs, the return on property and the unleveraged return on property. In addition the development profit and residual value, before and after taxation are calculated. The input values on which these
calculations are based are presented in a matrix. Additional probability distributions and sheets can be found in the appendices.

**Analysis of the results**

The significance of the models results are established by several analyses. The residual values computed by the model are compared to a static DCF calculation from which can be concluded that especially in the initiative phase the model generates more realistic value estimates which are also suitable for risk analysis. The results of the sensitivity analysis identify the four most influential variables; the LFA/GFA ratio, Rent level, Cap rate and Exit yield. Subsequently the probability of a financially infeasible project due to these single variables is established. Delay, the variable from the preparation and construction period which was not included in the overall sensitivity analysis is explored separately. Even when the investment is supported by debt the negative result of the direct effect of delay is not substantial. Lastly by studying the effect of amortization and LTV, it is concluded that restrictions from financers have influenced the purchase price of properties through the availability of loans and amortization obligations. In addition the effectiveness of the pre-sale/pre-lease requirements are questioned based on the minimum influence of vacancy on the residual value.

**Conclusions**

A model has been developed after an exploration of multiple elements of the re-development business and the transformation process. This research was aimed at including influential variables like taxation, financing, risk and uncertainty. The goal was to provide insight in the financial feasibility of projects without a large investment of time and money. It can be concluded that the model is capable of thoroughly analysing projects and estimating the most probable re-development value. In combination with the four step plan for selecting transformation projects, the model can be used by initiators to make grounded decisions based in financial feasibility.
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Foreword

Before you lies my graduate thesis, the result of an eight month research. With this research I conclude the master Real Estate and Housing at Delft University of Technology. This thesis combines the two aspect of my education which I liked the most; project development and financial analysis. When I started my bachelors in 2008, I already knew I wanted to follow this master course. The 6 years have prepared me well for executing my graduation research and I am confident that the results will be a contribution to the re-development industry.

I have enjoyed the graduate internship at AM Real Estate Development which was part of the process. I would therefore like to thank Thomas Vambersky, for mentoring me during the internship. While his thoughts and contributions gave me guidance, he also acted as a challenging discussion partner. I also would like to thanks my professors Philip Koppels and Hilde Remøy for listening to me, sharing their knowledge and experience and guiding me in the right direction. Lastly I would like to thank my parents for supporting me during my entire studies and for always cheering me on. In addition I am very grateful to my father, Willem Mensing, who I was able to consult in and for his patience, as he read this entire thesis.

Arlette Mensing

Amsterdam, June 2014
1 Introduction to research

What is the current market value of a vacant property?

This is a question often raised by parties faced with distressed real estate. Due to the economic crisis, demographic changes and a subsiding needs for office space, the supply and demand on the office market has become unbalanced. Different parties have therefore become owners of vacant properties and need to adjust their strategies to deal with this growing problem. Several options can be considered, but this research focuses on the option of re-use through transformation.

Reading guide

The following chapter will introduce the relevance of this research. It is divided into two parts. First, it will explain the problem of vacancy; how vacancy came into existence, why vacancy is a problem and the partial solution of transformation from offices to housing. Part 2 is a problem analysis of current valuation techniques. It is believed the neglect to revaluate vacant properties is obstructing transformation projects. Part 2 will therefore explain why this research is aimed at developing a valuation technique and what it can add to the current valuation models. These two analyses result in a research proposal which will be presented in chapter 2. This research proposal contains the research design, research question, research methods and the expected results.

Part 1

1.1 The start of vacancy

FOR RENT, two words that have dominated the streetscape in business districts and cities over the past years. The office market has seen an increase in vacancy since 2000, but really hit rough weather in 2008 with the outburst of the financial crisis (Huizinga, 2004). The Dutch office market currently knows a vacancy rate of 17% an equivalent of more than 8.3 million square meters (NVM, 2014). In Amsterdam, the vacation rate is currently 18,1%, roughly 1,7 million square meters acc. In The Hague, the current vacancy rate of 13% will double with the release of properties from the former ROVB portfolio onto the market (van Veen, 2014). These large numbers were not reached coincidental, the over-supply was created.

Previously, market mechanisms kept supply and demand in balance. As represented in the four-quadrant model of DiPasquale, periods of over supply were followed by constructing stops, reaching market equilibrium yet again. However, due to deregulations in the financial markets an extensive money supply became available. While the economy flourished and optimism triumphed, tenants were willing to pay sky-high rents. This, in combination with the eagerness of city councils to grow and attract economic activity, led to the extensive construction of expensive office buildings. Vacancy was no longer a real obstacle for new build.
However, the exponential growth in office space was not supported by real growth in employment or activity. On the contrary, demand for office space is expected to reduce even further due to new and flexible ways of working. Market mechanisms were not able to perform corrections and the Netherlands got stuck with an oversupply of millions of square meters of office floors. For the office market to function right again, demand and supply have to become balanced.

Figure 5 Availability vs take-up in Amsterdam, Bak property research Knight Frank, 2013

1.2 Why vacancy is a problem

Various influential people have showed their concerns surrounding the over-supply in the office market because the vacant properties are supposedly worth billions of euros. In addition, criticism on traditional valuation methods to value vacant properties is growing (Hooijdonk van, 2013).

- In August of 2011, Nieuwsuur aired an item, featuring Norbert ter Mors, initiator of Rent Review and former director of DTZ Zadelhoff. Different parties were interviewed to stress the magnitude of the vacancy problem. The 8.3 million square meters of vacant office space is theoretically worth billions of euros, but since the value is uncertain depreciation will be devastating. Mister ter Mors claims: “When the owners of all these empty buildings will eventually have to take their loss, another financial crisis will occur”. Maarten van der Poelgeest, an alderman of Amsterdam, claims that the 18% vacancy rate on the Amsterdam office market can already be called the next crisis.

- In 2006, Peter van Gool, a well renowned professor at the Amsterdam Business School, wrote an article on his concerns surrounding the real estate bubble that was being created by the wrong usage of appraisal methods. He claimed appraisers made assumptions to handle uncertainties which were too optimistic. Market risks were underestimated, which was confirmed by the credit crisis in 2008. Ironically, this was the year I started my studies at the faculty of Architecture. The rise and specifically fall of the Dutch office market, has dominated my education.

Figure 6 Dutch office market factsheet, DTZ July 2013
Pension funds invested in Real Estate

Many properties are owned by institutional investor like insurers and pension funds and financed by commercial banks. Excessive loss of asset value due to devaluation, can therefore cause problems for the entire society. In February 2012 the Dutch National Bank (DNB) warned for another crisis in the Netherlands, the real estate crisis. Sijbrand, a supervisor from DNB explained; since many pension funds have invested billions of euros in real estate, the inevitable devaluation of their portfolio’s will cause major cuts in peoples pensions (Waard, 2012). It is therefore important to provide owners with a realistic market value of their property and constructive solutions to diminish the financial damage depreciation will do to their organization and society.

Financial losses for municipalities

Municipalities are public parties partially dependant on income from land leases and revenues from development projects. Vacancy has led to the cancellation of many new build projects. Land revenues municipalities were to receive, are now missed. Between 2006 and 2010 alone, the municipality of Amsterdam has lost 650 million in missed land revenues due to the cancellation of future new build projects (Spaans, 2010). In addition, a decline in the land values resulted in a decline in the lease hold value. This translates into less income when the lease is revised.

A good example of this is the business district Amstel III. The book value according to the municipality is € 600 million euros (historic issue value). However, the area has known a vacancy rate of 25% (Gemeente Amsterdam, 2013). When this area is revaluated, the municipality will probably have to take huge losses. To prevent further loss, public parties are interested in transformation.

Social depreciation and sustainability

In addition, vacancy does not only affect finance, but also influences the social character of an area. The absence of cash flows causes the absence of maintenance resulting in general decay. Also vacancy means fewer people on the streets, causing a less lively atmosphere and even unsafety (Bak, 2009). The transformation of structurally vacant office buildings to a new function will bring back both people and cash flows. Another reason for the encouragement of transformation is the re-use of construction materials. While this research aims at facilitating in the process of making transformation financially feasible, it promotes sustainability and durability at the same time.

1.3 Transformation as a partial solution

It is clear, office space needs to be withdrawn from the market to recover the balance. Demolition is an option, but this destroys capital value. In addition, demolition is not sustainable as many properties have the potential to be re-used. When properties are part of a well- diversified portfolio, reluctance to act often leaves the vacant office properties untouched while owners are hoping for a new tenant. Unfortunately this often is not very realistic. Therefore parties are exploring the benefits of re-use through transformation. This research focusses on the transformation of vacant office buildings to housing.
**Demand for housing**

Since 2008 the financial crisis has caused a general construction slow which is causing a housing shortage in the Netherlands. This shortage will create an increasingly strong demand for housing in the near future, particularly in the Randstad. Therefore transformation of offices to housing can be a solution for 2 problems. It can revitalize buildings and create supply for the increasing demand for housing.

![Diagram of housing shortage](image)

*Figure 7 Housing shortage in Amsterdam, Woningen MRA 2010, edited by A.D. Mensing*

CBS Bouwinvest predicted a possible housing shortage of 700.000 dwellings in the Netherlands in the next 10 years (Baas, 2013). Especially in the urban areas, there is much demand for housing. The population of the Randstad is expected to grow with 700.000 people by 2025 (CBS, 2011). Facilitating in the transformation of office buildings to dwellings can contribute to solving this problem.

**Part 2**

1.4 Obstruction of transformation

"The PvdA (a Dutch political party) pleads for the devaluation of vacant office buildings ", reads the headline in ‘de Vastgoedmarkt’ on June 6th 2013. The political party wants institutional investors to devaluate their vacant properties to ease the process of transformation. Due to high book values, owners ask high prices for vacant properties, making the transformation from offices to housing financially unfeasible. Owners don’t want to revaluate, but need to be forced to do so, says PvdA-member of parliament Albert de Vries (Vastgoedmarkt, 2013)

This is the reoccurring problem initiators of transformation face: the reluctance of owners to revaluate their properties (Rodenhuis, 2012). Re-value is the estimation of the current market value. Revaluation should result in the adjustment of the currently high book value to a more realistic demand price. To establish the financial feasibility of a project, this demand price leading to the sale
price is very important. Two questions can be raised regarding this problem. How did book value and market value grow apart? And, how should the market value of a vacant property be determined?

**How did book value and market value grow apart?**

Book values are perceived a” high”, because current market values have dropped and a wedge came into existence between the book value and the market value. The book value of a property is usually established, when it is purchased as an investment, when the property is bought and valued by appraisers external or in-house. During the holding period, properties should be revaluated annually, adjusting the book value to the current market value. However, there are two reasons for why the book value and market value have grown apart.

Firstly, differences between book value and current market value can be caused by the usage of inappropriate valuation methods. McAllister defines the optimal current appraisal (Vt) as a function of a weighted average of current estimated market prices, established from comparable properties and the previous appraisal. Using the previous appraisal for a valuation results in little deviation in the estimated price. This phenomenon is called appraisal smoothing (McAllister et al., 2003). The other part of the valuation is based on comparables. Using face rents of comparable office buildings in an appraisal can lead to biased figures, since incentives mask effective market rents. Face rents are artificially high market rents. In addition, the market for vacant office buildings is a thinly traded market, which makes finding appropriate comparable transactions problematic. The combination of these factors, can result in book values that are higher than the current market value.

The second cause for overvaluation has to do with unexpected accelerated economic depreciation. The book value of a property was often established by subtracting yearly depreciation costs from the purchase price. These annual depreciation costs were established by dividing the purchase price by the financing term. When the economic depreciation does not exceed the accounting depreciation, the method holds, because accounting depreciation has exceeded economic depreciation (see figure 8). However, when economic depreciation exceeds accounting depreciation, the investors book value is higher than the actual market value of the property. Investors usually try to avoid selling below book value, which causes the previously mentioned problem of high demand prices which obstruct financial feasibility of transformation projects.

![Figure 8 Difference between book value and market value due to accelerated economic depreciation.](image)
How should the current market value of a vacant property be determined?

This question is often raised, but an univocal answer has not yet been given. Real estate comes in all forms and sizes. It is a diverse and location bound product. The market value is influenced by economic developments, market movements, the political climate, location and property specific characteristics. Whether traditional appraisal methods are sufficient to deal with the changing market is questionable (Hooijdonk van, 2013). The longer a property is vacant, the more difficult valuation gets. The spread of appraised values widens because of increased uncertainties, for instance regarding future cash flows. The lower the occupancy rate of a building, the more inaccurate the appraisals get. This was proven by Serge Schiltz, a graduating master student of the ASRE in 2006. Figure 9 shows this effect.

Some say a vacant property is worth the land value minus the demolition costs. However, if a property can still be used in a different function, this assumption is incorrect.

SBRCURnet-research defines the adoption of realistic book values as an important success factor for transformation (Lekkerkerkerker, 2013). According to Fred Schoorl, director of BNA, transformation projects start with the revaluation of the property (Luijten, 2012a).

Dissonance on the subject of market value of vacant properties and valuation techniques, can have a dilatory effect on repairing the balance on the real estate market. To be able to re-value vacant properties as accurate as possible, a valuation method should be used which includes realistic prospects of market rents and transformation costs. Valuation methods based on income streams which no longer exist, or on comparable transactions with biased numbers, have turned out too optimistic. This has led to differences in perceived value between owner, financers, investors and developers. This graduation research focusses on this problem and works towards a solution on the subject of valuating vacancy by providing a transparent valuation method, which can be used for the financial analyses of transformation projects and which includes previously underexposed factors.

![Value shifts: spreads](image)

Figure 9 Occupancy rates to appraised value, Schiltz 2006
2 Research proposal

2.1 What, who, where

The Re-development value

This research is aimed at providing owners and developing parties with a valuation method for vacant properties. It will produce a valuation method to establish the re-development value and enables initiating parties to perform an adequate financial feasibility analysis. This re-development value represents the price a developer would be willing to pay for the property in its current state, when planning on transforming it. The scope of this research is restricted to transformations from offices to housing only.

Target group

A conflict of interest between the owner and buyer of a property exist. The owner is assumed to want the appraised value of the property to be as high as possible. The in principal neutral appraiser, hired by the owner, tries to establish the market value of the property as accurately as possible, but is believed to be influence by his clients interest (Engelman, 2013). (Re-)developers assess the financial feasibility of a potential project on which their interest in the project is based. To do so, the (re-)developer should be able to make an independent but transparent calculation of the property’s value. Therefore the model, the product of this research paper, is established for the usage by real estate developing parties. In addition many project developers have realized re-use of the current stock, instead of new build, is going to dominate the profession for the coming years. That is why developing parties are this researches target group.
Why not appraisers

Appraisers estimate current market value of properties in their current function and do not aim at providing an investment advice. They are employed by those who hold the most interest in the highest estimate and often want to prevent devaluation. In addition, appraisal methods do not include future prospects and appraisers are not keen on revising their earlier estimates.

Target location

Most transformation projects take place in or near the “Randstad” (a conurbation in the Netherlands, consisting of the four largest cities; Amsterdam, Rotterdam, The Hague and Utrecht). The transformation of vacant office buildings to dwellings is only useful when there is a demand for housing. For this reason, only specific areas will be included in this research. Figure 12 shows the office markets with the highest vacancy rates in the Netherlands. Luckily, these areas coincide to a large extend with the areas highlighted in figure 13. This figure shows the municipalities in the Netherlands which are growing in size. These two figures therefore illustrate the overlap of demand for housing and supply of office space.

Figure 12 (left) Municipalities with high vacancy rates on office market, Koppels & Remøy Provada 2013
Figure 13 (right) Municipalities growing in size, Koppels & Remøy Provada 2013

The areas that stand out are the areas of The Hague, Rotterdam, Utrecht and Amsterdam. Table 11, by CBS confirms the population growth in these areas which will result in a growing demand for housing. This research is therefore focussed upon these areas.
Due to urbanization, demand for housing is high in cities. However, this does not hold for the entire city. Inner city locations have the facilities to support a housing market, office locations generally do not. Therefore only properties located in or near residential areas, or located in up-coming residential areas, are included in this research.

2.2 Research questions

The value of a property is usually based on the cash flow it produces. However, this research is not aimed at establishing the value of the transformation product, but of the vacant property which forms the starting point of the transformation. Therefore, the costs of the transformation are important to establish the re-development value in addition to the projects return. It is expected that elements like taxation, financing, planning, rules and regulations influence both the projects transformation costs and return on the realized property (figure 10). This research will therefore include an exploration of elements which might influence transformation costs and property returns. In addition, this research is aimed at producing a realistic value estimate, making risk and uncertainty about future values an important matter.

Main research question

What does a transparent valuation model, that includes additional costs of transformation and estimates the most likely re-development value for transformation projects of office buildings to housing, look like?

\[
\text{re-development value} = \text{current market value of property when planning transformation} = \text{Potential value} - \text{transformation costs}
\]

Research sub questions

1. Which variables should be included in an relevant all-inclusive valuation method?
2. Are these variables affected by current changes in the re-development business?
3. How do changes in real estate finance, affect transformation projects?
4. How does taxation affect costs of transformation?
5. How can be dealt with uncertainties in value estimates?
6. Which variables affect costs and revenues the most?
7. How does risk and uncertainty affect the re-development value?

Background questions

- What valuation methods are currently used and why are they not suitable for valuing vacant properties?
- What rules and regulation have recently changed and have influenced transformation costs both positively and negatively?

2.3 Research design

Figure 15 shows the research design. Based on literature studies, a basic knowledge of the transformation process and valuation methods will be established and presented in the theoretical framework. To broaden the understanding of the transformation project and check the inclusion of all the necessary variables, expert interviews with experienced re-developers are held. Finance and taxation experts will be interviewed to shed light on the latest developments and important issues. In addition the subject of risk and uncertainty are explored. Because the valuation model will include estimates of future values, it is important to account for the risk caused by the uncertainty of future prospects. For this reason the Monte Carlo simulation is introduced. The findings from these explorations will result in the development of a re-development valuation model. This model is built in Microsoft Excel and uses extra software to implement the Monte Carlo method. The model is then used to perform 5 valuations and financial feasibility analyses on case studies. These analyses will result in case specific and generalizable conclusions.
2.4 Research goals

The goal of this research is to provide insight in the financial feasibility of re-development projects with the help of a valuation model. The research will include previously underexposed influences of taxation and financing to form a complete picture of the transformation process. The model will be able to handle uncertainties surrounding value estimates of input data with the help of the Monte Carlo method. Without large investments of time and money, the model will enable initiating parties to analyse future projects and estimate the project risk through probability distributions of the required return on investment and most probable redevelopment value. The model will subsequently be tested on 5 case studies. The aim of these case studies are to: Firstly, establish the bandwidth of the projects costs and returns and therefore provide insight in the projects risk. Secondly, compare the results from the analyses to regular discounted cash flow calculations, to establish the added value of the Monte Carlo method. Thirdly, to compare the models results to the purchase price, to analyse the projects profitability. Fourthly, to establish the most influential variables through a sensitivity analysis. Through graphic displays which the model generates, the results of the analyses can be easily communicated to other parties. This makes the model appropriate for the use in situations where transparency and clarity are required.

2.5 Expected results

The expected result of this research is composed of the following elements:

- Conclusions on the best method to appraise vacant real estate
- Conclusions on which variables should be included in the valuation model
- Conclusions on the use of non-static variables to deal with uncertainties of estimates.
- Conclusions on how the financial crisis and demographic developments have influenced the real estate investment and development industry.
- Conclusions on how taxation and land lease effect costs of transformation.
- Conclusions on probability and sensitivity of required outcomes with input parameters.

These conclusions will be presented in chapter 13 of this report along with an easily usable valuation model in the form of Excel sheets.
3 Methods

This research will be a iterative research, meaning the literature study will lead to expert interviews, which will lead to a second literature study. The research will start with a literature study on the subjects of valuation theory and the transformation process. The empirical stage will consist of expert interviews and case studies. New insights from these interviews, will lead to an extended literature study, as is shown in figure 16. This second literature study will explore theory on risk and uncertainty, the Monte Carlo method, financing and taxation.

![Diagram showing the iterative nature of the research methods, with literature study leading to expert interviews, which in turn lead to empirical research and a valuation model, with case studies and literature study forming a feedback loop.]

Figure 16 Research methods, A.D. Mensing 2014

This chapter will briefly explain the built up of the empirical research, which consists of eleven expert interviews. Secondly, it will briefly describe the methods used to establish the re-development valuation model. However, the model will be explained in more detail in chapter 9.

3.1 The empirical research

The empirical part of this research will consists of 11 expert interviews. The first goal of these interviews will be to finalize the variables which will be included in the model. The second goal will be to deepen the understanding of taxation law and financing and to adjust this knowledge to the specific case of transformation projects from offices to housing. The third goal of these interviews is to collect information for the case studies. With the information collected during the empirical research, it is expected the following research questions can be answered.

1. Which variables should be included in an relevant all-inclusive valuation model?
2. Are these variables affected by current changes in the re-development business?
3. How did changes in real estate finance, affect transformation projects?
4. How does taxation affect costs of transformation?

The following experts will be interviewed:
(The interview transcripts can be found in appendices F till M.)
Experts on re-development:

Roderik Mackay: Roderik is the founder of ‘office up’, a subsidiary of ‘De Koninklijke BAM groep’. He now works for Pinnacle, a private investor interested in acquiring properties suitable for transformation. Roderik graduated from the TU Delft, department Real Estate and Housing in 2007, on the subject of construction costs in transformation projects. He is an experienced re-developer especially skilled in the selection of promising properties (appendix I).

Floris Roord: Floris graduated from the TU Delft in 2005 and has worked for TCN and as an independent project manager for re-development projects. He is the project manager of one of the case studies used in this research (appendix J).

Evert Meijer: Evert studied urban planning at the University of Amsterdam and graduated from the Amsterdam School or Real Estate in 2009. He is ‘development manager’ at Syntrus Achmea and responsible for the re-development process of properties owned by Syntrus or their clients. He is responsible for one of the case studies included in this research (appendix M).

Raymond Jansen: Raymond studied Business and has worked for several organizations in the construction and development industry. He now works for Urban Interest, a private investor involved in many transformation projects. Urban interest is a party actively investing in transformation project. Raymond is responsible for acquisition and transformation strategies. He was involved in case study 3 (appendix L).

Jos van Veen: Jos is one of the founders of the ‘Kantorenloods’, an initiative by the municipality of The Hague, aimed at facilitating transformation projects through communication and by providing information. He has knowledge on the municipal regulation and the transformation process from initiative to construction. He has been interviewed to shed light in the relationship between public and market parties in the re-development industry (appendix K).

Experts on real estate finance

Pieter Zwart: Pieter Zwart is Director of structured Real Estate Finance at the FGH bank. This bank is the largest financer of real estate development and investment in the Netherlands. Pieter has extensive knowledge on financing ex post and ex ante financial crisis. He has been interviewed to establish the changes in the financing industry and to explain the requirements for financing re-development projects (appendix G).

Kees Zachariasse: Kees is one of the partners at Deloitte Financial Advisory Services. He is an expert on finance, real estate and pensions. He advises large organisations like banks, insurers, pension funds and multinationals on corporate finance, real estate transactions and investments. The aim of this interview was to establish requirements for healthy real estate investments and differences between the perception of re-development ex ante and post financial crisis (appendix F).

Experts in taxation on land lease

Robert Kortman: Robert is a fiscal consultant for ‘De Koninklijke BAM groep’. He is specialized in value added tax and real estate transfer tax and advises on these matters in real estate transactions and (re-)developments. He has been interviewed to gain knowledge on fiscal scenarios and the
consequences thereof. The chapter on taxation which is particularly based on his expertise and that of Rendall Hofman, has been checked by both experts.

Rendall Hofman: Rendall is a fiscal advisor for Deloitte Tax Services. He is an expert on value added tax and transfer tax in real estate transactions and development. He co-created the ‘BBN transformation calculation tool’, for which he established the calculations concerning taxation. He has been interviewed to gain knowledge on the subject of taxation and verified the chapter included in this research.

Leon Hoppenbrouwers: Leon, who is partner at the law firm Allen and Overy, is an expert on landlease constructions. He has been interviewed to gain knowledge on this subject and the costs associated with land leases, but also provided a lot of input on the subject of financing (appendix H).

3.2 Translating the findings into a valuation model

The findings from the literature studies and the empirical research will be translated into a model. The model will be used to analyse the financial feasibility of 5 case studies. The first criterion for the selection of the case studies is that the project must be a transformation from an office building to a residential function. The residential function must be believed to be the highest and best used for the specific property. Preferably the project is located in the Randstad. When the project is not located in the Randstad, it will be assumed that a demand for housing exists in that region. The second criterion is the acquisition of the property. The property must be currently owned by the party performing the transformation, meaning the purchase price is known. After these analyses, the following research questions can be answered.

6. Which variables affect costs and revenues the most?
7. How does risk and uncertainty affect the re-development value?

The aim of the model is not to get the lowest estimate and facilitate the developer. The aim is to estimate the most likely market value of the property when planning on transforming the building from an office building to housing. It should result in a transparent build-up of the re-development value that both owner and developer can work with, in order to encourage transformation projects.
Theoretical framework part 1

Reading guide

The following three chapters compose the first part of the theoretical framework. They were established alongside the research proposal. The findings from chapter 4 on valuation methods explain the basics on which the valuation model is based. Chapter 5 explains the veto-criteria for (re-)development projects. Chapter 6 explains the role of the government and municipalities in (re-)development projects. After the first part of the theoretical framework, follow three chapters which together describe how the valuation model was constructed. Chapter 7 describes the influence of risk and uncertainty in (re-)development projects, chapter 8 explains the Monte Carlo method and chapter 9 the valuation techniques used in the model. These three chapters are followed by the second part of the theoretical framework, which explain in more detail this research findings on real estate finance and taxation.

4 Valuating vacancy

This chapter will discuss the expressed criticism on valuation methods used on vacant properties, which are believed to cause overvaluation and high book values obstructing transformation. Furthermore, it will discuss alternative valuation methods suggested in recent works of literature.

4.1 Valuation methods

Transformation does not happen on a large scale partly because of high book values, which are often supported by the usage of valuation methods inappropriate for the valuation of vacant properties. This figure from the graduation thesis of Rodermond from 2011 shows which valuation methods are used most often. 93% of appraisals, according to this research, are performed using income based methods. These income methods often use face rents to establish a properties future cash flow. This has led to overvaluation resulting in high book values. Since vacant properties do not produce face rents, the value which follows from these methods are not realistic.

![Figure 17 Valuation methods used by practitioners, Rodermond 2011](image)

The following paragraph will briefly discuss these income methods among others and explain why they are not suitable for valuating vacancy.
Direct capitalization method (BAR/NAR)

Because individual properties differ greatly in size, when speaking of prices and values it is common practise to think in terms of euros per square meter of current net rent or income. This method makes it easy to compare different buildings. Especially in commercial real estate a measure that is the inverse of this price/earnings ratio is most widely used to describe property prices. This measure is called the capitalization rate, or in short the cap rate and is the equivalent of the Dutch NAR (Netto Aanvangst Rendement). The cap rate, which is determined by capital investment supply and demand in the asset market, is used to calculate the value of a property. By dividing the property’s first year net operating income by the cap rate, the value is established (Geltner, 2007).

What is most important to note is the usage of net operating income in the equation. Usually structurally vacant properties do not generate income, or negative income when the operating costs become higher than the potential gross income. This would result in a negative value of the property. Instead, previous contract rents are used to substitute actual income. Since these contract rents are not market rents and the property has not been rented for those prices for years, it is unrealistic to assume this operating income and thus value.

Direct capitalization + Discounted cash flow method

An extension to the previously described method, is the direct capitalization method in combination with the DCF method. The DCF method incorporates time and reversion cash flows (see § 12.3.3.11) in property valuation. Though real estate is sometimes developed and held for its entire economic life, most investors have a much shorter investment horizon. Therefore the DCF methods assumes a finite holding period at the end of which it is assumed the property will be sold (Lusht, 1976). Instead of a cap rate, the discount rate is used which includes possible growth in value over time. However the DCF method is not without problems either. DCF analysis involves the projection of future revenues, expenses, and net operating income over an assumed holding period; the capitalization of the projected net operating income stream; and the capitalization of a future selling value (which is also usually based on projected net operating income) at a market-derived discount rate to arrive at the present value of an asset (O’Neill, 2003). The more values are assumed, the more sensitive the estimated value will be to errors. The origin of overvaluations lies in the previously overly optimistic assumptions concerning occupancy and value growth in the future. The method is not appropriate for valuating vacancy properties for similar reason as the direct capitalization method; the DCF method assumes a level of income and while it can compensate with variable discount rates, assumptions regarding the not so probable future using past rent levels will not result in a realistic market value.

Comparative method

Rent levels and values are often estimated by using transaction prices from comparable properties. This methods makes two implicit assumptions. One, the transaction price is representative for the market price. Two, comparable properties will be traded for comparable prices (Rodermond, 2011). When selecting properties for the comparison, their level of similarity to the subject property are of great importance. Location and function of the building are the most important factors. Because buildings always differ in size, it is advised to work with rent/price per square meter. Important to
note for this research specifically is the difference between quoted (or face) and effective rent levels or prices. Quoted rents often obscure the fact that in order to attract tenants, free rent and generous tenant build-out allowances may have been offered (Lusht, 1976). These type of incentives are particularly common when vacancy rises and results in a distorted view upon effective rent by the publishing of significantly higher face rents. It is speculated the DNB of NVM will soon intervene to make the office market more transparent (Luijten, 2012b). The second important aspect to note when using this method is the nature of the real estate market which is thinly traded. During the discussions on where to search for comparable sales to use for appraisals, it was pointed out that limiting the search area to the subject properties neighbourhood might be too restrictive. Usable sales data can be found in areas that are not geographically contiguous and rejecting data that is not from geographically close properties can leave the appraiser with little or nothing to work with. However adjusting for significant differences is necessary. In the case of vacant properties this brings up a problem. Structurally vacant properties are not traded often and as mentioned before in times of high vacancy rates face rents become more distorted. The combination of these elements make value estimated based on comparable properties very difficult.

4.2 Alternative valuation methods

The valuation methods described above are not suited for valuating vacant properties. Different sources have proclaimed the usage of alternative methods, of which the highest and best used method seems to be mentioned the most often.

The Highest and Best Use method (HBU)

The highest and best use premised of market value is a appraising method originally used to appraise land as if vacant. It can be found in appraisal literature since Babcocks 1931 texts. It was used to match the most profitable function to a piece of land based on how accessibility effects land value. The process starts by screening the market and eliminating obviously unsuitable uses. Then, a manageable number of feasible and competitive uses is analysed. Usually three different functions are studied in terms of development costs, expected income, expected rate of return and resulting land values. The highest and best used that is selected, is the use that results in the highest land value (Lusht, 1976).

When using the HBU method, two veto criteria exist. The first is the legality of the plans. The new plans and function of the building must be permitted by the zoning plan (Lusht, 1976). When this is not the case, a revision is the zoning plan can be requested. This used to be a lengthy process, but to enable transformations, many municipalities are working on smoothing this process. In addition, the used function must be permitted by environmental laws. For residential functions, stricter rules concerning air quality, noise and pollution apply than for offices. These veto criteria will be discussed in the next chapter.

The second veto criterion is the physical ability of the property to adjust to its new function (Lusht, 1976). This will be discussed in more detail in chapter 6.

Highest and Best use method in recent professional articles

In a journal article in which Cuno van Steenhoven, Elco Brinkman and Rinus Vader are interviewed,
the use of traditional valuation methods is mentioned along with strict zoning plans as one of the most obstructing factors of transformation. Rinus Vader, from Royal HaskoningDHV, a company that has actively been promoting this method, explains how they search for the most profitable user functions like hotels, conference centres and dwellings. The investment costs for transformation are included in the final value which make the feasibility study result actually feasible (Hooijdonk van, 2013). The inaccuracy of using non-existent income streams with income based appraisal methods is also discussed in this article. High book values that result from these methods obstruct transformation.

Out of office, a dissertation written by Hilde Remøy, mentions the financial value of office buildings as one of the biggest obstructers of transformation (Remøy, 2010). Under the supervision of Hilde Remøy, Bram Djajadiningrat graduated in 2012 on the usage of the HBU method on vacant office buildings. Strikingly this method is not as widely mentioned in recent articles as expected. Anke Sieverink and Rinus Vader, both employed at Royal Haskoning seem to be the returning source for all remaining articles found concerning this subject.

**Conclusions**

The highest and best use method is most appropriate for valuing vacant properties. However, this method suggests the consideration of multiple functions in the valuation process. The scope of this research includes only residential re-development projects. Therefore the residual method, on which the highest and best use method is based, will be used during this research. It will be assumed a residential function is the most suitable function for the selected case studies.

**5 Veto Criteria for (re-)development projects**

Laws and regulations exist that form veto criteria for transformation projects. When it is impossible to meet the requirements set in these laws, the project cannot be executed. This chapter will explain which laws apply and what criteria are mandatory.

**5.1 Noise abatement act**

The noise abatement act is an act that includes all forms of noise restrictions concerning traffic, industry, people and construction works. Some requirements in this act determine the ability to use a site for residential purposes and is therefore a veto criterion. Noise exposure to a façade is the most important one. A division has been made between noise sensitive function (dwellings, education institutions and healthcare) and noise insensitive functions (bars and restaurants, hotels, campsites, offices, recreational dwellings and houseboats). The first category has a preferred limit for roads of 48 DB and 55 DB for railways. However, which exact level applies depends on the function and quality level of the original structure (in Dutch: rechtens verkregen niveau). This means allowed decibel exposure might be higher because current laws do not apply due to the properties original construction year. When it is impossible to open parts of the facade, it is not required to test the noise exposure levels. According to article 110a, the mayor and alderman can define exemptions to these rules and judge the noise exposure per case (Ruiter, 2014). This means that in the case of a
transformation project where the preferred noise exposure it exceeded, it is possible to heighten the allowed exposure level to enable the transformation. However, this is not common since the living comfort should not be threatened.

Measures to restrict exposure to noise can be double facades, noise screens and noise restricting pavement. To prevent the exceeding of exposure to noise, some general rules concerning required distance between buildings and roads exist. The following rules do not apply in residential areas or areas with a speed limit of 30 km/h.

In urban areas:
roads of one or two lanes or one or two railways: 200 m
roads of three lanes of three or more railways: 350 m
In rural areas:
roads of one or two lanes or one or two railways: 250 m
roads of three or four lanes or three or more railways: 400 m
road of 5 or more lanes 600 m

(article 74, chapter VI, noise abatement act 2014)

The maximum height to which mayor and alderman can grant exemptions are:

<table>
<thead>
<tr>
<th>Situation</th>
<th>Max preferred value dB</th>
<th>Limit dB Highway</th>
<th>Urban road</th>
<th>Limit indoor dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>When present or under construction</td>
<td>planned 48</td>
<td>63</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>present 58</td>
<td>68</td>
<td>43</td>
<td></td>
</tr>
</tbody>
</table>

(article 74, noise abatement act, applicable 2014)

<table>
<thead>
<tr>
<th>Situation</th>
<th>Max preferred value dB</th>
<th>Limit dB</th>
<th>Limit indoor dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of noise</td>
<td>Functions</td>
<td>Industrial</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Industrial</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Railway</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Railway</td>
<td>53</td>
</tr>
</tbody>
</table>

(article 74, noise abatement act 1979, applicable 2014)

5.2 Air quality

The level of required air quality is age independent and only location specific. The same rules apply to all residential areas in the Netherlands. Air quality cannot be enhanced easily, which makes it a determinative veto criteria.

In the Netherlands, air pollution is divided into three groups.
- PM10 and PM2,5 (particles of 10 micro mm in size or less and 2,5 micro mm or less)
- NO2 (nitrogen dioxide) en NOx (nitrogen oxides)
- Benzene (important in parking garages).

According to EU norms, the daily concentration of particulate matter cannot exceed 50 μg/m³ for more than 35 days a year. For so-called ‘sensitive functions’ extra rules apply to restrict risk concerning health problems. These sensitive functions include schools, day-care, elderly homes and nursing homes. Under no circumstances is housing allowed in areas where the PM10 or NO2 limits are possibly exceeded. In addition, no sensitive functions can be built within 300 meter from a highway or 50 meter of a road (Rijksoverheid, 2008).

<table>
<thead>
<tr>
<th>Component</th>
<th>Concentration level</th>
<th>Max limit in µg/m³</th>
<th>Number of allowed yearly exceeding’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate matter (PM10)</td>
<td>Yearly average</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 hour average</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Nitrogen dioxide (NO2)</td>
<td>Yearly average</td>
<td>60</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Hourly average</td>
<td>300</td>
<td>18</td>
</tr>
</tbody>
</table>

RICHTLIJN 2008/50/EG Van het Europees Parlement en de Raad, 20 May 2008

5.3 Soil quality

The quality and level of pollution of soil is of influence on the liveability of an area. Bad soil can effects peoples health and has to be decontaminated. This is a very expensive process and can seriously effect a projects financial feasibility. It is therefore considered a veto criteria.

Whenever people reside in a building for more than two hours a day and the building touches the ground, soil surveys need to be done to make sure the soil quality is up to standards. The only exemption to this rule is when land is bought but no construction works will take place. The research that needs to be performed consists of a historical research and an exploratory soil investigation (fieldwork and analytical/chemical research). When historical research shows no evidence for possible pollution, the exploratory research can be omitted. In the case of polluted soil or polluted groundwater, the soil has to be decontaminated (Djajadiningrat, 2013).

5.4 External safety

The disaster and major accidents act (Wrzo), maps risk factors in certain areas. Risk indicators explain the possible dangers a region holds. Risk factors which negatively influence the liveability of a location are for example LPG-stations and railways that transport toxins. For vulnerable functions the odds of an accident cannot exceed 1:100.000 and for more vulnerable functions 1:1.000.000. The exact meaning of ‘more vulnerable functions’ are explained in Infomil. No (re-)development projects can take place in areas where external safety indicators were recently or are currently exceeded. Location bound risk factors, like production plants, are mapped by planMER (Djajadiningrat, 2013).

Since this research is focussed on the transformation of former office buildings, it is unlikely the property is located in a risk area. However it is still a veto criterion.
Conclusions
Veto-criteria based on environmental restrictions can obstruct (re-)development projects and should therefore be considered when selecting potential sites and properties.

6 A facilitating government

The ‘Transformatie potentiometer’ is a tool aimed at measuring the transformation potential of a property. This tool, among other works on the subject of transformation, stresses the importance of a cooperative and facilitating government. The realisation is spreading, and municipal attitudes as well as national regulations are changing to smoothen and simplify the transformation process of vacant real estate. The most important regulatory elements to the transformation process are:

- Spatial planning act
  Zoning plan
  Environmental permit
  Spatial structure visions
- Squatting and occupancy act
- Managerial instruments

6.1 Spatial planning act (WRO)

The most important aspects of the spatial planning act are the zoning plan and the environmental permit.

Zoning plan
The zoning plan is the most important mean of control of the municipality for land-use planning. It divides land into mapped zones which determine what type of land use (function) is permitted. In the case of transformation projects subject to this research, the land was previously meant for offices. Therefore a revision of the zoning plan has to be requested by the owner of the land and approved by the municipality, to enable the transformation to housing. When the municipality receives a ‘zoning plan revision’ application, she has 26 weeks to make a decision on whether the zoning plan will be revised for the sake of the project or not. When the decision is made, the public will get 6 weeks to file objections against the revision. The town council will decide if an objection is grounded and if a hearing will take place. When a hearing takes place, the seriousness of the objection and the persistence of the objector will determine the delay it will cause in the projects planning. According to Jansen en Roord, two experienced project developers, this could go on as long as two years. However, this is not very likely. When no grounded objections are made, the town council will approve the plan, which will then be presented for inspection for another six weeks. When the public feels their interests are not respected, they can file an appeal. The length of this appeal is again dependent on the ground of the appeal and the persistence of the appealer (Rijksoverheid, 2014).

Environmental permit
For all substantial construction activity, an environmental permit needs to be requested in the Netherlands. So when the zoning plan is revised, the initiator will need to get an environmental permit to continue with his project. This permit can be requested simultaneously with the zoning
plan revision. However, construction fees are due within 6 months after the permit is requested. The costs of these fees are a percentage of the construction costs and can be rather high. The timing of this request therefore depends on the initiators risk profile and strategy. When filed simultaneously, procedures of objection and appeal, for the zoning plan revision and environmental permit will coincide. This can save time (Roord, 2014). The procedure for the granting of an environmental permit is as follows: The initiator will hand in the plans for the re-development after which the municipality has six months to reach a decision. For very simple plans, like the placement of park benches, the municipality only has 8 weeks.

When the municipality has made her decision, the public will have 6 weeks to file an objection against this decision. Depending on these objections, the town council will decide on a hearing or not. When the objection is rejected, the permit is granted. Upon this decision, the public will have 6 weeks to file an appeal (Rijksoverheid, 2014). Important to note is while the objection or appeal are dealt with, all construction activities must be stopped.

**Spatial structure visions**

Besides these measures of control, the spatial planning act also includes non-decisive but steering tools. Spatial structure visions describe the municipal views and expectations of regional growth and development. Initiators can use these documents to anticipate on future developments. These structure visions usually include long-term plans and can therefore hold valuable information. Mapping planned capacity in combination with future demand prospects, provides owners and developers with insight into market conditions. It can clarify rent-ability of different properties and potential for transformation. It is the municipalities tasks to deliver this information and communicate with other municipalities to regulate development.

### 6.2 Squatting and occupation act

Since 2010 a law exists in the Netherlands that makes intrusion and occupation of vacant buildings by anyone other than the owner penal. In Amsterdam, the same law obliges owners to inform the municipality when a property has been vacant for more than 6 months. Failure to comply can lead to a penalty of 7500 euros. The municipality is obliged to dissertate with the owner within 3 months after the report has been filed. When the property remains vacant for more than a year, the municipality can nominate a possible user, initiate a function change or eventually assign a user (Rodenhuis, 2012). When a developer shows interest in a particular structurally vacant property of which the owner is not co-operative, the developer can rely on the municipality to intervene.

### 6.3 Managerial instruments

Actively approaching and encouraging owners will speed up the transformation process. When the owners or developers feel like they have the support of the municipality, the project seems less risky and parties are more willing to participate. To establish and maintain contact between actors and to fulfil the facilitating role, it has been suggested by developers during the research of Rodenhuis in 2012, to appoint someone within the municipality who is responsible for this communication. Mobilising potential customers and supplying information is a second element of active involvement of the municipality.
Conclusion
Through cooperation municipalities can positively influence the transformation process. The spatial planning act is their most powerful tool to enable but also to hinder re-development projects. It can therefore be concluded the success of a re-development is partially dependant on a cooperative and facilitating municipality. This chapter therefore stresses the responsibility public parties carry in the task of reducing the over-supply of office space.

7 Risk in re-development projects

In financial feasibility analyses and valuations, risk and uncertainty play important roles. This chapter has been included in this research to provide some background information on the subject of risk. It will explain the definition of risk, risk management, and risks specific to re-development projects. Chapter 8 will explain how these risks and uncertainties are accounted for in the valuation model with the help of the Monte Carlo method.

7.1 Risk

Risk has to do with the probability of something happening and the negative consequences which result from this event. It is difficult to exactly define the meaning of risk. Gehner (2011) provides a complete overview of the different definitions of risk used in professional literature on real estate development and investment. A much used definition from Stichting Bouw research (2000) is:

\[ \text{Risks} = \text{probability of failure} \times \text{the consequence of failure}. \]

The value component is the negative consequence which results from an event. The uncertainty component has to do with the probability of the event actually occurring. The risk taker is often not certain what the probability is of the event occurring. Risk and uncertainty are therefore related but are not the same thing. A risk can be taken knowingly, aware of the possible negative consequences. When something is uncertain, the consequences of the decision are not known at the time the decision is made.

7.2 Risk in re-development

Gehner (2011) defines risk in project development as following: “A risk is a predictable and stochastic malleable event which leads to a negative deviation from the projects required return”. From this statement it becomes clear that the effect of the event on the projects return is important. The relationship between risk and return is evident it all types of investments. Developers but also investors are willing to take a risk if it results in a reward. The higher the risk, the higher the reward must be.
The following graph shows three types of investments, all expecting the same return but associated with different risk levels. Investment A will be considered the best investment choice because the probability of achieving the desired return is the highest. Investment C is considered the most risky since the spread around the expected return is the widest and the probability of achieving this return the lowest. The re-development valuation model generates such probability distributions to visualize the risks of not achieving the desired return or of exceeding the maximum costs. In chapter 13 a sensitivity analyses for each case study will be presented, which will show the risk of a financially infeasible project.

7.3 Risk in real estate investment

Developers but also investors in every type of asset class always weigh risk against returns. Whether in stock, bonds or real estate, the balance between the expected returns and risk determines the willingness to participate. In real estate investments, this risk is often reflected in the discount rate through a risk premium. The height of this risk premium is project and market specific. Risk averseness differs between investors due to different goals, portfolio composition or personal preferences. To manage and reduce risk, modern investment strategies encourage diversification of investment portfolios. Diversification is a risk management strategy of adding investments to a portfolio to hedge against the investment risks of the investments already in it. Ideally, this reduces the risk inherent in any other investment and increases the possibility of making a profit, or at least avoiding a loss on the whole portfolio. Real estate has longer investment cycles than many other investment products. This often means that peaks and downturns of real estate cycles are mostly not
synchronously with stocks and bonds. According to Chun et al. real estate performs well as an asset class in macro-economic bad times, has become more predictable due to information availability and has quite high average returns relative to risk (Chun, 2004).

### 7.4 Risk management

The (re-)development business is an entrepreneurial business meaning parties are knowingly taking risks. Active risk management is therefore part of the development process. Risks management includes activities and measures aimed at controlling project risks. Gehner divides risk management in three steps: risk analysis, risk response and risk control. The model presented by Gehner, of which an English version is included in this research (figure 20), is a cyclic model because risks occur and change during the projects process.

Step one, risk analysis, consist of risk identification and risk quantification. It is linked to certain ‘decision moments’ in the transformation process (Nieman, 2008). In risk identification one tries to make a complete lists of all possible risks because incompleteness can lead to the wrong decision. Risk quantification is assigning a probability and an effect to an identified risk. When identifying risks the realisation of the following is necessary: there are things we know, things we think we know and things we don’t know (Gehner, 2003). So not all risks can be accounted for through risk analyses.

Step two is responding to the identified risks. Four attitudes can be taken by the decision-maker: avoid, reduce, transfer or accept.

Step three is risk control, which is aimed at implementing measures to increase the chances of achieving the required returns. The decisions to implement the measure or not depends on the impact of the event resulting from the materialisation of the risk. The model developed during this research is meant to be used in the initiative phase and makes a first estimation of financial feasibility. In the course of a development project, certainty increases while flexibility decreases. It is therefore important to include risk and uncertainty as early in the process as possible. Incorrect or incomplete estimations of risks can lead to severe loss of income, higher costs and an unfeasible project.

![Risk management cycle](image)
7.5 Risk in (re-)development projects

In (re-)development projects, developers and investors come together. Both parties are faced with risks concerning the project of which some occur in the acquisition and construction phase and others in the operating phase. All phases and future prospects are connected making the risk faced in both phases relevant to all parties. Distinctions can be made between risk against one can insure himself and risk which cannot be influenced. In the re-development valuation model, some of the risks described below are included by recognizing the uncertainty of the value estimates. For example the construction costs; instead of a static cost estimate, a range of possible costs expressed in a probability distribution is used to estimate the projects total costs. By using a range of value estimates, instead of a static value estimate, the risk and consequences of higher costs can be made quantifiable. The following paragraph will describe real estate related risks as described by Nieman, Brueggeman and Gehner.

**Business risk (or market risk)**

Real estate investors but also developers are in the business of renting space (Brueggeman, 2010). Fluctuations in economic activity affect the variability of income produced by the property and vacancy rates. Changes in economic activity affect demand for housing on certain locations through job opportunities and demographic changes the demand for certain dwelling types. In financial feasibility analyses rent levels, based on demand, are estimated on which the project return is based. The risk of not achieving the desired rent or occupancy level influences the projects financial feasibility.

**Financial risk**

Financial risk increases as the amount of debt in a real estate investment is increased (Brueggeman, 2010). The debt service (§ 12.3.3.8), which is an annual payment determined by the loans interest rate, amortization rate and loan to value ratio, will need to be paid even if the property does not produce the required amount of income. Furthermore, the real rate of return earned by the equity investor can be affected by changes in interest rates. Even if the mortgage has a fixed interest rate, or when the project is fully financed with equity, an increase in the interest rate may lower the price that a subsequent buyer is willing to pay. Moreover, yield rates that investors require for real estate tend to move with the overall level of interest rates in the economy (Brueggeman, 2010). The relationship between a properties income and the debt service is expressed in the debt service coverage ratio which is calculated by dividing the net operating income by the debt service. The lower the ratio the more financial risk the project holds.

**Liquidity risk**

The more difficult an investment is to liquidate, the greater the risk a price concession may have to be given to a buyer should the seller have to dispose of the investment quickly (Brueggeman, 2010). Real estate and especially distressed real estate which is the starting point of many re-development projects, has a high liquidity risk. This can be an advantage to developing parties.

**Inflation risk**

Inflation negatively influences the real value of a property if the rent increase does not offset the inflation. Historically real estate has performed well as an investment class during periods of inflation (Chun et all). This may have resulted in leases in which the net operating income can be adjusted.
with unexpected changes in inflation (Brueggeman, 2010).

Management risk
During the initiative phase, construction phase and operating phase, the process of consecutive activities must be managed adequately. The rate of return, both during construction and operation, can be dependent on the competency of the management. Management risk is based on the capability of management and their ability to innovate, respond to competitive conditions and operate the business activity efficiently (Brueggeman, 2010). In the transformation process, many parties are involved, making the management risks a joined responsibility between for instance the developer, contractor, advisors and investor.

Legislative risk
Real estate development and operation is influenced by numerous rules and regulations concerning tax, rent control, permits, zoning plans, liability towards third parties, environmental restrictions and other restrictions imposed by the government (Nieman, 2008). Changes in regulations, sometimes caused by changes in the political climate, can both positively and negatively influence the project returns. For instance procedure risk can cause delays or even cancellation but changes can also smoothen the process. Environmental restrictions hold the risk of soil decontamination which often results into high costs.

Construction costs
While some risk mentioned above directly influence construction costs, this is a risk worth mentioning separately. The construction process is a complex process and especially for redevelopment projects not many comparable projects exists to benchmark construction cost on. A typical re-development risk is the uncertainty of the quality of the existing structure. Other risks are contracting risks (contractual construction costs are higher than estimated costs), design risks (errors or design incompleteness leading to extra costs) and delays (not caused by legislative procedures).

Conclusion
This chapter summarizes the evident risks associated with investments in real estate. While investors and developers knowingly take risks, they are advised to perform risk management to reduce the probability of a negative deviation from the required return. The Monte Carlo function is included in the model to manage uncertainties on value estimates and to quantify the risk of not achieving the required return. On this subject will be elaborated in chapter 9.

8 The valuation model

Reading guide

This chapter will explain the built up of the re-development valuation model and the different results in generates. The model is based on the residual valuation method and is performed with the discounted cash flow method. The discounted cash flow method will be explained as well as the discount rate used to perform these calculations. This chapter will start with a simplistic graphical
display of the models basics. The model can be used for two purposes, to calculate the properties re-
development value and to analyse a projects financial feasibility. The chapter will be concluded with
a summation of the formulas used in the model.

8.1 The basics

The re-development valuation model is represented simplistically by the figure below. The model was designed to calculate the re-development value of a vacant property. By subtracting the transformation costs from the total return, the residual value is found (figure 21, left). In theory, this value represent the price the developing party can pay for the vacant property while achieving the required return. In addition, the model will be used to perform financial feasibility analyses. The financial feasibility can be analysed when the properties purchase price, or acquisition costs are known. When the acquisition costs are included in the calculation, the model does not calculate the re-development value but the total return. Because when all costs are subtracted from the return on property, the development profit, on top of the required return, remains.

![Figure 21 Calculation residual value (left) & Calculation Project Return (right), A.D. Mensing 2014](image)

The return on property is the positive cash flow, theoretically received at completion. The value is computed from the net present value of the positive and negative cashflows during the properties operating period and the resale value. The model estimates the unleveraged return on property (LTV ratio = 0%) and the leveraged return on property (LTV ratio = 60%). The transformation costs represent the net present value of all the costs involved in the transformation of the property. The acquisition costs represent the future value (t = completion) of the price the initiator has paid for the property.

8.2 The cash flow diagram

This paragraph will explain the calculations the model makes in more detail. The following figure shows the models cash flow diagram.
When calculating the residual value of a property, the worlds of the developer and the investor come together. The return on property after transformation is established form the investors point of view. The costs of transformation are established from the developers point of view. Their worlds meet at the completion of the project, at time $t=n$, as can be seen in the cash flow schedule. Time $t=n$ represent the completion of the transformation and the sale of the completed property from the developer to the investor. In the re-development valuation model, the project is completed after 4 years, which is the time to which all cash flows are discounted. The period before the completion is the transformation period, which represent de investment period of the developing party. The expenditures are irregular and compensated for by the sales-price at completion. The period after completion is longer and represent the investors holding period. It is assumed the investor purchases the property at the start of the operating period, after which a continuous cash flow is received during the operating period. Figure 22 shows an example of a cash flow statement from which the proportionate size of each different cash flow becomes clear. The link between the developer and the investor is the sales-price from the developers point of view and the purchase price from the investors point of view. The valuation model uses this value to estimates the re-development value, which is based on the return on property minus the transformation costs. The following paragraph will explain how these values are estimated and how the re-development value is computed from these values.

Figure 22 Cash flow diagram valuation model, A.D. Mensing 2014
Among the various approaches to value real estate, the discounted cash flow (DCF) method, is well accepted by academics and broadly used by practitioners. The DCF method takes into account the time value of money and produces the same results regardless of investors risk preferences (Mun, 2002). The discounted cash flow method discounts all positive and negative cash flows to a certain point in time. At this point in time, it is possible to compare, deduct and add up the ‘net present values’. To calculate the net present value, a discount rate is used. This discount rate generally consists of a compensation for the financing costs and a compensation for the risk taken (Brueggeman, 2010). When the Net present value of all the cash flows is positive, it can be considered the ‘development profit’. When the net present value equals 0, the required return to account for the risk taken is achieved and a project can still be considered financially feasible.

The DCF method is used in the model to value the product of the transformation process, the residential property. The DCF method is also used to establish the costs of transformation. The valuation model is based on the residual valuation method, which generally means the transformation costs are subtracted from the total income to calculate the residual value. To determine the re-development value with the use of the model, the net present value of the transformation costs at completion and the acquisition costs at completion, are subtracted from the return on property.

\[
\text{Residual Value} = \text{Redevelopment Value} = \text{Income from property (sales price)} - \text{Costs (acquisition price } \times \text{transfer tax} + \text{transformation costs (Incl or Ecl VAT)}
\]
Return on property

The income from the property, or return on property, is basically the value of the discounted cash flows of the operating period. It is found with the help of the re-development valuation model. The valuation model is developed in Excel, in which the goal seek function can be used to calculated values under certain conditions. The return on property is found by using goal seek function in the ‘net present value calculation’ of the cash flows in the operating period. As explained before, the required return is achieved when the NPV equals 0. Therefore the goal seek functions calculates at which purchase price’ the NPV of the investment equals zero. To calculate the present value of a cash flow, the cash flow is divided by a discount rate (r).

\[ PV = \frac{CF^t}{(1+r)^t} \]

The discount rate is an interest rate used to compute a future value to its present value. There are various compositions of interest rates which together can form a discount rate. In the re-development valuation model which is the product of this research, the discount rate used to calculate the NPV reflects the multi-period, euro-weighted average total return expected by the investor (Geltner, 2007). It is expressed with the going-in IRR (internal rate of return) which is an ex ante total return measure. There must always be a relationship between the cash flows which are being discounted and the discount rate. The denominator, the discount rate, must reflect the risk in the numerator, which are the cash flows (Geltner, 2007). Sometimes the property’s cash flows are separated into components that are characterized by different risk. In the model, a blended discount rate is applied. The next paragraph explains how a reasonable discount rate to use in the DCF methods can be complied.

Real estate discount rate in general

The DCF discount rate, is meant to be the opportunity costs of capital (OCC) for the subject investment (Geltner, 2007). It is the return an investor could typically expect to earn on average in other investments of similar risk to the subject investment. If the expected return of the subject is lower than a project of similar risk, investors will not be willing to participate in the project. If the return is higher than projects of similar risk, a stampede of investors will want to participate in the project. This popularity will eventually drive up the price of the subject property until this price offers a return similar to the other investments of similar risk. To use the OCC principle, two things must be known; the typical return investors expect from different types of investments and a judgement on the relative risk of the subject property.

The risk free rate and risk premium

The OCC therefore exists out of the risk-free rate plus the risk premium (rf + RP). Both components are translated in this context into a multiyear forward-looking IRR, because the expected holding period of the a real estate asset lies around 10 years. The relevant risk-free components is the average expected treasury bill rate over a long term investment horizon. The current Dutch 10 year government bond yield is 1.68%.
The risk premium can be determined with the help of historical risk premiums, for example with the help of the NCREIF index. The NCREIF Property Index is a quarterly time series composite total rate of return measure, of investment performance of a very large pool of individual commercial real estate properties acquired in the private market for investment purposes only, in the USA (Geltner, 2007). It must be recognised historical indices are ex post risk premiums.

Another way of getting an idea about investors expected returns on real estate investments is simply to ask them. Several national real estate information firms regularly question the investment community about expected IRRs and publish the results. The expected rate of return is an ex ante measure of the unleveraged return on real estate.

While the treasury bill rate and historic risk premiums are ex post but objective, the expected returns based on survey evidence are ex ante but subjective. It is often suggested that investor stated going-IRR expectations tend to be “sticky” and “rose-tinted”. Realistic ex ante IRRs are difficult to observe directly or empirically and historic IRRs for specific properties are difficult to collect. A third way exists to get an idea of the ex ante return expectations. This method uses the ‘cap rate’ to compute the return measure, the IRR.

Translating cap rates into return expectations

The following method is used in the re-development valuation model to compute the IRR based on current cap rates.

The cap rate, often published by real estate information firms, is the current rate properties are traded for and therefore easier to observe than the ex ante total returns investors are expecting. It is influenced by the opportunity costs of capital, growth expectations and risk. While the cap-rate is not the same as the going-in IRR, they are closely related. The constant-growth perpetuity model implies the current yield equals the expected long-term yield minus the long-term expected average growth rate (Geltner, 2007). Since both the cap rate and the Dutch equivalent, the “Netto aanvangst rendement” (NAR) are based on the Net Operating Income (NOI), they are assumed to be comparable in this research.

To compute the return expectation from the cap rate, the following formulae is used.
\[ E(r) = E(y) + E(g) \]

\( E(r) = \) rate or return  
\( E(y) = \) cap rate  
\( E(g) = \) growth rate

This means, the long term expected returns equals the cap rate plus the realistic growth expectation.

The cap rate is an initial yield component based on the net cash flow received in the first operating year of the investment and the price paid for the property. The cap rate is usually based on the properties net operating income NOI.

\[
\text{Potential gross income (PGI = rent sqm * LFA)}
- \text{Vacancy allowance} = ( - \text{vacancy rate} * \text{PGI})
+ \text{Other income (parking)}
- \text{Operating expense}
\]

\[ = \text{Net operating income} \]

Figure 25 Net Operating Income calculation, A.D. Mensing 2014

The capital improvement expenditures, which include major costs for property improvements like repairs and replacement of major equipment are not included in the models cash flow statement. Depreciation in accounted for in a lower resale value, caused by a reversion cap rate higher than the cap rate. Because the cash flow statement states the net operating income and not the Project Before Tax Cash flow (PBTCF), which includes capital improvements expenditures, the cap-rate does not need to be adjusted.

The growth component \( E(g) \), is the real rental growth rate. Geltner states real depreciation needs to be deducted from the expected growth because it is often unrealistic to assume rents will grow at the inflation rate. However, it depends on the expected rental growth and the expected inflation rate, whether the real growth rate is positive or negative. To calculate the ‘real growth rate’, the expected inflation rate is subtracted from the expected growth rate (Geltner, 2007). In the model the inflation rate is estimated between 1.5% and 2.5%. The expected rental growth is estimated between 2.5% and 5%. According to the CBRE market view (2013), the cap rate (or NAR in Dutch) was 4.45% for single-family homes in the Netherlands in 2013. These example figures translate into the following \( E(r) \), which is the expected unleveraged return rate or IRR in the valuation model:

<table>
<thead>
<tr>
<th>( E(y) )</th>
<th>Cap-rate (or NAR)</th>
<th>4.45%</th>
</tr>
</thead>
<tbody>
<tr>
<td>( E(g) )</td>
<td>Average annual rental Nominal growth rate</td>
<td>3%</td>
</tr>
<tr>
<td>Inflation</td>
<td>1.5% - 2.5%</td>
<td>2%</td>
</tr>
<tr>
<td>Real growth rate (with real depreciation adjustment)</td>
<td>( E(g) - \text{inflation} )</td>
<td>1%</td>
</tr>
</tbody>
</table>

\[ E(r) = (4.45\%) + (3\% - 2\%) = 5.45\% \]

This method is used in the model to compute the investor unleveraged IRR from current cap-rates.
*It must me noted that appreciation of the property, for instance due to sudden favourable market conditions, is not expressed with the IRR. If the initiator expects the property’s value to grow separately from the rental growth, this can be expressed in property’s resale value after the holding period. This resale value is determined by the exit yield and will be discussed in more detail in paragraph 12.3.3.11.

<table>
<thead>
<tr>
<th>Table 1: ‘Prime’ netto aanvangsrendement (NAR v.o.n.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Langstraatwoningen</td>
</tr>
<tr>
<td>Kortestraatwoningen</td>
</tr>
</tbody>
</table>

Figure 26 NAR rate, CBRE 2013

8.4 The re-development valuation models formula’s

With this information, the return on property and the transformation costs are calculated with the following formulas.

Income

+ Potential gross income
  = LFA * Simulation Rental income per LFA

- Initial Vacancy
  = PGI * (1 – percentage rented at completion)

- Vacancy
  = PGI * turn-over rate

+ Other income
  = number of parking lots * annual rent parking lot

- Operating expenses
- Land lease canon
  = NOI (PGI – vacancy + other income –OE)

\[
PV(\text{NOI}) = \frac{\text{NOI}_n}{(1+r)^n}
\]

\[
\text{NPV} = \sum_{t=0}^{n} \frac{\text{NOI}_t}{(1+r)^n}
\]
Return on property (LTV = 0%) = goals seek NPV operations = 0
The model also calculates the ”leveraged return on property”, which is based on a loan to value ratio of 60%. This cash flow statement also includes; the debt service, the purchase price, the loan amount and the outstanding loan balance at the end of the holding period. The net present value of this calculation, which lies above zero, represent the increased return due to the leverage.

Transformation costs

The transformation costs are calculated and discounted to t= completion. The following formulas represent transformation costs cash flows as used in the model. The discount rate used during the transformation period consist of the inflation rate and the risk-free rate. The reasons for this discount rate will be explained in more detail in paragraph 12.3.2.4.

Construction time = default 18 months

Costs

Construction costs
= Phasing (%) * GFA (gross floor area) * Simulation of Construction costs per GFA * (1+semi annual increase costs)\(^n\)

Additional costs
General costs = (construction costs + additional costs) * % (defined by developer)
Additional costs = constructions costs * (%) of additional costs

Financing costs
during preoperational period = acquisition costs * LTV * annual interest rate
during construction = outstanding loan* semi-annual interest rate
at completion = outstanding loan balance + (outstanding loan balance * semi-annual interest rate)

Development costs
Risk and return (profit reservation charged at completion) = % (RR) * return on property

\( r \) (discount rate) = inflation + risk free interest rate
\( TC = total costs \)
\[
P V (total \ costs) = \frac{TC \times (1 + r)^{t-t \ completion}}{1}
\]

\[
NP V \ total costs = \sum_{t=0}^{n} \ total \ costs \times (1+r)^{n}
\]

* It must be noted that financing costs are included in the cash flow statement and that the risk of inflation is included in the discount rate. Because some developing parties stated to usually account for financing costs and inflations risk in the ”RR reservation”(also called profit reservation), expressed in a percentage of the return on property, the RR can be adjusted downwards. This will
prevent the ‘double’ inclusion of these costs. The height and possible inclusion of the risk and return reservation is determined case specifically.

8.5 Cash flow statements

The formula’s explained in the previous paragraph result into two different cash flow statements: the property’s income during the operational period and the transformation costs during the construction period. The following bar charts show the absolute build-up and the proportionate build-up of the cash flows in the transformation period and the operational period for case study 1. With the help of these cash flow statement the proportionate size of a certain type of cash inflow or outflow can be analysed.

Figure 27 shows the cash flows during the property’s operational period. While the debt service remains constant, the potential gross income grows. The negative cash flow for acquiring the property is not included in this statement, since this value estimate is actually the result of this research. For the same reason the income from sale is not included in the construction phase cash flow statement.

![Cash flow statement operational period (income), A.D. Mensing](image-url)
Figure 28 The proportionate contribution of each variable to annual cash flows, A.D. Mensing

Figure 29 shows the cash flows in the construction phase. The financing costs, named interest on loan, grow during this period. However the outstanding loan balance is exactly as large as the total loan amount since this mortgage is not amortizing.

Figure 29 Cash flow statement construction phase (costs) . A.D. Mensing
It can be concluded that the property maintenance, repairs and maintenance, vacancy and other income, do not play influential roles. Not proportionally and not absolute. A slight increase an decrease in the potential gross income can be seen. From the transformation period cash flow statement it can be concluded that the financing costs of the loan are very low since it is an interest only loan. However, in the third column the outstanding loan balance is shown which is very high. If the developer is not able to pay this loan back within the contractual time, he will be faced with a very high interest rate

Conclusions
The discounted cash flow method is used to calculate the net present values of the different cash flows at point \( t=\text{completion} \), which represents the completion of the transformation project. All cash flows are discounted to this moment to be able to subtract them from each other. This results in the residual value of the vacant property. When the case studies are analysed and the acquisition costs are known, these can be included in the valuation model to determine the projects profitability.
9 Dealing with uncertainties, the Monte Carlo simulation

9.1 Limitations of the DCF method

Although the discounted cash flow method is a widely used method, the limitations of the method have been extensively documented by Baroni et al. (2005), as well as Hughes (2005) and Young (2006), who discusses the challenges of proper identification of discount rates, future rent and expense levels and reversion value estimates. Estimates of these variables can be completely arbitrary, making the results achieved with the discounted cash flow (DCF) method meaningless. Risk of financial infeasibility depends on the variability of income that the developed property can be expected to generate, the expected costs of the complete transformation and variability of the market value at reversion. Even when input variables are carefully selected, DCF’s can only generate point estimates of returns. Ignoring the full range of probable outcomes tends to distort the picture used for decision-making (Gimpelevich, 2010).

So while the DCF method is a broadly accepted method, is suffers from at least two major pitfalls. Firstly, the DCF analysis is performed under deterministic assumptions. It does not take into account uncertainty in the estimated cash flows. So when forecast do not materialize or inputs were slightly manipulated, the entire valuation loses its utility (Hoesli, 2005). In real estate valuations, this effect is particularly severe since the investment value, which is dependent on forecasted cash flows, the perpetual rate of growth and on the discount rate, is used to establish the residual value. If the parameters are not established with care, the value estimate of the property can lie far from its actual market value. Secondly, the DCF method has a circularity problem. This circularity is related to the cost of capital used to discount cash flows, which dependent on the value of the cash flows themselves. To calculate the cost of capital you need the value of the property, but to calculate the value of the property, we need the cost of capital (Hoesli, 2005).

This paragraph explains which methods have been used to deal with the uncertainty of estimates and the circularity problem.

Circularity

The discounted cash flow method discounts cash flow projections by the cost of capital. The cost of capital is usually defined as the weighted average of the costs of debt and equity. To estimate the cost of equity, the initiator determines the required return on the investment based on the risk associated with the project. Assumptions are also made for the cost of debt. However these assumptions make the value estimate less precise since a small fluctuation in the costs of capital has a big effect on the project feasibility. Therefore the model valuates the property based on a fully-equity financed investment and a leveraged investment separately. Following the ‘Adjusted Present Value ’methodology, developed by Meyers (1974), the circularity is removed from the valuation by using a discount rate which represents the required rate of return for fully equity-financed properties. The discount rate does not include a financial risk measure based on the investors loan. The property value is established by goal seeking the maximum purchase price in a fully equity financed investment, for when the NPV equals zero. In the leveraged equity return calculation; the principal loan amount, purchase price, debt service and outstanding loan balance are included. In
this calculation the discount rate still represents the required return. The debt services are included to represent the cost of debt. This debt service is calculated using the market loan to value ratio of 60% (default), the interest rate and amortization rate which are determined with Monte Carlo simulations (§ 12.3.3.8 debt service). The net present value of this calculation represents the increased return caused by the use of leverage.

**Uncertainty**

The valuation model uses value estimates of variables. Even though experts have knowledge and access to many sources of data, they can’t predict future values precisely. Therefore the model has to deal with the uncertainty of the variables upon which the calculations are based.

**Scenario planning**

Scenario planning is often used in real estate investment to deal with risk and uncertainty. Scenario planning is a disciplined method for imagining possible futures that companies have applied to a great deal of issues. It simplifies data in a limited number of possible states. Each scenario tells a story of how variables might interact under certain conditions (Schoenmaker, 1995). It establishes the combined effect of different risks which either occur together or are eliminated by each other’s presence. Calculating many different scenarios can provide the initiator with a broad understanding of all the possible directions and accompanying outcomes of his project. While scenario planning is a broadly accepted tool for strategic planning, it has two pitfalls: calculating different scenario’s using various input values is very time consuming. Therefore parties usually make a worst, base and best case scenario. In the worst case scenario, costs are high and revenues low. This explains the second pitfall: the odds of all variables to turn out the worst possible all at the same time, are not very high. Therefore this research uses a different method, more suitable for the estimate of the most probable value and less time consuming.

**The Monte Carlo Method**

The Monte Carlo method is a risk quantification method. It is a tool used for sensitivity analyses and is aimed at defining the bandwidth of the results for the desired outcome. In the case of this research the method generates a probability distribution of the transformation costs and property return. To achieve this, deterministic variables are expressed in probability distribution instead of point estimates. The method also produces a mean, which represent the most probable result, based on the input variables defined as ranges. The risk of either not achieving the required return, or exceeding the maximum costs, is defined by the volatility of the mean. The program calculates the probability of achieving a certain outcome with the help of the simulated values.

**9.2 Monte Carlo simulations**

**What is the Monte Carlo method?**

“Monte Carlo simulation is a computerized mathematical technique that allows people to account for risk in quantitative analysis and decision making” (RiskAMP, 2014). The Monte Carlo technique was named after the famous casino in Monaco and developed by famous scientist Enrico Fermi, in
the 1930’s when calculating neutron diffusion (Hoesli, 2005). The technique is used in many different fields like finance, project management, insurance and engineering. The simulations provides the maker with a range of possible outcomes and the probability they will occur.

The Monte Carlo simulation is widely acknowledged to overcome the static limitations of the DCF method. These limitations are caused by the uncertainty of input variables, which result in meaningless calculations when the expected static values do not materialize. To handle this uncertainty, Monte Carlo simulations are used in the re-development valuation model. The method replaces static value estimates with probability distributions of the value. Replacing point estimates with parameters allows the inclusion of dispersion information in the valuation. Iterative draws from the distributions give consideration to the many possible paths (Hughes, 1995). In this research software from RiskAMP was used, which allowed the inclusion of simulations in Microsoft Excel 2010, the program in which the valuation model has been built. The model calculates the transformation costs, return on property and leveraged equity return over and over again, each time using a different set of input values from the probability functions. Depending on the number of trials, the range of outcomes which result from this can be used in a risk analysis. The probability of not achieving the necessary property return for a financially feasible project can for instance be calculated.

The process firstly involves the identification and assessment of the key variables. To each variable, a suitable probability distribution is assigned that best describes the range of uncertainty around the expected value. The Monte Carlo Method then produces random sampled input values in the form of simulations based on probability distributions behind the variable. To do so, the minimum and maximum parameters of many uncertain input variables are defined, as well as the expected value, or ” accent value ” within this parameter. This accent is based on an expert opinion and represents the most likely value estimate for the particular variable. For each uncertain variable, a separate probability distribution in defined with the help of the range, accent value and certainty level. The certainty level represents the variability of the value estimate and is divided into 5 classes. This class, ranging from 1 to 5, represent the spread from the accent value. The highest certainty level is 5. This high certainty level has a small spread around the accent value. The least certain level is level one, which has the biggest spread around the accent value (Figure 37). The combination of the different probability distributions for the uncertain variables, results in a range of outcomes and a probability graph. The process is repeated (thousands of times) to generate the probability distribution of possible outcomes. This distribution can be analysed with the help of the accompanying graphs and tables. It provides an indication of the variability or robustness of the NPV analysis. For example “there is an 26% chance that the NPV exceeds 0%”. Using these simulations in the model instead of static values, allows for better decision making since it resembles reality more closely.

Different types of distribution

For most ‘uncertain input variables’, the Monte Carlo simulation is used to replace the former static value estimate with a probability distribution. A list of all these variables is included at the close of this chapter. The distributions can take the following forms.

Normal distribution

The normal distributions is a bell curve, where the user defines the mean and the standard deviation. Values in the middle near the mean are most likely to occur. It is symmetric and describes
many natural phenomena such as people’s heights.

Log Normal distribution
A log normal distribution looks like a normal distribution, however it does not need to be symmetrical. It represent positive values that don’t go below zero, but can be skewed to the left or right. Examples of these kind of variables are real estate property values and stock prices.

Uniform distribution
All values have an equal chance of occurring. Only a minimal and a maximum are defined.

The Discrete distribution
It is also possible to define a specific outcome and the likelihood it will occur. For instance, if only 4 different kinds of outcomes are possible, like in the zoning plan revision, 1. No objections (50% chance). 2. Objection is filed, 3 months delay (30%). 3. Objections is filed, six months delay (15%), 4. Objection is granted, no project (5%). For each of these outcomes the probability needs to be established.

Triangular
When the values of a variable lie between a minimum and a maximum, and the most probable outcome is known, the triangular distribution can be used. It is used to construct a probability distribution that favours the most likely value, which lies at the point of the triangle. It can be both symmetrical as well as skewed to one side, depending on where the most probable value lies.
This way, the triangular distribution can model a variety of different circumstances. However, the strict shape about the mode may place too much emphasis on the most likely values at the expense of the values on either side. The triangular distribution is useful because it is easy to calculate and generate, but it is limited in its ability to model real-world situations.

The Pert distribution

The pert distribution uses a minimum, a maximum and a most likely value to produce a distribution similar to the triangle. However, instead of the straight lines, the distribution constructs a smooth curve. This curve places gradually more emphasis on values around the most likely value. It is designed to more closely resemble a realistic probability distribution and is shaped something like a normal or lognormal distribution. But with defined upper and lower limits. When you have an expert opinion to draw from, this distribution is very useful since it ‘trusts’ the estimate for the most likely value while believing it to be not exactly accurate. A fourth variable can be included in the construction of the distribution, the lambda. This optional variable represent how confident you are about the most likely value. It represents the ‘peakedness’ of the generated distribution, similar to kurtosis and spread. It influences the thickness of the distribution around the most likely value. Setting it very high, will result in simulated values that rarely differ from the most likely value. It is optional and the default scale value is 4, which produces a curve that reasonably approximates the normal distribution like the figures below.
9.3 Parameters of the Monte Carlo function

The PERT distribution, which is often used in the re-development valuation model, is a special case of the beta distribution that takes three parameters: a minimum, maximum, and expected value. The curve is characterised by the density function and the distribution function. The PERT distribution uses the mode or most likely parameter to generate the shape. An additional scale parameter $\lambda$, scales the peakedness of the distribution; the default value for this parameter is 4. When the model is used on the different case studies, not the default value but a customized lambda is used to describe the certainty of the value estimate. This certainty is related to the project progression as well as the type of variable. The next paragraph will explain the lambda in more detail.

9.4 Lambda (peakedness) in the model

To analyse case studies with the help of the valuation model, a lot of information, in the form of value estimates, was needed. Preferably a minimum value, maximum value, expected or an "accent value" and an indications of the certainty of the estimated accent value.

The level of certainty on the accent value, which was described by the interviewed expert, was translated into a lambda which determines the distribution kurtosis or "peakedness". The smaller the peakedness, the closer the simulation values lie to the expected value. In the case studies, a certainty level, which describes how certain the initiator was about the expected value, is assigned to each variable represented by a probability distribution. For some variables, the certainty level is based on the projects progression. For other variables, like inflation, the future value will always be rather uncertain. The level of certainty is represented by a 5 point scale. Certainty level 1 is the most uncertain class and has a lambda value of 2.5. This low lambda will result in distribution of simulated value spread the widest from the expected value. Certainty level 5 is the highest certainty level and is expressed by lambda value 15. This will results in simulated values close to the expected value. The following 5 graphs visually represent each certainty level. By trial and error the lambda values for each certainty level were chosen. As can be seen in the visual representation, the peakedness of the distribution becomes gradually higher as the certainty level increases.
The following table shows the variables for which a Monte Carlo simulation was included in the model. To contemplate the value distribution each simulation was run 5000 times.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Let able floor area/ gross floor area ratio</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Construction costs per m2 GFA</td>
<td>Triangular distribution (Certainty level: 3)</td>
</tr>
<tr>
<td>Annual increase construction costs</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Additional costs</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Rent level per m2 LFA</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Nominal annual rent increase</td>
<td>Triangular distribution (Certainty level: 3)</td>
</tr>
<tr>
<td>Rent per parking lot annually</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Initial vacancy at completion</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Interest on “Interest only construction loan”</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Investors IRR</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Investors exit yield</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Repairs and maintenance</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Property maintenance</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Permanent mortgage annuity rate</td>
<td>Pert distribution</td>
</tr>
<tr>
<td>Annual amortization rate</td>
<td>Pert distribution</td>
</tr>
</tbody>
</table>

Figure 37 Visual representation of concept of "certainty levels", A.D. Mensing
9.5 Advantages of the Monte Carlo method

The use of Monte Carlo simulations in an appraisal/investment model, provides a number of advantages over the use of ‘scenario planning with single-point estimates’ and plain deterministic estimate analysis.

The Monte Carlo method provides decision-makers with a visual representation of the expected value and range of variability due to risk and uncertainty on each of the variables modelled. It also provides a visual representation of the expected value and range of the possible outcomes, representing the combined effect of the multiple sources of uncertainty. The range and probability of possible outcomes of the projects returns and costs are of great interest to the initiator. With the probability distribution the initiator can estimate the probability of reaching or achieving a predetermined threshold. These results can be analysed further to determine:

- Which risks have the biggest influence on the results
  Sensitivity Analysis: When you just have a few cases, it is hard to see which variables impacts the outcomes the most. With Monte Carlo Simulations, it is easy to see which inputs had the biggest effect on the bottom-line results.
- Scenario Analysis: With deterministic models, it is very time consuming to model scenario’s with different inputs or combinations of values and to see the effects. Using the Monte Carlo method, you can see exactly what value a specific variable had when a certain outcome occurred.
- Correlation of inputs: With the Monte Carlo Add in, it is possible to model interdependent relationships between input variables.

9.6 Monte Carlo simulations in valuation literature

The Monte Carlo method is a practical simulation based method which has been used for quantitative risk management in many fields. In real estate development it is widely used as a decision making tool because it realistically simulates probabilistic project return outcomes. A number of papers and theses have addressed the application of the Monte Carlo Method. Baroni, Hughes, Hoesli and Young have focused on the problems of asset valuations based on static input values. Atherthon has examined the usage of the Monte Carlo simulation tool for development probability analysis. Gimpelevich, building on this paper, illustrated the usefulness of the Monte Carlo method in decision-making methodology based on return and risk proportions. This paragraph briefly describes the application of the Monte Carlo method in previous research because it inspired the usage of this method in this research.

In 2005, Hoesli wrote an article on the use of Monte Carlo simulation in real estate valuation. He recognised the following limitations of the discounted cash flow method:

- the value of the property is needed to compute the discount rate; (Hoesli, 2005)
- the discount rate is assumed to be constant during the entire holding period; (Hoesli, 2005) and
- uncertainty is not explicitly taken into account (Hoesli, 2005).
His main contribution was the inclusion of uncertainty in the valuation process. This is achieved by using the distributions of the various input parameters rather than point estimates as is customary in DCF valuations. This results in an entire distribution of outcomes instead of a point value estimate. With the use of this distribution, the probability of the project yielding less than predetermined thresholds can be ascertained. Hoesli concluded this could be very useful for professional investors as well as developers. This knowledge has been translated to this research. In addition Hoesli’s approach contributed to debate on valuation variation and the margins of error in appraisals. However it must be noted that with the use of the Monte Carlo method, as is the case with all techniques, the quality of the outputs relies on the quality of the input.

In 2006 Baroni (Baroni, 2006) wrote a paper on the use of simulated cash flows in real estate valuation. He motivated the used of Monte Carlo simulations for the measurement of complex cash generating assets such as real estate asset return distributions. The Monte Carlo method is tested by valuing a residential real estate portfolio and comparing the results to value estimated by single point discounted cash flow models. What he finds it that the portfolio’s present value is much less sensitive to price trends in the simulation-based approach than in the DCF approach. This knowledge was translated to this research by including this type of comparison in the case studies.

In 2010, Gimpelevich used the Monte Carlo method as a quantitative risk management tool and illustrated its usefulness on a high rise office development. He stated developers often proceed with projects based on back-of-the-envelope calculations and intuition. The discounted cash flow method became more widely used when institutional and private equity investors became more active in funding development projects. However, the discounted cash flow methods knows the pitfalls discussed earlier in this chapter. Even with multi-point sensitivity analyses of discounted cash flow models, Gimpelevich argues it still does not provide sufficient information to base investment decisions on. In his paper he therefore formulates a methodology for a stochastic model that combines the DCF method and a reasonable approximation of reality through Monte Carlo simulations, as to generate a clear decision signal for practitioners (Gimpelevich, 2010). He calls this method the SERM method, simulation based excess return model. It is based on the assumption that knowing the probability of a certain outcome is not sufficient to make a decision to proceed. What is needed is a way to weight expected returns in the context of specific project risk so is it becomes clear what return is sufficient to compensate for the taken risk (Gimpelevich, 2010). From his case study results the following can be concluded; based on the single point discounted cash flow analysis, the project was approved. However, the SERM corrected the DCF short comings by uncovering the unsatisfactory return and risk proportion.

**Conclusion**

The Monte Carlo method is a widely known method but often just briefly discussed in real estate investment literature like Lush and Geltner. Through professional articles the usefulness of this method in real estate valuation became evident. Therefore it was applied in this research to overcome the limitations of the discounted cash flow method and to enable the risk and probability analyses of several case studies. In chapter 13 of this research the models results will be compared to a regular point-estimate DCF model. The utility of the Monte Carlo method in this valuation model will be discussed in the reflection based on this comparison.
Theoretical framework part 2

Reading guide

Chapter 10 and 11 form the second part of the theoretical framework. They present an in depth study of subjects of real estate finance and taxation encouraged by interviews conducted as part of this research. The information included in these chapters has partly been based on literature, but also includes assumptions based on interviews. Whenever assumptions based on interviews are included it will be specifically stated.

10 Real Estate Finance

“’The wall of money is gone’” (Zwart, 2014b)

This chapter describes what methods are used to finance (re-)development projects and what views are taken by lenders towards real estate financing. The financial crisis has been of great influence on the availability of loans. Banks have become more risk averse, and real estate has dropped in value. These two trends have influenced the sentiment towards real estate financing and therefore the nature of the real estate market and construction industry. More equity is needed to apply for loans, and less parties are able to execute projects. However, the market seems to be recovering slowly and more and more parties are finding ways to make (re-)development possible. This chapter is aimed at providing a outlook on the real estate finance market, different types of financing structures and into to the criteria on which financing decisions are based.

10.1 The real estate financing market

Availability of debt

The allowed loan to value ratio has changed due to the financial crisis. Higher levels of equity are needed to support debt which in general makes financing less risky. However, it also makes financing more difficult. The availability of money to finance real estate investments is of great influence to investors activity. Since the financial crisis a lot has changed.
The figure above shows the build-up of loans for real estate investment. The amount of debt available for real estate investments has been decreasing dramatically over the past 5 years. While this can be due to a decrease in demand, it is mostly associated with a decrease in availability. In 2007 banks issued loans worth a total of 26 billion euros, in 2011 this was only 6.6 billion. According to Wabe van Enk, director of PropertyNL, this trend has made it increasingly difficult for investors and developers to get projects financed. This was stated in the NOS news article ‘steeds minder vastgoedleningen’ in October 2012.

However, the Dutch market for real estate investments showed its resilience in 2013 (Leeuwen van, 2014). Compared to 2012, the total investment volume grew with 20% and reached almost 5.1 billion euro’s. In the first few months of 2014, several foreign financers have entered the Dutch market. Especially Anglo-Saxon and Anglo-American parties have focussed on office buildings on the ‘South Axis’ (Union and Deka), logistic real estate and single asset hotels (Leeuwen van, 2014). This has
resulted into greater liquidity in the real estate market. Due to the extra loan capacity, it is expected that the all real estate investment markets will see an increase in investment volume.

**The Dutch Lending market**

Historically, the European real estate market is dependent on financing from banks. Banks fulfilled the roles on the financing side, and on the purchasing side through commercial mortgage backed securities (CMBS). In the Netherlands three banks have dominated the Dutch real estate lending market: ING Real Estate Finance (ING), FGH bank (FGH) and SNS Property Finance (SNS). SNS however has been forced to implement a strategic re-positioning in the market, which means ABN Real estate Finance is gradually taking over the role of SNS (Huibers, 2012). 40% of the American market is controlled by CMBS holders, insurers and other institutions. Because the European real estate financing sector has been through some turbulent times, the ‘old’ structure will no longer be tenable. The real estate sector will look for alternative forms of financing and engage in new lending for the purpose of real estate investment (Leeuwen van, 2013). Paragraph 10.2 will cover some inventive financing structures and alternative sources. The following figure shows the market participants in the European real estate lending market, which are mostly banks. Cushman and Wakefield (2012) interviewed 78 leading real estate finance providers to determine their willingness to lend and to identify in which direction the European real estate lending market is likely to evolve. The willingness to extend credit to applicants with whom they had no previous relations fell with 33% from 2011 to 2012. The highly restrictive criteria were loan-to-value ratios and cash flow security requirements (Huibers, 2012).

***Figure 36 Market participants in the European lending market, ASRE Alternative finance 2012***

Another development which influenced the investment market, was the downward adjustment of the ECB interest rate. In January 2014, the rate was still at the historical low point of 0.25%. Banks decreased the interest rate on saving accounts as a consequence of this change, but waited a little longer to adjust interest rates on loans. Low interest rates make the saving of money on an account less appealing and could increase investment in real estate, especially by private parties and funds.

**Impact of Basel III on real estate financing**

*What is Basel III?*

The implementation of Basel III was of big influence on real estate financing. Between 2010 and 2011, the Basel Committee on Banking Supervision agreed upon this regulatory framework, in
response to the deficiencies in financial regulation revealed by the financial crisis. Basel III had four key objectives; dampen any excess cyclicality of the minimum capital requirements, promote more forward looking provisions, conserve capital to build buffers that can be used in stress, and achieve the broader macro-prudential goal of protecting the banking sector from periods of excess credit growth (Repullo, 2011). The third objective initiated the capital conservation buffer. It was supposed to strengthen banks capital requirements by increasing bank liquidity and decreasing bank leverage. It was scheduled to be effective from 2013 to 2015, but has already been extended until March 2018.

\textit{Consequences}

Since Basel III banks are required to maintain larger reserves and keep to stricter liquidity requirements. This entails increasing liquidity buffers and reducing the imbalance between liquid obligations and illiquid receivables. It is expected that these tightening regulations will put upward pressure on prices (Repullo, 2011). To keep the Dutch real estate market strong, a healthy competition is needed in the finance sector (Bilt van der, 2014).

As specific element of importance to the Dutch real estate finance sector is securitization within Basel III. Long-term securitization will possibly no longer count as ‘liquid assets’ which will reduce the banks appetite for them. It may result in allocation of bank capital away from real estate and higher financing costs. As a result future projects may be less attractive to investors and developers will have a hard time getting their projects financed. The role of banks is thus expected to decline while other financing parties present themselves.

\textit{Impact of Solvency II on real estate financing}

Solvency II, a European supervisory framework for insurers and pension funds was announced in September 2013. Solvency II replaced and integrated large amounts of existing insurance directives into a new framework of which the aim is to ensure insurers have sufficient capital at hand to prevent bankruptcy. It requires insurers to hold equity that is equivalent to a prescribed percentage of the market value of their investments. In the case of direct real estate, insurers will need to hold equity that is equivalent to a minimum of 25% of their real estate investments market value. In the case of indirect investments, this may amount to 39% of the investments market value (Leeuwen van, 2013).

A smaller buffer is required for investments in fixed-interest securities, such as mortgages and government bonds. Consequently, it would be reasonable to anticipate insurers reducing their allocations to real estate and shares. Prior to the introduction of Solvency II, several European insurers have already decided to switch to lending funds for commercial real estate or to structure these. This possible re-evaluation of their investment policy could also present opportunities for the real estate financing market (Leeuwen van, 2013).

\textit{Demand for (re)financing}

According to various studies, banks and other financial institutions have an excess of € 2 trillion of outstanding loans to European commercial real estate. More than 50% of this amount will have to be refinanced during the period 2012–2015 (Almond, 2012). However, many traditional financing entities (e.g. SNS property finance) are reducing their real estate exposure. A proportion of this outstanding sum will therefore not be refinanced. In 2012 EuroHypo,
one of the major lenders to real estate across Europe, withdrew from the market. Its parent company, Commerzbank required billions of euros of support from the German government and had to wind down EuroHypo at the request of regulators (Leeuwen van, 2013).

In addition to reduced (re)financing and risk averseness, the value of the commercial real estate collateral has fallen. Therefore a funding gap is emerging.

The Dutch Government is planning on establishing a National Mortgage Institute to improve the Dutch financing market. This institute, supported by capital from insurers and pension funds, is aimed at taking over tens of billions worth in mortgages loans from banks. Dutch banks currently have 80 billion worth of outstanding national real estate loans. This is 20 billion and 11 billion for pensions funds and insurers, respectively (Leeuwen van, 2014). However, this new institute is not enough to close the financing gap which is about to emerge. Foreign financers and debt funds can also bring more liquidity on the Dutch real estate market. These and other finance constructions will be discussed in the following paragraph.

Stock market listing

An IPO, or stock market listing, can also be a way for developers to collect capital. Since the economy is stabilizing and the confidence in the real estate market is recovering, rumours about potential stock-market listings by real estate funds are emerging (Leeuwen van, 2014). An example is the possible stock market launch of OVG in June 2014. The Dutch project developer is supposedly planning on collecting 300 million euros to invest in the re-development of office properties in Amsterdam. In addition later issues are supposedly going to bring the developer another 200 million. OVG is planning of collecting this capital through ‘blind pools’. With these construction is remains unknown in which properties the capital is invested (Vastgoedmarkt, 2014). According to van Leeuwen, head of JLL capital market, stock-market listings are a potential exit strategy for real estate investors, just like single-asset sales or long term strategies retaining the real estate for at least 7 years.

10.2 Financing constructions

Notwithstanding institutional investors need to bring equity, real estate investment are usually financed using debt. In real estate loans used to finance investments or developments are called mortgages. As the previous paragraph explained, these loans are increasingly difficult to get. Therefore this paragraph will explain which alternative structures can be used to finance real estate developments. However, this paragraph will start with a brief explanation of the traditional mortgages. We distinguish between private and commercial mortgages. Private mortgages are used by individuals to finance the acquisition of a home. Commercial mortgages are used to finance development projects or real estate investments (Lusht, 1976).

Permanent commercial mortgages

Permanent mortgages are used to finance a fully operational property. Typical loan terms are 3,5,7, or 10 years but can also be as long as 25 years. However, it is the interest revisions term that is of interest. In an permanent loan, the loan is disbursed all at once and paid back gradually during the loan tenure with interest. Paying back the loan during the tenure is called amortization. When the
debt service, which includes interest payments and amortization in constant, it is called an annuity loan. The amortization part of the debt service starts small but grows exponentially as time progresses. With a ‘linear mortgage’ the debt service is relatively high at the start, but decreases due to constant amortization which causes a decrease in rent (Geltner, 2007). However, amortization is not self-evident. In the past, many mortgages have been distributed without amortization obligations (Zwart, 2014b). The amortization obligation, when present, usually depends on the function of the real estate collateral. Amortization rates for office investments are currently 2 to 4%, for housing the rates lie between 1 and 1.5% (Zwart, 2014b). Mortgage bankers issue these permanent mortgages with fixed or adjustable interest rates. It depends per loan. Interest rates are at a historic low. Pieter Zwart from the FGH bank therefore stated; lenders use this low rate to lure new clients, which they offer a fixed interest rate for a number of years.

**Construction mortgages**

Construction mortgages are used to finance construction projects. Typically construction mortgages have loan terms between 1-3 years, floating interest rates and are paid back when the construction is completed. Cash is disbursed gradually as the project progresses. During the loan term there is no amortization, so when the loan term expires, the entire loan needs to be paid back. When the debtor is not capable of doing so, he will be charged a very high interest rate. The construction mortgage has an extensive default risk since the collateral is the project under construction (Geltner, 2007). Local branch offices of commercial banks and thrift institutions (for default risk) usually distribute these kind of mortgages to depository institutions. To handle the risks, strict requirements to the issuing of construction mortgages exists. These are described in paragraph 4 of this chapter.

**Sale and lease back**

Land-leases can be used to finance transformation projects. Parties that already own the property they want to transform or refurbish, can sell the land on which the property stands, the bare ownership, to the municipality. They then lease back the right to use the land through a land lease. By doing so they receive the sale proceeds from the bare-ownership which enables them to use this capital for the transformation or renovation of the existing construction. The lease payments represent financing payments in traditional loans (Grenadier, 2003). A disadvantage of this arrangement is the transfer tax which is due on the land sales price. Examples of this sale and lease back, between a market party and the municipality exist in Rotterdam and include e.g. the ‘Calypso building’. (For more information on the land lease, see paragraph 12.2.2. “land lease”).

**Postponed payment**

The first payment period in a (re-)development project includes the acquisition costs of the land and when present, the existing structure. Due to the diminished capital positions, parties often struggle with making such payments so early in the process. Land-lease constructions can be used as financial instruments in these kinds of situations as well. Municipalities and (semi-)public parties actively manage land and properties they own to favour functionality and public planning. The land value is established by the municipality with the use of the residual method, (income – costs) on which the land lease canon in based. In the case of a re-development project, the developing party can buy the
‘bare-ownership’ of the property from the (semi-)public party, instead of the complete ownership, evading the early financial investment (Luth, 2011). If the developing party had to buy the complete ownership, he would have needed to apply for a loan, on which interest in due. Using this construction, the developing party can avoid financing costs. In return, the developing party can make a commitment of buying the full ownership when he has the financial means. What basically happens, is the (semi-) public party indirectly issues a loan to the developing party, by accepting the delayed purchase of all the property rights, but selling the ‘bare-ownership’ which results in the acceptance of canon payments until the total ownership is transferred. Canon payments are commonly based on the residual value of the land, based on the revised zoning plan (handleiding grondprijsbepaling 2013). As was explained before, this (semi-) annual canon is determined by multiplying the land value with the established canon percentage. The annual canon payments can be considered ‘interest payments’ on the temporary loan issued by the semi-public party to the developing party.

According to Pieter Zwart, the canon percentage is an acceptable return on the ‘issued loan’ (Zwart, 2014b). However, the issue of ‘state aid’ can be relevant to such constructions. In this specific situation two issues become relevant; the established land/property value, and the canon percentage. Firstly, the price of the property must be established according to the European guidelines. Therefore an appraisal by a qualified and independent party must take place in advance of any purchase negotiations (Bruggink, 2012). Secondly, the canon payments, which ‘replace’ the interest payments on the non-issued loan, have to be in line with the market (Bruggink, 2012). The European commission has established interest and discount rates representing market rates used to determine the if ‘state aid’ is provided. Loans issued by decentralised authorities to entrepreneurial parties will be compared to these rates to establish that no advantages were offered. When the rates are not in line with the market, and or provide advantages the market party could not have received through market conform loans, the possibility of state aid is present, in which the ‘postponed payments’ would be rejected by the European committee and reversed (Bruggink, 2012).

**Land-lease lease**

A third but less well-known form of using the land-lease as a financing construction, is the land-lease lease. This financing structure, which is gaining in popularity, diminishes transfer tax and can therefore be more beneficial than the sale and lease back structure (Hoppenbrouwers, 2014). With the land-lease lease, the entrepreneurs sell a cash flow in the form of a ‘bare-ownership’, to a private party who becomes the financier. The entrepreneur receives the capitalized cash flow value which he can invest in his business (Louwerier, 2013). The cash flow is a secure cash flow, due to several characteristics of the lease-hold right. For example, the lease-hold right is a transferable obligation, meaning the obligation to pay the annual canon is transferred to the new owner if the property is sold. This makes the lease-hold a firmer contract than a rental contract, which can be terminated or renegotiated in case of a transfer of ownership (Hoppenbrouwers, 2014).

The second reason for the interest in this financial construction, is the opportunity of increasing returns by diminishing transfer tax (VBC, 2012). The transfer tax can be decreased, by decreasing the value of the bare-ownership (which is about to be transferred and over which transfer tax is due) with the value of the land-lease. The value of the land lease is dependent on the canon and the duration of the lease. The value of the land lease can be increased, to decrease the value of the bare-
ownership and thus simultaneously the height of the transfer tax. This can be achieved through the following rules: When the owner of a property sells the 'bare ownership' to an investor, he has to pay transfer tax. This transfer however, can never exceed 17 times the annual canon value plus the value of the land lease right (4-6% of the land value) (van der Laan, 2013). What parties therefore do is play with the height of the canon and duration of the lease, so the legal base for the transfer tax (which is the value of the bare-ownership) is diminished, eliminating the transfer tax (Hoppenbrouwers, 2014). Especially when return margins are low, the diminishing of the transfer tax can make the difference in achieving the required return (Hoppenbrouwers, 2014). Escalation clauses of all sorts can be included to provide the ‘bare-owner’ and the lessee with the desired rights.

The credit tenant lease

A ‘credit tenant lease’ is a commercial mortgage loan secured by one or more properties leased to a "credit tenant," or an entity that has received a long-term unsecured credit rating. The analysis of a ‘credit tenant loan’ (CTL) loan primarily depends on receipt of lease payments from the rated tenant (Sim, 2013). Typically, CTL transactions are arranged with special-purpose vehicles and are backed by loans with generally high leverage (a high loan-to-value ratio) and a low debt service coverage ratio (Sim, 2013). CTL financing emphasizes the credit quality of the tenant and the structure of the lease in order to establish a cost of borrowing. The rental payments are assigned to the lender and the asset is pledged as collateral. CTL transactions may have a single tenant or multiple tenants. The tenants may be in one building or in a number of buildings. In a CTL transaction, the rating will generally be based on one or more specific tenants.

CTL Financing has several advantages over traditional real estate financing and therefore is a valuable source of capital and an effective use of the debt capital markets.

- CTL Financing has no maximum Loan-to-Cost (can be over 100% of costs).
- CTL Financing is non-recourse: the lessee has payment and performance obligations.
- Interest rates are typically fixed for longer periods of time (equal to lease term).
- Debt service coverage ratios are as low as 1.0x. \( \text{DSCR} = \frac{\text{net operating income}}{\text{debt service}} \)
- CTL financing generally requires no financial or operating covenants typical of corporate finance instruments.
- CTL Financing for new construction provides a long-term, fixed rate lock prior to construction.
  
  (Levy, 2014)

Corporate capital markets focus on capital solutions for planned or existing single-tenant assets on behalf of corporate occupiers, developers and owners (Levy, 2014). Since financers have expressed to avoid single-tenant properties because of high vacancy risks, this is difficult with other financing forms. However, the CTL secures the vacancy risk for a substantial amount of time and enables the development of such properties.

This form of financing is especially popular in the USA. However, examples of this construction in the Netherlands exist too. The acquisition of the High Tech Campus by Phillips has been financed with a credit tenant lease. Because Phillips has a high solvency rate, parties were willing to finance the project based on the secure rental income. They were less interested in the value of the property. The reason this structure is growing in popularity is the fact that financers need protection from the
Devaluation of the collateral. When the financing is based on the rental income, this problem is diminished (Hoppenbrouwers, 2014).

Debt Funds

As was stated earlier, the real estate finance market was previously dominated by banks. According to real estate analyst agencies like Jones Lange LaSalle and DTZ, funds and vehicles are set up by a variety of institutions and private equity entities to fill the gap left by retreating banks.

It is interesting for institutional investors to hold more fixed income mortgage loans which provide an interesting product. Firstly, the capital requirements for these fixed income mortgages are much lower than for the direct property. Secondly, the mortgage collateral provides a limited risk and attractive returns. In addition, they also provide a good risk-reward ratio in investment portfolios and contribute to diversification benefits. But especially the long-term stable income is interesting for e.g. pension funds (Twigt, 2011). In 2012, DTZ already predicted a 80 billion USD lending capacity from non-bank lenders. Insurer AXA launched a so-called debt fund in 2011, which provides capital for real estate investment loans. In 2012 DTZ was aware of 10 insurance companies lending in the UK and continental Europe. Thirty debt funds were on the market at the close of 2012 who still provide senior debt in the market. These included both dedicated debt funds as well as global opportunity funds (Almond, 2012).

![European net debt funding gap 2012-13, USD bn](chart)

Figure 37 European debt funding, ABN AMRO 2013

Since 2012 several debt funds have successfully been deployed in the European market of which the UK market is the most developed.

Non-bank lending funds are expected to grow over the next few years. Because of Basel III and Solvency II investing in the real estate financing market through these funds has become more attractive. Insurers will be able to acquire a substantial share of the financing market. The shift towards a more diverse lending base across Europe is a welcome shift in the market. The dominance of banks as a source of finance will reduce and present new financing opportunities for real estate investors and developers. This can also lead to competitive interest rates. In addition, current low returns on government bonds could lead to an increased allocation to real estate financing of funds from pension funds (Almond, 2012).

Crowd funding

Another form of alternative financing is the upcoming concept of crowd funding. Crowd funding is a financing construction that arose from the principle of the enhanced ability to do something as a
group rather than to doing it alone. People have always gathered their strengths in economical bad times to enable initiatives. However, recently professional organisations have tried to use this type of financing as well. “ Crowd funding is the process of one party financing a project by requesting and receiving small contributions from many parties in exchange for a form of value to those parties (Rubinton, 2011).” In real estate development crowd funding can be used as a way to directly invest in real estate development with or without specific personal interest in the project. Professional developers can use this type of financing in different types of development. As long as the public believes in its success and wants to invest in it. However, implementation is not as easy due to various legal, technical and social complexities.

10.3 Selection criteria for granting loans

While bank or other loan providers are never allowed to act as developers or investors, they are interested in project specifications because the projects forms the loan collateral. Financers receive interest and amortization and therefore consider the financial feasibility of a project. In addition, they have a duty to care for their clients financial wellbeing. This chapter discusses project requirements and characteristic commonly used by banks as loan granting criteria. The information presented in this chapter is based on two interviews conducted during this research. Pieter Zwart director at FGH bank and Kees Zachariasse partner at Deloitte financial advisory services, both contributed to this research by cooperating. The FGH bank is the biggest supplier of real estate loans in the Netherlands. They issued 1.5 billion euros worth of loans out of the total of 2.5 billion past year. This chapter is not all inclusive but provides a framework of considerations when it comes to real estate financing.

Pre-sold and Pre-leased

Banks do not finance risky developments. Securing the sale and tenants is important to get a project financed. While Kees Zachariasse spoke of a pre-sale requirement of 70%, FGH bank works with 90% to 100% pre-sale of pre-lease requirements. Achieving this is easier for smaller projects. A trend of developing smaller batches at a time is therefore evident in the current market (Zwart, 2014b). The let-ability of a project depends on many factors. The most important ones are location, marketability and size. Forecasts of marketability are important since projects are expected to have a long lifetime. FGH bank makes her own estimation of the let-ability of a project with the help of these elements.

Solvency

Due to current market conditions, banks ask parties to bring 50 to 60% equity into their projects. This means, especially for larger projects, initiators need to be wealthy to receive financing (Zwart, 2014a).

Mixed functions

FGH bank believes in mixed functions. This statement was made by most of the parties interviewed for the sake of this research. It can therefore concluded multifunctional projects are preferred by most involved parties.

Adaptive capacity on property level

A mismatch exist between the current stock and demand. To prevent this from happening again in
the future, the adaptability of properties is important. When a project is submitted, FGH bank therefore checks the adaptability of the plans to different functions. A property therefore needs to be flexible, both technical and constructive. When an office building is transformed to a hotel, it is important this function can be changed to housing in the future if the demand changes (Zwart, 2014a).

**Alternative functions**

Beside the flexibility of the property, the marketability of different functions is important. Locations should be suitable for different functions to ensure the marketability of the project in the future. What banks do not take into account, according to Pieter Zwart, are the prospects of the sector a specific tenant is in. An example of a situation in which the financer does not consider the tenants specific market: When consumers are expected to eat less bread, a bank will not reconsider financing retail properties which hold a bakery. FGH bank only adjusts their portfolio strategy to market movements on a larger scale, for example the reducing demand for office space.

**Debt service coverage ratio (DSCR)**

The debt coverage ratio is the ratio between the costs of debt and the net operating income. Financing institutions have determined minimum debt coverage ratio’s to judge the financial feasibility of a project. The ratio gives an indication of the operational cash flows and the ability of the cash flows to cover the costs of debt. In theory the DSC ratio should minimally be 1, but the higher the better. As it is a commonly used checking method, it is included in the model.

**Loyal clients**

This factor might not be of influence to all lenders, but was specifically mentioned in the interview with Pieter Zwart. Real estate financing is scarce. Therefore choices between projects must be made. FGH bank chooses to primarily finance projects by loyal customers. Parties who have chosen a cheaper bank is the past, will most likely not get loans from the FGH bank. They question the loyalty of these new customers and expect them to leave the bank when the economic tie is turned. FGH bank therefore prioritizes existing clients.

### 10.4 Consequences for parties involved in re-development projects

**Developers**

The boundaries between traditional roles in the (re-)development industry are fading. However, there are still examples of pure sec project developers. In the Netherlands, post crisis, not many real estate developers remain with enough equity to finance larger transformation projects.

**Traditional situation**

Traditionally, developers structured housing development projects, is such a way that the sale proceeds could (almost) finance the construction. These sale proceeds partly came from the sale of individual dwellings to consumers. When the sale of the future dwelling was secured, developers could apply for a loan at banks to finance the rest of the construction. Conditions for the granting of these loans were pre-sale norms or pre-let norms of 50-60% (Zwart, 2014b). When this requirement
was met, banks would be willing to finance the project, with loan to value rations of 80 to 120% (Zachariasse, 2014). This means the developer would need only 20% or less equity to execute the project.

New situation
However, due to the risk averseness, the pre-sale of pre-lease demand for housing projects has risen to 70-90% (Zwart, 2014b). In addition, loan to value rations have declined to 40-60%(Zwart, 2014b). Often equity is stuck in previous projects where the sales to the investor has not turned out as planned. The combination of these three elements have severely complicated things for developers. In addition, increasingly critical consumers, who wish to see the project before buying or renting a dwelling, make pre-sale difficult. Especially in transformation projects, it can be hard to provide a convincing example of the final product (Zwart, 2014b).

Private investors
Distressed office buildings, a result of the financial crisis, are interesting to parties who can acquire the properties for low prices, and transform them into profitable housing projects. It is assumed strong equity based private investors have the means to acquire such projects (Mackay, 2014). While project (re-)development is not the private investors core business, the opportunities the current market presents have lured these parties in. Their equity positions give them an advantage compared to traditional developers. It is assumed few parties have the means to buy properties, so private investors can cherry pick the best ones (Jansen, 2014). Especially for bigger volumes, which are riskier and more costly, competition is scare (Jansen, 2014). In addition, private investors have equity and are therefore usually not bound to pre-sale requirements of financers. They can act faster, and bid without extensive conditions. Based on information provided by private investors during the interviews conducted for the sake of this research, it is assumed the combination of these benefits, make (private) investors great initiators of re-development projects.

Institutional investors
Institutional investors have invested in real estate as an asset class and therefore directly or indirectly own properties stored in funds. Due to the declining need for office space, an over-supply of offices has emerged. Therefore even well performing office funds, can contain distressed properties. Asset managers need strategies to handle these properties well, for their owns as well as their clients sake. A way of doing this is by transforming office buildings into housing (Meijer, 2014). Parties like Syntrus Achmea have executed this strategy and successfully transformed office buildings into housing. These offices came from office funds and were already in Syntrus Achmea’s possession. Buying properties for the sake of transformation, or providing financing to transformation projects is therefore not obvious, but also not unthinkable (Meijer, 2014). It is assumed, institutional investors have the financial means and knowledge to perform transformations. While (re-)development is not their core business, Syntrus Achmea established a development department to answer to this new demand. The benefit of the in-house ability to redevelop, is the combined return of both the investor and developer. Traditionally, developers charge margins for ‘risk and return’ as part of the construction costs. When such risk do not externalize, the margins become return for the developing party. When the investors does the developing himself, he enjoys the benefits of the unused margins (Meijer, 2014). Based on interview with institutional investors the following is assumed: F
financial benefits, financial means and the excess to an extensive real estate portfolio, make institutional investors appropriate parties to initiate transformation projects.

11 Taxation

11.1 Taxation in general

When the ownership of a property shifts from one party to another, either Value Added Tax (VAT) or real estate transfer tax needs to be paid. VAT is charged to the selling party, while transfer tax is due by the buying party. The difference between which tax is due or charged, can make a lot of difference in the eventual costs of the project. It is therefore important for parties to understand the rules surrounding VAT (in Dutch BTW) and transfer tax. The following chapter explains several scenario’s applicable to the transformation of offices to housing. The rules explained in this chapter will be applicable only to properties which have been used (or intended to be used) as offices and transformed into housing.

Which taxes needs to be paid depends on several things such as:

- The nature of the owner: private person, a company or entrepreneur, or a public party
- The nature of the buyer and his intentions with the property: owner-occupied or renting to tenants
- The function of the real estate: office, housing etc.
- Whether it is fiscal old or new build.

VAT (value added tax)

Value added tax is a form of sales tax of levied at the delivery of a product or service. The general rate in the Netherlands is 21 % and it usually paid by the selling party. In the case of VAT-entrepreneurs, this taxation is often deductible. Renovation and maintenance of dwellings, among other labour-intensive activities are charged with a reduced rate of 6% till December 2014. However, when a party performs a transformation or renovation on a property which is not a residential property, VAT is due on the construction costs and labour. This VAT can be either deductible or not.

The main rules are:
- The supply of real estate or uncultivated land is exempt from VAT but charged with transfer tax,
- Until two years after deployment, the supply of newly constructed real estate is charged with VAT and not transfer tax in the case of residential properties (Buitelaar, 2013).
- When a residential property is bought by a party with the intention of letting it to individuals, the VAT he has to pay is not deductible. The letting of dwellings is a VAT exempt action, which means if VAT is paid, it is never deductible (Buitelaar, 2013).

Transfer tax
In contrast to VAT, transfer tax is paid by the buyer. It is due either over the economic value, or the purchase price, whichever is the highest. The general rate is 6% over the acquisition value of the real estate, however since 2011 the rate has temporarily been reduced to 2% for the transfer of dwellings, to encourage activity on the housing market. It is due at the moment of transfer of property rights and limited real rights like land leases. Exemptions are made for governmental parties, educational institutions and sometimes in concurrence with VAT in the base of construction sites and new build.

![Diagram of taxation in real estate]

Figure 38 Taxation in real estate, Buitelaar 2013

### 11.2 Taxation in the model

The scope of this research is restricted to the transformation of office buildings to residential buildings. The dwellings can either be rented to consumers by the party who re-developed the property, sold to an investor who plans on letting the dwellings, or sold to individuals. The current owner is assumed to have been using the property for entrepreneurial activities, since these are all offices. When VAT which is not deductible is charged, one can appeal for exemption from transfer tax. When the VAT is deductible, transfer tax is always due (WBR, 2014). It is possible to opt for VAT-charged activities to make VAT deductible. However, this is only possible when the buyer uses at least 90% of the real estate for VAT deductible activities. This means this option is not possible when the property is bought for private use, rented out as dwellings or let or sold to tax-exempt service providers like banks and insurance companies (Buitelaar, 2013).

**The difference between ‘new’ and ‘old’ properties**

In the re-development business, there is a difference between properties which are considered newly constructed or existing structures after the transformation. The difference between new and old, can make the difference between paying 21% VAT which is either deductible or not. Whether
the one or the other is more beneficial, depends on multiple factors. This paragraph explains which project characteristics influence the ruling. Important to note is: Definitive ruling on the subject cannot be given by any other person than an inspector of the Dutch Tax office.

**Newly constructed real estate**
When the ownership of a newly constructed building, or a building operational for less than 24 months, is transferred, 21% VAT has to be paid by the seller over the price of the property. When the buyer performs VAT-taxable activities, the VAT-payments are deductible. Sometimes renovated or transformed property are labelled as fiscally ‘new’.

**Renovated or transformed labelled as old build**
When existing real estate is transferred from one owner to another after it has been used for two years, no value added tax has to be paid. When the property remains an ‘existing structure’ after the transformation, no VAT will be charged when the property is sold. This means when the ownership is transferred only transfer tax is due (Buitelaar, 2013).

From jurisprudence transformation projects are known in which the property remained an ‘existing structure’, even after a functional transformation (Helwegen, 2013). The inspector of the Dutch tax services ultimately decides whether a property will be viewed as new or as an existing structure. The law does not precisely state which factors are decisive (Helwegen, 2013). Therefore some guidelines have been established to give an indication of the possible ruling. The following guidelines are based on several sources: the BBN calculation tool, an interview with Rendall Hofman and a master thesis from 2013 by Helwegen at the university of Tilburg. It is advisable for initiator to look into all possible taxation scenarios. In the model, different relevant tax scenarios are incorporated and displayed in the TAX sheet. The model can therefore be used to quickly provide insight in costs related to taxation.

**Indicators**
Commissioned by ‘BBN adviseurs’, a Dutch firm specialised in construction and development costs, Rendal Hoffman, fiscal consultant at Deloitte, developed set of indicators to use as guidelines to establish the difference between new and old build. These indicators, as published on the website: http://www.bbn.nl/rekentools/transformatie/ are:

- (partial) change of function
- substantial extension or both horizontally as vertically
- external appearance
- (new) distribution of window frames over façade
- alteration in entrance
- other specific changes to exterior

The tool works as follows: The initiator can ‘check a box’ for each of these indicators. Each indicator is assigned a value in percentage. When the cumulative value exceed 55%, it can be assumed the property will be labelled a new construction.
As part of this research, an interview with mister Hofman was conducted to provide extra information on this subject. During this interview, the following additional indicators were named: addition of balconies or other outdoor spaces, the relationship between constructions costs and the property’s value and substantial changes to the buildings floor plan.

Adding these extra indicators resulted in the following figure. This figure shows the different indicators and their possible influence on the ruling. The percentages were estimated by R. Hofman and are comparable to the percentages used in the transformation tool by BBN. When the cumulative value of the applicable indicators exceed 55%, it is likely the property will be labelled ‘a new construction’ after the transformation. However this figure can only be used as a guideline.

![Figure 39 Indicators for fiscal new build, source: A.D. Mensing representation of results from interviews](image)

**Situations included in the model** (all examples are of office buildings older than 10 years)

**Owner to Investor**

In many cases a former office building is part of an national or foreign investors portfolio. The owners might be operating the building or this might be in the hands of another party. Due to vacancy in the office building, the owner or operating party can come to the conclusion transformation might be the best option for the property. An example of such a situation is the project ‘The Molenwerf’.

The Molenwerf was an office building used by Syntrus Achmea and was part of the portfolio of Pensionfund Metaelektro (PME). Syntrus however thought, for several reasons which can be found in the project description in paragraph 13.1, this property could better be transformed into housing. Therefore the Achmea Dutch Residential Fund, bought the building from PME, with the intention of keeping it in their residential fund after transformation. In this example, Achmea who is an insurer and investor, acted as the developer too. Situations like these occur increasingly frequent. Both institutional and private investors are acting as developers in transformation projects. The great benefit of this construction is the perish of the developers fee.
Important to note is the importance of the age of the property at the moment of sale. When the property has been used for more than 10 years, the following figures apply. However, when a property has never been used, or has been used but for less than two years, different rules apply. In addition, other rules apply when a property has been used for more than 2 years, but less than 10. These exemptions will be explained in the last paragraphs of this chapter.

Figure 40 Investor to Investor (fiscal old build) source: A.D. Mensing

In the figure above, two scenarios are presented in which a property, which remains an ‘existing structure’ after transformation, is sold from one investor to another. In both situations VAT is charged over the constructions costs which cannot be deducted because ‘renting out dwelling’ is an activity exempt from VAT. The new owner will rent the dwellings to individuals, therefore VAT charged on the constructions costs, will not be deductible. When the investor sells part of the property after transformation to an second investor, and separate dwellings to individuals, the situation regarding VAT stays the same.

Figure 41 shows the situation where a property is transferred from one investor to the other, but is fiscally labelled as ‘new build’. In this case, the VAT over the construction costs is deductible if the first party does the transformation. Since a new property is transferred from one party to the other, 21% VAT is charged over the total value of the property. The buying party cannot deduct this VAT, since letting is VAT exempt. The investor has to pay the 180 euros for the entire property (see figure). He can however opt for exemption on transfer tax in this case, which is usually granted to prevent the double pay of taxes. When the first party sells a part of the property to an investor and separate dwellings to consumers, the VAT on construction costs will still be deductible. However, if the first investor holds on to several dwelling, which he will be renting to individuals after transformation, the VAT on the construction costs for these dwellings will not be deductible. When the second party commissions the transformation, the eventual costs are lower. Costs related to taxation are usually lowest when the property’s ownership is transferred the lease amount of times (Kortman, 2014).
Owner to Developer to Investor

Project developers are looking for the best building to buy, transform and sell with a profit. When they find a property they like, they will try to acquire it through a bidding. The developer might use equity or take a construction mortgage, however the financial construction is not relevant to taxation. When the transformation is completed, the developer will (partly) sell the property to an investor or to individuals. The next figure shows what will happen when the former office building, transformed to a residential property remains a ‘existing structure’.

Figure 41 Investor to investor (fiscal new build) source: A. D. Mensing

Owner to Developer to Investor

In this situation, taxes over transformation costs are not deductible. When he developer sell the property to investor_2 within 36 months after he bought the property from investor_1, investor_2 can appeal for reduced transfer tax (Kortman, 2014). He will only have to pay transfer tax over the added value. In this scenario, transfer tax would only be due over the added value to the property, of sixty euros.

The following figure shows what happens when the property is labelled new build. A contractor will always charge the client 21% VAT, however in this case this VAT is deductible. Therefore it is not
shown in the figure.

```
Current property value: €100
Transformation costs: €50
VAT on transf. Costs: € +/- 10
Fiscally NEW BUILD after transformation
```

100 * 1.06 = 106

156 * 1.21 = 189

106 + 50 = 156

Figure 43 Investor to developer to investor, new build source: A.D. Mensing

It makes no difference whether the developer sells to an investor or an individual in this case. However, when he keeps part of the property to rent out himself, he will not be able to deduct VAT charged over the transformation costs for that part of the property.

**Owner stays owner**

The last scenario included in this research is the scenario in which the owner stays the owner. The owner wants to keep the building in his portfolio, but in a different function. In this case, the current owner either performs and finances the transformation himself, or sells the property to an another party and (partly) buys it back after completion.

The following figure shows what happens when the current owner is not capable of performing the transformation himself and sells the property to a third party. After completion the building is still viewed as an ‘existing structure’ and the original owner buys it back.
When the property is labelled new, the following situation occurs. As you can see, VAT on transformation costs is deductible. Since the original owner intends to rent the property to a third party, the VAT on the entire fiscally ‘new’ property is not deductible.

In general, the cheapest solution is the one with the least transfers of ownership. This can be clearly seen in the following figure (see next page), which shows the scenario in which the owner stays the owner and performs the transformation himself (Kortman, 2014).
Because the owner will rent the property to a third party, the VAT on the transformation costs will not be deductible. The situation is therefore the same for both fiscally old and new.

As can be seen in these examples, it depends on the residual value and the transformation costs whether it would be more beneficial to have the property labelled ‘new’ or an ‘existing structure’. All scenario’s discussed in this chapter are included in the model. Comparing these scenarios can help the initiator choose the most beneficial structure.

**Temporary reduced VAT on renovation of dwellings**

In this chapter on taxation it is relevant to note that the current VAT rate (on labour costs, not materials) on the renovation and maintenance of dwellings and gardens, is currently reduced from 21% to 6%. This rate applies to renewal, extensions, restorations, replacements and all other construction activities on existing dwellings or gardens. The temporary reduction will last till the 31st of December 2014. It is possible that when this date approaches, period of reduces rates will be prolonged.

**11.3 Properties younger than 10 years**

The following paragraph explains some possible but not frequently occurring situations. These are not included in the model but discussed to provide the initiator with guideline if these situations do occur.

So far, all case studies and examples were of buildings older than 10 years. However, when a building is younger than 10 years, different rules regarding tax apply.

**Used for less than 24 months or not at all**

When a building has been operational for less than 24 months, or has never been used at all, the following rules apply.
**From investor to investor:** The selling party sells a ‘new’ office building, which means 21% VAT is charged over the property’s purchase price. It makes no difference who performs the transformation, because the property will always remain ‘new build’. Knowing the selling party has to pay VAT, the asking price will most likely be enhanced to compensate for these costs (Hofman, 2014). This makes ‘new’ buildings extra expensive and less suitable for transformation.

![Diagram](image)

**Figure 48, investor to developer to investor, A.D. Mensing**

**From investor to developer to investor:** The investor sells a new office building to the developer, which means 21% VAT is charged over the properties purchase price. When the developer then sells the transformed property to investor2, VAT is charged again, because the property is considered ‘new’. However, whether a building is new or not, depends on its age and whether it has been used or not. The deployment of a building can be a grey area. A newly constructed office, never used as an actual office building and empty for 5 years, could have been used for a temporary art exhibit. Or, it could have been used only once to host a meeting. This could mean however, the building was deployed at the moment of this meeting or exhibit. Therefore, when the building is older than two years and used at some point, no VAT is charged but transfer tax is due. According to VAT expert Rendall Hofman, situations like this exist. On basis of jurisprudence, the property can be labelled an ‘existing structure’ and only 2% transfer tax will be charged (Hofman, 2014).

**Property between 2 and 10 years old**

When a property is older than 2 years, but younger than 10 years, the rules of revision damage (herziening schade) can apply. The properties analysed in this research, were all former office buildings. All activities in office can be assumed to be ‘entrepreneurial’ activities, which means the VAT on the construction of the property, and of the VAT paid when the building was acquired, was often TAX deductible. When the property is sold again free from VAT, revision damage needs to be paid to the tax service (Hofman, 2014). This means previously deductible VAT needs to be paid over the years the property was not used for VAT-charged activities. So ten minus the operational years as an office.

**Investor to investor**

The property is transformed by the selling party to a residential property: When the property is sold after 2 years but within 10 years, the selling party owes the tax which was deducted for the years it wasn’t used as an office. So, when a property was only used for VAT taxable activities for 4 years, the

![Diagram](image)

**Figure 49 Investor to investor, A.D. Mensing**

Master of Science Thesis by A. D. Mensing
When two years have passed and the project is sold, the developer has to pay 6% transfer tax. The selling party still has to pay the revision damage. When the developer than sells the property to a new investor, two things can happen depending on whether the transformed property is labeled new or old build. When the building is labeled ‘new build’, the buyer opt for a VAT-charged transfer. When this happened, the revisions damage will no longer need to be paid. Instead, 21% VAT is charged over the new value and the construction costs. When this amount is lower than the revision value, using opting for VAT can be beneficial. When the property remains an ‘existing structure’, the buyer pays 2% transfer tax and the revision damage paid by the first seller remains (Hofman, 2014).

**When the property stays with the original owner**

When the original owner decides to transform the property himself, many things can happen tax wise. When the property is older than ten years and stays ‘old build’, the 21% VAT will be charged over the construction costs which is not deductible if the owner rents the dwelling to consumers. When the property becomes ‘new build’, the 21% VAT is deductible. When the owner than sells the ‘new build’ property within ten years, revision damage rules apply (Hofman, 2014).
Results

Reading guide

The following two chapters present the results from this research. Chapter 12 summarizes the results from the expert interviews. The chapter chronologically follows the steps which guide the selection of a property for a transformation project. By explaining these steps, the variables included in the re-development valuation model are introduced. The chapter is concluded with an overview of all variables included in to model. Chapter 13 present the results from the case studies. The valuation model is used on these case studies to establish their financial feasibility. In addition a sensitivity analysis is performed.

12 Transformation in practice

This chapter will explain the property selection process for transformation projects on which the valuation model in based. All variables included in the model, have been chosen because of their relevance to the transformation process. The process presented in this chapter is based on interviews with experienced re-developers and supported by literature like the ‘transformation potential meter’. This tool describes 5 strict steps to estimate the potential of a property. These steps include an extensive and hierarchical analysis resulting in a ‘point system’ to judge the potential. Since the model developed for this research is aimed at relatively experienced (re-)developers, this research will not completely follow the strict steps. However, the process described in this chapter which is one of the products of this research, resembles the transformation tool by and large.

The following figure represents both the property selection process for transformation projects as the structure of this chapter.

![Figure 51 Four step plan for selection transformation projects, A.D. Mensing](image-url)
12.1 Initiative phase

In the (re-)development industry, parties of many sorts are active. The party performing the transformation is called the developing party. This could be a developer pur sec. or a party who’s core business is not real estate development, like institutional or private investors. A property usually comes to a developers attention when; suggested or tendered by semi-public parties, or by pro-active search of the current (market) stock or own portfolio.

(semi-) public parties

Vacancy is a problem effecting both market parties as well as public parties. Devaluation of the mortgage collateral can cause problems for owners like pension funds and insurers and financers, like banks. Municipalities have experienced losses through cancelled developments and missed revenues. Additionally, most parties are concerned with the liveability when vacancy causes deterioration and affects safety and aesthetics. Therefore public parties are concerned with transformation of the current vacant stock and facilitate in the process. The national government can facilitate by loosening rules and regulations. Municipalities can act locally and on a project level. To match and actively suggest vacant properties to appropriate market parties, organisation have been founded who provide communication between the municipality and these market parties. In addition, these organisations help market parties with finding their way through complicated rules and regulations municipalities are still struggling to establish.

Kantorenloods

The Kantorenloods is one of these parties, founded to initiate transformation and smoothen the process. To shed light on the ways the Kantorenloods works, an interview Jos van Veen, one of the founders in The Hague, was conducted. The transcript of this interview can be found in appendix K and will be referenced to by (van Veen, 2014). The Kantorenloods is an initiating party because it actively searches for potential project and approaches the appropriate market parties like developers, investors, contractors and corporations. The organization is not officially part of the municipality, but is very well connected. The Kantorenloods mainly focusses on larger volumes on important locations. Smaller vacant volumes are more easily taken-up by market parties and tend to be of less influence on the surroundings. Large transformation projects call for large investments for which suitable parties are scarce (Veen, 2014). The Kantorenloods has no financial means to subsidize transformation project, however they have the means to perform several types of research, like market analyses, technical and environmental reports. This means the Kantorenloods
can supply market parties with valuable information, saving them time and money and reducing risk. While the Kantorenloods is not qualified to approve zoning-plan alterations, they can review the project with the town council, who ultimately decide on re-development plans (Veen, 2014).

**Pro-active search of vacant market stock and portfolio**

Due to changing strategies, investors in real estate are re-considering their own and/or their clients’ portfolios. Such parties include pension funds, insurers, corporations, investors and other types of owners. Parties who are actively looking for properties to re-develop are developers and private investors. They are scanning the current stock to cherry pick the best properties from the market.

### 12.2 Selection phase

To comprehensively cover different types of project selection, parties of all sorts were interviewed. Since many selection criteria reoccurred in the different interviews, the following paragraph will discuss deterministic elements of selection to market parties in general, specifying where necessary. On basis of the interviews, a two-step selection process is assumed. Step 1, the first impression, is a general judgement of the location and basic features of the building. When positive, this will lead to step 2; the second inspection, which will include a visit to the site possibly accompanied by experts or consultants of some sort.

![Select Diagram](image)

- **12.2.1 First impression**

The “transformatie potentiometer” defines the following 4 elements in step 1: market, location, building and organisation. The “transformatie potentiometer” will be referred to by TPM from here on.

**Macro: market and location**

For the selection of a property, a market must exist for the proposed function. In this research, a demand for housing in the area of the property is the first selection criterion. Market and location are judged on general assumptions of growth and demand. One of the interviewed parties, Pinnacle, stated they have pre-determined 10 urban areas in which they are actively searching for properties. This specific strategy is not generalizable, but it can be stated that the focus for transformation projects lies particularly in the Randstad. However, transformation project in smaller municipalities located closely to attractive cities are considered too.
Two veto criteria from the TPM relevant in this stage of the process are safety and the zoning plan. Is a danger to the public health present? Does the zoning plan permit a residential function or a revision to a residential function?

**Building**

The two most important characteristics of the property itself are volume and shape. Volume preferences depend on the developers strategy. Larger projects require a larger financial capacity and hold a bigger marketing risk. Some organisations, like Pinnacle, have the equity to support large and riskier investments. Since not many parties do, competition is scarce (Mackay, 2014). In addition, size and return on investment are related. One larger project is expected to generate a larger return than a bunch of smaller projects. The third benefit of larger properties is their importance to the owners accounting. Vacant larger properties increasingly affect portfolio performance, encouraging owners to attend to the vacancy issue (Meijer, 2014). The shape of the building affects the adjustability of the floor plans to other functions. Rectangular buildings are preferred.

**Organisation**

The TPM stresses the importance of an enthusiastic initiator, which is assumed to be present in this research. In addition, it points out the importance of the owners willingness to sell or cooperate.

- **12.2.2 Second inspection**

The second inspection combines steps 2a and 2b from the TPM, where meso and micro location and property aspects are divided into functional, technical, cultural and juridical elements.

**1 Functional**

All parties have confirmed the preference of projects located in residential areas with an existing structure of facilities. This decreases the risk of sale and rent and decreases the investment in the projects surroundings. Important is the distance to facilities, public transportation, accessibility by car and the presence of other residential properties creating a pleasant atmosphere and some bustle on the streets. In addition, some functional yet not deterministic characteristics of the property influencing transformability exist. These include the construction year, recent renovations and extendibility. A truly deterministic functional location and property characteristic is parking.

**Parking**

Jansen named parking availability as a very important selection criterion (Jansen, 2014). It is therefore assumed that other developing parties consider parking important as well. Municipalities are usually very strict when it comes to parking norms, therefore a project can fail on this notion. The desired parking norm for housing is composed of the following four elements: average car ownership per household, possession of leased cars, expected growth of car ownership and non-neighbourhood related visitations by car. Car-ownership per household is the most influential factor and depends on the following elements: dwelling surface, level of urbanisation and type of dwelling (DSO, 2011). The following figure shows the relationship between *car-ownership and dwelling size in m2 of lettable floor area per dwelling in The Hague*. 
As the level of urbanisation increases, car-ownership decrease. Reason for this are the availability of public transportation and a denser built surface. Zones to describe the level of urbanisations are usually determined by circles expanding from the city centre. The Hague, which is used as an example to illustrate the formation of the parking norm, is divided into 5 zones. The following figure shows these zones by different colouring. The translation of the zone types from the top down is: city centre, urban park zone, urban, green/ urban, highly urban, suburban, residential area (DSO, 2011). However to calculate the parking norm, this initiator needs to place his project in a less complicated categorisation, namely city centre, city or city edge.

The last element needed to compose the parking norm is the dwelling type. We distinguish between single-family homes, apartments, student housing and nursing homes. When the initiator has made an estimation of the variables he can use the following formula to calculate the parking norm.
Desired Parking norm = average car ownership + extra for visitor. The following table shows the average car ownership and visitors in The Hague. The parking norm for case study 2 therefore is: (apartments, 70-100, city edge) 1.0 + 0.3 = 1.3, and (apartments, 100-160, city edge) 1.3 + 0.3 = 1.6. On average for the project the parking norm is 1.3 parking spots per apartment.

<table>
<thead>
<tr>
<th>Eengezinswoningen</th>
<th>Centrum</th>
<th>Stad</th>
<th>Rand</th>
<th>Toevoegen tbv bezoek</th>
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<td>0.8</td>
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<td>0.9</td>
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</tr>
<tr>
<td>&gt;160m²</td>
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<td>1.3</td>
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</tr>
</tbody>
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<table>
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<td>0.3</td>
<td>0.3</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Figure 54 car ownership in The Hague, Nota Parkeer normen Den Haag 2011

2 Technical state:

The technical state of the property and specific elements influence transformability: maintenance of the property, main construction, pattern of constructional elements, the façade and installation.

3 Cultural:

The cultural aspects describe the looks and feel of the property. Does or can it feel like a residential property? Important are the entrance and the façade

4 Juridical:

Building code

The building code is a set of rules and codes that applies to every building in the Netherlands. The building code was recently revised (2012) and an important exemption was included beneficial to transformation projects. Transformed buildings do not have to meet the ‘new build’ requirements anymore. Adjustments only have to maintain the current quality level (BZK, 2012). This law was introduced to ease the transformation process and reduce costs. Requirements that have changed in the building code concern for example thermal insulation, day light penetration, fire safety and external partition. New elements added to the building and escape routes must only live up to the rules for ‘existing structures’ (BZK, 2012). However, professional articles report on uncooperative municipalities because of unacceptably low quality levels, which threaten the living comfort and fire safety of future residents (Lagae, 2010).

Land lease

In several places in the Netherlands, but particularly in Amsterdam and Rotterdam, some property owners lease the land on which the construction is built from the municipality or sometimes a private party; this is called land lease. The user of that land or lessee, pays a yearly canon that is recalculated to match the market value of the land every 50 or 75 years. (Gemeente Amsterdam,
2013, Francke, 2013). Pinnacle and Urban Interest, both private investors, state they only buy properties on privately owned land. The reasons for this aversion of land leases are:

- Land leases negatively affect the value of a property
- Canon payments reduce the developers return
- Availability of consumer mortgages is negatively affected by a land lease.

**Control and income**

Land lease is both a source of income to the municipality, as a mean of control in urban planning. The zoning plan is the first mean of control which states the functions allowed on a certain location. However, when requested, zoning plans can be revised. When plans cannot reasonable be rejected by the zoning plan, the land lease comes in handy. The land remains in ownership of the lessor, who is granted the privilege of ultimately deciding what is and isn’t allowed on the land. The municipality plays a double role when it comes to urban planning. Their public role of urban planner gives them the right to look into the plan details and acquire useful knowledge for their private role as lessor. The municipality has to approve dwelling types and can therefore choose for the most profitable type (Hoppenbrouwers, 2014).

**Canon**

The value of the lease hold influences the property’s value as it is subtracted from the total value of the property. However, pre financial crisis, distinction between properties on lease hold land or properties on privately owned land was rarely made. This distinction should however have been made since the revisions of the yearly canon has huge financial consequences. The yearly canon is determined by the factors: land value and a ‘reasonable return on the land’ and can be paid off for periods of 50 to 75 years. But when this period comes to an end, the canon is revised and increased in relation to the current market value of the land. ‘Housing’ is the highest appraised usage of land, so the canon will usually increase when the property’s functions is changed from office to residential. To prevent these negative financial surprises, land leases should be incorporated in financial models (Hoppenbrouwers, 2014).

In the model, the formula as described in the ‘Algemene voorwaarden erfpacht 2000’ article 12, directed at land leases in the case of a change in function, is used. This formula is:

New canon = old canon + ((land value in new function – land value in old function) * canon percentage).

This canon percentage equals the ‘reasonable return’. This percentage differs per municipality, however Amsterdam is known to set the trend.

Since the canon is based on the land value, disputes between the municipality and developers or owners on the land value arise. The land value is determined by the municipality, who benefits from higher values, resulting in a risk of overvaluation. Many developers claim value oppressive elements are not sufficiently taken into account by the municipal appraisers (Hoppenbrouwers, 2014). In addition, experts decide on what ‘the reasonable return on land’ is. This ‘reasonable return’ seems very subjective, which it is. Based on conducted interviews, two reasons for disputes on this matter were established: - vacant office buildings are labelled a ‘distressed assets’, therefore the municipality considers the project risky and demands a higher return. - In addition, the municipality often makes no distinction concerning returns between re-development and new build. They ask for
returns comparable to the new build projects on greenfield locations, which are often significantly higher.

5 Remaining tenant or distressed real estate

This fifth factor is not named in the ‘TPM’, but is included due to its reappearance in expert interviews. After the acquisition of a property, time is needed to prepare and make plans for the transformation. It is therefore assumed, remaining tenants who produce an income stream are desirable. Besides income, the duration of the remaining contracts are important to the possibility to start partial demolition (Mackay, 2014).

However, remaining rent and the vacancy duration also influence the willingness of the owner to sell the property. Structurally vacant properties, or distressed real estate, includes properties vacant for a significant period of time and in unfavourable market conditions. Vacancy costs money and has an undesirable effect on the property’s value and its surroundings. The longer it takes, the less likely a new tenant will be found. Therefore some parties believe owners of distressed properties are more willing to sell or cooperate which influences the price and the duration of the process. This factor is therefore considered during the selection of properties.

12.3 Calculations

- 12.3.1 Simple sketches of floor plans

The first step to making calculations is sketching the dwellings onto the existing floor plans. The ratio lettable floor area to gross floor area determines the income to costs ratio. Gross floor area determines costs, lettable floor area determines income. New build project are designed efficiently, leading to an average GFA/LFA ratio between 70-80%. However, in transformation project this ratio is usually much lower. Existing space is used in a different function which often means it is used less efficiently. Firstly, efficiency is related to building shape. Rectangular buildings allowing the best daylight penetration and are usually preferred (Jansen, 2014). Secondly, the lettable floor area of an office building and residential building differ. While storage rooms, hallways and parking garages are part of the lettable floor area in office buildings, they are not in residential buildings. In the case studies included in this research, ratios between office and residential functions differ greatly due to this problem. The residential LFA/GFA ratio’s ranges between 50 en 60%. Because the ratio cannot be determined precisely without final floor plans, this variable is established with the use of a Monte
Carlo simulation. Multiple developers have established that in general the ratio must exceed 50% for a project to qualify.

- **12.3.2 Cost calculations**

1 Preparation time

Time is money. Therefore time management is very important in (re-)development projects. The clock starts ticking the moment a property is bought. The urgency to take action will depend on remaining tenants and outstanding loans. The course of action will differ per party, but it is assumed that the application for a zoning plan revision will be filed first. This can only be done by the property owners. Since the acquisition of the property requires an investment of equity or debt, interest will be due or missed and owners will prefer the shortest possible procedures. The second preoperational step is to request an environmental permit, which could be done simultaneously with the zoning plan revision. As was explained in chapter 6, both procedures can be lengthy due to objection and appeal.

*Delay in the model*

Delay possibly caused by objections or appeal, for both the zoning plan revision as the environmental permit, is represented in the model. The initiator can fill in the expected length of these procedures and see what the effects on his costs and return will be. For instance; because the model calculates the residual value or return at completion, the future value of the acquisition costs increase as the projects time increases. The direct financial consequences of a longer preparation time and a longer construction time are explored in the sensitivity analysis. However, the indirect consequences cannot be modelled while they do exist. When a initiator has pre-sold dwellings to individuals to finance his project, he has a maximum of two years to start with the construction of the dwellings. This could mean that in the case of lengthy objections and appeals, the initiator can lose his financing by the retreat of buyers. When the initiator has agreed to sell the project to another investor, he has to deliver within the contractual time. If he doesn’t, the investor can withdraw.

*Crisis and recovery act*

Before the financial crisis, (re-)development projects were planned and revenues assumed. To prevent a construction stop, great losses and to keep organisations in the (re-)development sector in business, the crisis and recovery act was drafted. The main goal of this act is to speed up procedures and to remove obstacles. Floris Roord (project developer) suggested this act has influenced the tolerance level of the municipality towards (re-)development projects. For the survival of organizations and jobs in the construction industry, work needs to be created. This means the economic interest of the (re-)development projects are weighted against the interest of the objecting or appealing party. The crisis and recovery act has started a trend of valuing economic interest higher than the interests of individuals. This trend was spotted by several interviewed parties. Jos van Veen, employed by the Kantorenloods, cannot officially confirm this trend. However, he too knew plenty examples of projects where objections or appeals were dismissed to secure the projects execution and to prevent further delays. This is, as he claims, not only the effect of this act, but a change in mentality of municipal officials. Municipalities are more eager to facilitate transformation projects and to help market parties.

Two other changes of influence on transformation projects are the lengthening of the period for temporary use from 5 to 10 years and shorter procedures for smaller projects. For housing projects
till 1500 m², the procedure for a zoning plan revision will only take 8 weeks. For offices till 10,000 square meters, this rule applies as well (Veen, 2014).

2. Construction costs

The methods of establishing construction costs are not part of this research. However it is an important input variable, so the methods used by the parties interviewed are discussed here. 

**Comparable project:** The most common way to estimate construction costs in transformation projects is with the use of comparable projects and experience. In new build projects, prices are basically established and risks can be estimated fairly well. However, in transformation projects estimating construction costs on an element base is more difficult. Therefore all interviewed parties stated they used comparable projects, either from within their own organisation or from available databases.

In this phase of the process, initiators are not sure which elements of the building will be re-used or replaced. Therefore they usually work with several scenario’s, including and excluding the re-use of elements like the façade, installations and elevators. The addition of outdoor space in the form of balconies is considered a necessity in general, therefore cost related to this addition are usually included. To establish the construction costs in the model, the Monte Carlo simulation is used. The initiator will have to make an estimation of the min, max and most probable costs on basis of experience and comparables. In the model the expected increase in construction costs is included as well. Construction costs have decreased since the financial crisis due to the decreasing number of projects and fierce competition on the construction market. Therefore construction costs have only increased with inflation over the past few years. However, the market demand is expected to grow resulting in an increase in construction costs. This is translates in a higher but uncertain estimate of increase in costs for project which have not started yet and a low and certain increase in costs for nearly finished projects.

3. Additional costs

Additional costs, which include consultation costs, construction fees and connection fees are determined as an percentage of the construction costs. The height of this percentage depends on the scale of the project and its complexity. Additional costs vary between 15 and 25% of the construction costs (Roord, 2014). Since transformation projects are usually more complex than new build project, due to the existing context, additional costs tend to be higher. Cases studies used in this research have shown that transformation projects have high additional costs. Floris Roord stated additional costs are often ‘over estimated’ to create a buffer for the constructions costs. By working with higher additional costs some risks of increased construction costs can be absorbed (Roord, 2014).

4. The discount rate

The discount rate is an interest rate used to compute future cash flows to its present value. Two different discount rates are used in the model, one for the construction period and one for the operational period (see paragraph 8.3).

*The operational period*
The discount rate used in the operational period is a multi-period, euro-weighted average total return expected by the investor, expressed with the going-in IRR. The expected going-in IRR must be determined by the initiating party when using the model. For analysis of the case studies included in this research, the IRR was computed from the current cap-rates. During the interviews the initiating parties provided the cap-rates (or NARs in Dutch), which were converted into IRRs using the method explained in paragraph 8.3.

**The construction period**

The discount rate used in the construction period does not reflect the expected return on the investment. Developers traditionally use the “nominal method” to include risk and return in the financial feasibility calculations. The “nominal method” includes risk and return as a form of costs in the calculation of the investment costs. This is called a profit reservation. The height of the profit reservation is calculated by multiplying the expected income from sale of the property by a percentage. This percentage represents the return on investment the developer wants to achieve and can differ greatly per developer. To cover for unexpected extra costs, developers often include a margin for “unexpected costs” in the project. When debt is used to finance the construction, the interest payments during construction phase are included in the cash flow statement.

<table>
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<td>- Acquisition price land/construction</td>
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<tr>
<td>- Construction costs</td>
</tr>
<tr>
<td>- Additional costs</td>
</tr>
<tr>
<td>- direct additional costs (advisors, promotion, administrative expenses, plug-in costs)</td>
</tr>
<tr>
<td>- unforeseen costs</td>
</tr>
<tr>
<td>- incentives (if applicable)</td>
</tr>
<tr>
<td>- Interest expenses during construction</td>
</tr>
<tr>
<td>- Development costs (general costs)</td>
</tr>
<tr>
<td>- Risk and return</td>
</tr>
</tbody>
</table>

= Investment costs
+ Income from sale

= Nominal return

**Figure 55 Investment budget estimate developer, A.D. Mensing**

The discount rate of the construction period is used just to calculated the present value of the cash flows. The discount rate thus equals the inflation rate plus the risk-free rate. This risk-free interest rate compensates investors for the pure time value of money. No required return is stored in the discount rate. The height of the inflation rate in the model is based on the intention of the European Central Bank to stabilize the inflation with a maximum rate of 2%. The model default setting is therefore range of 1.5% to 2.5%. The current risk-free interest rate can be found on the internet, for instance on tradingeconomics.com. The current ten year government bond interest rate in the Netherlands is 1.68% (see paragraph 8.3). Some developers are used to include inflation risk and
financing costs in the ‘profit reservation’. Therefore this percentage should be adjusted downwards when this is the case, to prevent the double inclusion of these costs.

- **12.3.3 Revenue calculations**

1 Rent level

On basis of interview results, it is assumed, rent levels are estimated by the initiator based on several factors: - projects of comparable quality, - marked rent levels, - and recent transactions. Parties usually work with three different scenario’s, a worst case, a base case and a best case scenario. The pitfall of this method was explained in chapter 7, therefore the Monte Carlo simulations will be used to determine the rent level. A minimum, maximum and expected rent level will be included, as well as a certainty level of this estimate. This certainty level is based on the projects progression, meaning the closer the project is to completion, the more certain the rent level is.

2. Rent increase

It is assumed initiators select projects because of expected profitability. Rent levels and positive prospects affect this profitability. Investments are made considering the market conditions of the near future, suggesting an expected annual increase in rent levels. The annual increase represent the growing demand due to demographic changes, housing shortage or other market conditions. Due to its exponential nature, the rent increase percentage is of great influence on the rental income and profitability. Development experts interviewed for this research stated to advertise a conservative attitude towards rent increase. They considered the positive prospects to be sufficiently represented in the initial interest in the project in itself. Therefore the range and accent value of the rental growth is determined case specifically, considering the location and nature of the investor (commercial or corporation). It should also be noted this rental increase remains constant over the holding period meaning the increase should be considered an average expected increase.

3. Other income

Parking can be an form of other income. In depends per project whether parking places are sold, rented separately, or per apartment. To calculate how many parking places are needed, the parking, norm is used (see paragraph: 12.2.2). The initiator is advised to make an estimation of the annual rent or sales price per parking place on the basis of references. In the model, additional income comes from “extra parking places”. It is assumed the parking norm per dwelling is achieved and incorporated in the price. The initiator is advised to take note since this assumption is not necessarily generalizable.

4. Marketing

It is assumed, after completion, dwellings can be:
- Sold empty; to an investor who rents the dwelling to individuals.
- Sold empty; directly to individuals
- Let to individuals and operated by the initiator.
During interviews initiators suggested specific marketing plans are based on their organisations' profile, the projects size and market conditions. Selling empty dwellings to an investor, means transferring the risk of vacancy to the buying party. This transfer of risk, will mean a smaller return for the selling party. Therefore, to enhance returns, initiators often will try to sell or rent out parts of the properties themselves (Mackay, 2014). On the other hand, some parties do not have the capacity or intention of owning and operating real estate and will therefore aim at selling the project as soon as possible.

A second reason for holding on to the property after completion, might be an expected increase in value. When parties expect the price of the dwellings to increase further over time, they might decide to rent out the dwellings themselves and sell them when the market value is highest. In addition, Roord states an initiator will weigh the options of selling quickly, maybe slightly below market value to a lower yield, or selling above current market value; slowly but achieving a higher yield. It depends on the financial constraints and the planning whether the selling party has time to wait for the highest price.

When dwellings are meant for the sales market, parties will always try and sell as many dwelling prior to construction. The sale proceeds can be used to finance the transformation process. Some projects are completely financed by sale proceeds. It is also possible to structure the transfer of ownership of the property in such a way, that payments for the acquisitions of the vacant property are due, when sale proceeds start coming in.

The marketing strategy initiators choose, affects the initial vacancy, income and the timing of this income. In the model it is therefore possible to choose which percentage of the property will be sold, sold individually or rented out. It is also possible to structure the expected speed of sales and renting out according to expected market movements as it influences vacancy. Project financed by banks are usually subject to strict pre-sale and pre-lease requirements. The nature of the initiator can therefore be of influence on the initial vacancy as well.

5. Turn-over rate

When discussing the office market, we speak of vacancy rates. When it comes to housing, we speak of turn-over rates. Some developing parties base their revenues on the gross development value, which is based on a fully led property. It is assumed however, more realistic revenues can be calculated by including vacancy.

The turn-over rate represents the dynamics of the housing market. It is composed of the number released dwellings or relocating people as an percentage of the stock. Housing mutations in the regulated rental sector are well monitored by housing corporations, while mutations in the private sector are fragmented. The turn-over rate can be determined using several methods:

- (0.5 * the settlers) + (0.5 * the leavers) / average population. Using the population measured at the start and end of the year in question. This function is used to define turn-over rates in specific regions or cities and can be looked up (Dignum, 2006).

- The turn-over rate can also be expressed per target group on basis of social trends.
To determine the number of mutations in a residential property, the turn-over rate is multiplied by the number of dwellings in the project. To determine the vacancy, the mutation is multiplied by the average vacancy after mutation.

An useful indicator of vacancy after mutation, is the ‘time on the market’ of comparable properties. The average time a dwelling stays vacant after a mutation lies between 8 and 16%, meaning \(0.16 \times 365\) days = 58.4 days. These numbers are based on housing development calculations by AM real estate development. They are based on a healthy demand in the private rental sector and average duration of maintenance activities in-between tenants (AM Measure, 2014). These two figures are multiplied and used in the model to substitute the vacancy rate and to express the loss of income due to mutations in the tenant base. A report from Platform 31 from 2013 states the average mutation rate in the private rental sector is on average 10% and in the ‘public rental sector’ 7% (Raatgever, 2013). 10% is used in this model as the default value.

6. Operating expenses

We distinguish between operating expense and capital improvement expenditures. From a cash flow timing perspective, the characteristics of capital improvement expenditures that distinguish them from regular operating expenses is that capital expenditures occur less frequently. Capital improvement expenditures in general refer to major expenditures providing long-term improvements to the physical quality of the property. Because this research focusses on transformation project, meaning all properties will have just undergone a thorough refurbishment, capital improvement expenditures are not included in the operation cash flow statement. Charges for depreciation are expressed in a lower real sale value caused by a higher exit yield. Operating expenses are included in the cash flow statement. They include several regularly occurring expenses associated with the on-going operation of the property. In the model we distinguish between fixed and variable costs.

Largely fixed costs are labelled *repairs and maintenance costs* and are insensitive to the occupancy levels. Usually developers work with fixed average expenses per square meter GFA or LFA. The costs estimate is based on experiences and comparable projects. Vambersky, an experienced project developer employed at AM Real Estate Development, estimated the costs for average sized transformation projects to commercial housing to lie between 3 to 5 euros per m²/ LFA/ annually. Because these costs are property specific, an accent can be placed somewhere on the range depending on the property characteristics like size and tenant service costs. In the model this number is computed by the Monte Carlo simulation.

Operating expenses also include largely variable costs, sensitive to the occupancy level. These are called property maintenance costs in the model and include: Utilities, building and grounds maintenance and routine repairs. To prevent deteriorating, it is advised to owners to comply property maintenance plans. Property maintenance on average is expressed as an percentage of the rental income. The model uses a percentage range of 5% to 10%, which are commonly used figures. The costs can vary within this range depending on property characteristics like the square meters or glass façade. It is assumed housing corporations have a lower maintenance budget. The costs depend for instance on the quality of the materials used. In the model this number is computed by the Monte Carlo simulation.
7. Market risk

As was explained in paragraph 8.3 and 12.3.2.4, the discount rate used in the operational period is an expression of the risks associated with the project. For this reason, the following paragraph includes some background information on the Dutch housing market. This information can be used to make a judgement on the riskiness of housing development project compared to for instance office development project.

The residential investment market
A research on Capital Value, by ABN Amro and ABF research, shows Dutch institutional investors have 2 billion euros at their disposal for the investment in rental dwellings. Foreign investors have also shown interest in the Dutch residential market. Investor consider the risk and return ratio very beneficial, especially in comparison to other real estate markets. The Capital Values research states that turn-over rates on residential markets have decreased in 2013 as well as vacancy in residential portfolio’s. Rent levels have increased since 2013 and are expected to keep rising slightly in the coming years (van Harten, 2014). The main interest of institutional investors lies with new build, however their interest in re-development is growing. Private investors are mainly interested in existing multiple-family homes. The private rental sector, with rent levels just above the liberalisation level is most popular with investors, since no landlord levy is due in this segment (van Harten, 2014).

The Dutch housing market
This investors interest in the housing market in created by the increasing demand for housing. Since the economic crisis many plans for the construction of dwelling were cancelled. In 2009, only 80.000 dwellings were constructed. This number decreased to the historic low of 35.000 in 2013. However, housing is needed and the real estate development market in strengthening, so analyst expect this number to climb to 40.000 in 2014 and 60.000 in the years following. The prices for owner-occupied dwellings have decreased dramatically, with 20% on average (excluding inflation). However, in 2013 the rent levels increased with 4.7 % and corporations and investors expect this number to increase over the following years. The demand for rental dwelling in de private sector is growing due to the enhanced difficulty of getting mortgages and the recently introduced income-based rent increase (van Harten, 2014). The result of all these trends is a substantial housing shortage in the Randstad and other areas. The housing shortage, currently at 4% will reach 8% in 2020. Research’s show additions to the housing market in the lower segment, with € 550 monthly rent are needed. Housing corporations are responsible for this segment. The shortage in the middle segment of € 700- € 850 monthly, can be filled by market parties. However, municipalities obstruct a quick response to this growing demand by asking high land prices. The price of land should often drop 20 to 30% to promote the construction of rental dwellings (van Harten, 2014).
8. Debt service

When real estate investments are partially financed with debt, the cash flow is reduced by the debt service payments to the lender. The debt service includes both the interest component and the debt amortization component. Since the renting out of residential real estate is exempt from income tax, this component is not included in the cash flow statement.
The table on the left shows the equity after tax cash flow from operations as stated by Geltner (Geltner, 2007). The table on the right shows the edited version which represents the leveraged equity cash flow statement as included in the valuation model.

The constant payment mortgage (CPM)

In the model the constant payment mortgage is applied because its constant payments make budgeting easy for both the borrower and the lender. Also it works well in combination with the typical pattern of rental growth. The concept of the CPM loan provides flexibility in the trade-off between the payment level, amortization rate and maturity. When the loan is fully amortizing, it means the loan will be completely paid back at the loan’s maturity. In commercial real estate investments, this is however not common. Usually the holding period of the loan, or loan tenure, is shorter than the amortization period, which is the period in which the loan would have been paid back. This results in a high payment of the outstanding loan balance at the end of the loan tenure if the property is sold or the loan not extended. This payment can be reduced by increasing the constant payment level leading to faster amortization.

The CPM payments are included in the model as the ‘debt service’ and determined with the annuity formula.

\[ PMT = \left[ \frac{i}{1 - \left( \frac{1}{(1 + i)^n} \right)} \right] \times L \]

\( PMT = \text{debt service (constant because annuity)} \)
\( i = \text{(contractual) mortgage interest rate} \)
\( n = \text{amortization period} \)
\( L = \text{principal loan amount} \).

(Geltner, 2007)

Permanent mortgage annuity rate

Because the model works with constant payments, the interest rate used in the formula above is the permanent mortgage annuity rate. This rate is based on the interest rate, amortization rate, Euribor, the collateral risk, costs and return. Euribor rates are historically low, which means interest rates on mortgages have lowered by 0.5% or so (Zachariasse, 2014). According to Kees Zachariasse, the
interest rates on mortgages for real estate investments did not change substantially due to the financial crisis. However, the amortization component has changed due to the financial crisis. According to Pieter Zwart from the FGH bank, banks differentiate between commercial real estate typologies to determine the necessary amortisation rate. For investments in office buildings, banks will ask between 2% and 4% annual amortisation. For residential property loans, amortization rates lie between 1% and 1.5% (Zwart, 2014b). In the model, the permanent mortgage annuity rate, consisting of an amortization and interest rate, are estimated through a MC simulation. The min, max and accent values are based on rates published on websites of loan distributors. Current rates lie between 3% and 7% for commercial loans, depending on the loan amount, amortization component and LTV ratio. With the permanent mortgage rate the height of the debt service included in the net cash flow is determined

Outstanding loan balance
When the loan tenure ends or when the investor decides to sell the property, the loan is usually not fully paid back. The outstanding loan balance, which is the remaining amount of the outstanding loan, will need to be paid back to the lessor. To calculated the outstanding (OLB) at a given year, the following formulas are used.

\[ MB = b \times (V_m) \]
MB = mortgage balance
\( V_m = \text{value mortgage} \)

To calculate b, the following formulae applies,

\[ b = \frac{R_m \text{original term}}{R_m \text{remaining term}} \]
\( R_m = \text{mortgage constant} \)

\[ R_m = \frac{i}{1 - \frac{1}{(1+i)^t}} \]
To calculate the mortgage constant of the original term, the amortization period is used. In the model the default setting is 25 years. The remaining term represents the amortization period, minus the years the debt service has been paid. In the model, the operating period of the property is estimated at 11 years. In this case, the loan tenure equals the operating period. So when the property is sold at the end of the loan tenure, 14 years remain (25 – 11 years).

9. Holding period

The holding period of real estate investments vary, on average, between 8 and 12 years according to David Collet (Collet, 2000). When acquiring assets, investors aim at fund performance through timing and selection. Applying this portfolio theory, attention must be paid to the holding period of assets and the investment horizon. Literature on investors holding periods suggest high transaction costs are associated with longer holding periods (Collett, 2000). Volatility of returns is associated with
quick responses and shorter holding periods. The high transaction costs of real estate trading and perceived illiquidity lead to longer expected holding periods. Research into depreciation and obsolescence might suggest an optimal holing period for residential real estate exists. However empirical evidence for this was not found during this research.

**Defining the holding period**

A research into the average holding period of real estate in the UK was done in the year 2000. The Investment Property Databank was used to investigate sales rates and holding periods for UK institutional real estate between 1981 and 1994. The results ranged between 8 and 12 years (Collett, 2000). Another research from 2005 suggest a relationship between mortgage financing practices and the optimal holding period. Real estate investments are characterized by the usage of leverage and long loan amortizing periods. “ In perfect capital markets, leverage has no impact on the investment decision aside from tax considerations. However, the mortgage financing market is quite far from perfect in many countries” (Koh, 2005). The research by Winston Koh presents complicated formulae for the optimal holding period, which exists due to market imperfections. Some general conclusions on basis of this research are; “ A minimum level of financial leverage is often necessary if a real estate investment is to produce a rate of return greater than the required rate. As the mortgage loan is amortized, the leveraged rate of return on equity falls, so that the optimal time to exit the real estate investment is when the leveraged rate of return falls below the required rate of return. If refinancing of outstanding loan is available, an alternative to selling the property is to refinance “. (Koh, 2005)

This is translated into the following numerical results: As the net return rate increases from 5% to 9%, the optimal holding period increases sharply from about 3 years to almost 19 years, for a loan tenure of 25 years. Variations in the mortgage interest rate appear to have the least effect on the optimal holding period. A four percentage point difference in the mortgage rate (from 4.5% to 8.5%) reduces the optimal holding period from 15.48 years to 12.85 years, a difference of only 2.63 years.

Combining the results of both researches, it become clear the tenure of the loan is often assumed to be longer than the holding period. The holding period of real estate investments vary, on average, between 8 and 12 years according to David Collet. Winston Koh claims the holding period should be determined by the mortgage financing and net return rate.

**Conclusion**

The input value for the holding period and the loan tenure are related in the model. The default holding period is 10 years.

**10. LTV/leverage**

Debt is often used to finance real estate to create leverage. Positive leverage increases return on equity when the interest on debt is lower than the expected return on the investment. The loan to value ratio (LTV) can be increased to boost the returns, however higher LTV’s are more risky. That is why the LTV has been lowered since the financial crisis from 90%-120% to 40%-60% (see paragraph 10.4) The models default setting is a LTV of 60%.
11. Reversion cash flows

The reversion value, which is the resale value at a future point in time minus selling expenses, is one of the most important values in the valuation of real estate according to the DCF method. According to Geltner the reversion value accounts for one third of the present value of the property in a typical 10 year DCF valuation. The most commonly used method of forecasting the resale value of the property is to apply the direct capitalisation method; dividing the net operating income from ‘one year after the planned sale, by the reversion cap-rate, also known as the exit yield. No capital improvement expenditures are included in the model, therefore economical en functional deterioration caused by the aging of the building must be expressed in the resale value. To account for this loss in value, the exit yield is usually higher than the going-in cap rate, which results in a resale value lower than the initial purchase price (Aalbers, 2013). In the re-development model, the exit yield is always higher than the IRR applied during the operating period.

However, this assumption of deterioration does not always hold. The prevailing cap rates at the time of resale will depend on the nature of the market at the time of sale.

Theory on the exit yield

A thesis written by Brons, published in 2012, proves that the realized exit yields rates are not always higher than going-in cap rates in commercial real estate investments in the Netherlands over 3 periods of time. An analysis of the cap rate, forecasted exit yield and actual yields at the end of the holding period of 10 years between 1998-2008, 1999-2009 and 2000-2010, shows a lower exit yield than the cap rate in all periods. According to Brons, the exit yield should be based on four major components: interest rate, risk factor, inflation and growth expectations and several sub-components (Aalbers, 2013). The values of some components follow cycles and can therefore be forecasted. Others are subject to the residential investment market and are harder to predict (Smulders, 2013). The following figure represents the composition of the exit yield according to Brons.

![Yield Components Diagram]

Figure 59 Yield Components, source Aalbers 2013

The exit yield from a financers point of view

During the interview with Pieter Zwart from the FGH bank, the exit yield was discussed. He explained the following: When lenders determine the financial feasibility of a project, they make an estimation of the reversion value of the collateral. This reversion value is based on an exit yield which is...
determined by the properties prospects. FGH bank especially looks at property risks when determining the exit value. These risks are associated with the described selection criteria; let ability, location, adaptability, flexibility, alternative functions, energy labels and marketability. FGH bank makes forecasts and scenario’s and calculates the investments costs for re-using and revitalizing the property in the future. These costs are subtracted from the reversion value. Especially for older buildings, energy labels are specifically important. The determination of the exit yield is influenced by property specific risks and should therefore be determined per property.

Conclusion
The exit yield is dependent on many property specific characteristics and market developments. It should therefore be determined on a project level. However, it is not possible to perform an extensive market analysis on each of the case studies, on which the exit yield should be based. Therefore the rule of thumb, suggested by the project developer Vambersky, is used in the model. *This rule of thumb adds 0.1% for each year of the holding period to the going-in cap rate to estimate the exit yield.*

12.4 The bid

- Worst, base, best case. Risk and general conditions

When the initiator wants to buy the property, this usually happens through a bidding or tender. During this research an interview with Roderik Mackay was conducted. The bidding procedure in this paragraph is based on that interview.

It is assumed most parties work with worst, base and best case scenario’s to handle uncertainties of value estimates. Depending on the parties strategy, they will base their number on the results of the worst, base and best case estimates. As explained by Mackay, it can be assumed that higher biddings come with more conditions. This can be explained by the risk and return principle. The riskier an investment is, the higher the required return. The buyers conditions are meant to provide loopholes to withdraw from the acquisition when circumstances turn unfavourable. They therefore reduce the buyers risk and subsequently his return. This return is reduced by the higher purchase price. An example of a condition in re-development projects is: When the zoning plan revision is not approved, the buying party has the opportunity to reconsider his acquisition of the property.
12.5 The variables included in the re-development valuation model

Overview variables included in the valuation model

- Zoning plan
- Environmental permit
- LFA/GFA
- Construction costs
- Construction costs increase
- Construction mortgage interest rate
- Additional costs
- Risk and return
- Risk-free rate
- Inflation
- Phasing
- Acquisition costs
- LTV
- Rent level
- Marketing
- Cap rate
- Nominal annual rent increase
- Inflation
- Exit yield
- Repairs and Property maintenance
- Amortization period
- Loan tenure
- Mortgage interest rate
- Mortgage amortization rate
- Turn over rate
- Land lease (optional)
- Other income (often parking)
- LTV
- Sales proceeds
- Initial vacancy
- Value added tax
- Transfers tax

Figure 60 List of variables included in the re-development valuation model, A.D. Mensing
13 Model results

"It’s not hard to make decisions, when you know what your values are”, this quote from Roy Disney is the motto that was chosen for this research. This chapter presents the result of this research: the valuation model. The methods which underlay the model are based on both literature studies and empirical studies presented in the preceding chapters. The model is aimed at providing insight into the financial feasibility of a project by calculating the most likely re-development value and the development profit. Only the results which are of most interest to the initiating party are presented in this chapter. The underlying formula’s, accompanying tables and a blank explanatory model are included in the appendices.

The valuation model is applied to 5 case studies and performs a thorough financial analysis. Most of the case study information was gathered during 4 interviews and some was publically available on websites. The detailed information which was needed for the analyses can be sensitive to clients and competition. Many sources asked for the projects to remain anonymous. Therefore details about the owner, developer, client and precise location are not always included in this report.

13.1 Introduction of case studies

This chapter starts with a short introduction of each case study which will explain: How far the project has progressed, who has previously owned it and who will buy it after transformation, in what kind of market it is located and what the initiators motivation was to take on the project.

Case study 1

Case study 1, located in Amsterdam, is a transformation project initiated by Syntrus Achmea. The property, leased by Syntrus, was part of an office fund, owned by both Syntrus and the pension fund MetalEktro PME. Due to downsizements Syntrus had to rethink their corporate real estate strategy. Syntrus occupied several properties spread over the Netherlands but needed to both shrink and centralize. Case study 1 stood out because it was relatively new, located in a residential area and had a residential appearance. While this property still met all the requirements of a modern office and was considered well-functioning, it was decided to transform it because of its ‘residential character’ and location. Syntrus Achmea initiated the process in 2011 and acted as the developer through their ‘real estate development’ department. The transformation is almost completed and the ownership of the property will remain shared between Syntrus and PME in the Achmea Dutch Residential Fund. The properties book value is unknown. Evert Meijer, who was interviewed on this project stated the decision of the transformation was based on the transformation potential of the property compared to the other properties occupied by Syntrus, like the property on the monofunctional office location near the train station Sloterdijk. Case study 1 could have functioned as an office property for some remaining years, but this would have caused vacancy on location less suitable for transformation. On basis of the interview, it is assumed no debt was needed to finance the project therefore debt service payments are not included in the model. In addition, no developers profit reservation is included because Syntrus performed the transformation themselves. In this particular case, the focus is on the property value after transformation. Syntrus does not pay acquisition costs, but wants to achieve a property value close to or higher than the current book value. Monte Carlo simulations are used to estimate the probability of reaching the required value.
The actual book value of the property was not revealed by Syntrus. However, the aim is to achieve a residual value as high as possible.

<table>
<thead>
<tr>
<th>Location</th>
<th>Amsterdam</th>
<th>Re-used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction year</td>
<td>2002</td>
<td>Concrete main construction</td>
</tr>
<tr>
<td>Transformation initiative</td>
<td>2011</td>
<td>Entrance hall</td>
</tr>
<tr>
<td>GFA office</td>
<td>22.000 m2</td>
<td>Façade</td>
</tr>
<tr>
<td>LFA housing</td>
<td>14.200 m2</td>
<td>2 of 4 elevators</td>
</tr>
<tr>
<td>Number of dwellings</td>
<td>185</td>
<td>Geothermal heat pump</td>
</tr>
<tr>
<td>Contractual Costs m2 GFA</td>
<td>646</td>
<td>Staircases</td>
</tr>
<tr>
<td>Additional costs</td>
<td>20%</td>
<td>Window frames/ window sill</td>
</tr>
<tr>
<td>Rent</td>
<td>1000 – 1400 € / month</td>
<td>installation</td>
</tr>
<tr>
<td>Dwelling size</td>
<td>70- 80 m2</td>
<td></td>
</tr>
<tr>
<td>Additional parking spots</td>
<td>49</td>
<td></td>
</tr>
</tbody>
</table>

**Case study 2**

The private investor X is planning the transformation of an office located in The Hague. The old office in being transformed into a luxury apartment building of which the design is made by a well-known architectural firm. The municipality of The Hague has just approved the initiators plans but the construction will not start until January 2015 because the building is still partly leased. The property, which is themed “living at the park” is located in a green and residential area. The private investor thinks there is a demand for luxury ‘one-level’ apartments in this part of The Hague, for so called ‘empty-nesters’, elderly and expats. In the old office building 7 penthouses will be constructed, either overlooking the park and estate, or looking out at sea. These will be priced at 1 million euros for 240 square meters. The existing parking deck will be turned into a park. Parking facilities for residents will be underground. The property will include a small gym and café. In addition, a new build volume will be added. The volume, originally placed perpendicular and attached to the bigger office volume, will be demolished. A smaller volume, will be constructed on the far end of its foundation, creating a visual connection with the estate which lies beyond. The property will not be sold in one piece after completion. Investor X is planning of keeping 33% of the property to rent out themselves and 33% to sell individually to consumers. These percentages are however not definitive and will remain flexible according to market demand. Investor X uses equity to finance this project and is expecting a return of 30%. The big difference between GFA and LFA is again caused by unlettable archives in the basement and storage space.

<table>
<thead>
<tr>
<th>Location</th>
<th>The Hague</th>
<th>Re-used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction year</td>
<td>1980</td>
<td>Concrete main structure</td>
</tr>
<tr>
<td>Transformation initiative</td>
<td>2012</td>
<td></td>
</tr>
<tr>
<td>GFA office</td>
<td>51.000 m2</td>
<td>Additions to the structure</td>
</tr>
<tr>
<td>LFA housing</td>
<td>31.500 m2</td>
<td>Balconies</td>
</tr>
<tr>
<td>Number of dwellings</td>
<td>240</td>
<td>Additions</td>
</tr>
<tr>
<td>Costs m2 GFA</td>
<td>750</td>
<td>New build volume of 40 dwellings</td>
</tr>
<tr>
<td>Additional costs</td>
<td>25%</td>
<td>Underground parking garage</td>
</tr>
<tr>
<td>Monthly rent</td>
<td>840 – 2500</td>
<td></td>
</tr>
<tr>
<td>Sale proceeds m2 LFA</td>
<td>3599 – 3750</td>
<td>Estimated book value: 20 – 25 million</td>
</tr>
</tbody>
</table>
Case study 3

Private investor X is making plans to transform one of their properties, case study 3. This building, located in the Hague, is a former office building. The entire property includes the office tower, a shopping mall with little vacancy and an apartment building. The office tower was occupied by a municipal department, but the lease was ended two years ago. During the interview conducted for this research, the initiator explained; the worsening office market of The Hague meant the property had lost its functionality. It had been vacant for some time, which had a negative effect on the surroundings. Investor X, who is also the owner of the shopping mall and adjacent apartment building, has an interest in the vitality of the area. Therefore the decision was made to transform the office tower into a residential building. The location of the property is suitable for dwellings because it is located in a residential area very close to several facilities. As was pointed out during the interview, the efficient rectangular shape of the property made the volume easy to adjust to its new function. However, to optimise the volume, it was decided to replace the buildings core, which provided stability, with a new more efficient core. The stability elements were placed outwards, perpendicular to the façade. The ground floor of the tower will retain its retail function. The first and second floor will stay office space and the remaining floors will become apartments. The transformation of offices into housing, will mean the necessity for extra parking spots, especially on Saturdays. Therefore Investor X acquired additional land to realise these parking spots. The book value of the property is unknown. It was bought in a portfolio some years ago. As was explained in the interview, the existing demand on the housing market and the vitality of the area which is of interest to the initiator, lead to the decision. In addition, the initiator explained during the interview he estimated the property to be worth less than 10 million euros in its current condition. He expect the property to be worth much more after its transformation. The residual value of only the residential part will be estimated in this case study. The rent levels of the retail and offices as well as the construction costs remains unknown. The rent and sale of the additional parking places could be counted as extra income, however since the acquisition costs of the extra land are unknown too, extra income will be disregarded in this analysis.
The transformation of the Brinkwal is a small scale transformation project, executed by the developing housing corporation ‘Jutphaas wonen’ and TransVorm. In April 2014, the transformation of the 25 dwellings was completed and the tenants took their residence.

This influenced the certainty level of various value estimates. The property is located in Nieuwegein and is intended for young professionals in a lower income bracket than the previously analysed projects. The relatively small organisation owns around 1850 dwellings and could be considered a transparent organisation since they were willing to provide all the necessary information for the financial analysis. The design of the Brinkwal project was executed by A3 architects who mainly used pre-fab products. The concepts was to develop a dwelling type from pre-fab elements which could easily be assembled according to the residents preferences. The project was included in this research because of its small scale and unusual target group. “Small batch” developments are assumed to be less risky since the marketing is easier and the investment smaller. The low rent levels suggest low construction costs. However they are not very low in comparison to the other projects. In addition, sustainability played an important role in the design of the building. The re-use of the existing structure and the efficient use of energy throughout the property contributed to this goal. The numbers presented in this analysis were provided by Jutphaas and represent the actual costs and income of this project.
<table>
<thead>
<tr>
<th></th>
<th>GFA housing</th>
<th>Façade</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFA housing</td>
<td>1445 m²</td>
<td>Window frames/ window sill</td>
</tr>
<tr>
<td>Costs m² GFA</td>
<td>700 euro/m²</td>
<td></td>
</tr>
<tr>
<td>Rent</td>
<td>575 € / month</td>
<td></td>
</tr>
<tr>
<td>Dwelling size</td>
<td>60 m²</td>
<td></td>
</tr>
</tbody>
</table>

**Case study 5: Einsteinbaan**

![Photo case study 5, Jutphaas wonen 2013](image)

The developing housing corporation Jutphaas, is transforming a vacant office building located at the Einsteinbaan in Nieuwegein into 50 dwellings. The construction just started, which influences the certainty of several value estimates. The apartments are in a low rental segment and meant for starters and young families. Some dwellings will even be ground bound with a little garden. The future residents of this property worked in close collaboration with the corporation to adjust the dwellings to their preferences. The floor plans are very flexible and can therefore easily be adjusted to future preferences. Sustainability played a big part in this re-development project. Extra attention was paid to energy consumption.

<table>
<thead>
<tr>
<th>Location</th>
<th>Nieuwegein</th>
<th>Reused</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformation initiative</td>
<td>2012</td>
<td>Concrete structure</td>
</tr>
<tr>
<td>Planned Completion</td>
<td>2014</td>
<td>Façade partial</td>
</tr>
<tr>
<td>Number of dwellings</td>
<td>50</td>
<td>Elevators</td>
</tr>
<tr>
<td>Dwelling size</td>
<td>55 – 60 m²</td>
<td>Extensions</td>
</tr>
<tr>
<td>LFA housing</td>
<td>2905 m²</td>
<td>Balconies</td>
</tr>
<tr>
<td>GFA office</td>
<td>4333 m²</td>
<td>Gardens / public terrain</td>
</tr>
<tr>
<td>Rent</td>
<td>560 € / month</td>
<td>Sustainable Installations</td>
</tr>
</tbody>
</table>

**13.2 Matrix**

This paragraph presents a matrix in which the *Monte Carlo simulated variables* and their corresponding values are presented. Through expert interviews and ‘public information sources’ the values used in these case studies have been collected. Since many parties work with static value estimates, ranges were not always provided for all variables during all interviews. To deal with this data gap, ranges were estimated on the basis of other cases studies and the projects progression. When the value is based on such an estimates or assumption, the letter “E” will be places behind the value.
R = range. The range represent the minimum and maximum value of the variable.
A = accent. The accent represent the expected value or the static value provided per case.
CL = certainty level. The certainty level represent the certainty of the accent value. It defines the spread around the accent value. A high certainty level means a smaller spread around the accent value.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Case study 1</th>
<th>Case study 2</th>
<th>Case study 3</th>
<th>Case study 4</th>
<th>Case study 5</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFA/ GRA</td>
<td>R: 55%-70% E</td>
<td>R: 55%-65% E</td>
<td>R: 75% – 80 E</td>
<td>R: 70%-80% E</td>
<td>R: 60% - 70%</td>
<td>12.3.1</td>
</tr>
<tr>
<td>A: 65%</td>
<td>A: 60%</td>
<td>A: 79 %</td>
<td>A: 79 %</td>
<td>A: 66%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL: 5</td>
<td>CL: 3</td>
<td>CL: 4</td>
<td>CL: 5</td>
<td>CL: 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction costs €/m2/GFA</td>
<td>R: 790 – 900</td>
<td>R: 680-800</td>
<td>R 640 - 700</td>
<td>R: 680-750</td>
<td>R: 600 – 650</td>
<td>12.3.2.2</td>
</tr>
<tr>
<td>CL: 3</td>
<td>CL: 2</td>
<td>CL: 2</td>
<td>CL: 5</td>
<td>CL: 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual construction costs increase</td>
<td>R: 2% - 3.5%</td>
<td>R: 2% - 3.5%</td>
<td>R: 2% - 3.5%</td>
<td>R: 2% - 3.5%</td>
<td>R: 2% - 3.5%</td>
<td>12.3.2.2</td>
</tr>
<tr>
<td>A: 2.25%</td>
<td>A: 3.25</td>
<td>A: 3.25</td>
<td>A: 2.25%</td>
<td>A: 2.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL: 5</td>
<td>CL: 2</td>
<td>CL: 2</td>
<td>CL: 5</td>
<td>CL: 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional cost (% of construction costs)</td>
<td>R: 15% - 25%</td>
<td>R: 15% - 25%</td>
<td>R: 15% - 25%</td>
<td>R: 15%-25%</td>
<td>R:15%-25%</td>
<td>12.3.2.3</td>
</tr>
<tr>
<td>A: 20%</td>
<td>A: 25%</td>
<td>A: 17%</td>
<td>A: 17%</td>
<td>A: 23%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL: 4</td>
<td>CL: 2</td>
<td>CL: 2</td>
<td>CL: 5</td>
<td>CL: 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rent €/m2/LFA/month</td>
<td>R: 12 – 14</td>
<td>R: 12 -15</td>
<td>R: 9 -12</td>
<td>R: 9.0 - 10</td>
<td>R: 9 - 11</td>
<td>12.3.3.1</td>
</tr>
<tr>
<td>A: 12.5 13.5 E</td>
<td>A: 12-14 E</td>
<td>A: 10, 10.50</td>
<td>A: 9.60</td>
<td>A: 9.33, 10.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL: 2</td>
<td>CL: 1</td>
<td>CL: 1</td>
<td>CL: 4</td>
<td>CL: 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sale proceeds €/m2/LFA</td>
<td>X</td>
<td>R: 3500 – 4000 E</td>
<td>R: 2150 –  2500 E</td>
<td>R: 1370 – 1400 E</td>
<td>-</td>
<td>12.3.3.1</td>
</tr>
<tr>
<td>X</td>
<td>A: 3674</td>
<td>A: 2200</td>
<td>A: 1382</td>
<td>-</td>
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<td></td>
</tr>
<tr>
<td>Nominal annual rent increase (%)</td>
<td>R: 2.5-5</td>
<td>R: 2.5 – 5</td>
<td>R: 2 – 5</td>
<td>* inflation</td>
<td>* inflation</td>
<td>12.3.3.2</td>
</tr>
<tr>
<td>A: 3%</td>
<td>A: 2.75%</td>
<td>A: 2.5%</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL: 3</td>
<td>CL: 2</td>
<td>CL: 2</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rent parking place</td>
<td>R: 180-240 E</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>12.3.3.3</td>
</tr>
<tr>
<td>A: 200</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>CL: 4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>* Initial vacancy at completion</td>
<td>R: 5%-25%</td>
<td>R: 5%-25%</td>
<td>R: 5%-25%</td>
<td>R: 5%-25%</td>
<td>R:5%-25%</td>
<td>12.3.3.4</td>
</tr>
<tr>
<td>A: 10%</td>
<td>A: 20%</td>
<td>A: 20%</td>
<td>A: 5%</td>
<td>A: 5%</td>
<td>A: 5%</td>
<td></td>
</tr>
<tr>
<td>CL: 4</td>
<td>CL: 1</td>
<td>CL: 1</td>
<td>CL: 5</td>
<td>CL: 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>** Number of mutations</td>
<td>R: 5% - 20% E</td>
<td>R: 5% - 30% E</td>
<td>R: 5% - 20% E</td>
<td>R: 5%-20% E</td>
<td>R: 5%-20% E</td>
<td>12.3.3.5</td>
</tr>
<tr>
<td>A: 10%</td>
<td>A: 20%</td>
<td>A: 10%</td>
<td>A: 7%</td>
<td>A: 7%</td>
<td>A: 7%</td>
<td></td>
</tr>
<tr>
<td>** Vacancy duration after mutation</td>
<td>R: 8% - 16%</td>
<td>R: 8% - 16%</td>
<td>R: 8% - 16%</td>
<td>R: 8% - 16%</td>
<td>R: 8% - 16%</td>
<td>12.3.3.5</td>
</tr>
<tr>
<td>A: 10%</td>
<td>A: 14%</td>
<td>A: 12%</td>
<td>A: 12 %</td>
<td>A: 12 %</td>
<td>A: 12 %</td>
<td></td>
</tr>
<tr>
<td>CL: 3</td>
<td>CL: 3 C</td>
<td>CL: 2 E</td>
<td>CL: 3 E</td>
<td>CL: 3 E</td>
<td>CL: 3 E</td>
<td></td>
</tr>
<tr>
<td>Interest on construction loan (%)</td>
<td>R: 2.7 – 3.95</td>
<td>R: 2.7 – 3.95</td>
<td>R: 2.7 –3.95</td>
<td>R: 2.7 –3.95</td>
<td>R: 2.7 – 3.95</td>
<td>12.3.2.4</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
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<tr>
<td>CL: 1</td>
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<td>CL: 1</td>
<td>CL: 1</td>
<td>CL: 1</td>
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<td></td>
</tr>
<tr>
<td>**** Inflation (%)</td>
<td>A: 1.5 %- 2.5%</td>
<td>R: 1.5 – 2.5</td>
<td>R: 1.5 – 2.5</td>
<td>R: 1.5 – 2.5</td>
<td>R: 1.5 – 2.5</td>
<td>12.3.2.4</td>
</tr>
<tr>
<td>A: 2 %</td>
<td>A: 2 %</td>
<td>A: 2 %</td>
<td>A: 2 %</td>
<td>A: 2 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL: 1</td>
<td>CL: 1</td>
<td>CL: 1</td>
<td>CL: 1</td>
<td>CL: 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk-free rate</td>
<td>A: 1.685%</td>
<td>A: 1.68%</td>
<td>A: 1.68%</td>
<td>A: 1.68%</td>
<td>A: 1.68%</td>
<td>8.3</td>
</tr>
<tr>
<td>A: 1.68%</td>
<td>A: 1.68%</td>
<td>A: 1.68%</td>
<td>A: 1.68%</td>
<td>A: 1.68%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL: 1</td>
<td>CL: 1</td>
<td>CL: 1</td>
<td>CL: 1</td>
<td>CL: 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Variable Case study 1 Case study 2 Case study 3 Case study 4 Case study 5 Chapter
** Exit yield (simulation + IRR)

- **^ Exit yield: R: 1% – 3% E, A: 0.1%, CL: 1
- **^^ Exit yield: R: 1.5% – 3% E, A: 2.5%, CL: 2

---

** Cap rate

- **^ Cap rate: R: 5 – 6.5 E, A: 5.25%, CL: 2
- **^^ Cap rate: R: 4.75 – 5.25, A: 5, CL: 4

---

** Property maintenance

- **^ Property maintenance: R: 5% - 10%, A: 5.5%, CL: 1
- **^^ Property maintenance: R: 5% - 10%, A: 5.25%, CL: 2

---

** Permanent mortgage interest rate

- **^ Permanent mortgage interest rate: R: 2% - 4%, A: 2.5%, CL: 1
- **^^ Permanent mortgage interest rate: R: 1% - 1.5%, A: 1.25%, CL: 1

---

** LTV (return on property calculation)

- **^ LTV: 60%

---

** LTV (leveraged return calculation)

- **^^ LTV: 60%

---

** Case 1: Strong demand for housing in Amsterdam, so low vacancy and high confidence. Case 2: According to initiator strong demand for housing, so high confidence level. But higher initial vacancy than in Amsterdam.

** Case 4: Housing corporations usually have waiting lists resulting in a very low initial vacancy rate. Since case 4 has been completed, the confidence level is very high. Case 5: Property owned by a housing corporation and strong involvement of future tenant results in a low initial vacancy rate and high confidence level.

** It is assumed the number of mutations will be high in case 2, since expats form one of the main target groups.

**^ It is assumed that the vacancy duration after a mutation is low in areas with a strong demand for housing (case 1) and for projects owned by housing corporations due to long waiting lists. However, due to expected renovations after a mutation in a ‘social housing dwelling’, the duration is not assumed lowest in the range.

**^^ The European Central Bank aims at keeping the inflation rate stable at max. 2%, hence A:2%. Over the past years however the inflation has fluctuated between 1.5 and 2.5%. Inflation is difficult to predict therefore the lowest confidence level is used.

***** The properties in Case studies 1 to 3 are thoroughly renovated. Therefore it is expected the R&M costs will lie in the lower part of the range during the holding period. It is assumed housing corporations have smaller budget for R&M than commercial development due to low rent levels. The range and accent of case study 4 and 5 are therefore adjusted to this assumption.

**^ The range of the permanent mortgage interest rate is based on current offerings by commercial loan providers and was confirmed by Pieter Zwart from the FGH bank. He also states interest rates are currently low, therefore the accent lies on the lower part of the range. Since the interest rate is usually revised after a few years, probably multiple times during the holding period, it is an uncertain value estimate.

**^^ The exit yield is assumed to be higher in case study 4 and 5 since both projects are located in an area with a smaller demand for housing.
13.3 Results per case
This paragraph presents the following results per case

1. Distribution of total costs
2. Distribution of ‘Unleveraged return on property’
3. Distribution of ‘Leveraged equity return’
4. Development profit (if applicable)
5. Residual value (at completion and ‘now’)
6. Most beneficial tax scenario

<table>
<thead>
<tr>
<th>Skewness</th>
<th>Measure of symmetry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kurtosis</td>
<td>A measure of the proportion of the mass density near the mean. The higher the proportion of mass density near the mean, the higher the kurtosis, while the higher the mass density away from the mean, the lower the kurtosis</td>
</tr>
<tr>
<td>Development profit</td>
<td>When the projects acquisitions costs are known, these are subtracted from the residual value to estimate the development profit. This is the profit the initiator made on top of the required return.</td>
</tr>
<tr>
<td>Residual value</td>
<td>The residual value should be interpreted as the highest possible demand price for the vacant property at t= completion (t= 4)</td>
</tr>
<tr>
<td>PV Residual value</td>
<td>The current highest possible demand price for the vacant property (t= 0). To calculate this, the residual value at t= 4 is discounted. The discount rate used for this is (risk-free rate + inflation = 4.2%)</td>
</tr>
</tbody>
</table>
Case 1

1. Transformation costs (without profit reservation)

<table>
<thead>
<tr>
<th>Case 1 transformation costs</th>
<th>Results Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>€ 24,224,470</td>
</tr>
<tr>
<td>Number of Trials</td>
<td>1000</td>
</tr>
<tr>
<td>Standard error</td>
<td>€ 24,618</td>
</tr>
<tr>
<td>Minimum</td>
<td>€ -26,508,092</td>
</tr>
<tr>
<td>Maximum</td>
<td>€ 22,576,862</td>
</tr>
<tr>
<td>Median</td>
<td>€ 24,145,488</td>
</tr>
<tr>
<td>Range</td>
<td>€ 3,931,230</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>€ 778,488</td>
</tr>
<tr>
<td>Variance</td>
<td>€ 606,044,046,544</td>
</tr>
</tbody>
</table>

Skewness: -0.42
Kurtosis: 2.50

2. Return on property

<table>
<thead>
<tr>
<th>Case 1 Return on Property</th>
<th>Results Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>€ 41,385,781</td>
</tr>
<tr>
<td>Number of Trials</td>
<td>1000</td>
</tr>
<tr>
<td>Standard error</td>
<td>€ 64,034</td>
</tr>
<tr>
<td>Minimum</td>
<td>€ 36,360,508</td>
</tr>
<tr>
<td>Maximum</td>
<td>€ 48,593,012</td>
</tr>
<tr>
<td>Median</td>
<td>€ 41,319,102</td>
</tr>
<tr>
<td>Range</td>
<td>€ 12,232,104</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>€ 2,024,916</td>
</tr>
<tr>
<td>Variance</td>
<td>€ 4,100,367,252,439</td>
</tr>
</tbody>
</table>

Skewness: 0.24
Kurtosis: 2.79

LTV = 0%
3. Leveraged equity return

![Leveraged equity return](image)

<table>
<thead>
<tr>
<th>Case 1 leveraged equity return</th>
<th>Results Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>€ 45,349,112</td>
</tr>
<tr>
<td><strong>Number of Trials</strong></td>
<td>1000</td>
</tr>
<tr>
<td><strong>Standard error</strong></td>
<td>€ 66,756</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>€ 39,590,539</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>€ 52,785,642</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>€ 45,223,552</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>€ 13,175,103</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>€ 2,111,007</td>
</tr>
<tr>
<td><strong>Variance</strong></td>
<td>€ 4,456,350,723,996</td>
</tr>
<tr>
<td><strong>Skewness</strong></td>
<td>0.24</td>
</tr>
<tr>
<td><strong>Kurtosis</strong></td>
<td>2.94</td>
</tr>
</tbody>
</table>

LTV = 60%

4. Residual value

This property was part of a portfolio prior to transformation and will remain with the same owner after completion. The difference between the properties book value and residual value, therefore represent the loss (or profit) the owner has made. Considering this property was a quite new and functional office building, the residual value of 10.03 million euros will probably not exceed the current book value. Since the book value remains unknown, this however is just speculation. The aim of this transformation was not to make a profit, but to prevent vacancy in properties elsewhere.

| Residual value (Before tax) | € 17.12 million |
| Residual value (after tax at completion t=4) | € 12.07 million |
| Range | € 1.92 million | € 12.07 million |
| PV Residual value (at t = 0 ) | € 10.03 million |

5. Taxation scenario

Most beneficial tax scenario: This property is being transformed by the original owner, therefore scenario 3 applies. When the property will change funds, from the office fund to the residential fund, which results in a transfer of ownership, the “existing structure” results in the highest residual value.
Case 2

1 Transformation costs (without profit reservation)

![Transformation costs chart]

<table>
<thead>
<tr>
<th>Case 2 total transformation costs</th>
<th>Results Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>€ -49,888,330</td>
</tr>
<tr>
<td><strong>Number of Trials</strong></td>
<td>5000</td>
</tr>
<tr>
<td><strong>Standard error</strong></td>
<td>€ 19,757</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>€ -55,291,949</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>€ -45,583,353</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>€ -49,725,799</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>€ 9,706,596</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>€ 1,397,004</td>
</tr>
<tr>
<td><strong>Variance</strong></td>
<td>€ 1,951,619,373,661</td>
</tr>
<tr>
<td><strong>Skewness</strong></td>
<td>-0.51</td>
</tr>
<tr>
<td><strong>Kurtosis</strong></td>
<td>3.03</td>
</tr>
</tbody>
</table>

2. Return on property

![Unleveraged return on property chart]

<table>
<thead>
<tr>
<th>Case study 2 Unleveraged return on property</th>
<th>Results Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>€ 83,966,358</td>
</tr>
<tr>
<td><strong>Number of Trials</strong></td>
<td>5000</td>
</tr>
<tr>
<td><strong>Standard error</strong></td>
<td>€ 64,158</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>€ 70,702,236</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>€ 100,679,329</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>€ 83,857,592</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>€ 29,977,094</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>€ 4,516,632</td>
</tr>
<tr>
<td><strong>Variance</strong></td>
<td>€ 20,581,026,884,706</td>
</tr>
<tr>
<td><strong>Skewness</strong></td>
<td>0.15</td>
</tr>
<tr>
<td><strong>Kurtosis</strong></td>
<td>2.81</td>
</tr>
</tbody>
</table>

LTV = 0%
3. Leveraged equity return

Since the acquisition costs are known, the model can calculate both the development profit as well as the residual value. In scenario 2, transformation costs without a developer's profit reservation are included because of the nature of the initiator of this project. The initiator stated they work with a measure of return on equity invested and to not make an profit reservation in the construction costs. The return on investment, achieved with the taxation and ownership scenario closest to what actually happened, is 9.4 million euros (at completion). Because the total investment (acquisition costs of 13.5 million and transformation costs including tax) are estimated at t=completion, this results in a return of 12.6% (at completion). The initiator wanted to achieve a return on equity of 30%, however this number does not coincide with the calculations of the model. A reason for this could be that the initiator included the achieved required return in this calculation. In addition remaining rental income during the preparation time could have caused a higher income.

<table>
<thead>
<tr>
<th>Development profit (before tax)</th>
<th>€ 14.10 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development profit (after tax, most beneficial scenario)</td>
<td>€ 10.07 million</td>
</tr>
<tr>
<td>Development profit (what actually happened)</td>
<td>€ 9.40 million</td>
</tr>
<tr>
<td>Range</td>
<td>€ 1.58 million to € 10.07 million</td>
</tr>
<tr>
<td>Purchase price (t = 0)</td>
<td>€ 9,900,000</td>
</tr>
<tr>
<td>Purchase price (t=completion)</td>
<td>€ 13,423,390</td>
</tr>
<tr>
<td>Residual value (before tax, t =completion)</td>
<td>€34.08 million</td>
</tr>
<tr>
<td>Residual value (after tax, t = completion)</td>
<td>€ 24,042,148</td>
</tr>
<tr>
<td>PV Residual value (t = 0)</td>
<td>€ 19,978,760</td>
</tr>
</tbody>
</table>

4. Residual value

Since the acquisition costs are known, the model can calculate both the development profit as well as the residual value. In scenario 2, transformation costs without a developer's profit reservation are included because of the nature of the initiator of this project. The initiator stated they work with a measure of return on equity invested and to not make an profit reservation in the construction costs. The return on investment, achieved with the taxation and ownership scenario closest to what actually happened, is 9.4 million euros (at completion). Because the total investment (acquisition costs of 13.5 million and transformation costs including tax) are estimated at t=completion, this results in a return of 12.6% (at completion). The initiator wanted to achieve a return on equity of 30%, however this number does not coincide with the calculations of the model. A reason for this could be that the initiator included the achieved required return in this calculation. In addition remaining rental income during the preparation time could have caused a higher income.
5. Taxation scenario

In case 2, a private investor who acted as a developer bought the property for 9.9 million euros are $t=0$. The acquisition costs are based on the future value of $t=\text{completion}$. If the developing party sells the property after completion, the most beneficial is an “existing structure”, which results in a return of 8.6 million. If the developing party was to keep the property after completion, an higher return of 9.3 to 10.0 million could be achieved with both a fiscally new and existing structure.

Case 3

1 Transformation costs
2. Return on property

<table>
<thead>
<tr>
<th>Case 3 Unleveraged return on property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results Summary</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Number of Trials</td>
</tr>
<tr>
<td>Standard error</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Variance</td>
</tr>
<tr>
<td>Skewness</td>
</tr>
<tr>
<td>Kurtosis</td>
</tr>
</tbody>
</table>

3. Leveraged equity return

<table>
<thead>
<tr>
<th>Case 3 Leveraged equity return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results Summary</td>
</tr>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Number of Trials</td>
</tr>
<tr>
<td>Standard error</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Variance</td>
</tr>
<tr>
<td>Skewness</td>
</tr>
<tr>
<td>Kurtosis</td>
</tr>
</tbody>
</table>

4. Residual value

| Residual value (before tax, t=completion) | € 14.08 |
| Range                                    | € 4.45 million | € 11.66 million |
| Residual value (after tax, t = completion) | € 11.66 million |
| PV Residual value ( t = 0)               | € 9.678.187 |

5. Taxation scenario

The initiator of this project was the owner of the property. He will remain owner of the property after transformation and it will not change funds. Because the owner will remain owner, he cannot deduct VAT on the transformation costs and no transfer of ownership will take place. This means if the project will achieve the same residual value for both ‘new build’ and as an “existing structure”. It must however be noted that if the property becomes ‘new build’ the owner cannot sell the property within 2 years, or the return on property will be reduced by 21% VAT.
Case 4

1. Transformation costs

![Transformation costs](image)

LTV = 0%

2. Unleveraged return on property

![Unleveraged return on property](image)
4. Residual value

Because the acquisition costs are known, both the residual value as the development profit can be estimated. The property was bought by the initiator before the start of construction for 900,000 euros. The initiator acted both as investor and as developer, so no profit reservation is included in the transformation costs. The project was executed by a non-commercial party. While achieving the required return, stored in the IRR, the party still managed to make a profit of 117,714 euros. This does not seem much, however it is still a return on investment of 3.6%.

<table>
<thead>
<tr>
<th>Return on investment (before tax)</th>
<th>€ 547,288</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on investment (after tax, most beneficial)</td>
<td>€ 181,821</td>
</tr>
<tr>
<td>Return on investment (what actually happened)</td>
<td>€ 117,714</td>
</tr>
<tr>
<td>Range</td>
<td>-€ 745,074</td>
</tr>
<tr>
<td>Purchase price (t=0)</td>
<td>€ 900,000</td>
</tr>
<tr>
<td>Purchase price (t = completion)</td>
<td>€ 1,069,430</td>
</tr>
<tr>
<td>Residual value (before tax, t = completion)</td>
<td>€ 1,616,718</td>
</tr>
<tr>
<td>Residual value (t = completion)</td>
<td>€ 1,250,283</td>
</tr>
<tr>
<td>PV Residual value ( t = 0)</td>
<td>€ 1,038,971</td>
</tr>
</tbody>
</table>

5. Taxation scenario

In this case, a negative return would be achieved if the initiating party was to sell the property after completion while being “new build”. This is relevant since the property will be partly sold and partly rented out.
Case 5

1. Transformation costs

![Transformation costs](image1)

**Case 5 Transformation costs**

**Results Summary**

- **Mean**: € -3,607,270
- **Number of Trials**: 5000
- **Standard error**: € 1,048
- **Minimum**: € -3,873,297
- **Maximum**: € -3,378,319
- **Median**: € -3,603,348
- **Range**: € 494,578
- **Variance**: € 5,491,671,641
- **Skewness**: -0.16
- **Kurtosis**: 2.75

![Unleveraged return on property](image2)

**Case 5 Unleveraged return on property**

**Results Summary**

- **Mean**: € 6,314,074
- **Number of Trials**: 5000
- **Standard error**: € 4,482
- **Minimum**: € 5,396,404
- **Maximum**: € 7,610,320
- **Median**: € 6,292,597
- **Range**: € 2,213,916
- **Variance**: € 100,441,908,384
- **Skewness**: 0.37
- **Kurtosis**: 3.16
4. Residual value
This project was initiated by a non-commercial party. The project has a positive NPV with the required return, meaning the project can be considered financially feasible. In addition the purchase price lies below the residual value, meaning the initiator did not overpay.

<table>
<thead>
<tr>
<th>Development profit (before tax, ( t = \text{completion} ))</th>
<th>€ 1,034,017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development profit (after tax, most beneficial)</td>
<td>€ 269,611</td>
</tr>
<tr>
<td>Development profit (after tax, what actually happened)</td>
<td>€ 148,722</td>
</tr>
<tr>
<td>Range</td>
<td>-€ 297,624</td>
</tr>
<tr>
<td>Purchase price (( t=0 ))</td>
<td>€ 1,350,000</td>
</tr>
<tr>
<td>Purchase price (( t=\text{completion} ))</td>
<td>€ 1,672,787</td>
</tr>
<tr>
<td>Residual value (( t = \text{completion} ))</td>
<td>€ 1,854,964</td>
</tr>
<tr>
<td>PV Residual value (( t = 0 ))</td>
<td>€ 1,541,454</td>
</tr>
</tbody>
</table>

5. Taxation scenario
The difference between taxation due on a new build property and an “existing structure” makes the difference between a financially feasible an infeasible project. Especially with small profit margins, this difference is evident. The situation that occurred, whichs yielded €148,722 is not the most beneficial scenario. However the difference is very small. It must be noted that small differences in input values can easily result in a negative return.
13.4 An analysis of the results

The paragraph present the following analyses

6. Comparison to static DCF results
7. Sensitivity analysis
8. Probability of financial infeasibility due to
   - LFA/GFA ratio, Rent level, Cap rate, Exit yield
9. Effect of delay and on financial feasibility
10. Effect of vacancy
11. Effect of financing

6. Comparison to static DCF results

The Monte Carlo method was included in this research to overcome the pitfalls of the point-estimate DCF method as discussed in chapter 9.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Residual value (Monte Carlo)</th>
<th>Residual value (point estimate DCF)</th>
<th>Nominal difference</th>
<th>Percentage of total investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>€ 12.074.172</td>
<td>€ 14.135.396</td>
<td>€ 2.061.224</td>
<td>7.03 %</td>
</tr>
<tr>
<td>Case 2</td>
<td>€ 22.171.676</td>
<td>€ 23.849.253</td>
<td>€ 1.677.577</td>
<td>7.6%</td>
</tr>
<tr>
<td>Case 3</td>
<td>€ 11.657.419</td>
<td>€ 9.675.465</td>
<td>€ 1.981.954</td>
<td>14.2%</td>
</tr>
<tr>
<td>Case 4</td>
<td>€ 1.250.283</td>
<td>€ 1.226.726</td>
<td>€ 23.557</td>
<td>1.9%</td>
</tr>
<tr>
<td>Case 5</td>
<td>€ 1.854.964</td>
<td>€ 1.737.199</td>
<td>€ 117.765</td>
<td>6.4%</td>
</tr>
</tbody>
</table>

Conclusions from the comparison:
The difference between the DCF value estimate and the Monte Carlo method is the smallest for case study 4 and 5. This is apparent considering case study 4 is finished and case study 5 is nearly finished. In addition, rent levels and sales proceeds were predetermined for both projects because the initiator is a non-commercial party. Due to this, the uncertainty levels of the values estimates used in the model were very low, closely resembling the point estimates in DCF method. The largest differences between the Monte Carlo method and the point estimate DCF lie in case study 2 and 3. These projects are still in the initiative phase, making the value estimates uncertain. While case study 1 is nearly completed, there is still a difference between of 7% on the total investment between both.
methods. This cannot be explained by low certainty levels. What could be an explanation is the asymmetrical distribution of the value estimates. The point estimate and the distributions mean do not coincide. No generalizable conclusions can be drawn from these results. However it has been ascertained a difference exists between the models estimates and the static DCF calculations. This difference might seem small, but then these 5 project are all past the initiative phase. The construction of case studies 2 and 3 has not started yet, however definitive drawings exists as well as a construction budget. The results therefore suggest that the model will produce estimates further dispersed from the static DCF calculations as uncertainty increases. Since the model is aimed to be used during the selection of potential re-development projects, this realization might encourage initiators to use the method presented in this report instead of a static DCF model.

7. Sensitivity analyses

A sensitivity analysis establishes the effect of a change in an input value (both positive and negative), on the outcome. Two types of sensitivity analyses were executed to establish which variables are of most influence on the models outcomes.

1. The nominal difference between: the simulation average plus 10% and the simulation average minus 10%.

   The proportionate sensitivity of several outcomes (total transformation costs, return on property, leveraged equity return and residual value) was calculated with the following method: Each variable was assigned its simulation average. While all other variables remained constant, the value of the subject variable was increase with 10% and the models outcome mapped. Then the value was reduced by 10% and the outcome mapped. This was done for each variable seperately. The nominal difference between the outcomes of plus 10% and minus 10%, was mapped in a table as well. The summation of all the nominal differences together formed 100%. The proportionate influence of each variable could then be established by dividing the nominal difference by the total nominal difference and multiplying it by 100%. This way the influence of the each variable on the different outcomes was established and visually presented in a bar chart. Because the residual value is calculated with the unleveraged return on property, some variables are excluded in this analysis. The analysis gives the purest indication of the impact of an equal proportional change in the input value.

2. The second analysis is not focussed on the proportional change, but on the effect of the size of the range. Instead of plus and minus 10% of the value, the minimum and maximum value of the range of each variable was used. The sensitivity of the residual value, with different LTV ratios, is also calculated. (LTV = 0% and LTV = 60%).

The sensitivity analysis was performed on case study one. This case study was chosen because it includes an extra form of income and because in this case the residual value is not distorted by an extra development profit. In addition, this case study has a commercial goal, however the profit margin is not as extravagant as in case study 2 which makes it a more representative example. Lastly, case study 3 was part of an project which also included offices and retail which were not included in the calculations. This makes the financial feasibility results less absolute because these assets could have been included in the initiators financial feasibility analysis.
7.1 Conclusions from sensitivity analysis 1

- The annual rent level and LTV/GFA ratio have almost an equal amount of influence on the return on property. From this it can be concluded that achieving a rent level of 14.3 (instead of 13) and 66% (instead of 60%) will result in the same increase of the return on property.
- The second proportionally most influential variables are the cap rate and the inflation rate. The cap rate, which is more of a benchmark, is translated into the internal rate of return. This number represents the riskiness of the project and the appropriate return for taking this risk. The cap rate, like the inflation rate, cannot be influenced by the initiating party. However, it does point out the importance of the accuracy of the point estimate. A 10% difference in the
cap rate, say 5% or 5.5%, translates into a direct difference in return on property of \( \frac{17.47}{2} = 8.74\% \). An increase in the inflation rate of 10% (from 2% to 2.2%) results in a 3% decrease of the property return. It can therefore be advised to use value distribution instead of point value estimates for these variables.

- The construction costs per m² gross floor area is the most influential to the total transformation costs. The gross floor area which was previously included as a variable in the sensitivity analysis, cut the participation of the construction costs in half. However, since the gross floor is a static variable, it was not included in the final results.

![Figure 60 Sensitivity analysis 1c, A.D. Mensing](image)

The residual value is the combination of the transformation costs and the return on property. The acquisition value is constant. This bar chart shows the effect of the change of an input value on the residual value.

- The influence per variable is much better distributed in the residual value than in the transformation costs and return on property separately.
- The construction costs and the cap rate and not of almost equal importance but the rent level and LFA/GFA ratio are remain the most influential. From this is can be included the properties income is of greater importance to the projects financial feasibility than the projects costs.
7.2 Conclusions from sensitivity analysis 2

- The residual value is much more volatile when debt is used to finance the project. The minimum and maximum values that determine the range of the simulation distributions were used to contemplate the next bar charts. The introduction of a LTV ratio of 60%, resulted in a difference of the total nominal difference in residual value, of almost a million euros.

- The even distribution over the difference variables increases too with the introduction of debt. While the impact of the exit yield decreased, the impact of the annual rent increase gets almost ten times larger.

- The increase in the importance of the construction costs when a loan is introduced is also striking since the influence of the rent annually decreases.

<table>
<thead>
<tr>
<th>Total nominal difference</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LTV = 0</td>
<td>€ 47,377,217</td>
</tr>
<tr>
<td>LTV = 60</td>
<td>€ 56,764,410</td>
</tr>
<tr>
<td>Difference</td>
<td>€ 9,387,193</td>
</tr>
</tbody>
</table>

- The following bar chart compares the proportional increase and decrease of 10% to the minimum and maximum range. It can be concluded that the ranges chosen for the variables result in a comparable proportionate influence on the residual value. However, the range of the exit yield is significantly large because the impact of the exit yield almost doubles. In addition the ranges of the construction costs and rent annually are proportionately smaller since their impact decreases. Which of these two different sensitivity analyses should be used to base investment decisions on depends on the precision with which the ranges are established. When the ranges include very exceptionally reached minimum and maximum values, the proportionate sensitivity analysis might be more of interest. However, if very realistic ranges were chosen in combination with low certainty levels, the results of the sensitivity analysis two are more interesting.

Figure 61 Sensitivity analysis 2a, A.D. Mensing
8. Probability of financial infeasibility

Based on the results of the sensitivity analysis, which singled out the most influential variables, an analysis of the probability of achieving a negative financial result due to variations in these variables is performed. These variables are changed one by one, while the remaining variables remain constant at the “simulation average” (ceteris paribus). This analysis is performed on case studies 2 and 4 because the acquisition costs for these studies are known, which makes the identification of the financial infeasibility turning point more precise. In addition the profit margins differ greatly between these two cases, making the comparison more interesting.

The most influential variables according to the sensitivity analysis are:
- LFA/GFA ratio,
- Rent level,
- Cap rate,
- Exit yield

The turning point from a financially feasible project to a financially infeasible project for the most influential variables lies at the following values (these values were established with trial and error):

<table>
<thead>
<tr>
<th>Variable</th>
<th>Turning point - Case 2</th>
<th>Turning point - Case 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFA/GFA ratio</td>
<td>54.6 %</td>
<td>75.05%</td>
</tr>
<tr>
<td>Rent level annually</td>
<td>€ 141.5</td>
<td>€ 11.80 monthly</td>
</tr>
<tr>
<td></td>
<td>€ 110.25</td>
<td>€ 9.19 monthly</td>
</tr>
<tr>
<td>Cap rate</td>
<td>6.75 %</td>
<td>5.35%</td>
</tr>
<tr>
<td>Exit yield</td>
<td>10.75 %</td>
<td>8.83%</td>
</tr>
</tbody>
</table>

The next step is to establish the probability of reaching these levels. For case study 2, the turning points all lie outside the variables ranges. This theoretically makes achieving a negative result due to one of these variables zero percent. However this regards a negative residual value. The initiator of this project stated he wanted to achieve a 30% return on investment on this project. This calculation estimated the return on investment at 12.6%. So instead of regarding a negative residual value as financially infeasible, we now regard a return on investment lower than 10%, which is 7.5 million, as a financially infeasible project.
This leads to the following turning points:

<table>
<thead>
<tr>
<th>Turning point - Case 2</th>
<th>LFA/GFA ratio</th>
<th>Rent level annually</th>
<th>Cap rate</th>
<th>Exit yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFA/GFA ratio</td>
<td>56.8%</td>
<td>€ 157.15</td>
<td>6.17 %</td>
<td>8.55%</td>
</tr>
<tr>
<td>Rent level annually</td>
<td>€ 157.15 € 13.1</td>
<td>€ 157.15 € 13.1</td>
<td>6.17 %</td>
<td>8.55%</td>
</tr>
</tbody>
</table>

In case study 4 all turning points lie within the ranges.

The following graphs show the value distributions of the four most influential variables. With the value distribution, the probability of outpacing the turning point can be established.

<table>
<thead>
<tr>
<th>LFA/GFA ratio</th>
<th>Value</th>
<th>Range</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 2</td>
<td>56.80%</td>
<td>55% - 66%</td>
<td>6.40%</td>
</tr>
<tr>
<td>Case 4</td>
<td>75.05%</td>
<td>70% - 80%</td>
<td>14.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rent level</th>
<th>Value</th>
<th>Range</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 2</td>
<td>€ 157.15€ 13.10</td>
<td>€ 12 - € 14</td>
<td>82.20%</td>
</tr>
<tr>
<td>Case 4</td>
<td>€ 110 € 9.15</td>
<td>€ 9.0 - € 10.0</td>
<td>13.4%</td>
</tr>
</tbody>
</table>
The exit yield is calculated with the following formula:

Exit yield = IRR + depreciation.
IRR = Cap rate + (rental growth – inflation)

<table>
<thead>
<tr>
<th>Case</th>
<th>Cap rate</th>
<th>Value</th>
<th>Range</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6.17%</td>
<td>5.5% - 6.5%</td>
<td>16.8%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5.35%</td>
<td>4.75% - 5.5%</td>
<td>3.7%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case</th>
<th>Exit yield</th>
<th>Value (Depreciation)</th>
<th>Range (Depreciation)</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8.55% (1.55%)</td>
<td>1.0% - 3.0%</td>
<td>43.2%</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>8.83% (3.33%)</td>
<td>1.50% - 3.0%</td>
<td>1.50%</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

Even though the profit margin in case study 4 is very low, the risk of a financially infeasible project is much smaller in case study 4. This has two reasons; firstly case study two has been initiated by a non-commercial party. This means some variables, like rent levels, rental growth, IRR’s and cap rates are dispersed close around the expected value. In addition, the initiator has a waiting list for tenants, so the market risk is very low. Secondly, the minimal return on investment used to determine the ’turning point’ in case study 2 was relatively high. Meaning, the level of 7.5 million was only just reached and the probability of sinking below therefore quite large. The aim of including this chapter in this research was to show the utility of the model. Because probability distributions are used, the model is able to generate information in risk and financial feasibility which can be useful to the initiator in the decision making process.

9. Effect of delays on residual value

In this analysis all variables were held constant except for the construction time and the preparation time. The numbers on the horizontal axis representing the construction time in months are shown in the table. The increase of the construction period from 18 months to 36 months translates into an increase of the residual value of € 754,480 (5.40%) for unleveraged investment. When both the transformation and the purchase of the property are financed with 60% debt, the residual value decreases with €31,152 (1.39%). When the preparation time increases, the residual value increases too, also with a leveraged investment. (See appendix O for the tables and numbers). It can be concluded the negative effect of delay increase when debt is used to finance the project. However, the negative is not as drastic as one might expect.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 months</td>
<td>24 months</td>
<td>30 months</td>
<td>36 months</td>
</tr>
</tbody>
</table>
10 Effect of Vacancy

To illustrate the effect of vacancy, case 3 in combination with a fictional acquisition price is used. During the interview conducted, the investor estimated the property to be worth less than 10 million. Therefore acquisition costs of 9.5 million are included in the model and all other variables are fixed at their simulation average. The following tables show the developers profit for two situations.
1. The initial vacancy is very low and reached equilibrium very fast.
2. The initial vacancy is very high and recovers slowly.

<table>
<thead>
<tr>
<th>A1cst</th>
<th>33%</th>
<th>Sale at completion</th>
<th>4.5</th>
<th>5.5</th>
<th>6.5</th>
<th>7.5</th>
<th>8.5</th>
<th>9.5</th>
<th>10.5</th>
<th>11.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>leased in (%)</td>
<td>83%</td>
<td>87%</td>
<td>95%</td>
<td>97%</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 64 Valuation model results: Development profit vacancy situation 1, A.D. Mensing 2014
The effect of this drastic change is not as big as might have been expected. The utility of the strict 90% pre-leased requirement set by financers as a measure to establish a projects financial feasibility, can therefore be questioned. One could suggest to loosen the requirement or stretch it over a longer period of time. However this would increase the projects riskiness because the financer would need to make an investment without the security of tenants. An alternative to the pre-sale/pre-lease requirement could therefore be a focus on the debt-service-coverage-ratio, from which a “custom made” pre-lease requirement could be computed. Instead of focussing so much on the 90%, it could be established what the minimum occupancy rate needs to be to achieve the required DSCR. That occupancy rate could be translated into the actual minimum pre-sale/pre-lease requirement. This “custom made requirement” would be project specific and therefore more suitable.

11 Financing components

The question whether the availability of debt should be included in financial analyses has been discussed during this research. It has been hypothesised that the availability of debt pushed up real estate prices in the past. The creation of the real estate bubble was partly caused by this effect. It can therefore be argued that the current situation with a reduces availability of debt, as discussed in chapter 10, has an oppressive effect on real estate prices. Meaning the return on investment is lower, because properties are sold for lower prices. The difference between the leveraged return on equity, opposed to the return on property, becomes quite clear from the models outcomes. By increasing the LTV, the leveraged return on equity increases. The return on property was used to establish the residual values in all previous analysis. However, when leverage is used for the acquisition of the property at completion, the buyer would be able afford to pay a higher price due to the extra return, increasing the residual value or the investors development profit. When the investor is not able to use debt for the investment, a lower price can be paid for the same property.
Return on property LTV 40% LTV 60% LTV 80% LTV 90% LTV 120%

1 1.350 1.0173 1.0174 1.0087 1.0261

Difference between 40% loan or 80% loan = 3.2 million

**Amortization**

As discussed in chapter 4, many loans were issued before the financial crisis without any amortization obligation. However, this has changed and amortization between 1% and 1.5% percent is now valid for housing developments. The following graph shows the effect of the amortization rate on the leveraged equity return (LTV constant at 60%). A steep decrease is caused by the increased amortization rate, meaning the potential buyer is forced to pay a lower price for the same property due to stricter loan amortization obligations.

Difference between 0% amortization or 1.25% = 5.6 million
14 Conclusions

14.1 Answers to research questions

This chapter will answer the sub research questions and finally the main research question.

1. Which variables should be included in a relevant all-inclusive valuation method?

All variables directly affecting the net cash flow, should be included in the valuation model. In addition, all variables affecting the purchasing power of the customer should be included as well. Real estate prices are not unequivocal meaning they will rise and fall according to market developments in supply and demand. In addition, rules and regulations affect real estate prices as well. A complete list of included variables subject to a probability distribution can be found in chapter 12.

During this research the re-development process was investigated and several important building characteristics and criteria arose whose effect on the transformability of the property was decisive. The criteria have not been translated one-on-one into the valuation model. Some criteria discussed in chapter 12, do not make a reappearance in chapter 13. The first criterion is land lease. While a canon certainly affects the net cash flow and therefore the property’s value, it did not play a role in any of the case studies. The interviewed parties all stated they avoid projects on leased land which resulted in 5 cases with no land lease contracts. The possibility of inclusion of the land lease and calculation of the yearly canon does remain an option in the model. The second criterion which played a smaller part than expected is the parking norm. Additional income from parking only appeared once, since spare parking places were not common and parking for residents was often included in the price for the dwelling. However, since extra income through parking is possible, the option should remain in the model. The sensitivity analysis discussed the effect of delay in both the construction time as well as the preparation time. The negative effect on the residual value due to an increase in construction time is smaller than expected for a LTV of 60%. The positive effect due to an increase in the preparation time means the expected rent increase exceed the cost of debt.

2. Are these variables affected by current changes in the re-development industry?

All variables subject to macro-economic developments are also influenced by current changes in the re-development industry such as regulations and attitudes of municipalities towards re-development projects. While some changes seem to have a price oppressing effect, like financial restrictions, others have a stimulating effect, like relatively low constructions costs and real estate transfer tax. It can be concluded the industry has been heavily affected by the financial crisis, but recovery encouraged by stimulating measures is definitely on the horizon.

3. How do changes in real estate finance, affect transformation projects?

As discussed in chapter 10, the risk averse attitudes from banks resulted in a drastic decrease in issued real estate loans. However, new kinds of loan suppliers are emerging as a result of this funding gap. In addition, parties have become more creative and are looking into alternative ways of financing. The unstable value of the collateral has encouraged a trend of financing on cash flows and tenant solvency. Traditional financers like banks changed regulations considering pre-lease
requirements, LTV’s and amortization obligations. While LTV and amortization do affect the leveraged equity return on the property, the initial vacancy did not seem to affect the return on property as much as expected. The reason for this is the relatively quick rise, or recovery, of the occupancy level. Nevertheless, if the strict pre-lease requirements had been effective in this fictional project, it would not have been executed. Therefore the utility of this requirement used by financers is questioned.

4. How does taxation affect costs of transformation?

Taxation affects costs of transformation project specifically. While some rules, like the temporary reduced real estate transfer tax for housing affects all projects, the most beneficial taxation scenario differs per situation. This research only focusses on the transformation of offices to housing. However, when including different functions like hotels, additional rules become relevant. It must therefore be noted that the results of this research only apply to transformations of offices to housing. This difference between taxation scenarios is caused by the transfer of ownership and the difference between fiscally ‘new structures’ and ‘existing structures’. The model calculates the residual property value for various possible taxation scenario’s which lie quite far apart. To reach the most beneficial taxation scenario, the initiator must consider several things
- What is the properties age and function?
- Which party will execute the transformation?
- Who will operate the property
- If it’s part of a portfolio, will it need to change funds and will this count as a transfer of ownership.

5. How can be dealt with uncertainties in value estimates?

As discussed in chapter 9, the model which is the product of this research uses value probability distributions instead of static values to handle uncertainties. These distributions are determined by a minimum, maximum, accent and certainty level. The estimates of these point should be chosen with care as they affect the probability of a negative or positive outcome. The probability of every alternative outcome can easily be calculated. The benefit of the usage of this method, is the insight it provides in the probability of very negative or very positive results. In addition, it enable the user to ‘play’ with certain variables and see the effect on the end value. The sensitivity of the residual value to certain variables can be explored and the estimates adjusted to the certainty level of the estimate. This reduces the risk of an overly optimistic or pessimistic estimate. The models outcomes were compared to a regular point-estimate DCF calculation to establish the difference between both methods. It became clear that the difference heavily depends on the “certainty level” assigned to the value estimates. The largest difference is a difference of 14% in case study 3. While case study 3 is the least progressed project, the floor plans and costs estimates are already finished and the permits are granted. Considering the model was originally established to be used in the initiative phase, one can expect the point-estimate DCF results and the models results to grow even further apart. Therefore it is advised to work with the Monte Carlo method.

6. Which variables affect costs and revenues the most?

The variables which affect costs, revenues and the residual value the most are: the LFA/GFA ratio, the rent level, the cap rate and the exit yield. All four variables are relevant to the operational period
and affect the return on property and leveraged equity return. It can therefore be concluded the residual value is affected more by the projects revenues than by the projects costs.

7. How does risk and uncertainty affect the re-development value?

As can be seen in the result presented in chapter 7 and 9, the effect of the min, max, accent and certainty level influences the model outcome severely. Since the model is meant to be used in the initiative phase, this possibility of working with ranges instead of static values will result in much more realistic estimates of the projects costs and income.

Main research question

What does a transparent valuation model, that includes additional costs of transformation and estimates the most likely re-development value for transformation projects of office buildings to housing, look like?

A model has been developed after an exploration of multiple elements of the re-development business and the transformation process. Although other forms of valuation models might exist and be currently used by initiating parties, this research was aimed at including variables which were otherwise excluded, like taxation, financing and dealing with uncertainty of value estimates. The goal was to provide insight in the financial feasibility of projects without a large investment of time and money. Additional costs components were explored both theoretically and with the actual model. The value distributions were used to produce the most likely re-development value. In addition the mode was used to uncover the relationship between these variables which were explored in more detail. It can be concluded that the model is capable of thoroughly analysing projects and is capable of dealing with the uncertainty of value estimates. In addition it is possible to include property characteristics and current developments on the money supply market to present an up to date and most probable value estimate. The 4 step plan which was developed during this research can strengthen the model because it structures the selection process of potential projects and extracts all the values needed for the use of the model. The combination of the model and this 4 step plan can help initiators make grounded decisions based on financial feasibility.

14.2 Reflection

In this reflection I will address what I learned from this experience, which element of this research I found most challenging and share my personal experiences. This chapter will be concluded with recommendations for further research.

Process

Looking back at this research, I feel like the process of performing a research by myself has taught me a lot. I have met with 11 very interesting experts who were willing to share a lot of information with me. While I was not able to publish some of it, the insights I gathered through these interviews gave me a sense of reality of the (re-)development industry. As a student I was allowed to pursue high-minded goals under the assumption that the development industry pursued the same ones. As part of this graduation research I also did an internship at AM Real Estate Development. I was involved in a re-development project myself and witnessed the many ups and downs in the process.
This experience taught me a lot about the project development industry and the relationships between different actors. AM RED also gave me enough time and a wonderful place to work on my graduation thesis for which I am very grateful.

While I am generally content with the process of this research, I did find myself facing some difficulties along the way.

**Gathering information**: Gathering the right information was sometimes a challenge. Quite early in the process I started with conducting open-ended and structured interviews. However, at that moment I was not exactly sure on what precise information I needed. Partly because the variables included in the model were an outcome of these interviews and the case specific values were gathered in the same period of time. Looking back on the interviews I conducted, I noticed several information gaps. While most were caused by the unwillingness of parties to provide me with complete information, some were caused by the reluctance of me asking. Especially the ‘certainty levels’ of the value estimates could have been collected in a more efficient and precise manner.

**Sensitive information**. Especially when working for different parties or a wide range of customers, developers are not keen on sharing information on costs and return. Most parties who provided me with information asked for it to remain anonymous. But many more were unwilling to present me any of their numbers as they found it undesirable for me to have insight in the profitability of projects and the returns they made. A lot of time was invested in finding the right projects and parties. While I originally anticipated on analysing 8 case studies, I do not feel the choice to only analyse 5 has affected the quality of my research substantially.

**The product**

This research resulted in two products which together can be used to establish the financial feasibility of transformation projects from offices to housing. This was the goal of this research so I am very content with the result. However, the exact composition and utility of the model did change slightly over time.

**Transparency**. This research started with the desire to create transparency in a potential re-development project, to smooth the process and reach decisions acceptable to all parties. I approached the situation in the supposition that owners had an unrealistic perception of the value of their distressed real estate. I hypothesised transparency in costs and income could provide clarity in this matter. However, I learned transparency is not exactly what parties desire. Real estate development is mostly a commercial business, meaning parties want to achieve the highest returns and are not keen on sharing these results. However, the case studies analysed in this research prove that financial feasibility of re-development projects may encourage owners of distressed real estate to take action. Concluding, the model may not increase transparency between stakeholders, but it can enhance the understanding of the feasibility of transformation. By providing the initiator with a tool to analyse his property, he will possibly see the benefits of transformation.

In addition; this research starts by explaining why transformation projects are often obstructed by financial infeasibility. The subject of **high book values** leading to high demand prices is pinned as one of the reasons. While this research was aimed at providing insight in financial feasibility, it does not necessarily solve this problem. I realised that the height of the demand price is not determined by an
owners understanding of the build-up of the residual value of the vacant property, but by the urgency to sell. Whenever the need to sell becomes high enough, owners will lower their prices and transformation will become feasible. The more difficult an investment is to liquidate, the greater the risk a price concession may have to be given to a buyer should the seller have to dispose of the investment quickly. Instead of waiting until the execution sale of the property is the last option, I would advise owners of distressed real estate on proper locations to look into redeveloping the property themselves. Case study 2 is a great example of this.

14.3 Recommendations

In this paragraph I will make two types of recommendation. The first will be a recommendation for further research. The second will be a recommendation based on an evaluation of the current re-development industry as I experienced it.

Follow-up research
This research focuses on the transformation of offices to housing. That choice was made to narrow to scope of this research, not because other types of transformation aren’t relevant. Therefore I would recommend a research in the transformation of for instance retail to housing. In addition I would recommend real estate professionals and students to enhance their knowledge on taxation and law. Taxation is often considered a form of costs. However during this research I have met with experts who were able to use taxation for their benefit. The study in taxation in this research is not in depth enough to cover all the possibilities the rules and loopholes hold. Therefore I would recommend a follow-up study on taxation and law in (re-)development projects and also on the financing structures for real estate investment projects.

Recommendations based on my evaluation
During this research I came to the conclusion that some developing parties put their focus on the transformation costs of a project instead of the revenues. The sensitivity analysis presented in this research showed that variables related to the project return have a bigger influence on the residual value than elements of cost. I would therefore recommend developing parties to focus more on market research instead of precise construction cost estimates. In addition I would advise stakeholders in re-development project to share experiences. A lot of knowledge is available but not effectively shared. For a student it is obvious research literature or ask a fellow student whenever something is unclear. I think professionals could work more efficiently and productive if their nature was to ask and share like students, instead of individually inventing the wheel over and over again.
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