VALUE CAPTURE FUNDING IN THE NETHERLANDS

A study into the application of value capture funding instruments in the Netherlands

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COLOPHON

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PREFACE

This research was conducted as last part of the graduation at the faculty of Architecture at the Technical University of Delft in the Management in the Built Environment track. It was conducted within the topic of Urban Development Management with a focus on Transport and Planning.

The topic of research, value capturing, works well with the Urban Development Management topic. It is interesting to connect the topic of infrastructure funding to urban development to see whether this may form a solution to funding problems. Together, the topics therefore from the beginning captured my imagination and were capable of combining subjects within my field of interest such as urban area development, transport development and economics. Apart from the field of interest the topic was also able to motivate me to stay on track as it enabled me to think in conceptual terms and it enabled me to learn more about transport economics and planning. Combining the new field of topics with my knowledge and experience made it possible to find new perspectives on the research and combine my fields of interest. In my view, many large projects such as infrastructural projects that would in many ways benefit society as a whole do not find a way due to funding problems and a lack of vision and courage in the public domain. Being able to explore what possibilities occur through the engagement of private parties in the development of infrastructure is a way to find out whether these views may be appropriate or whether in reality things are far more complex.

Without my mentors conducting this research would not have been possible which is why I really want to thank my TU Delft mentor team Tom Daamen and John Baggen for guiding me throughout the process. Their input and support is highly valued as they guided me through the complex field of research in these strange times. Next to this, I would also like to thank my mentors at Rebel, Remco Derksen and Jos de Vries, for their guidance and supplying me with the means to do this research. I would also like to thank my colleagues at Rebel for their support and input to my research. Additionally, I would like to thank all the interviewees that have participated in the research for providing data and insights for this research.

I hope you enjoy reading this graduation thesis and if any questions arise or if you would like to know more about the research feel free to contact me.

Sincerely,

Bernard Murre
Rotterdam, June 2020

ABSTRACT

An increasing demand for mobility due to natural growth in demand and an urbanizing Randstad region create a demand for a higher quality and higher capacity system of public transportation in the Netherlands. Funding for improvements is however lacking threatening the development of needed homes in the region as new development locations lack accessibility. The responsibility for plan making and development of housing and regional infrastructure has shifted to lower levels of government. Value capture funding instruments are successfully applied abroad where they supply parts of the required funding for infrastructural projects. The application of value capture instruments in the Dutch context is studied by looking at Dutch cases where regional public transportation infrastructure and urban development are combined and by expert interviews to explore the application of value capture instruments. Through a literature study it was found that the upgrade of public transportation infrastructure can lead to a 3 to 5 per cent rise in real estate values in the first kilometer from a new station location. By estimating a rise in real estate values using qualitative characteristics complex quantitative calculations can be avoided and an expected rise in real estate value can be found. A proposal for a value capture process is made where the choice for an instrument is related to the capture space and financial feasibility is considered in relation to the choice for value capturing. It is recommended that the Dutch government takes action to empower local public bodies to be able to apply value capture instruments by taking away legal risks. Timing, scale and governance are seen as key factors for local public bodies to be able to succeed in capturing value.

Key words – Alternative funding, value capturing, Randstadrail, Urban Area Development, infrastructure funding

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PART 1: RESEARCH DESIGN

1. INTRODUCTION

For the understanding of the reasoning behind and structure of the research this chapter starts with describing the research topic and relevance to be followed up with the problem statement, research questions and end with a reader' guide.

1.1 RESEARCH MOTIVES

Developing and funding large infrastructural works takes years of planning and decision making before construction can commence. Consequently, planning and budgeting for large infrastructural projects is done years in advance to make sure the (public) transportation system meets mobility demands. The careful connection between planning and budgeting makes the current public transportation infrastructure funding system robust but inflexible as plans are made years in advance. Additionally, the Netherlands finds itself in a time of urban growth with a large demand for housing and a resulting need for development locations.

The demand for a high quality and high capacity public transportation system is growing and at the same time supplying a high quality public transportation system is beneficial. High quality transportation networks are according to the OECD (2016) and Salon & Shewmake (2011) necessary for the emergence of successful urban regions. Additionally, if the development of mobility and urban development are combined in the right way this can lead to agglomeration effects benefiting economic growth.

The Dutch Randstad region is quickly urbanising. As a result, the region is prone to further densification, increasing urban footprint and a growing population resulting in a rapidly increasing demand for mobility. Already parts of the transportation network are reaching maximum capacity creating bottlenecks in the system (NMCA, 2017). As transportation infrastructure is complex and expensive to develop it takes years of planning and development to extent a network and increase the quality of transportation in a region. To increase the quality and capacity of the transportation network and in this way keep up with the increasing demand, about €5 billion of investments are needed in the southern Randstad region alone, until 2030 (MRDH, 2019). Current government funding programs are insufficient at meeting this amount and it is expected that government budgets for infrastructure funding will also decrease over the coming decades (Alterman, 2012). As public funding for transportation infrastructure is insufficient and becomes scarcer it creates the necessity to start considering the use of additional forms of infrastructure funding.

Alternative infrastructure funding methods have been applied on a small scale in the Netherlands and are used on a larger scale in more market-oriented countries around the world such as the United States and Great Britain. With alternative funding, financial value gained by private parties created through public actions is taken to fund the initial public action. With decreasing government budgets and increasing demand for public transportation alternative funding might be able to fill the emerging funding gap created by the decreasing government capacity to invest in public transportation infrastructure.

A current and future lack of funding to upgrade public transportation infrastructure in the Randstad region to cope with the increasing demand for mobility makes it clear that a solution to fill the funding gap is required to fund future investments in mobility. Contributing to research in the field of value capturing might provide policy- and decision makers with more means to make decisions on the application of value capture instruments.

1.2 Problem definition

The Netherlands is facing a housing shortage resulting in a need to add one million additional homes to the existing housing stock by 2030 (ABFresearch, 2018). Next to creating space for the development of these homes over the coming years the people moving into these new homes require transportation and add up to the already congested Dutch transport system. Over the course of the past few years there has been an explosive growth in the use of public transportation, car ownership still continues to grow, as well as the total distance people travel each year (Giezen et al., 2015; Verdaas, 2019). The one million extra houses and the corresponding growth in demand for mobility therefore pose a challenge for Dutch society and urban planning: make sure The Netherlands and mainly the Randstad region does not entirely jam up. Budgets for investments in the expansion of existing and the addition of new infrastructure are, however, already set until 2030 and do not take the new homes into account (Verdaas, 2019).

Over half of the one million needed homes are to be developed in the Randstad region. The national housing shortage is therefore also a local problem with local and public bodies responsible for the urban planning and regional infrastructure development. It is therefore that local public bodies are in a difficult position. Mainly in the Randstad region – already the most densely populated region in the Netherlands with corresponding congestion problems – new strategies are required to continue urban growth and manage mobility issues. National public bodies currently fund maintenance and extensions of the public transportation networks. As the existing infrastructure takes an increasing amount of money out of the budget for maintenance and as budgets for new projects have already been spent a lack of funding emerges. The lack of financial capacity for investments in public transportation infrastructure threaten urban developments and can cause delays in the developments whilst the national government wants to increase the Dutch housing production (NRC, 2019).

A shift in responsibility for urban development and infrastructure development towards regional and local public bodies in combination with a decreasing capacity for infrastructure funding leads policy- and decision makers to look for alternative forms of funding. Value capturing, successfully used abroad in mainly market oriented economies and large agglomerations has over the past few decades been able to fund investments in some of the worlds renowned public transportation networks. Based on the classical concepts of land rent theory and the monocentric city model (Alonso, (1964), Muth, (1969), Mills, (1972)) the concept where a reduction in travel costs in combination with increasing economic potential leads to higher land prices it becomes possible to capture value accrued indirectly by private parties in relation to public infrastructure investments.

Value capturing can formally be executed in the Netherlands but has never been done to fund large infrastructural works. A lack of practical experience and lack of knowledge about the consequences of application of value capture instruments as well as uncertainty about the financial feasibility of using alternative funding are among reasons why instruments are not applied.

The recent shift in responsibility and decreasing budgets do however urge the need for more research into the topic. The lack of knowledge and practical experience with utilizing instruments to capture value created by public actions in the Dutch context shows a gap in literature which requires attention as the demand for mobility is increasing whilst budgets are decreasing the application of alternative forms of funding may become inevitable.

1.3 Research proposal

Municipalities in the southern part of the Randstad have started a collaboration to cooperate on mobility issues and the challenge of creating enough space to supply the current and future demand for housing called the Verstedelijkingsalliantie (MRDH, 2019). The alliance of eight municipalities sees it as their goal to develop 240.000 new homes by 2040 in the southern part of the Randstad. It is the goal of the alliance to construct 170.000 of these homes in existing urban areas next to high quality public transportation (MRDH, 2019). Focussing on the increase of accessibility in the region and the improvement of public transportation is in line with advice given by the OECD (2016) stating that improving the connectivity and accessibility of the southern Randstad region can lead to agglomeration advantages and compact forms of urbanisation, which is desirable.

Known as the Oude Lijn, the railway line running from Dordrecht to Leiden, connects the southern part of the Randstad by rail and is seen as the main backbone for the integrated development approach in the region (MRDH, 2019). With the desire to develop about 75 per cent of the new homes near high quality public transportation and a faster than expected growth in demand for mobility the public transportation system requires large investments to upgrade the capacity and extend the reach of the network. Among these investments are the construction of extra railway tracks, extra stations, new public transportation lines and the increase of capacity of existing lines (MRDH, 2019).

Part of this research is to look further into the practical application of value capture instruments in a case as knowledge and practical business cases in the Dutch context are lacking in literature. Therefore, the southern Randstad region is chosen to find out more about the impact of public transportation infrastructure development and consequences on urban development and real estate values.

1.31 Research objectives

For this research a few objectives have been set. The main objective is to contribute to the current body of knowledge at the basis for the discussion whether value capturing could be a feasible form of funding for use in future public transportation infrastructure projects in the Netherlands. The main goal is:

The identification of to what extent value capture instruments can be applied to fund public transportation infrastructure in the Dutch context

Furthermore the objectives of this research are:

1. Research the relation between urban development, mobility and value creation in the process of developing and funding the upgrade of public transportation infrastructure
2. To find out how value capturing can be done in the Dutch context
3. To find out what amount value capturing instruments can contribute to fund the upgrade of the Dutch public transportation network

1.32 Research question

The main question following from the motives as described above is:

How can the emerging public transportation infrastructure funding gap be filled by capturing value accrued by private parties benefiting from public investments in public transportation infrastructure in the Netherlands?

To be able to answer the main question, the main question is supported by multiple sub-questions:

Part	Chapter	Questions
Theoretical framework	2	-What does literature say about the relation between accessibility, mobility, urban development and the effect on real estate value? -How can private financial benefits generated by public investments in public transportation infrastructure be captured?
Context	3	-What does the Dutch urban development and public transportation context look like? -How is the construction of public transportation infrastructure funded in the Netherlands? -How can value capturing instruments be applied in the Dutch context?
Case study	4	-What lessons can be learnt about infrastructure and urban development from an existing integrated urban development and public transportation infrastructure project? -What is the value of the private financial benefits generated by public transportation infrastructure investments?
Synthesis	5	-What real estate value increase can be expected from investments in public transportation infrastructure? -To what extent can value accrued by private parties from an increase in real estate value be captured to fund the public actions? -What contribution can value capturing make to funding public transportation infrastructure in an urban area development business case?
Conclusion	6	-How can the emerging public transportation infrastructure funding gap be filled by capturing value accrued by private parties benefiting from public investments in public transportation infrastructure in the Netherlands?

Table 1: Research overview and relating research questions

1.33 CONCEPTUAL MODEL

Based on the problem definition and research questions a conceptual model can be created. The conceptual model forms the basis for the literature review and the case study research.

The conceptual model tempts to create an overview of the different concepts part of this research. The relationship between funding, public transportation infrastructure, accessibility and real estate value is shown on the left side. New public transportation infrastructure is currently funded through public funding. With the development of public transportation infrastructure in a location accessibility of the location increases which in turn has a positive effect on real estate values. The addition that is made in the model is the introduction of the concept of alternative funding in the context of urban area development. The increase in real estate value is the basis for value capturing that is used to fund parts of the public transportation infrastructure.

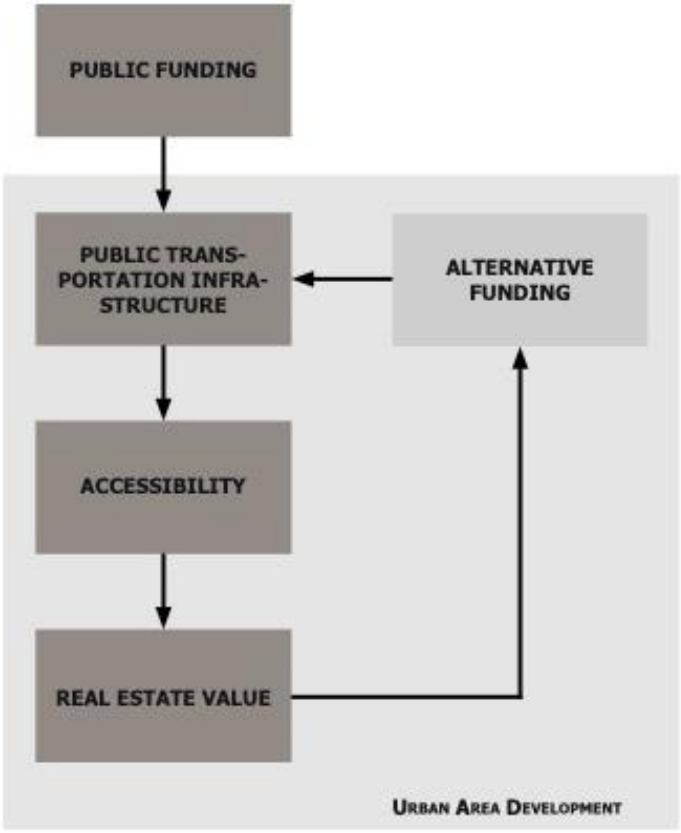

Figure 1: Conceptual model (own illustration)

With the conceptual model, the research gap can also be identified. The relation between accessibility and land value is known. How to capture the value created by an increase in accessibility is however not certain. Methods are known but the practical application in the Dutch context is still a problem. It is therefore that the arrow between 'real estate value' and 'alternative funding' that can be seen in figure 2 forms the research gap in this research.

1.34 Dissemination and audiences

This paragraph is about the audiences for this research. Three main groups have been identified as the main audience:

- **Local and regional public bodies**

Local and regional public bodies can for a great part be seen as the problem holder. As the responsibility for urban planning and local and regional transportation has shifted from a national level towards the lower levels of government the funding and integral development of mobility and urban areas now lays at the local and regional governmental levels.

The current responsibility to integrate urban growth and mobility whilst depending on the national government for funding create a problem. The lack of funding for mobility in urban areas makes local and regional governments an important audience for this research.

- **Private parties**

As urban area development is a joint effort of public and private parties it is interesting for private parties to see what their role could be in the future of mobility and urban development. Developers and investors can profit from accessible developments and the

positive effects forthcoming from an effective transportation network. Next to this, many alternative funding methods depend on private means to fund public transportation investments making private parties part of the process of the development and funding of public transportation. This makes private parties stakeholders and therefore makes them an audience for this research.

- **Academic world**

Abroad, value capturing is used to fund public transportation projects. The tool is new to the Netherlands and does not see wide application in urban area developments. The research done can contribute to the knowledge on integrated urban and mobility development and the way mobility is funded and to what extent value capturing can be applied

1.4 Research design

This chapter is about the methods used to gather knowledge and data to support the research. The paragraph is divided into four parts: type of study, methods and techniques used, data collection and data analysis.

1.41 Type of study

Before conducting a case study a theoretical framework is created for the research. Next, in the empirical part the research zooms in on the specific Dutch context. Part of researching the Dutch context is placing the value capturing practice in the Dutch. Through literature, document study and interviews the application of value capturing instruments is researched and a step-by-step plan for the application of value capture funding is created.

To be able to answers the questions and attain the research goals as formulated a qualitative study is conducted. The study consists of an in depth retrospective case study for which the Randstadrail project is used. The Randstadrail project is in this research treated as a typical or also known as exemplary case. A typical or exemplary case is according to Bryman (2015) chosen because it can be seen as an example of a typical situation or; it exemplifies a situation. Another reason for choosing a typical case can be to see what the impact of the implementation of the case is and why the project has a certain outcome and if this can be replicated.

For the study the entire metro line E is used as well as one specific location along the line to determine how the location was developed and what value was added through the integrated development in combination with the Hofpleinlijn transformation to metro line E. The lessons learned from the single case study are useful for a similar location where infrastructure is to be transformed to light rail as well. The project can partly be compared and used as a basis for another project in the region but is not generalizable as a whole due to the singularity of the case study not generalizable (Lancaster, 2005). Furthermore, the identification of additional funding methods and how these methods function in the Dutch context limits parts of the research to the Dutch context. Studying the impact of a transformation and the value created through such a transformation is interesting because it makes it possible to see the added value of the increased quality of a public transportation service.

After the retrospective case study a prospective business case is created for a location with infrastructure that can be transformed to light rail infrastructure where a new station can be opened. The location chosen for this is the Van Nelle location in Rottermdam. Lessons learned from the case study are integrated in the business case while the lessons learned about value capturing in the Dutch context and the application of value capture instruments are applied on the case to be able to in the end answer the main research question.

1.42 DATA COLLECTION

In this part of the chapter the data collection is elaborated on. The data collection is divided in three phases following the structure as can be seen in chapter 3.2. Each phase requires a different form of data collection. Furthermore, the case research is separated in two levels with the regional and the local level. The data collection can be divided in three phases relating to different methods and questions as can be seen in the table below.

Part	Chapter	Questions	Research methods	Data collection
Theoretical framework	2	-What does literature say about the relation between accessibility, mobility, urban development and the effect on real estate value? -How can private financial benefits generated by public investments in public transportation infrastructure be captured?	Narrative literature review	Google scholar, Scopus, library, Internet
Context	3	-What does the Dutch urban development and public transportation context look like? -How is the construction of public transportation infrastructure funded in the Netherlands? -How can value capturing instruments be applied in the Dutch context?	Narrative literature review, semi-structured interviews	Literature, document review, semi-structured interviews
Case study	4	-What lessons can be learnt about infrastructure and urban development from an existing integrated urban development and public transportation infrastructure project? -What is the value of the private financial benefits generated by public transportation infrastructure investments?	Berkel Westpolder, case study AND Van Nelle business case	Document review, semi-structured interviews, BAG, Funda house prices
Synthesis	5	-What real estate value increase can be expected from investments in public transportation infrastructure? -To what extent can value accrued by private parties from an increase in real estate value be captured to fund the public actions? -What contribution can value capturing make to funding public transportation infrastructure in an urban area development business case?	Expert interviews	Input from former chapters and document study
Conclusion	6	-How can the emerging public transportation infrastructure funding gap be filled by capturing value accrued by private parties benefiting from public investments in public transportation infrastructure in the Netherlands?	Thesis research	Input from previous chapters

Table 2: Overview of research questions and data collection methods

The basic concepts for this research are first researched through the narrative literature review. The theoretical framework forms the basis for the case study research. In phase two the retrospective case study is researched and the application of alternative funding in the Netherlands is researched. It is possible to zoom in on a location and find more data about the actual developments and value increases created by the upgrade of the rail infrastructure.

In the third phase, the goal is to use the lessons learned from phase two in combination with the theoretical framework and apply this on the van Nelle business case.

1.44 Research guide

The data analysis scheme, as can be seen below, shows an overview of the process of data collection and connection between process and output. Small dark grey boxes are research methods and steps used to come to a framework or overview presented in the wide light grey boxes.

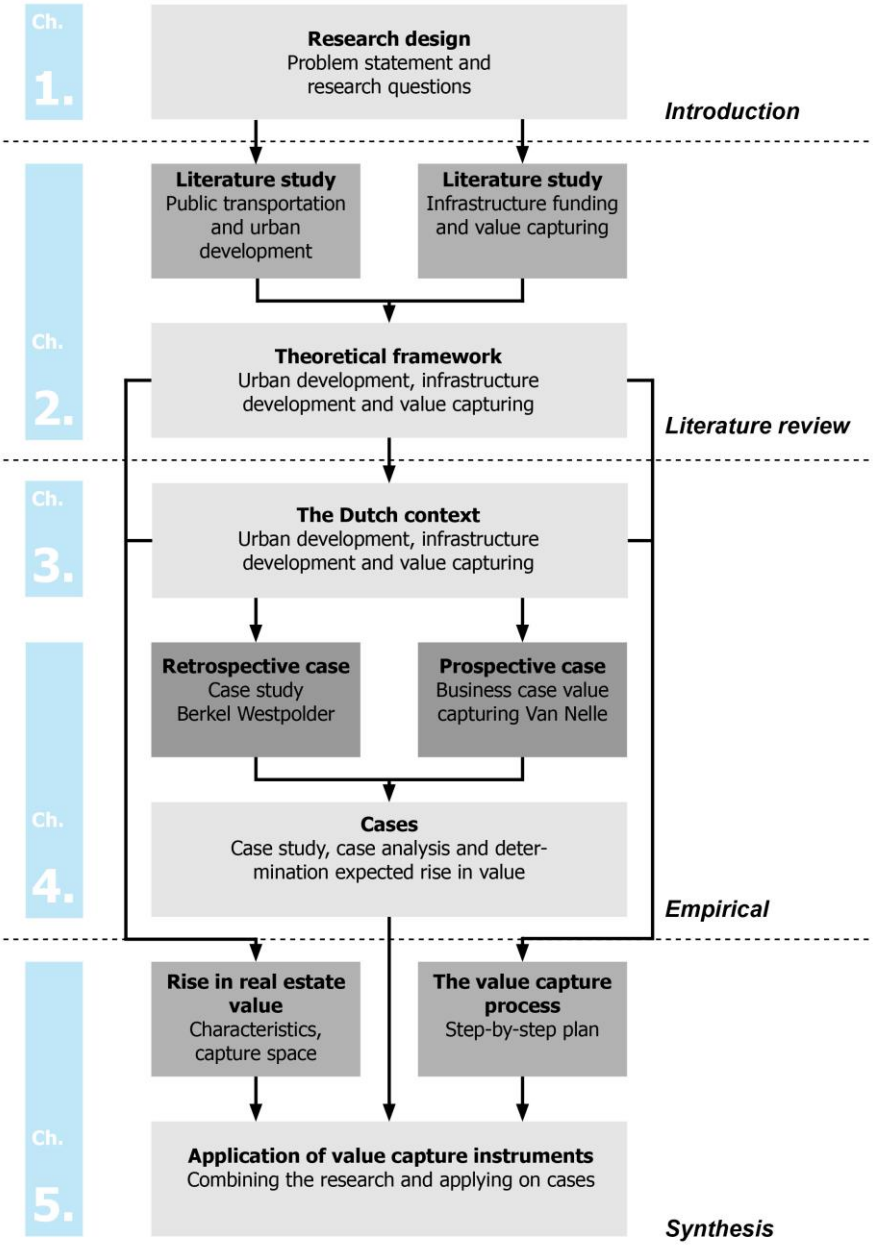

Figure 2: Research guide (own illustration)

Next to the data analysis scheme the collection of data has to be considered. The FAIR guiding principles are taken into consideration with respect to the collection of the data for this

research that is collected through literature research, document research and interviewing. According to the FAIR guiding principles data has to be findable with next to this accessible as well as interoperable and lastly also reusable (Wilkinson et al., 2016).

PART 2: THEORIES

2. CAPTURING VALUE ACCRUED BY PUBLIC TRANSPORTATION INFRASTRUCTURE INVESTMENTS

To gain an initial understanding of the literature the narrative literature review provides an initial understanding of relevant literature (Bryman, 2012). In chapter one the concept of a monocentric city and land values was introduced (Alonso, (1964), Muth, (1969), Mills, (1972)) and the research problem was defined. In this chapter the basic concepts behind urban development and mobility are studied as this is relevant to find the basis on which value is created in the built environment. The latter part of this chapter focuses on the concept of value capturing.

In this chapter the first two research questions will be answered:

- What does literature say about the relation between accessibility, mobility, urban development and the effect on real estate value?
- How can private financial benefits generated by public investments in public transportation infrastructure be captured?

2.1 URBAN AREA DEVELOPMENT AND MOBILITY

In this part of the chapter the relation between urban growth and urban area development is reviewed. The focus lays on the impact of mobility on urban growth patterns and how these concepts translate into the Dutch situation.

2.11 URBAN GROWTH, URBAN PLANNING AND URBAN DEVELOPMENT

According to Glaeser (2004) cities exist to eliminate the transportation costs of people, goods and ideas. It is argued that cities are shaped by the transportation infrastructure that is present at a moment in history (Rodrigue et al., 2009). It is therefore that the dominant transport technology dictates urban form. At the end of the 20th century and the beginning of the 21st century the predominant form of transportation is the car, which is why cities tempt to sprawl due to the specific characteristics of the car (Glaeser, 2004). It is argued that spatial policies, neighbourhood interactions and accessibility are the most influential factors for land use change nowadays (Verburg et al., 2004). Furthermore, it is likely for urbanisation to occur near existing urban areas, which can be seen when looking at new suburbs near major cities (Kasraian et al., 2019).

Urban growth and its negative side effects are the basis for the need for urban planning to organize urban growth and regeneration. Urban area development can according to Heurkens (2009, p 1) be characterised as '*the integral development of a defined area with a mixed functional program*'. The need for land due to urban growth makes the practice of urban planning a necessity. In the Netherlands the planning practice has a long history due to the geography of the country (de Zeeuw, 2019). Urban area development in the Netherlands is seen as a practice where since centuries public parties, private parties and the community together form the stakeholders in urban planning (de Zeeuw, 2019).

Over the past few decades since the 1980s the government its role is changing in the field of urban area development. Since decentralisation policies and privatization policies private parties are able to have more influence on urban area development and have become the key between planning and implementation for urban plans. (Heurkens, 2012).

2.12 Mobility, accessibility and urban development

Mobility is defined as a way of having accessibility to wherever one demands to go (Anas et al., 1998). Improving the accessibility of a location therefore makes it more desirable as mobility increases, which can therefore stimulate and guide urban growth (Annas et al., 1998). Accessibility can therefore play an important role in urban planning and development. According to Salon & Shewmake (2011) public transportation contributes a great deal to the success of some of the renowned high performing urban areas in the world. Accessibility is according to them one of the key factors for successful urban areas and higher accessibility of an area can be achieved with public transportation. According to Maat & Wee (2019) there is a connection between the likelihood of an area turning from a non-urban to an urban area because of the accessibility of an area. After studying 50 years of urban development in the Netherlands it was found that urban growth predominantly takes place in accessible locations next to existing urban areas.

The impact of accessibility on the economic potential of a location and the arrival of new forms of transportation has led to forms of urban sprawl the decentralisation of cities. Where in the past urban development followed the paths of public transportation with the introduction of the car this was no longer necessary as roads go almost everywhere. New challenges such as higher cost of transportation, environmental pollution, road congestion and the spatial dynamics of contemporary society (Bertolini et al., 2012) created the emergence of Transit Oriented Development or TOD in short, in Europe (Cervero, 2004; Dittmar & Ohland, 2004; Dunphy et al., 2005; Curtis et al., 2009).

In contemporary society according to Bertolini et al. (2012) people have become more 'footloose' because of increasing globalisation and the way people, goods and information can easily be transported. Urban patterns adapt to this in a world where people and companies instead of diffuse have become selective in their location decisions. This creates an increased need for mobility where travel mobility becomes both the problem and the answer. Time rather than travel distance starts to determine land use and transportation hubs become more and more important in this respect. With the TOD principle this means transportation hubs and stations tempt to become areas with a multifunctional land use.

In the Netherlands the Stedenbaan project between The Hague and Rotterdam is an area with desire for TOD (Balz & Schrijnen, 2009). In the case of the Stedenbaan the principle of TOD is used as a tool to guide urban development and connect existing urban areas in combination with upgrading travel mobility and developing new urban areas where sustainable urban growth and mobility are key (Bertolini et al., (2012).

2.13 The relation between mobility and land values

A clear link can be seen between accessibility and land values (Zhao et al., 2012). Modern forms of transportation, such as highways and light rail, are able to considerably improve accessibility of areas (Du & Mulley, 2006). According to the classical theories with the monocentric city model it is the cost of transportation that is the main factor influencing land value (Alonso, (1964), Muth, (1969), Mills, (1972)). A lower cost of transportation to get to the CBD of a city leads to higher land values. The time it takes to travel, number of transfers and cost of travel are closely connected and with a longer travel time the cost of transportation increases. Kim and Lahr (2013) illustrate this theory in figure three where the reduced travel time cost increases the bid-rent price that can be afforded by parties in the market. In this case, a decrease in travel time or a decrease in travel costs increases the potential bid-rent price. In theory therefore a reduction in travel costs can be directly translated in higher real estate values.

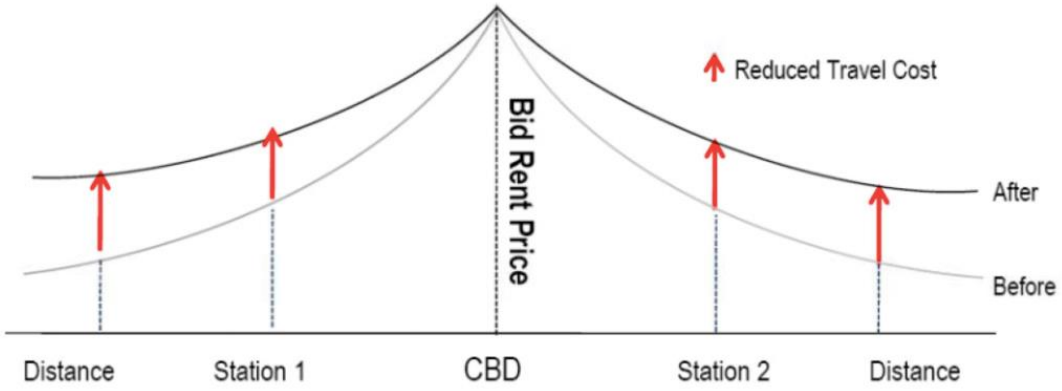

Figure 3: Effect of upgrade of public transportation infrastructure on reduced travel costs (Kim & Lahr, 2013)

Research done by Spiekermann & Wegener (2006) on the relationship between accessibility and economic potential in the European union shows that there is a relationship between the accessibility of a region caused by multiple modes of transportation and the economic success of the region. It is therefore that mainly the highly populated areas of Europe with high quality transportation networks to both have high accessibility and high economic potential. On a lower level, the effect of improving a public transportation connection is according to the PBL (2009) that people are able to find a job that better fits their skills and preferences increasing their wage leading to positive economic effects and higher property values.

2.2 Value capturing

In this part of the chapter a more in depth look into value determinants and valuation is taken. The chapter starts by introducing relevant value capture concepts and to frame explain the methods used for this research. This is relevant to come to a deeper understanding of value determinants that form the basis for value capture funding. Next to this, the concept of value capturing is further explored.

2.21 Value determinants and value capture space

Next to the classical determinants of real estate value based on travel costs to reach the CBD it can be assumed that many other locational characteristics determine real estate values in a given location. Finding this set of characteristics in relation to infrastructural upgrades is necessary as value capturing instruments are based on this change in value.

Urban area developments have specific characteristics in terms of for example ownership and type of urban area which influences the amount of value gained from an increase in quality of transportation. Three mayor categories of characteristics therefore result in the degree of value change in relation to an infrastructure upgrade being: contextual characteristics, infrastructure characteristics and area characteristics. Analysing a location and infrastructure development can therefore indicate what rise in value can be expected from an infrastructure development.

This change in real estate value, that can be determined by looking at the characteristics forms the basis for value capturing. With the determination of the expected rise in value the amount that can be captured is not yet determined. It is uncertain whether all value accrued by private

parties can be captured and it is likely that this is different for any situation. This results in a situation where the accrued value can be separated in a capturable and uncapturable part. The difference between the expected rise in value and the amount that cannot actually be captured given the situation is in this research referred to as the capture space. The capture space is further illustrated in figure 4 below. Figure 4 divides the rise in real estate value into a capturable and uncapturable part. The size of each part is determined by the specific situation in which one desires to capture value and the context in which this happens.

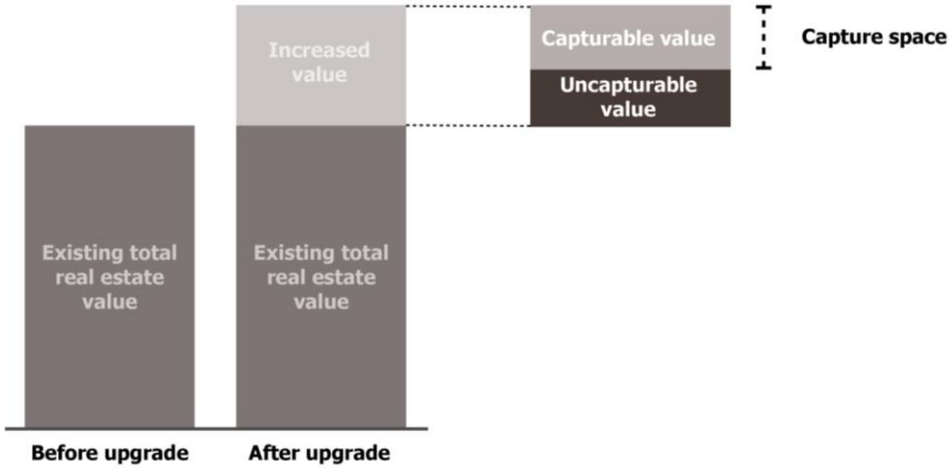

Figure 4: Capture space, relationship between rise in real estate value and value that can and cannot be captured (own illustration)

Expected rise in real estate value

Through interviews with real estate valuers and statisticians it has become clear assessing the actual real estate value development that that occurs in any situation in relation to an infrastructure developments requires complex procedures and is for a few reasons may be too complex and therefore not feasible to come up with:

- It is not possible to determine an exact time horizon over which to look at the value development. Determining a starting and finishing year is important because only then it is possible to measure a change in value.
- If the hedonic pricing method developed by Rosen (1974), that can be used to measure the influence of one characteristic on value development, is used to determine the influence of a light rail station and infrastructure investment this requires a comparable area with equal characteristics or a location has to be synthetically created. Otherwise, the difference between a situation where the change did and did not take place cannot be found. Using this method, given this research time frame, is not possible and requires complex procedures and a lot of data.
- Using common value determination methods requires market data about housing transactions over a certain period of time. This data is not available as the area is not fully built up yet and many dwellings have just been finished which is why there is not a large sample of transaction data yet. The difference in difference method and methods where repeated sales data are used are therefore not effective in this area.

- The WOZ-value as input for determining values in the area can be done although the WOZ-value is not the actual market value but a value for determining property taxes.

A different way to look at value development caused by a public transportation infrastructure transformation is to compare characteristics of the Randstadrail transformation and location and compare this with value changes found in literature.

With this it is possible to find the expected real estate value development in relation to a light rail development as opposed to the actual value development by looking at specific characteristics of an area and comparing these to the qualitative variables.

2.22 Determination of value change

Based on research done in the Netherlands and abroad it is possible to find comparable infrastructural projects and the corresponding effect on real estate values. The table below gives an overview of relevant research into the effect of infrastructural investments on real estate prices.

Author	Koster, Ommeren & Rietveld (2010)	Ossokina (2010)	Debrezion, Pels & Rietveld (2006)
Type of research	Impact of 30 newly constructed sprinter stations in The Netherlands on real estate values	The impact of railway stations on real estate value in Amsterdam	Meta-analysis of 73 different pieces of research into the impact of transit on real estate values
Value change found	5% increase in the first 1 km with beyond this a decay of between 1,5-2%	5% increase within a range of 1.1 km and with high nuisance locations about 3%	4.2% rise in value within the first 402 meters of a station for simple light-rail service. Commuter rail service yields a 14% higher rise in value
Comments	-Findings are on the low side due to low service stations researched -Effects reach out for a few kilometer due to Dutch cycling culture	-Directly next to infrastructure that is causing a high level of nuisance rise in value is lower with in this research about 3%	-Commercial properties are heavily effected with a 16% increase within the first 402 meters -Commuter rail service have the largest effect

Table 3: Overview of relevant research into effect of station and infrastructure development on real estate values (Based on (Koster, Ommeren & Rietveld, 2010; Ossokina, 2010; Debrezion, Pels & Rietveld, 2006)

Comparing the relevant pieces of research shows that the rise in real estate value within the first kilometer near a station is expected to be between 3% and 5% with commercial real estate showing a higher increase. The research does however show different factors influencing the amount of increase that can be expected such as the service level that is provided. It is therefore necessary to look at what characteristics contribute to a certain rise in value. Next to this, literature shows that certain situational characterics could influence the extent to which value can be captured contributing to a change in size of the available capture space. With these characteristics it is possible to compare existing locations to what can be found in literature. In the table below, value change determinants and capture space determinants are shown that were found in the literature that contribute to the size of the change in value.

Author	Value change determinants found	Capture space determinants found
Koster, Ommeren & Rietveld (2010)		-Timing of contract and anticipation effects cause early capitalization of value changes
Ossokina (2010)	-Nuisance from infrastructure -Nearness of consumption amenity -Proximity of rail alternatives	
Belzer, Eaton & Ohland (2008)	-System regional connectivity -Frequency of service -Link to center(s) of employment -Healthy RE market (demand) -Traffic congestion	-Degree of capitalization -Market tenure -Supportive public policy -Land speculation
Debrezion, Pels & Rietveld (2006)	-Closeness to CBD -Nearness to highway can diminish effects of rail on value	

Table 4: Value change determinants and capture space determinants found in literature (Based on (Koster, Ommeren & Rietveld, 2010; Ossokina, 2010; Belzer, Eaton & Ohland, 2008; Debrezion, Pels & Rietveld, 2006)

2.23 Alternative funding and value capturing

In alternative funding of infrastructure the infrastructure is fully or partly funded through other means than public funding as can be seen in the figure below. Funding infrastructure projects through alternative funding is uncommon in the Netherlands. Alternative funding methods are however more common in more market oriented economies such as the United States and Great Britain where alternative funding methods were first used at the beginning of the 20th century (Alterman, 2012).

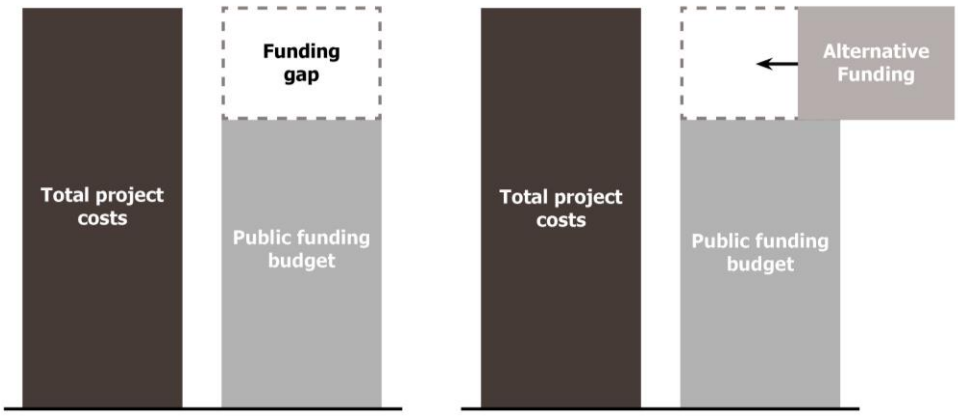

Figure 6: Infrastructure project funding showing funding gap and use of alternative funding (own illustration)

For alternative funding for infrastructural works there is often spoken about value capturing as a term to cover many forms of alternative funding. Value capturing is according to Huisman (2004, p.9): ''*a collection of instruments that makes it possible to take the increase in value of land and real estate that was created by public actions and is then directly or indirectly taken to fund the activities causing the increase in value''.* Public investments in infrastructure can increase accessibility increasing the land value of a location benefiting non-direct users of the infrastructure in this particular location. These non-direct users, or also referred to as direct

beneficiaries, can for instance be landowners that do not contribute to the development of new infrastructure but do receive the benefits in the form of higher accessibility and related higher land values. Value capturing can in this case be used to intervene in the market and make private parties contribute to local public investments (Offermans, 2004).

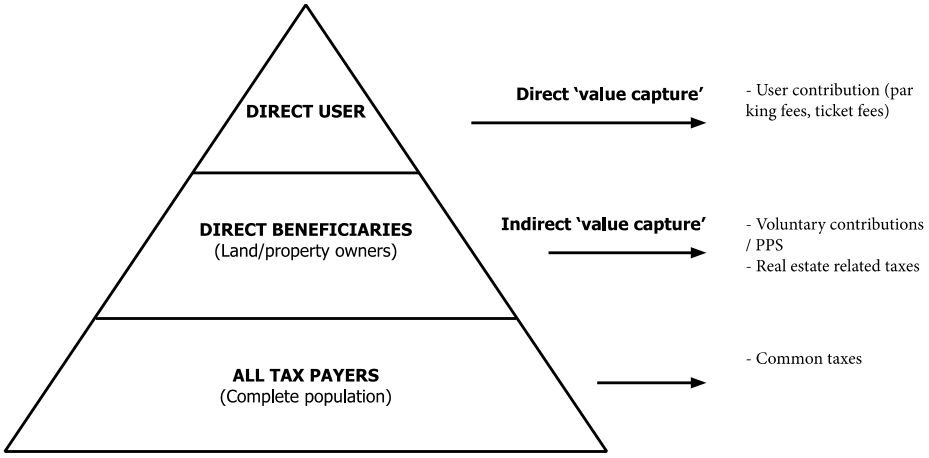

Figure 7: Levels of infrastructure investment funding (Schoenmaker & Verlaan, 2013)

Value capture instruments are used to capture value accrued by parties in the direct beneficiaries category and can be performed through a multitude of instruments as an extra source of funding for investments in infrastructure (Offermans, 2004).

With knowing how value is accumulated in relation to infrastructure upgrades and what target groups are relevant for value capturing Fogarty et al. (2008) adds some factors that increase the feasibility of applying value capture instruments. researching a multitude of American studies to value capture funding a few factors are vital in effectively executing value capture funding:

Favourable condition	**Explanation**
Integrated planning	Instruments are most effective when used in new developments or in the redevelopment of existing properties. If developers have plans to develop or redevelop an area this makes setting up a value capturing scheme easier
Combining instruments	Value capturing strategies that incorporate multiple instruments are most successful in achieving funding for a project
Timing	The timing of use of instruments is key as setting up the contracts too late reduces value capture potential. Next to this, market conditions have to be considered when setting up a value capture scheme
Land ownership	The suitability of an instrument is decided by who owns the land
Dedicated area	Matching value capturing instruments with a geographical area that is influenced maximizes the potential of the value capturing instrument that is used

Table 5: Conditions increasing the potential of applying value capture instruments (Based on Fogarty et al., 2008)

2.3 Conclusion: theoretical framework

The goal of this chapter was to understand the relationship between accessibility, mobility and urban development and the influence on real estate values. Next to this, an understanding of the concept of value capturing is needed. This led to two research questions that were answered during this chapter:

- What does literature say about the relation between accessibility, mobility, urban development and the effect on real estate value?
- How can private financial benefits generated by public investments in public transportation infrastructure be captured?

Relation between accessibility, mobility and urban development

- Accessibility is essential for urban development and for a great part dictates urban form
- Compact urban forms evolve to decrease travel time and minimize travel costs. Costs and means of travel therefore strongly influence urban form
- To make an area accessible highways and light rail are nowadays seen as effective tools for enhancing mobility

Effects on real estate values

- Through a decrease in travel time to the central business district higher accessibility and increased mobility can lead to higher real estate values
- The bid-rent price theory dictates how the market values land in relation to accessibility
- An increased quality of transportation and decrease of travel time thus increases land values in accessible locations
- Finding an actual rise in value in relation to an increase in quality of transportation is complex and therefore finding an expected rise in value is more feasible
- An increase in value of real estate depends on the situation in which one wants to capture value and the context in which it is done
- Looking at comparable research a rise of between 3% and 5% can be seen within the first kilometre of a station.

How can private financial benefits in relation to public investments be captured?

- Alternative funding is used to fund parts of public projects with other than public money and is usually used as an additional form of funding next to public funding
- Value capturing is a form of alternative funding where it is possible to perform direct value capturing, for users, and to perform indirect value capturing where indirect beneficiaries who for instance benefit through an increased real estate value contribute
- Value capturing is successfully performed abroad but however new to the Netherlands which is why examples of value capturing in the Netherlands are scarce
- In the Dutch context a rise in value of residential real estate within the first kilometre of a new station of up to 5 per cent can be expected depending on characteristics of the location and infrastructure project

Value capture instruments

- Instruments are most effective when used in new developments or in the redevelopment of existing properties. If developers have plans to develop or redevelop an area this makes setting up a value capturing scheme easier

- Value capturing strategies that incorporate multiple instruments are most successful in achieving funding for a project
- The timing of use of instruments is key as setting up the contracts too late reduces value capture potential. Next to this, strong market conditions increase the potential of success
- The suitability of an instrument is decided by who owns the land
- Matching value capturing instruments with a geographical area that is influenced maximizes the potential of the value capturing instrument that is used

PART 3: EMPIRICAL RESEARCH

3. THE DUTCH VALUE CAPTURE CONTEXT

The previous chapter has shown how urban development, infrastructure development and the relation with real estate value works. Next to this, a more in depth look was taken at value capturing as a source for funding of infrastructure. This chapter continues by exploring the same topics specifically looking at their role in the Dutch context. The goal of this chapter is to get an understanding of the Dutch, mainly Randstad, public transport and urban development context. Furthermore, an overview of how infrastructure is currently funded in the Dutch context is created in combination with the current position of value capturing in the Netherlands. At the basis of this chapter lay the following three research questions:

- What does the Dutch urban development and public transportation context look like?
- How is the construction of public transportation infrastructure funded in the Netherlands?
- How can value capturing instruments be applied in the Dutch context?

3.1 URBAN DEVELOPMENT AND PUBLIC TRANSPORTATION

This part of the chapter start with a historical perspective on urban development in the Netherlands to be able to reflect on urban development trends in the Netherlands on a governance and spatial development level. After this, the Dutch public transportation context is characterized and compared to the European context to see possible trends in the development of the Dutch public transportation network.

3.11 A HISTORICAL PERSPECTIVE ON URBAN DEVELOPMENT IN THE RANDSTAD REGION

The Netherlands has a strong centralised urban development and urban planning culture where new cities and urban areas were created from scratch. In a region where space is scarce and the most densely populated areas lay below sea level urban planning has been a necessity for centuries. In the post-war era a trend of increasing centralisation of urban development saw dedicated ministries dictate where urban development could take place resulting in the construction of new cities and large extensions of the urban footprint of the larger existing Dutch cities.

This urban growth and extension of the urban footprint led to the Randstad concept where the conurbation of cities in the heavily urbanised western part of The Netherlands could be seen as a network of cities (Priemus, 2018). According to Priemus (2018) the Randstad region before the 1990s was an area with little synergy and a lacking focus on controlled economic development because of decentralisation policies. After the 1990s a policy of more centralisation and controlled development in combination with investments in infrastructure resulted in increasing agglomeration effects. The region has turned into an urban network and on the lower scale into a network of cities (Priemus, 2018).

The VINEX policy

The policy for more centralised development and controlled economic development was called the VINEX programme. The urbanisation policy stating that new urban areas were to be built on a large scale next to existing major cities in the Netherlands. A national policy was needed to meet the housing demands of the time and to decrease car mobility by building on a short distance from the central business district of cities and supplying high quality public transportation to these central business districts. (VROM, 2012)

The main goals for the VINEX policy were to supply new housing, do this next to existing cities and decrease car mobility. To decrease car mobility the policy was to develop the areas next to existing cities and supply the areas with high quality public transportation as an alternative for using the car to the nearby city.

Officially the VINEX programme ran for only ten years until 2005 although some projects initiated through the programme have not even been completed the programme was generally seen as a success. What was innovative about the programme in the Dutch context was as opposed to the former controlled decentralisation of housing in the Randstad region with housing as the prominent driver in decision-making the new policy saw the connection with existing urban areas, high quality public transportation access and the connection with central business districts as the major principles.

The post-VINEX policy period

In recent years, mainly after the 2008 crisis, housing development is no longer strictly arranged from a national level but has become the responsibility of lower levels of government. Next to this, housing development is no longer the leading factor in spatial planning as since the turn of the century infrastructure turns out to be the prevalent factor in the spatial planning of housing. Housing developments are therefore nowadays increasingly determined by infrastructure policy and planning.

The Randstad region continues to grow and develop further. The southern part of the Randstad region along will see the development of 240.000 new homes in the coming years (MRDH, 2019) in the already highly urbanised region. The national government has made plans to cope with this challenge and sees the importance of existing inner urban locations for the development of these homes. Furthermore, areas near existing public transportation lines are seen as locations to develop around 170.000 dwellings (MIRT, 2017). The combination of mobility and urban development are emphasized by stressing the importance of high quality public transportation forms and the focus on development of cities and regions that have access to high quality public transportation networks.

For urban planning and urban area development it can therefore be said that over the past few decades there has been a shift in planning from a central national level to a lower level of government where infrastructure planning has become the dominant factor in urban planning as opposed to housing. Furthermore, greater influence of private parties causes more responsibilities to shift towards private parties in the field of urban planning.

The short overview above can be compared to the current situation and trends that are seen in the urban planning Dutch political context and Dutch spatial development context showing a few things:

Political context

- Governance
    - The government is shifting responsibilities from higher levels of government to lower levels of government
    - Local regions are now responsible for urban development and planning
    - Some former public functions have been privatized and public bodies now rely more on private parties for daily operation and the execution of plans

Spatial development context

- Planning context

- The ministry of urban planning (VROM) no longer exists
- More private involvement is desired in the field of urban development
- Active land policies have become uncommon and land acquisition is nowadays done for strategic purposes

- City development
  - Where in post-war The Netherlands an outflux of people were one of the reasons for the expending urban footprint of cities since a few decades living in or near the centre of a city is becoming increasingly more popular and causing an influx of people moving to the city
  - Brownfield and inner city locations are seen as important locations to solve the emerging housing shortage in the Netherlands as construction on greenfield locations is seen as unsustainable making former harbour areas and dilapidated inner city industrial sites the new frontier in urban development
  - Station areas and major stations sites around the Netherlands have moved to the centre of attention for new urban developments as many of the major station buildings have been transformed making for attractive high accessibility areas that are attractive for development

3.12 The Randstad public transportation network

Public transportation plays an important role in evolving contemporary transportation networks. With the negative side effects of car based transportation networks such as pollution and urban sprawl public transportation networks are making a comeback and see large investments in new infrastructure over the past few decades (Bertolini et al., 2012). According to Bertolini et al. (2012) in Europe there are two main developments that characterize the development of public transportation:

1. High speed rail networks have been extended over the past few years creating a greater hub function for stations along these high speed rail lines
2. The development and/or extension of regional light-rail networks

For the Dutch context there are a few striking differences with the prevalent trends in Europe stemming, according to interviewees, mainly from Dutch geography and the Dutch cycling culture. Due to the number of small cities and high concentration of urban areas distances between cities are relatively small making a national high speed network less effective at reducing travel times. Hence, a high speed rail network is therefore useful for international connections but not primarily used for national transportation as a competing network of national rail connections already exists.

Next to this, the Dutch cycling culture results in a lower demand for public transportation in inner city areas and increases the catchment areas of public transportation stops. Furthermore, the cycling culture may increase costs for the development or transformation of public transportation infrastructure as cycling infrastructure is needed requiring large investments in for instance underground bicycle parking.

It is, according to interviewees, mainly for these reasons that The Netherlands does not see an as extensive high speed rail network as well as a more modest development of extensive high quality local or regional public transportation networks. This does however not mean

that with expanding urban regions the demand for high quality local and regional public transportation networks may rise.

Development of the Dutch infrastructure network
With the existing network of public transportation infrastructure focused mainly on connecting cities and the strong cycling culture in cities the near future of the development of mobility a trend where accessibility is according to interviewees more thought of in terms of regional accessibility with a greater focus on accessibility of a city with the region around it as opposed to the interconnectivity between the larger cities.

3.2 Infrastructure funding in the Netherlands

To be able to see the role of value capturing in funding of public transportation infrastructure it is important to understand the way the development of infrastructure is currently funded in the Netherlands. Therefore, the chapter starts with exploring the governance and decision making behind infrastructure investments to next look at trends in infrastructure funding and the role of value capturing.

3.21 Infrastructure funding

In the Netherlands the ministry of 'Infrastructuur en Waterstaat' has the task to maintain the national road network. Next to maintaining budgets for maintenance of the road network another important role is controlling the national infrastructure fund (Verlaan, 2017). There are three main sources for funding for large infrastructural projects in the Netherlands being: the infrastructure fund, the MIRT investment planning and European budgets (Schoenmaker & Verlaan, 2013).

Decisions on what projects are executed and will receive funding occur at the top of the pyramid, the strategic level as can be seen in figure 3. This is where the national government based on the MIRT analysis, in which passenger growth through the NMCA analysis and budgets are analysed, in cooperation with stakeholders decide what projects are needed and receive funding (Schoenmaker & Verlaan, 2013).

The MIRT analysis is made with a scope of over ten years due to the time it takes to allocate funding and implement changes to the transportation network. It is therefore that the MIRT budgets have already been set until 2030, which decreases the capacity to adapt to changing demands (Verdaas, 2019).

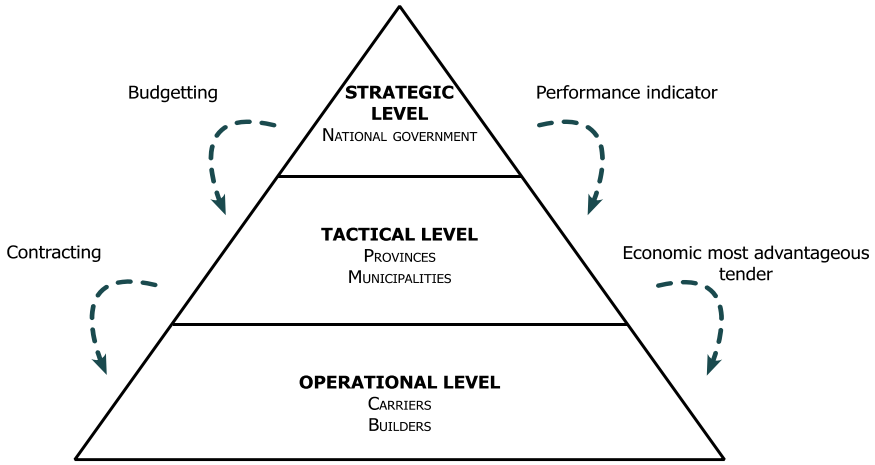

Figure 8: An overview of infrastructure governance (based on Schoenmaker & Verlaan, 2013)

Funding of infrastructural works is a complex process of allocating resources by combining long-term budgets with budget supplied by the national government in the yearly national budget and it is therefore that the planning and funding of infrastructural projects takes many years (Verlaan, 2017).

Most of the time the national government will initiate investments in infrastructure but there is however the possibility to involve private parties in infrastructure projects (Schoenmaker & Verlaan, 2013). Already private involvement occurs often on the tactical and operational level where through complex contract forms private parties are responsible for the design and construction of infrastructure projects or in the most extended form responsible for the design, construction, financing, maintaining and operating of infrastructure (Rijkswaterstaat, 2019). On the strategic level parties can also be involved in the funding of infrastructure through public-private partnerships in a trade-off between risk and return (Schoenmaker & Verlaan, 2013).

Trends in Dutch infrastructure funding

Dutch infrastructure funding can be characterised as having a strong focus on logistical demand through capacity demand analysis as well as a strong focus on long term budget allocation. This directly influences the development of new large infrastructural projects as these projects are strictly controlled from a national level but executed on a regional level. As responsibilities for the development of infrastructure occur on a regional level this creates a split between the execution level and the level providing budget for projects.

As demand for transportation is increasing faster than expected and infrastructural projects are complex and take many years to complete decision making and planning is complicated and mismatches can occur. Regions depend strongly on national plans and budgets which have already been spent for the coming years. There are two major reasons for the decline in availability of budget for new projects being:

- A major part of existing large infrastructural works reaching the end of its functional lifespan requiring large budgets for maintenance or reconstruction
- a decreasing natural gas income which was in the past partly used to fund large both urban development and infrastructural project.

It is the combination of these trends that has sparked the desire for private involvement in the development of regional transportation infrastructure. Private involvement is sought after in two major ways:

- Major infrastructural projects are increasingly executed through public-private partnerships where the national government through contracts attempts to move the financial risks of projects to the private parties involved in the construction and sometimes maintenance of the project
- Public parties are increasingly looking for co-funding options as well as more resources are put into research to alternative forms of funding showing that alternative forms of funding are taking on an increasingly important role

3.22 VALUE CAPTURING

According to Needham (2007) The Netherlands is one of the last of the developed countries in the world to adopt indirect capture instruments as these are enabled for the first time by the Land Act in 2008. ''*So even the Netherlands – with its uniquely strong tradition of direct government action in land purchase and development – must now rely more and more on land use regulation and private developers as a source of financing for public services*''(Needham, 2007: 176-177).

In the Netherlands two main alternative funding methods already exist. The first is the public-private partnership where through private contracts public and private parties collaborate to fund an infrastructural project. An example of such a project is the Sijtwende project in The Hague where a developer contributed to the development of a tunnel in return for being able to develop dwellings on top and next to the tunnel location (Edelenbos & Teismann, 2008). The private contribution to the project was in the end estimated to be about 13% of the cost of the construction of the tunnel (Offermans, 2004). This particular case can also be seen as an example of development contributions where funding is provided in in return for the right to develop an area (Verheul et al., 2017).

Another form of alternative funding present in The Netherlands is the '*baatafroming'* system that can be translated to benefit capturing or value capturing. Value capturing methods are based on the principle that the increment in value created by public efforts, in this case the increase of accessibility through construction of infrastructure, are partly or fully captured to fund the development of the infrastructure (Offermans, 2004). The system is seen as fair in the way that parties profiting from an increased value of assets contribute to the factor leading to the value increase.

In the Netherlands the value capturing instrument can only be used under strict conditions and requires local governments to make extensive plans and policy to show there are reasons to perform a form of value capturing. This creates risks for municipalities as landowners and developers are tempted to file lawsuits against municipalities for not being able to argue why the value capturing method was applied and for what amount of money. (BVH Ruimte & Vreman advies, 2014)

Apart from the alternative funding methods used in the Netherlands, more forms of alternative funding are used around the world. The methods, in theory, show potential to fund public transportation infrastructure now that long-term budgets have been set for the coming years and there is a trend of decreasing public funding of infrastructure (Alterman, 2012). Daamen and Zoest (2019) have identified the following three forms of alternative funding as promising and showing potential for use in the Dutch context:

- **Tax Increment Financing (TIF)**

Also known as accessibility increment financing and defined by Zhao (2010) and Medda (2012) As:
TIF is a fiscal incentive that earmarks future revenues to finance current expenditures. The method is mainly used in underdeveloped areas that are set to develop because of increased accessibility by investments in public transportation. It is in the US mainly used as a public-private financing tool used in urban redevelopment projects and for public transport investments. According to Medda (2012) about 30% of the Chicago city area is covered by TIF-zones. This is however controversial due to the great impact on tax incomes and steep land value increases in combination with densification. The TIF in this case creates an incentive for public bodies to develop an area to generate enough tax incomes to fund the infrastructure investments. This in turn decreases the funding for other needed amenities such as schools as the TIF in some cases takes up about 40% of the current and future tax base.

The Netherlands has a taxation system for real estate called the OZB tax. The problem with the OZB and a TIF construction in the Netherlands is still that the OZB tax is relatively low in comparison to its US counterparts and that the Dutch government compensates a high income from the OZB tax by lowering it national funding contributions to a municipality to give all municipalities in the Netherlands equal opportunities. Changes to the current system are therefore needed to actually make TIF work in the Netherlands. (Offermans, 2004)

- **Betterment tax**

Also known as value capturing and defined by Alterman (2012) and Medda (2012) as:
With value capturing the increase in land value from increased accessibility is captured to recover the costs for the investment in the public infrastructure. Given that the value of land in the vicinity of a public transportation station rises after the development of this new connection or the upgrade of an existing connection, it is according to this theory fair that the private parties profiting from public investments should contribute to the public investments made in this area. This technique is mainly used in the US and the UK although there is in the Netherlands a form that is a lot alike value capturing called 'baatafroming'. An example of a project where betterment tax is used is the Crossrail project in London, the United Kingdom. With Crossrail a number of metro and train lines in and around London are upgraded and extended to form a network of lines running from the east to the west of the city. The increased accessibility and associated increase in real estate values form the basis of nearly one third of the multi-billion investments and are retrieved through value capture mechanisms (Medda, 2012).

- **Development contributions**

Also known as *'private ontwikkelbijdrage'* and according to Verheul et al. (2017):
A form of funding where public and private parties negotiate about an extra contribution of developers in an urban area through private contracts to fund additional public investments and services in an area. This form of funding goes towards a public-private form. An example of this is the Sijtwende project in Voorburg, The Netherlands (Offermans, 2004).

Offermans (2004) adds two more ways of alternative funding that are applicable to the Dutch context. Firstly an active land policy where municipalities buy land and are therefore able to control the development process and use increases in land value to fund amenities. The method was common before the 2008 crisis but was however after the crisis seen as risky as many municipalities got into financial problems due to great losses caused by decreasing land prices.

Secondly, the development of a project by one party that develops the land as well as the infrastructure. In the Netherlands the NS, the Dutch national railway company, can be seen as such a party that exploits the Dutch stations as well as develops the areas around the stations taking the increments to fund its transport organisation. (Offermans, 2004)

Alternative forms of funding are applied around the world and on a small scale in the Netherlands. It is however hard to say whether methods used abroad are applicable in the Netherlands. Different institutional, formal, economic and locational contexts make it difficult to compare and apply foreign policies (Williamson, 2000).

3.3 Application of value capture instruments

The goal of this part of the chapter is to find value capture instruments that are relevant for this research as a plethora of alternative funding methods to secure private funding for public projects exists making a selection of instruments necessary. Therefore, a framework for the initial selection of instruments is created first after which an overview of instruments is created that can be compared. Lastly, instruments are selected and feasibility of use aspects are discussed.

3.31 Overview of value capture instruments and criteria

This chapter As explained in chapter 2.23 methods for infrastructure funding can be separated on three levels with the direct user level, the direct beneficiary level and the general public level. Instruments discussed in this research are based on the direct beneficiary level.

Value capturing instruments are successfully used abroad but can in their form for cultural, institutional and legal reasons not always be copied and used in the Dutch context. There are two ways of researching the use of value capture funding instruments in the Dutch context which is through:

1) Copying foreign successful instruments and testing these instruments on their applicability in the Dutch context, or;
2) Taking existing Dutch legislation and instruments and adapting these instruments

For this research the second approach is chosen. Foreign instruments can be interesting to investigate and show promising results but are however hard to adapt and apply in the Dutch context. The principles behind the foreign instruments and results achieved by the instruments can be used to benchmark the performance of the Dutch instruments.

Alternative forms of funding come in many shapes and forms and it is not difficult to come up with new creative forms of funding that might be able to contribute project funding. Interviewees have come up with an array of interesting ways to widen the funding base for infrastructure projects. Among these were increasing car parking costs, decreasing the parking norm for project developers and initiating partnerships with pension funds which often sound like practical solutions which however do often not burden the direct beneficiaries. It is therefore that for this research a selection of instruments is needed.

Instruments can roughly be separated by the party levied being either the developer, real estate owner or real estate user. Furthermore, the transfer of money either occurs through a tax, charge or transfer of costs. Roughly four main promising categories of instruments can be designated for application in the Dutch context:

- **Levies on properties**

- *Property tax based instruments*
  The property tax based instruments are based on the existing Dutch property tax system where through a valuation done by the municipality and a tax level set by a municipality tax based on the property value is raised. According to interviewees there are two major options to adapt this system for value capturing purposes which are the redirection of parts of the municipality budget deriving from newly built properties to form an accessibility fund, which is already done in the municipality of Utrecht, or initiating an area based additional property tax system which is with current legislation only possible on the municipality level
- *Transfer based instruments*
  Instruments used at the moment of transfer of real estate functioning on the basis of an additional transfer taxes or set amount
- *Betterment levy*
  A betterment levy exists in The Netherlands but may require adaptations as the instrument is for practical and legal reasons currently not applied. For the betterment levy a public party has to go far to prove there is a benefit and the private party will have to pay at once.

- **Charges on residents**
  - *Access charge*
    A charge used to recuperate the benefits of owning real estate on an accessible location. May be difficult to use in a catchment area but might be possible to be used in regional area. May effect real estate not in catchment area.
  - *Resident charge*
    Charge for all residents in a municipality for the funding of projects benefiting all residents. Therefore not strictly a value capturing mechanism.

- **Developer contributions**
  - *Voluntary developer contribution*
    Contribution by developer to the public transportation infrastructure. May be in exchange for extra development rights.
  - *Involuntary developer contribution*
    Using the existing or extending the existing possibilities for the recouperation of costs made to make an area accessible and prepare land for construction. Possible difficulties due to already existing set of involuntary contributions and proving the necessity of the contribution by the developer. Already extensively done, not for large infrastructural projects.

- **Publicly owned land revenues**
  - *Land lease*
    Existing instrument where land stays in public hands and is leased to property owners. Through the increased land value in relation to the infrastructure investments it is possible to yield extra income from the land lease

- *Land sale*
  The increased land value yields higher land sale prices. Using this instrument might be difficult because of lacking public land ownership and other public goals than highest land sale price as well as the timing of the sale of land in relation to the completion of an amenity.

3.32 INSTRUMENT SELECTION

Not all instruments on the list as shown above are applicable or in the scope of this research. Therefore a set of instrument selection criteria is created to be able to select value capture instruments relevant to this research. Instruments relevant to the research have to fulfil a few requirements that derive from the research scope and Fogarty et al. (2008).

For this a few main selection criteria have been created to determine whether an instrument is a value capturing instrument that can be applied in relation to the direct catchment area of public transportation station and whether the instrument is not or rarely used in the Netherlands.

1. Applicable to catchment area – Is it possible to apply the instrument in the catchment area of the amenity (Fogarty et al., (2008)
2. New or promising instrument – Is the not already widely applied and is the instrument promising
3. Applicable to research – Combination of description of instruments and instrument selection criteria

Value capture instrument	Dutch term for instrument	Value capturing instrument	Applicable to catchment area	New or promising instrument	Applicable to research
Levies on properties					
-Area property tax with TIF construction	Gebiedsgerichte OZB met TIF constructie	Yes	Yes	Yes	**Yes**
-Redirection of property tax	Afromen toename OZB	Yes	No	Yes	**Yes**
-Betterment levy	Baatbelasting	Yes	Yes	Yes	**Yes**
-Additional transfer tax	Opslag overdrachtsbelasting	Yes	No	Yes	**Yes**
Contribution by developer					
-Voluntary contribution in exchange	Vrijwillig bijdrage in ruil voor verandering in ontwikkeling	Yes	Yes	No	No
-Involuntary contribution	Verplicht Kostenverhaal/ bovenplanse bijdrage	Yes	Yes	No	No
Charge on people living in catchment area					
-Access charge	Bereikbaarheidsheffing	No	No	Yes	**Maybe**
-Resident charge	Ingezetenenheffing	No	No	Yes	No
Revenues from publicly owned land					
-Sale of land at moment of development	Verkoop gronden in eigendom: Eenmalig bij ontwikkeling	No	Yes	No	No
-Sale of land in ground lease for perpetuity	Verkoop gronden in eeuwigdurende erfpacht	Yes	Yes	No	No
-Sale of land in temporary ground lease	Verkoop gronden in tijdelijk erfpacht	Yes	Yes	No	No

Table 6: Instrument selection overview

Looking at the table above the last column shows the result of the selection of instruments. Clearly two categories of instruments being the contribution by developers and revenues from publicly owned land fall away. Although many of the instruments can be used as value capturing instruments they are not in particularly new and also rather specific to a situation and easily influenced by the situation.

Furthermore, contributions by developers can be applied as value capturing although in this case it is not the user or owner of a property that benefits that is burdened. Next to this, developers are by many interviewees even on the public side of the spectrum seen as party that already carries a large size of the burden for urban area development through existing legislation.

Levies on properties as well as charges on people living in the catchment area have a more institutional character and are pointed at real estate owners and users in an area. Furthermore, both categories are rather new to the Dutch context and therefore interesting to take into account in this research.

3.33 Feasibility of application of value capturing instruments

Part of the scope of this research is to look at the financial potential of the application of value capture instruments. The theoretical possibility of capturing value and recouping public investments is subject to feasibility problems. According to interviewees two main categories

threaten the effective application of value capture instruments being legal aspects and political governance aspects. Both are in this research related to the influence on the financial feasibility of the application of value capture instruments. Financial feasibility is in this research seen as whether the instrument has enough effect to be worthwhile using - does the instrument effectively contribute funding. Next to this, financial feasibility is considered in terms of whether there is a large risk of the amount expected to be captured differing from the amount of value that is actually retrieved.

The two major aspects that are important in this respect are considered below:

Legal feasibility
For the legal feasibility aspect the profit principle, proportionality principle and accountability have to be taken into account.

The profit principle is the starting point for any value capturing instrument as it stipulates that there is a benefit that does reasonably belong to the party causing the benefit. In the context of value capture feasibility it stipulates that a party has to have a benefit and it should be possible that a party has a benefit. It also means that with less benefit the contribution of a party should be lower.

Part of the profit principle is therefore considering the proportionality of the use of an instrument which in this case means that the question whether a party contributes proportionately to the benefit is has received. Another part of the profit principle considers accountability. It is important to be able to show what party does benefit and to what extent a party benefits and can therefore be held accountable.

Political governance feasibility
In the case for the political feasibility two parts are of major importance being the political sensitivity of an increase in burden and capability of a public organization to execute an instrument.

- Increase in burden

An increase in burden for civilians decreases the political feasibility of an instrument. On the other hand, from an economical point of view it is best to make users and beneficiaries make the biggest contribution to projects as this can decrease the general tax burden. Next to this, if the introduction of an instrument is part of a set of measures where in other parts of the tax system income decreases it might be necessary to increase taxes in one place.

- Governance and efficiency

For the governance feasibility part the question is whether there is support for profit principle based finance instruments. Next to this the question is whether a chosen instrument can be executed by the parties responsible for the application of the instrument in for a project. If the costs for collecting funding through instrument are too high it might not be efficient to use value capturing.

Implications for financial feasibility
As stated above the financial feasibility is taken as focus for this research. The legal and political governance feasibility have to be taken into account in the respect of their influence on the financial feasibility of the application of value capturing instruments. In the table below some of the complications and risks that have to be taken into account when considering the financial feasibility are presented.

Feasibility aspect	Impact on financial feasibility
Legal feasibility	
Profit principle	Proving what the benefit gained is may be hard to do and can be contested by private parties possibly decreasing returns.
Proportionality principle	Due to the proportionality principle it might not be possible to capture all of the increase in value in relation to an infrastructure investment
Accountability	It is up to the public organisation to prove that a party is benefiting from public investments. This can lead to lawsuits with parties disagreeing creating legal costs and increasing the risk of a lower value capture return
Political governance feasibility	
Increase in burden	It might not be feasible to increase the burden on parties near a station location. It is however not possible to tell to what extent this impact the financial feasibility of a value capturing instrument
Governance and efficiency	The governance aspect does impact the financial feasibility of a value capture instrument. Depending on the chosen instrument the costs of executing the instrument might not outweigh the return due to complexity of the instrument and relating costs for applying the instrument taking away support for the application of value capture instruments

Table 7: Impact of feasibility aspects on financial feasibility

Looking at the table above shows that in applying value capture instruments considering the legal and political governance feasibility have to be taken into account before even considering to perform value capturing. It seems that the size of a project and a professional organisation are beneficial to meeting the legal feasibility requirements as well as making the capturing worthwhile.

Furthermore, a value capturing instrument should be designed in such a way that it can deal with the legal feasibility problems so as to decrease the legal risks in the application of the value capture instruments. For the political governance feasibility it is important to note that an increase in burden is a politically difficult aspect but cannot be taken into account in this research nor in considering financial feasibility in the sense that coming up with additional alternative forms of funding will nearly always cause an increase in burden in relation to the instrument and can also not be seen separate from financial burdens for other goals.

The governance aspect does present an important take away as it shows that small scale value capturing might be too costly and complex and expensive to apply value capturing instruments might also not justify incurring high costs for the application of instruments.

3.4 SUMMARY

The goal of this chapter was to get an understanding of the Dutch, mainly Randstad, public transport and urban development context and to create an image of how infrastructure is currently funded and value capturing in the Dutch context. At the basis of this chapter lay the following three research questions:

- What does the Dutch urban development and public transportation context look like?
- How is the construction of public transportation infrastructure funded in the Netherlands?
- How can value capturing instruments be applied in the Dutch context?

Dutch urban development and transportation context
The Netherlands had a strong centralised planning culture for both urban development and infrastructure development. This culture has seen a shift since the last large urban development programmes were finished after the turn of the century and the responsibility for future urban development and transportation development will therefore likely shift towards lower levels of government and be decentralized. Furthermore, the Randstad conurbation is nowadays seen as the major location for the development of new dwellings where mobility will be leading.

Dutch public transportation infrastructure funding
-Funding of large infrastructural projects is centrally organized with the ministry of V&W being responsible for the maintenance of the national road network and the funding of large infrastructural projects
-There are three main sources for funding for large infrastructural projects in the Netherlands being: the infrastructure fund, the MIRT investment planning and European budgets. The budgets have a long scope of over ten years creating a stabile flow of investments and extending time horizons of infrastructural projects decreasing the flexibility of infrastructure investments
-Local parties receiving more responsibility for infrastructure development are increasingly looking for alternative forms of funding
-Three major forms of value capturing are considered as high potential options being: Tax Increment Financing, a Betterment Tax and Development Contributions
-Value capturing instruments do currently exist but are however rarely used in the Dutch context

Application of value capture instruments
-For this research existing instruments or instruments based on existing legislation from the Dutch context are used as foreign instruments cannot with certainty be used in The Netherlands
-A list of four instruments is selected for use in this research to apply as value capture instruments which are: area property tax with TIF construction, redirection of property tax, betterment levy, additional transfer tax
-The feasibility of use of value capture instruments is considered by looking at the influence of the most important legal and political aspects on the financial feasibility of using value capture instruments

4. THE CASE OF INFRASTRUCTURE AND SPATIAL DEVELOPMENT

In order to get a better understanding of integrated urban development and infrastructure development and funding a case study was undertaken for this research. The goal of the case study is to get a better understanding of the process and impact of the integration of urban development and public transportation infrastructure development. Next to this, in order to apply the lessons learned and apply value capture instruments a second case was selected to act as a prospective case. In this chapter the following research questions are addressed:

- What lessons can be learnt about infrastructure and urban development from an existing integrated urban development and public transportation infrastructure project?
- What is the value of the private financial benefits generated by public transportation infrastructure investments?

First, the methodology used to approach the case study research is elaborated on. After this, the cases are analysed from a regional to local level to at the end of this chapter analyse the cases in relation to value capturing.

4.1 METHODOLOGY

In this part of the chapter the methodology applied in the case study research is explained. As the selected study type is a qualitative case study the motive for choosing certain cases is important. First, the choice for the retrospective case study Randstadrail Berkel Westpolder location and the Oude Lijn Van Nelle location business case are further elaborated on.

4.11 CASE STUDY SELECTION

As stated in chapter 2 and 3 the housing shortage and infrastructural capacity issues in the Netherlands are regional problems requiring regional solutions. It is therefore interesting to consider a typical regional case where both are integrated as a typical case can perform as an example (Bryman, 2012). Therefore, a regional public transportation infrastructure project where infrastructure development and urban development is seen as desirable for this research.

- **Retrospective case study: Randstadrail, Berkel Westpolder**

The Randstadrail project is seen as a successful implementation of the integration of a transformation of a regional transportation connection in combination with regional urban developments. The aim is to determine the added value created in this particular situation and find variables that determine the size of this added value. Treated as a typical case it is interesting to pull lessons from the case.

The impact of the infrastructure project is studied by looking at the Berkel Westpolder station location along the public transportation line and find out what the impact of the transformation of the Hofpleinlijn was on this location in terms of urban development and added value. This location is interesting because it is claimed that urban development and infrastructure development were integrated. What is also interesting about the location is that it is a typical location in terms of urban development in The Netherlands around the time when Randstadrail was developed as it is a VINEX policy greenfield location.

- **Prospective case: Oude-Lijn, Van Nelle Fabriek**

In choosing a prospective case location it was for this research seen as important that the location is somewhat comparable to the retrospective case location as this makes the lessons learned from the retrospective case more applicable and relevant. The location is different from the Berkel Westpolder location in terms of: urban typology, current functions on the location and type of location. The location currently can be characterised by different functions and land use types as well as it being an inner city location. Although there are many differences with the Berkel Westpolder location the location is interesting to research because it makes a typical location for current and future urban area development making the case relevant for the research problem. Next to this, the lessons learned from the Ranstadrail case about value development and about infrastructure planning can still be applied on the case.

The Van Nelle case is approached in the same way as the retrospective case by first doing research on the higher infrastructure level and next zooming in on the location. Because it is a prospective case there is no use for doing an extensive case study which is why this is not done as extensively. Instead, focus lays on creating a business case for future development and researching what development can take place to see how this can be combined with value capturing. For this purpose, the location is also suitable as it combines a mix of existing areas and areas that will receive a major role in urban area development over the coming years making the location relevant for the research problem.

4.12 Research techniques

For the research a number of techniques will be used to form a complete image of the case. Furthermore, the timing and output are discussed to create an image of the interdependencies and impact on deliverables of the several different research steps and techniques that are used.

- *Document study on local urban developments*
    - Aim: To determine how urban and mobility development were integrated
    - Source: Project plans, municipality reports, zoning plans, development plans
    - Timing: After location selection and after first parts of regional study are done
    - Output: Analysis of locational developments and there relation to the mobility development in the form of maps, explanations and tables

- *Interviewing for cases*
    - Aim: To determine the role of stakeholders in the process, governance and the project costs and funding
    - Source: Stakeholders; Project organisation representative(s), municipality plan makers, representative from ministry of I&W, area developer,
    - Timing: During case study in the first half of phase 2
    - Output: Interview transcriptions. Input for regional research on Randstadrail development process; stakeholders, process, funding, regional development, urban development, mobility development

- *Determining expected rise in real estate value related to light rail transit development*
    - Aim: Determine value change related to the upgrade of the Hofpleinlijn
    - Source: Literature, interviews, case study, BAG, funda
    - Timing: During empirical part of research, phase 2
    - Output: Determination of value change caused by development of the upgrade of the transportation infrastructure

Interview set-up

- Purpose

There are two different interview groups. On the one hand there is the interviewing that is directly about the case study to gain a deeper level of understanding of the case. Through interviews it is possible to create an image of the process leading towards the integrated development of regional transportation lines and get more insights into the stakeholder intentions as well as find out more about the project costs and funding.

The other group are policymakers and stakeholders in the funding process for mobility in the Netherlands that create the framework for alternative funding. It is this group that is interviewed about alternative funding methods and how these methods can practically be used and to what extent.

- Technique

For the interviews the semi-structured interview technique is used. This is due to the small number of people that will be interviewed and the possibility for the interviewer to deviate from the interview. Furthermore, the semi-structured interview technique offers the flexibility needed in a small-scale research. The downside of using a semi-structured face-to-face interviewing technique is that it may influence the behaviour of the interviewee; it is possible to guide an interviewee in a different direction. Being aware of the flaws that come with the use of a semi-structured interviewing technique reduces this risk (Opdenakker, 2006).

- Interview protocol

It is desired to record the interviews to, as interviewer, be able to focus on the interview. Permission for the recording will be asked in advance as well as an explanation of the purpose of the research and a case study summary. There are two interview protocols with one before the case study and one on alternative funding.

Case study interview

2. Interview opening
3. Position and profile
4. Project governance and stakeholders
5. Funding and costs
6. Interview ending

Alternative funding interview

1. Interview opening
2. Position and profile
3. Experience with use of alternative funding
4. View upon the use of alternative funding
5. Feasibility of use of alternative funding methods in the Dutch context
6. Interview ending

The interview protocol is the basis for the interviews. As the purpose of the interviews may differ due to different roles of the interviewees it is necessary to deviate from the protocol in terms of questioning. Next to this, the semi-structured interview form creates space for the interviewee to freely talk about their point of view and experience. Furthermore, to come to a natural flow in the interview it is possible to deviate from the pre-formulated questions.

4.2 Retrospective case study: Randstadrail, Berkel Westpolder

The Hofpleinlijn transformation part of the Randstadrail project is seen as a successful infrastructure project linking two major Dutch cities and running across a number of municipalities. The project is unique in the way it was organized and planned and lessons can be learned about the integration of infrastructure development and urban development. Firstly, the infrastructure development process is studied after which the related urban development on a location along the line is studied.

4.21 Infrastructure project overview

For this research the transformation of the Hofpleinlijn and related urban development is studied. The Hofpleinlijn, formerly part of the Dutch national heavy rail network, was transformed to form a part of the light rail network in the southern part of the Randstad region

as a part of the Randstadrail network. The line is currently serviced by the Rotterdam metro network and used by metro line E.

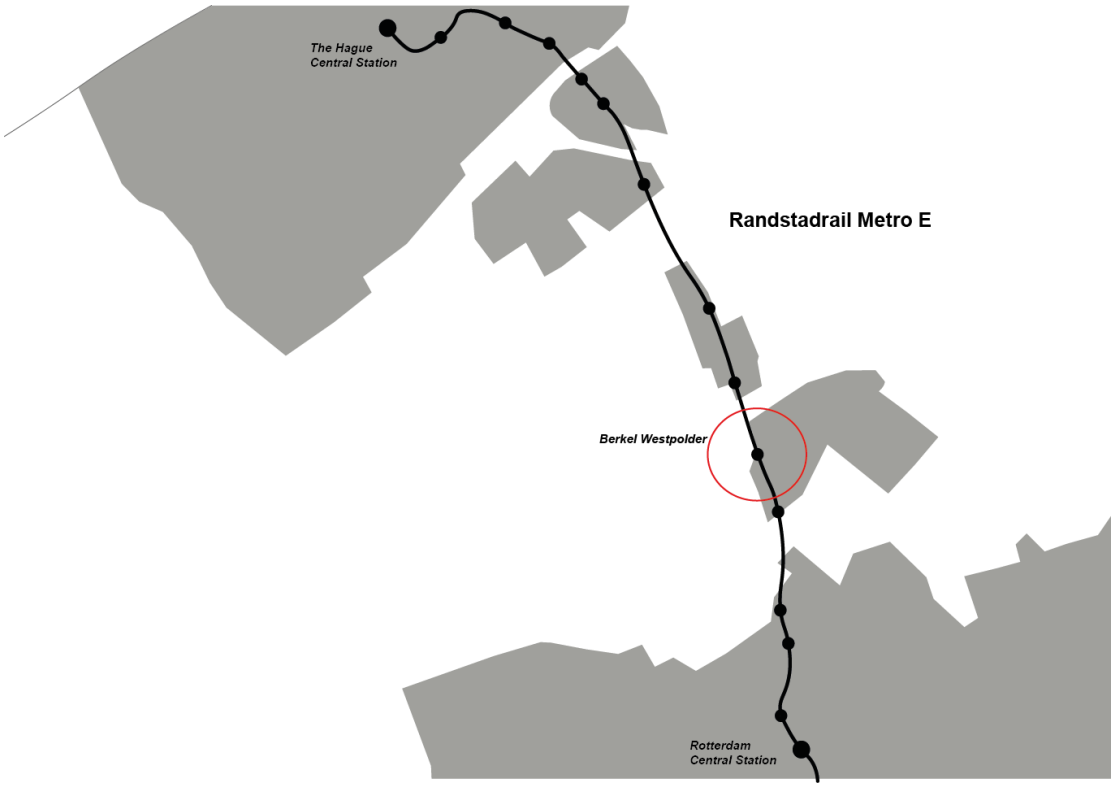

Figure 9: Randstadrail Metro line E case location (own illustration)

The Randstadrail project

The transformation of the Hofpleinlijn is part of the Randstadrail project. The project included the redevelopment and extension of existing railway tracks in the region between Rotterdam and the Hague in the southern part of the Randstad region. With the redevelopment a few goals were set to be fulfilled by the redevelopment of the existing infrastructure to light rail infrastructure (Koppenjan et al., 2008):

1. Spatial development: make new VINEX areas along the lines accessible
2. Geographical: in the southern Randstad region, create direct connections between the centres of Rotterdam, the Hague and Zoetermeer
3. Technical: Make more efficient use of existing rail infrastructure by increasing frequency, better stations and better trains
4. Modal split: A change in modal split towards more public transport oriented transportation

In 1995 a study group was set up by the province of Zuid Holland, the city region Stadsgewest Haaglanden and the city region of Stadsregio Rotterdam to investigate the extension of the public transportation network in the southern part of the Randstad region. The main task of the study group was to develop ideas to create an alternative for the car traffic congestion and air pollution caused by this traffic investigating an increase in quality of public transportation. Part of the research was to investigate the Hofpleinlijn and the performance of the line. This resulted in a study called 'Randstadrail, de files voorbij' that propagated the intensification of the use of existing rail lines with construction of additional rail lines. The

Hofpleinlijn, part of the scope of the research, was seen as an underperforming railway line part of the national railway network and not embedded in the public transportation network in a sufficient way. Next to this, the line lacked quality in terms of frequency, image and comfort. Additionally, the operator of the line, the Dutch railways ('NS') had the desire to decommission the line due to high operational costs and low passenger numbers. (Veen & Adel, 2014)

The existing railway tracks used to be the responsibility of the national government and were maintained by Prorail. With the change in status from heavy rail infrastructure, part of the national rail infrastructure network, to light rail infrastructure the responsibility for the line shifted to lower levels of government and Prorail was, after preparing about 150 km of track to be able to serve light rail vehicles, no longer responsible for the maintenance of the railway tracks (Infrasite, 2006). In this way the responsibility for the maintenance and operation of the line shifted to the city regions of The Hague and Rotterdam (Koppenjan et al., 2008). A shift in responsibility for maintenance and operation as occurred with the existing railway tracks used for Randstadrail in the Southern part of the Randstad region is unusual in the Netherlands and shows how regional public bodies have gained power and receive greater responsibilities. The transformation can therefore be seen as a part of the decentralisation of responsibilities.

The Randstadrail transformation project was coordinated by two main stakeholders in the project, the municipality of Rotterdam and the municipality of the Hague. Both city had a leading role in their own city regions. The city regions operated as clients and within the city regions cooperation on the field of urban development and regional transit development was arranged. In their role as client the two parties assigned parties to execute the development of the Randstadrail transformation being the Dienst Stadsbeheer ('*DSB*') of the municipality of the Hague and the RET for the municipality of Rotterdam (Ten Heuvelhof et al., 2008). The DSB and RET are different organizations where the DSB is part of the organization of the municipality of the Hague and the RET is an independent transport body responsible for the Rotterdam region. Both city regions adopted a different approach.

The Randstadrail network became operational in phases. The first phase was mainly about reopening existing lines with new services what in the end took one year to complete. Two parts were finished later with the tunnel leading from the outskirts of the city of Rotterdam to the central station connecting the line to Rotterdam metro network opening in 2010 and a new connection to the The Hague central railway station opening in 2016.

The new Rotterdam Hofpleinlijn opened in 2010 with the completion of the tunnel leading from the outskirts of the city to the Rotterdam central railway station. After completion of the Randstadrail transformation Zoetermeer was connected with The Hague and it was possible to go from city centre to city centre using the Hofpleinlijn, at a higher frequency with additional new light rail station location along the line between The Hague and Rotterdam. Next to this, new vehicles were purchased and the regional network was rebranded to Randstadrail.

Part of the redevelopment of the existing railway tracks is the redevelopment of the Hofpleinlijn running from Rotterdam to the Hague which was constructed at the beginning of the 20th century as a heavy rail line. Running from Rotterdam to the Hague, the line crosses through three other municipalities which are the municipality of Lansingerland, the municipality of Pijnacker-Nootdorp and the municipality of Leidschendam-Voorburg.

Stakeholders/project governance

The Hofpleinlijn project was initiated by a cooperation between the city regions and the province of Zuid Holland that jointly conducted an exploration study to the introduction of a light rail system in the southern part of the Randstad region to create an alternative for car mobility in the region. After some alterations to the original plans it was in 2001 that an agreement was reached between the city regions and the national state, the ministry of Verkeer & Waterstaat, for funding for the transformation and extension of the line. (Leijten et al., 2010)

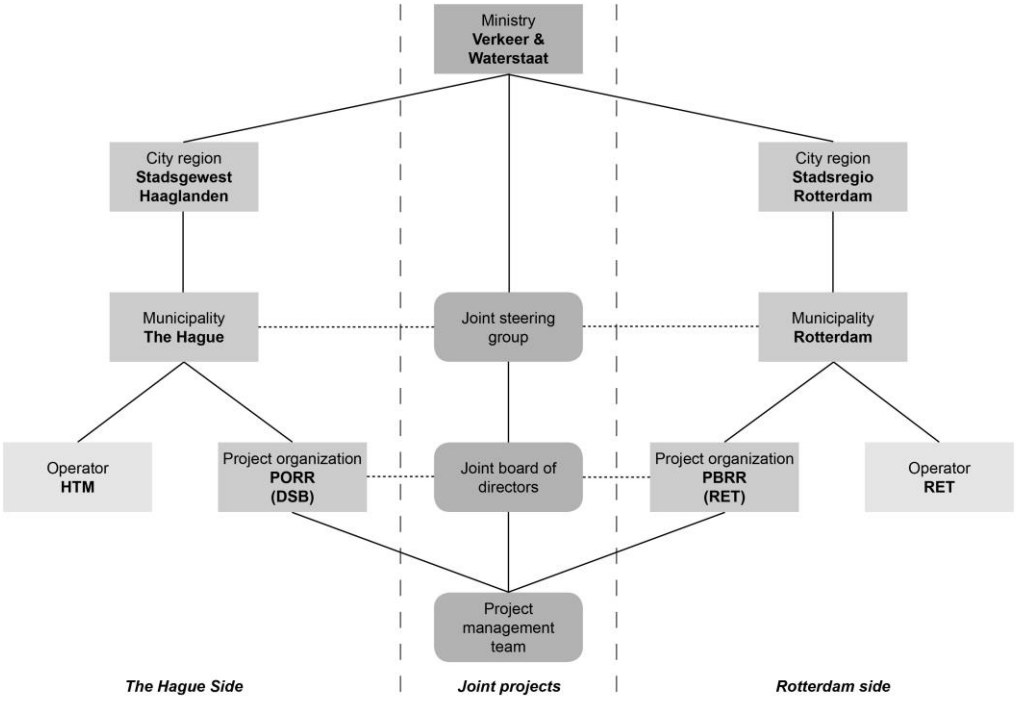

Figure 10: Overview of stakeholders in Randstadrail project

During the transformation of the line the project was divided in two sides with the city region in The Hague responsible for the The Hague side of the Hofpleinlijn and the city region of Rotterdam responsible for the construction of the Rotterdam side of the project. The city regions secured the subsidies needed for the transformation and operated as clients. The city regions contracted the municipality of The Hague and Rotterdam to operate as the coordinators. The municipalities then both set up their own project organization to coordinate the transformation of their part of the line. Upon finishing the project both municipalities became responsible for granting the concession for their part of the line.

Furthermore, the two sides cooperated on a few overarching project parts such ICT systems and the Randstadrail branding and connection of the two transportation systems.

Project funding

The project funding can be separated in two parts being the The Hague and Rotterdam part. Information about the funding for the redevelopment to light rail is provided for all the parts of the Randstadrail including the part of the line running to Zoetermeer. An overview of the sources of funding and total funding can be found in the table below:

	Stadsgewest Haaglanden	Stadsregio Rotterdam	Randstadrail total budget
Subsidies of ministry of V&W	€413 million	€392,4 million	€805,4 million
Local municipality contribution	€32,9 million	€114,1 million	€147 million
Total	€445,9 million*	€506,5 million**	€952,4 million

Table 8: Overview of sources of funding and total funding for Randstadrail
**Budget in 2002 (Ten Heuvelhof et al., 2008)*
***Budget in 2001 (Veen & Adel, 2014)*

The subsidies provided by the ministry was provided in lump-sum at the start of the project (Veen & Adel, 2014). With providing the subsidy for the project in lump-sum the ministry also transferred the responsibility for cost overruns from the national government, the ministry level, to the lower regional authorities. On the one hand this meant reducing transaction costs and moving responsibility to a lower level of government on the other hand this meant that the regional authorities had to be careful with cost overruns with the responsibility of the cost overruns laying at the client level. The city regions received the subsidy at the start of the project and also received the risk of cost overruns. The city regions served as clients and contracted parties to construct the line and became responsible for granting the concession for operating the line. This was not an innovative set-up although it is not usual with risky and uncertain projects, such as Randstadrail. Moving responsibility for the execution of Randstadrail and the responsibility for cost overruns to the same level resulted in a project focused on keeping costs under control. (Leijten et al., 2010)

4.22 URBAN DEVELOPMENT

For this research a single location between Rotterdam and The Hague along the Hofpleinlijn is used as case study to be able to understand the relationship between the transformation of the line and the spatial development in the region. Next to this, near one stop along the line the transformation of the line is linked to the real estate value developments in the region to see the impact of the transformation of a heavy rail line to a light rail line on real estate values.

The Berkel Westpolder development area is part of a VINEX area in the southern part of the Randstad region called Noordrand lll, This part of the chapter is about the impact of the VINEX policy on the urban development in the area.

VINEX and spatial development

With the emerging housing shortage at the beginning of the 1990s it was decided to make agreements with local city regions to develop more housing. In these agreements, covenants, promises were made about housing production in the region and locations were appointed for large scale housing developments (VROM, 2012). Studies were conducted at the beginning of the 1990s on a national level to find locations for large scale housing developments as can be seen in figure 12. An overview of an indication of the new VINEX locations near the city of Rotterdam can be found in figure 13. Agreements for the development of a total of 53.000 housing units were made that were to be constructed in the period between 1995 and 2005.

Municipalities could be appointed development communities (‘*bouwgemeenten’*) meaning that these municipalities were to develop plans for the execution of the VINEX policy. It was in this way that at the northern side of the city of Rotterdam two municipalities, the municipality of Bergschenhoek and the municipality of Berkel en Rodenrijs, were appointed development communities and plans for the development of between 10 and 15 thousand housing units had to be drafted. (Fleischeuer et al., 2014).

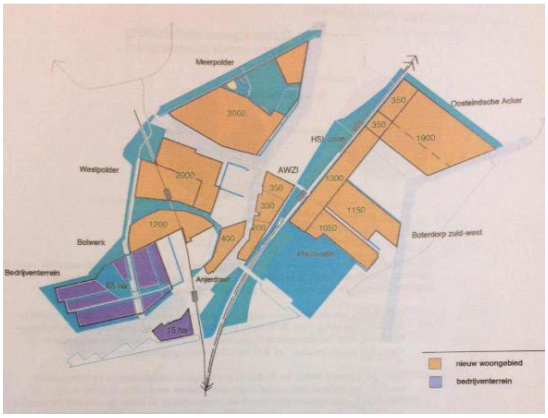

Figure 11 and 12: Regional plans for VINEX in 1991 and local structure plans for the Noordrand 3 are (Fleischeuer et al., 2014)

According to Fleischeuer et al. (2014) the municipality of Berkel en Rodenrijs at the time was a small town with just 5.500 dwellings with an annual growth in housing stock of just under one per cent. Discussions with the province and city region started at the beginning of the 1990s and concerned the appointment of the area as ‘construction area’ (‘*bouwgemeente’*). The municipality feared that the national government would push through the development plans if did not cooperate in the plan making. In fear of the national government forcing the municipality to execute the plans through a direction of the ministry or through annexation of the municipality by neighboring cities the unexperienced municipality decided to cooperate. The municipality came to an agreement with the city region to make plans for the development of 4.500 dwellings in the area and the development of about 100 hectares of commercial land, as can be seen in figure 14.
The VINEX policy had a clear hierarchical governance structure where several layers of government were responsible for the execution of plans. Through a top down structure several layers controlled lower layers covenants and agreements. Roles of the stakeholders were according to Fleischeuer et al. (2014) separated as can be seen in the table below:

Government level	**Role**
Minstry of VROM	The role of the ministry of VROM in the process was to support the local municipalities with subsidies for land acquisition as well as extra budget for needed investments in other amenities (‘Verfijningsregeling’). Next to this, the ministry was monitoring whether plans developed by lower levels of government would meet the production amounts agreed on in the covenants.
The province of Zuid Holland	The province did research into the number of dwellings that were needed in the region and participated in the development of structure plans (‘structuurplannen’) on a regional level

The city region Stadsregio Rotterdam	The city region was responsible for the realization of the initial plans and did this by making agreements with the municipalities that were involved in the VINEX developments in terms of housing numbers that were to be developed as well as subsidies that were required for this. This was done through execution covenants with lumpsum agreements.
Municipality of Berkel en Rodenrijs	The municipality was responsible for the zoning plan and the urban plan in the area for the housing developments. Next to this, enforcing the execution of the plans and preparing the land for construction in difficult locations was also part of the responsibility of the municipality which in the case of Berkel en Rodenrijs mostly meant carrying out an active land policy.

Table 9: Overview of levels of government involved in the VINEX programme and their role

Spatial policy and funding

The municipality of Berkel en Rodenrijs conducted an active land policy requiring large investments for land acquisition. The programme of development consisted of 30% expensive housing, 40% mid-level housing and 30% affordable housing. In the plans it was foreseen by Stadsregio Rotterdam (1995) that the expensive housing would not require subsidies, the mid-level housing would require small subsidies and the affordable housing would require heavy subsidizing to be realized.

During the time when land had to be acquired for the housing developments it was noted that private parties had in the years before the plans were accepted by the municipality been acquiring land in the municipality resulting in large rises in land prices in the municipality due to speculation with development land. This rise in land prices was not taken into consideration on the beforehand, when the subsides were provided, which resulted in a shortage of investment capacity for requiring land in the area. (Fleischeuer et al., 2014)

Furthermore, with the shortage of investment capacity and speculators investing in development land the municipality of Berkel & Rodenrijs was forced to cooperate with the land owners to acquire the land. At the time, an active land policy was normal practice. Berkel and Rodenrijs therefore acquired all needed development land. Due to the increase in prices and strategic land ownership of developers in the area the municipality did however have to grant development rights to developers owning land in the area with the provision that developers could start construction at their own desired moment in time. This resulted into the municipality not meeting the housing production agreed upon as well as high losses on the land acquired during the credit crisis almost bankrupting the municipality. (Fleischeuer et al., 2014)

VINEX policy and mobility

The goals of the VINEX policy lay in line with the mobility policies that were in place at the end of the 20th century, the time when plans were made for the development of VINEX and Randstadrail. The main goals of mobility policies at the time were increasing accessibility and liveability in general. To accomplish these goals a set of policy measures were taken which were according to the Projectteam Randstadrail (1996):

- A conservative approach towards the construction of new roads
- The discouragement of car use and spread of congestion over the day
- Spatial development based on mobility with new spatial developments near public transportation lines

- Offering adequate public transportation as an alternatives for consumers that are due to the other policies deciding not to use the car

According to the Projectteam Randstadrail (1996) it was according to policy only possible to reach the underlying goals of reducing car traffic and related pollution if all measures were executed. In hindsight, according to an interviewee, one can say the measures were not all effectively executed with mainly a conservative approach towards the construction of new roads and the discouragement of car use lacking.

In the case of the Randstadrail, the combination of mobility and spatial development was however successful and policy was therefore effectively executed in the Randstadrail area. This might also be because in order to make investments in public transportation infrastructure viable a certain amount of passengers is required. Apart from making the public transportation network more attractive to passengers, increasing the number of people living or working in the catchment area of the infrastructure is also an effective way to increase ridership. This is another reason for the mobility led spatial policies that sought to concentrate new housing and employment near public transportation lines. (Projectteam Randstadrail, 1996)

The national government, the ministry of VROM responsible for spatial development in the Netherlands at the time made agreements with regions and stakeholders on how mobility and urbanisation were to be arranged. In these agreements the high quality form of public transportation in the form of new railway stations, light rail or free bus routes were laid down with the condition that with the completion of two-third of the homes the high quality transportation was to be completed (VROM, 2012). To supply this high quality public transportation a set of standards were set looking from the consumers perspective to define the high quality public transportation. In the case of Randstadrail the high quality public transportation also referred to as HOV ('Hoogwaardig Openbaar Vervoer') for consumers was characterized as fast, frequent, on-time, comfortable and with a good image (Projectteam Randstadrail, 1996).

Apart from reducing car usage more side-effects were expected from the implementation of a high quality public transportation system such as a decrease in air pollution, an increase of employment and an increase of housing prices near the public transportation lines. (Projectteam Randstadrail, 1996).

The two city regions in 1995 made agreements with the ministry of VROM in the form of covenants where agreements were made about the VINEX development in an area. The covenant contained agreements about housing production and the development of high quality public transportation in combination with agreements about subsidies for land acquisition. Agreements about housing production and related soil decontamination as well as subsidies for land acquisition were arranged with the ministry of VROM. Agreements for the high quality public transportation on development and subsidies were made with the ministry of V&W. (VROM, 2012)

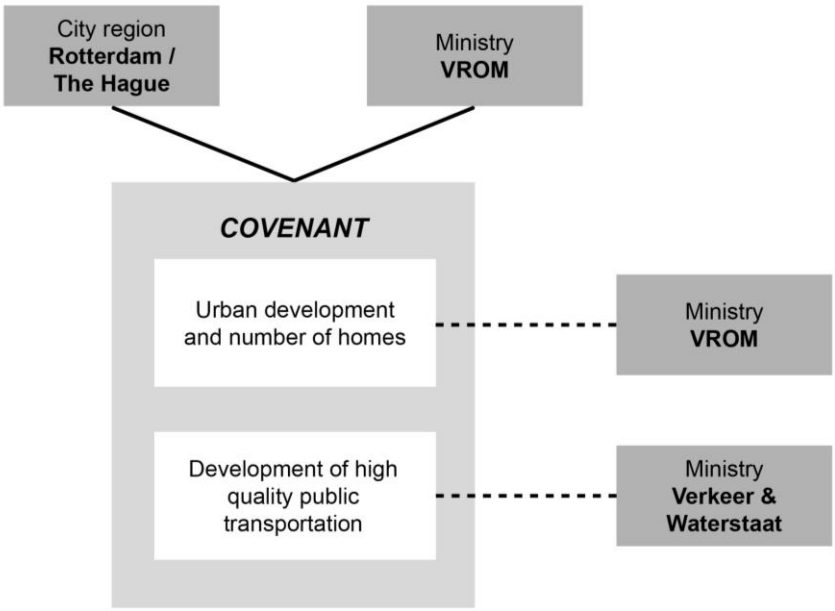

Figure 13: Relationship between covenant and stakeholders

4.3 Retrospective case study findings

The goal of the case study is to get a better understanding of the process and impact of the integration of urban development and public transportation infrastructure development. In this chapter the following research question were addressed:

- What lessons can be learnt about infrastructure and urban development from an existing integrated urban development and public transportation infrastructure project?
- What is the value of the private financial benefits generated by public transportation infrastructure investments?

In this part of the chapter the research questions are considered and provides an overview of insights that is used later on this research.

4.31 Lessons learned

Randstadrail and the VINEX policy were in some ways connected. Spatial developments with the construction of thousands of homes resulted in a need for a high quality regional form of public transportation to make new development areas accessible and reduce car mobility in the region. Several organizations in the Southern part of the Randstad region were involved with the development of VINEX and Randstadrail where the city regions played a prominent role in the development of both VINEX and Randstadrail.

Mobility and spatial funding

With the covenant for VINEX subsidies for mobility and urban development came from two separate ministries. Furthermore, municipalities along the Hofpleinlijn got the task to execute the VINEX policy and develop thousands of homes. Through an, most of the time, active land policy, land was acquired for the development of homes and business areas. Because of the required mix of housing, costs of preparing the land for construction, density and high prices

of the land, municipalities had difficulty with earning back the investments. Next to this, some municipalities were forced to take losses on the urban development projects due to decreasing demand for housing and decreasing land prices. Moreover, on a funding level the two projects were not connected in the region as mobility and spatial development were separated in terms of funding.

Connection between mobility and spatial development
The spatial and mobility developments were not planned in collaboration. From a mobility point of view the extra residents in the catchment area of the line were needed to make the transformation of the line feasible. From a spatial development perspective, policy to develop VINEX areas next to high quality transit did however result in urban development near the metro line E. Furthermore, extra stops were added to the line due to service the urban development in the area. Therefore, the spatial and mobility development were not integrated but do depend on each other to become feasible.

4.32 Randstadrail infrastructure project findings

From the Randstadrail point of view a few lessons can be learned from the Randstadrail project in relation to spatial development and the process of rail transformation and light rail development:

- **Lumpsum funding**

For the Randstadrail project a lumpsum funding method was used. This was a relatively new method of subsidizing a project but was done on purpose to be able to move the responsibility for cost overruns to a lower level of government. The reason this approach was chosen was due to other large national infrastructural projects at the time saw large cost overruns. The lumpsum approach had a positive influence on the project as cost management became important for the parties executing the project and the lumpsum approach made it possible to be flexible in budgeting within the project.

- **Transit oriented development**

The existing heavy rail line made it possible for spatial planners to orient their development plans towards this existing line. The joint effort of the city regions in terms of making agreements with the ministry for spatial development and supporting the development of the Randstadrail network made Transit Oriented Development possible.

- **Ridership**

Ridership was an important factor in decision making in the planning phase of the transformation of the Hofpleinlijn. In the transportation models, the intended spatial development was taken into account in calculating potential ridership numbers in the end making the realisation of the project feasible. However, initially ridership numbers did not meet the expectations which was due to a delay in housing production along the line caused by the credit crisis and the way Berkel & Rodenrijs contracted developers.

- **Real estate value increases**

Areas near the Hofpleinlijn trajectory received an upgrade in terms of accessibility and the public transportation infrastructure increased in quality. This inevitably led to higher quality of life in the areas along the line and higher real estate values. This increase in real estate

value was not captured nor were real estate owners in any other way taxed in relation to the Randstadrail project.

- **Development process**

Plans for Randstadrail and spatial development were drafted in the same period, the beginning of the nineties. The actual development horizon was different. Housing development started at the end of the nineties and continues till this day as land for development of housing is still available. The transformation of the existing Hofpleinlijn in the end took one year with additional pieces of track such as the tunnel leading to the Rotterdam central station and the new connection with the The Hague central station opening a few years later. Therefore, the planning horizon of both projects is different as the scope of planning for the Randstadrail took over ten years after which it could be completed in phases within a few years. The spatial development planning took just over five years although the actual development and construction, in phases, takes far longer and is subject to many more uncertainties in terms of market behavior and cooperation with many stakeholders. Infrastructural projects, as in the case of the Randstadrail project attempt to take away uncertainties during the planning phase.

- **Difference in time horizon**

Because the spatial development and infrastructure development in the Randstadrail case have such different forms of planning and phasing it complex to connect both in terms of planning and funding. Integrating development and funding is in this case therefore not possible due to the difference in plannnig horizon, project scale, stakeholders involved and sensitivity to market behaviour.

4.33 Urban development and VINEX policy findings

From the VINEX policy point of view a few lessons can be learned from the VINEX spatial development policy and specifically from the relation with the Randstadrail project:

- **Car traffic**

Car traffic did not decrease, actions undertaken during the VINEX policy did however result in lower growth of car.

- **Concentration of spatial development**

Spatial development was concentrated next to the existing cities although development targets were not met due to higher than expected land prices, the credit crisis and problems with allocating resources for urban area development by the developing municipalities.

- **Cooperation between ministries**

Cooperation between the ministry responsible for spatial development (VROM) and the ministry of infrastructure development (I&W) was lacking. Mainly cooperation on planning locations for the development of real estate were not always combined with plans of the ministry of infrastructure for new infrastructure resulting in disagreements between the ministries about where infrastructure had to be upgraded or constructed to supply new spatial developments with adequate accessibility.

- **Centralised urban planning**

The policy where the national government appointed areas for large housing development schemes resulted in private parties buying up development land before the municipalities responsible for the development of the areas could get involved. This caused shortages in budget for land acquisition.

- **Urban devevelopment with high quality public transportation**

For the areas next to the transformed Hofpleinlijn it can be said that high quality public transportation, as defined by the VINEX policy, was provided to the VINEX areas near the line.

- **Development planning governance**

Due to the hierarchical structure and centralized planning local public bodies became development areas. Although planning and funding derived from the higher levels of government and public bodies, execution of the plans and financial responsibility laid at the lower municipality level. In the case of Berkel & Rodenrijs, a small town with little experience with urban development this resulted in mistakes in the planning and development process.

- **Spatial development funding**

Berkel & Rodenrijs, developing dwellings under the VINEX policy, received to little budget for acquiring development land due to land speculation. In the end took large risks in order to meet the goals set in the covenants with the city region and national government. This caused losses and almost led to bankruptcy of the municipality.

- **Value capturing instruments**

With the VINEX policy no guidelines or instruments for value capturing or other forms of alternative funding were used to fund infrastructure investments. Extra income from OZB taxes generated after the development of the urban areas were not used or captured to fund additional projects in the region.

4.4 Prospective case: Oude Lijn, Van Nelle

In this part of the chapter the prospective case is studied in order to be able to create a value capturing business case for the Van Nelle station location.

4.41 Infrastructure project overview

The Oude Lijn is the railway running between Dordrecht in Leiden in the southern part of the Randstad region and forms the backbone of the public transportation network in the region. As the capacity of the existing two track rail line was meeting its limits plans for doubling the number of tracks were created to take away the public transportation bottleneck between Rotterdam and The Hague. With the addition of extra railway tracks doubling the number of railway tracks between Rotterdam central station and The Hague central station it becomes possible to introduce a higher frequency of rail service on the Oude Lijn railway tracks. With the completion of the tracks at the end of this decade it becomes possible to transform two out of four tracks to light rail tracks creating an opportunity to add extra stops along the line (MRDH, 2019).

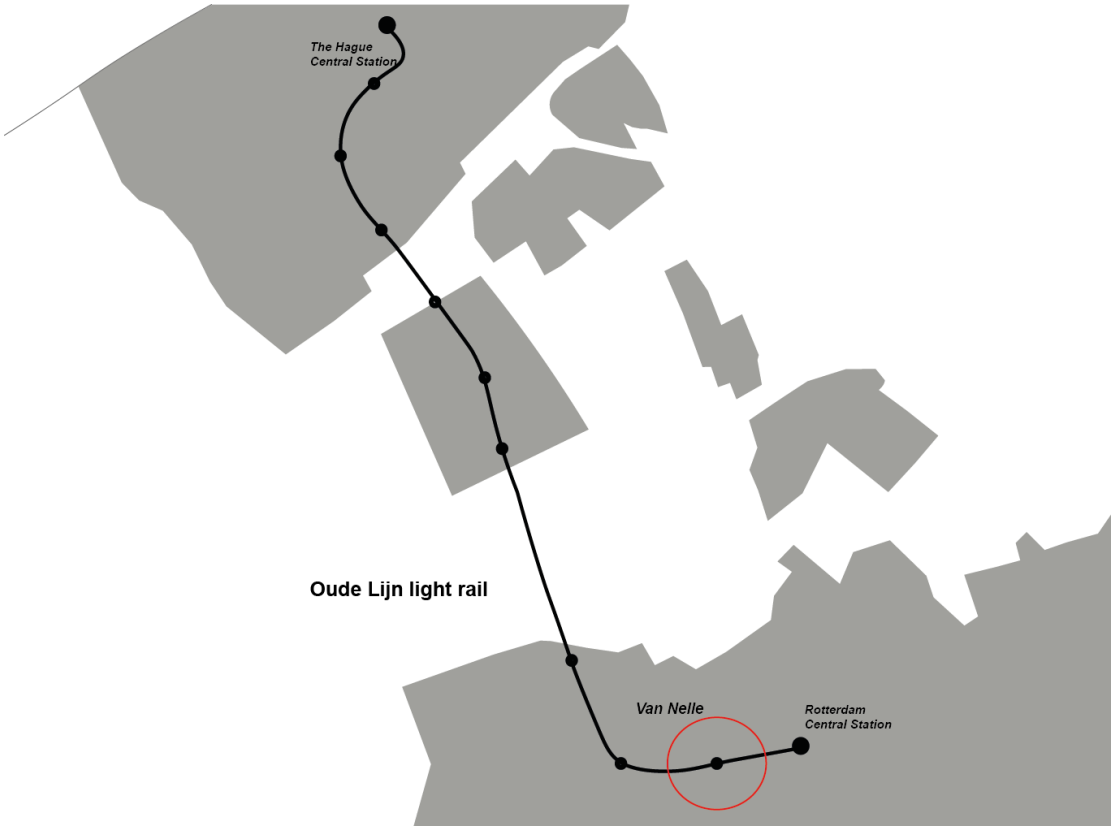

Figure 14: Oude Lijn light rail transformation location (own illustration)

Whether two of the four tracks will exclusively be used for light rail service or stay part of the national railway network is not yet clear. Possibilities to create extra stations do however come up. Next to this, the projects shows many similarities with the Randstadrail project as well as the possibilities for urban development along the line and the desire of the MRDH to develop housing in the vicinity of public transportation.

1. Spatial development: developed new housing areas and possibility for transit oriented development
2. Geographical: in the southern Randstad region improve connections between suburban areas and central districts
3. Technical: Increase the capacity of the public transportation network
4. Modal split: Adding stations to the line and through transit oriented development public transportation becomes more attractive

Stakeholders/project governance

The MRDH nowadays is the regional body responsible for public transportation projects in the region. As it is not yet certain in what form light rail concept will be developed it is hard to say something about the party initiating and operating the line. What can however be said is that a string of municipalities will be involved united under the MRDH. In comparison to the Randstadrail project it is unlikely the project is organized with such a topdown approach where the national government through ministries funds parts of the project because large subsidy programmes are not as common as during the time of Randstadrail and VINEX responsibilities have been shifted to lower layers of government. This is one of the reasons why co funding and in this case value capturing is receiving more attention as the lower layers of government have to look for additional sources of funding.

Project costs and funding

Estimating the costs of the entire infrastructure project is at this moment difficult as the precise scale and program of requirements for the project is still unknown. Although existing infrastructure and infrastructure that is currently being constructed can be used it is not clear whether additional pieces of track and tunnels have to be created to for instance connect to the Rotterdam metro network such as was done with the Randstadrail project. Interviewees were however able to estimate the costs of a simple light rail station, at for instance the Van Nelle location, with minimal amenities at 25-30 million euros. Given this is a basic station with minimal amenities extra costs that have not been taken into consideration are bike parking amenities, additional roof structures or passenger tunnels. Costs for a station can therefore differ depending on the existing situations and requirements.

4.42 Urban area development

Looking at current trends and policies for urban development inner city areas are seen as ideal locations for development of housing as brownfield locations are seen as preferable over greenfield locations. Furthermore, accessibility is seen as an important factor in choosing locations for housing development.

The prospective case location potentially offers both these aspects being an inner city location at the edge of town and with the potential to become an accessible location if serviced by a light rail station. The Van Nelle location is situated at the edge of town next to the rail line between Schiedam central and Rotterdam central station. The Unesco world heritage site marks the entrance to an industrial area called Spaanse Polder just north of the rail line connected over water by the Schie river and by a highway running through the area. South of the railway line early 20th century urban areas are the dominant factor with sports accommodations and a football stadium being an exception to the rule. On the other side of the railway and the Schie river a park, allotments and more sports accommodations are present. The stretch of land directly surrounding the railway tracks, industrial sites, sports accommodations and allotments offer opportunities for development.

The mix of functions, land use and partial potential for redevelopment make the area an interesting case for the use of value capturing. Next to this, plans for redevelopment and the development of a station on the location have not yet been announced.

4.5 Value capture case analysis

For the value capture analysis the case locations have to be analysed for their current type of development and potential future additional development. The purpose is to determine the expected rise in value of real estate on the case location.

For the data about housing the BAG is used to collect data about the existing housing stock in the area surrounding the station at a range of a 1000 meters. Through the use of QGIS the data is collected and analysed. Furthermore, by using housing sales data provided by Funda an average housing square meter price can be determined for the area.

4.51 Randstadrail, Berkel Westpolder location

Looking at the figure below the Berkel Westpolder location is shown with a radius of 1000 meters around the station location. The red part of the image shows existing built up areas with the orange areas showing locations where development is planned to commence in the coming years. Lastly, the green areas laying within the areas are green buffers zones with no plans for development.

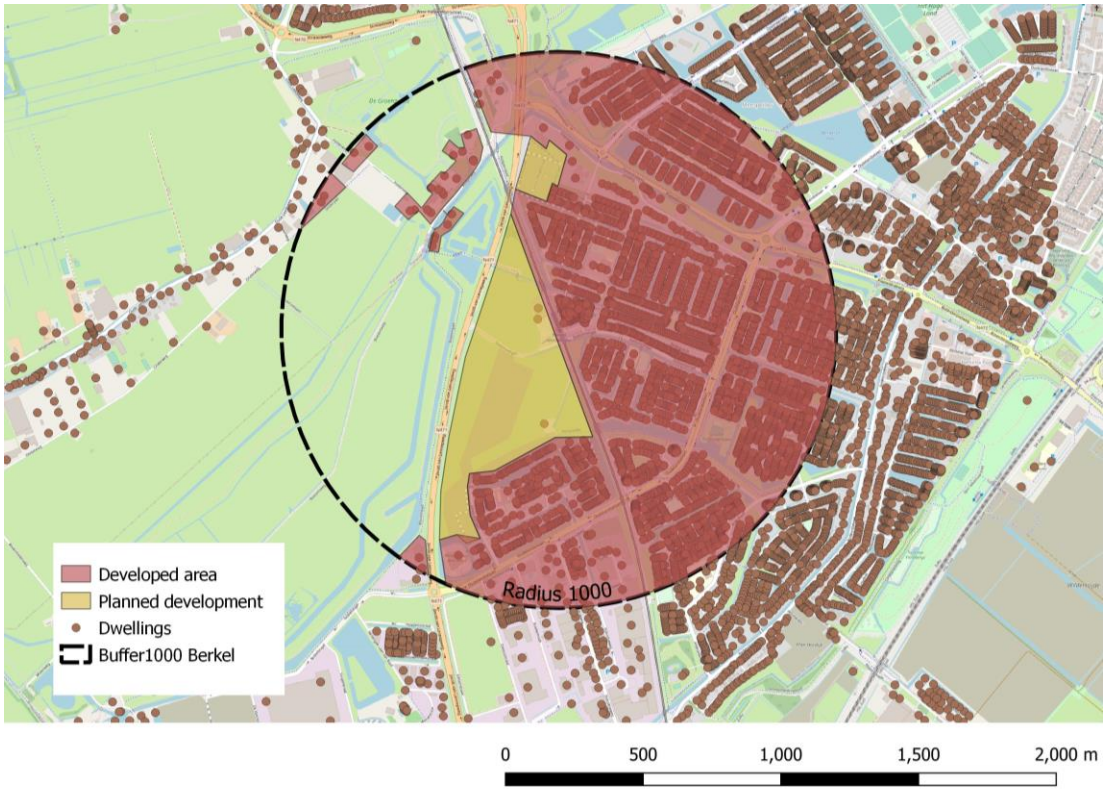

Figure 15: Overview of data collection and area still to be developed for Berkel Westpolder area (Qgis, 2020)

Combining data as collected from the BAG (2020) dataset and Openstreetmap (2020) data with sales data from Funda (2020) it is possible to create the table below. What can be seen is that over two third of the area around the station will become housing with a total of almost 5000 dwellings. There is some uncertainty as the type and amount of development that may be done in the orange currently not built up area is not certain which is why the same degree of development as for the red area is taken.

	Area in hectares	**Number of dwellings**	**Amount of m2 of housing**	**Market price per m2 (2020)**
Case area (Radius1000)	314.15	4937	619658	€ 3,609
Built up housing area (red)	197	4266	535406	€ 3,609
Further housing development (orange)	31	671	84252	€ 3,609

Table 10: Market price real estate valuation for Berkel Wespolder case area

Looking at the Funda sales data, which can be found in appendix C, some things have to be said about the accuracy of the market price data:

- Housing sale prices are used for houses sold over the last year
- A range of building types representing the mix of housing in the area is chosen
- A range of building year of housing is chosen

- Housing ranging from next to the station till 1000 meters from the station is taken
- It is not possible to determine the housing price for all dwellings in the area as only a select amount has been sold over the last year and for only a part of this amount the sales data is available
- Commercial and rental market prices are not considered in the determination of the real estate value. The value is therefore the value looking at the open housing sales market

Given the accuracy of the data the actual market price in the area may be different from the one found through the data. Furthermore, the OZB price which is determined by the municipality is likely to also be different. Calculating the average home price in the area gives a value of almost 453.000 euros with an average 125 m2 per dwelling.

4.52 Oude Lijn, Van Nelle location

Looking at the figure below the Van Nelle location is shown with a radius of 1000 meters around the station location. The red part of the image shows existing built up areas with the green, orange and pink areas showing potential for redevelopment. In this way, the area can roughly be divided in four main areas being the southern already built up housing area, the parks and sporting accommodations areas, the strip of land next to the railway and lastly the industrial/commercial areas next to the Schie river.

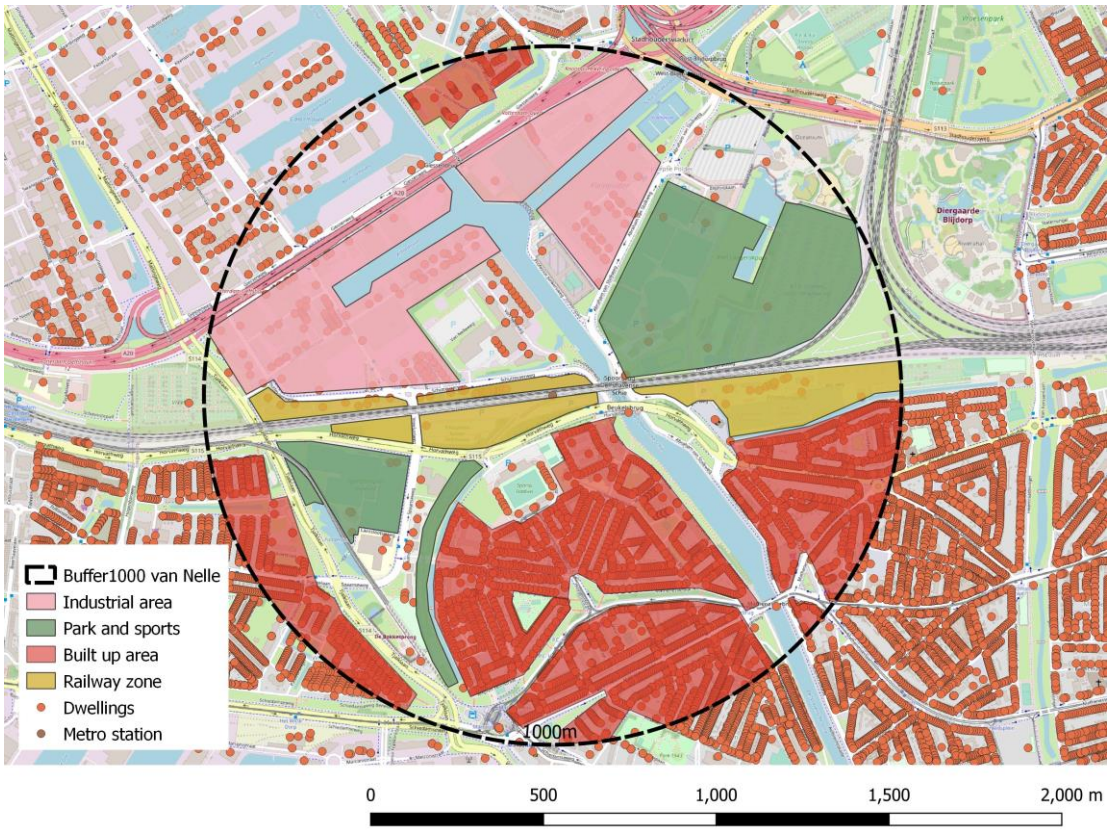

Figure 16: Overview of data collection and area still to be developed for Van Nelle location (Qgis, 2020)

Combining data as collected from the BAG (2020) dataset and Openstreetmap (2020) data with sales data from Funda (2020) it is possible to create the table below. What can be seen is that about one third of the area surrounding the potential station location is currently used for residential purposes with a total of 8540 dwellings in the area. Dwellings in the area are

smaller than in the Berkel Westpolder area which is likely due to the urban character of area south of Van Nelle location and due to the large quantity of social housing in the area as can be seen on the woonlastenatlas (2020). Next to this, the housing stock is almost entirely made up of apartments.

	Area in hectares	**Number of dwellings**	**Amount of m2 of housing**	**Market price per m2 (2020)**
Built up residential area	86	8540	741406	€ 2,768

Table 11: Market price real estate valuation for Van Nelle case area

Looking at the Funda (2020) sales data, which can be found in appendix D, as well as at the case area some things have to be said about the accuracy of the market price data:

- Social housing makes up a large proportion of the housing stock in the area which means that the value given in the table above does not represent the value of all the housing in the area but gives the value if all of the housing were to be on the free market. The actual average price is therefore likely lower
- Housing sale prices are used for houses sold over the last year
- A range of building types representing the mix of housing in the area is chosen
- A range of building year of housing is chosen
- Housing ranging from next to the station till 1000 meters from the station is taken
- It is not possible to determine the housing price for all dwellings in the area as only a select amount has been sold over the last year and for only a part of this amount the sales data is available
- Commercial prices are not considered in the determination of the real estate value. The value is therefore the value looking at the open housing sales market

The average dwelling in the area has a floorspace of 87 m2 and based on the data an average value of just over 240.000 euros which given the mix of housing and type of ownership in the area is likely to be too high a valuation.

Van Nelle urban area development

Next to the existing residential areas the Van Nelle location offers opportunities for redevelopment. Looking at figure 16 these areas have been marked and looking at the table below the size of the separate areas is provided.

	Area in hectares
Total area around station (Radius1000)	314.15
Built up residential area	86
Areas with potential for redevelopment	96
Park and sport accomodations	*38*
Railway strip	*17*
Industrial/commercial areas Van Nelle	*41*

Table 12: Overview of plot sizes and areas suitable for redevelopment

According to the municipality of Rotterdam plans are being developed for development of the area surrounding Van Nelle. The difficulty with planning new residential areas in the case area is the presence of existing functions that before the possibility for redevelopment occurs have

to be moved to different locations. Business might not want to move from their current location just and constructing residential areas on locations with parks and sports accommodations.

For the business case this implies that it is unlikely that the entirety of the areas with potential for redevelopment will be developed. As parts of the area currently fulfil functions necessary to the functioning of the city of Rotterdam and some functions are hard to remove. One could argue that space could be used more efficiently and with a growing city it becomes more desirable to plan different functions in the area. With potential for rising land values and looking at chapter 2 it is reasonable to consider function changes from an economic standpoint. Next to this, with the current housing shortage and realisation of a station in the area reasonable that some areas will be redeveloped as the area becomes more attractive for residential purposes.

	Area in hectares	**Percentage available for redevelopment**	**Amount of hectares available for redevelopment**
Areas with potential for redevelopment	96		43
Park and sport accommodations	*38*	25%	9
Railway strip	*17*	75%	13
Industrial/commercial areas Van Nelle	*41*	50%	20

Table 13:Overview of plot sizes and areas suitable for redevelopment after selection

Given the circumstances described above and on input from the municipality of Rotterdam a reasonable estimate for the amount of land that can realistically be redeveloped can be made and are shown as percentages in the table above. The parks and sport accommodations are seen as difficult to redevelop as these functions will also be required for the new residential area which is why only a small portion of 25% may reasonably be redeveloped. Next to this, the railway strip next to the railway offers greater opportunity for redevelopment represented by a 75% development potential. Lastly, the industrial and commercial areas offers a 50% development potential due to the uncertainty whether it is possible to move all current functions in the area as well as difficulty to develop former industrial areas.

	Amount of hectares available for redevelopment	**FSI (Floor Space Index)**	**Residential floorspace to develop**
Park and sport accommodations	9	1	90.000 m2
Railway strip	13	2	260.000 m2
Industrial/commercial areas Van Nelle	20	1	200.000 m2
Areas with potential for redevelopment	43		550.000 m2

Table 14: Areas suitable for redevelopment and related FSI

After considering the amount of area that can be developed the type of development that can be done is considered. A measure for density that can be used is the Floor Space Index (FSI) that looks at the ratio between the size of land and the amount building floorspace developed on it. For the existing area south of the rail line the FSI is around 1. Considering the concept of transit oriented development that is desired it is reasonable to raise the floor space index for the area next to the railway. For the other areas it may be a low estimate but it seems reasonable to take about the same floor space index as in the existing residential areas at the southern side of the railway. Adding up the numbers gives a potential development floorspace of about 550.000 m2 near the new station location.

In general, looking at the business case a conservative approach is taken towards estimations as estimations that are calculated form the basis for further calculations on the potential value capture amount. Applying a conservative approach gives parties involved the opportunity to flexible in planning and to upscale plans if desired.

Therefore, looking at the Van Nelle urban development business case, a few things can be concluded:

- It is not reasonable to consider all of the land that could be redeveloped to be fully developed as other functions will still be needed in the area
- The FSI could be raised higher depending on the type of development that is desired, for now a conservative approach is taken for the redevelopment of the major part of the area except for the area next to the line considering TOD principles
- Existing residential areas are not considered for densification or redevelopment although this might be possible as well
- For the Van Nelle development plan only residential areas are considered, it is unlikely office functions will be developed on the location as in the vicinity of the location there is still space for office development and the region currently has a reasonable office vacancy rate not urging the need for major office developments

PART 4: SYNTHESIS

5. VALUE CAPTURING IN THE NETHERLANDS

The goal of this chapter is to find out what financial benefits in the form of an increase in real estate value can be accredited to public transportation infrastructure investments. Next to this, in this chapter the value capture process is considered and it is considered in what way the type of infrastructure investment and situation influences the accrued real estate value and to what extent this accrued value could reasonably be captured.

This chapter forms the connection between what was found in literature in chapter 2 and what was found through case studies in chapter 4. With the goal of the chapter and combining the knowledge gained and findings from the former chapters it becomes possible to in this chapter address the following research questions:

- What real estate value increase can be expected from investments in public transportation infrastructure?
- To what extent can value accrued by private parties from an increase in real estate value be captured to fund the public actions?
- What contribution can value capturing make to funding public transportation infrastructure in an urban area development business case?

5.1 THE VALUE CAPTURE PROCESS

Value capturing is a relatively new phenomena in The Netherlands. Some forms of alternative funding are already sparsely applied but large scale value capturing or alternative funding schemes such as can be seen abroad have no precedent in the Netherlands. Next to this the extensive integration of infrastructure and urban development is uncommon as it only occurs on paper or in the integration of planning but not on a financial level. A step-by-step plan therefore does not exist for the implementation of value capture instruments. This is likely due to:

- The lack of precedent and experience
- Former lack of need for alternative funding sources in general
- Complexity and time horizon of the process of infrastructure funding
- Complexity and time horizon of the real estate development process
- The heterogeneity of situations and cases

It is therefore that in this part of the chapter in order to structure the research and be able to create a business case a step-by-step plan for the implementation of value capture funding in the Netherlands is created. Using input from the former chapters as well as the lessons learned from the case study in chapter 4 in combination with input from interviews it is possible to structure the value capturing process.

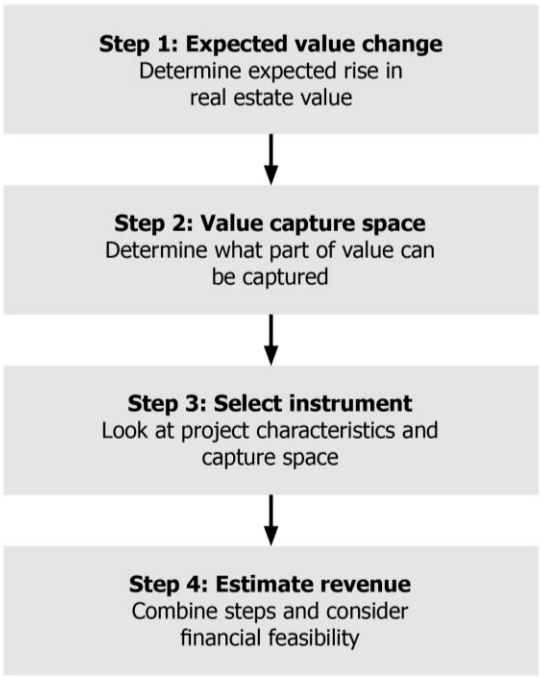

Figure 17: Step-by-step approach for value capture funding

To be able to find the potential contribution value capturing can make for infrastructure investments in this chapter the process as shown in the figure above is followed. The step-by-step plan is preceded by an analysis of the infrastructure development as case area analysis. Using the input from this analysis the following step-by-step plan is followed:

1. Analysing specific locational and project characteristics the expected rise in real estate value is considered that can be related to the infrastructure investment
2. After considering the characteristics that determine the change in real estate value caused by the infrastructure investment the capture space that is left is considered by looking at capture space characteristics
3. The next step involves looking at what instrument yields the highest potential for recouping the public investments
4. After following the steps a value capture amount can be deduced and business case can be developed for value capturing. Input from this part can be used to consider whether value capturing could play a role in infrastructure funding and making urban area developments accessible

5.2 Rise in real estate value

The first step in the process is determining what rise in real estate value can be assigned to an infrastructure project. For this a set of value determinants was created that is further elaborated on in this part of the chapter.

5.21 Value determinants resulting in a change of real estate value

To determine the expected change in real estate value three categories of characteristics have been created being contextual characteristics, public transportation characteristics and development area characteristics. At the basis of these characteristics lay table 4 in chapter 2.22 showing value determinants in relation to the project characteristics (Koster, Ommeren &

Rietveld, 2010; Ossokina, 2010; Belzer, Eaton & Ohland, 2008; Debrezion, Pels & Rietveld, 2006). Additional determinants were found through interviews and the case study which can be found below.

A few aspects were taken into account with selecting and using the characteristics:

- The characteristics have to be independent; characteristics do not influence each other
- A change opposed to the situation before a project is measured
- Characteristics form a qualitative representation

Contextual characteristics

- Healthy real estate market – To what extent is there a strong demand for real estate in the area
- Traffic congestion – To what extent do existing or former forms of transportation see levels of congestion and cause extra commute and travel time. Decreasing overall congestion in the area by increasing transportation capacity has a positive influence on real estate prices

Public transportation characteristics

- Travel time to CBD – The change in travel time to the CBD
- Link to CBD – Change in the number of transfers needed to reach the CBD; is there a direct link to the CBD
- Regional catchment area – Change in number of customers/jobs that can be reached
- Frequency of service – Change in frequency of service on the line
- Image of transportation – Does the public transportation service have an improved public image

Development area characteristics

- Possibility for densification – Are there possibilities for densification of the area in relation to the improved accessibility
- Real estate function – What type of real estate functions are present in the case location
- Nuisance – Nuisance caused by the form of
- Public transport alternatives – The extent to which public transportation alternatives already cover the area. If the area is already serviced by alternatives the influence is smaller on the development
- Alternative transport forms/infrastructure – If in the vicinity for instance highways or other forms of transportation competing with public transportation are present the effect on real estate values caused by investments in public transportation infrastructure is lower
- Supportive public policy – Does the local public policy support transit oriented development and stimulate the use of public transportation through development

5.22 Application on cases

Depending on the characteristics the potential for a rise in real estate value in relation to a public transportation infrastructure investment can be considered. A high scoring location shows there is a high potential for a value increase and a low scoring location shows less

potential for a high increase in real estate value. The score is derived from scoring the influence on the rise in real estate value from:

-- : Highly negative influence
- : Negative influence
0 : No influence
+ : A positive influence
++ : Highly positive influence

The qualitative approach to finding an expected rise in value can be related to what is found in literature and seen in table 3 of chapter 2.22 where research shows what change in value can be expected. Applying the first step of the process on the cases as described in chapter 4 yields the following results:

Determinant	**Berkel Westpolder**	**Van Nelle Fabriek**
Contextual characteristics		
Healthy real estate market	+	++
Traffic congestion	++	+
Public transport infrastructure characteristics		
Travel time to CBD	++	+
Link to CBD	+	++
Regional catchment area	++	0
Frequency of service	++	+
Image of transportation	++	+
Development area characteristics		
Possibility for densification	+	++
Real estate function	0	+
Nuisance	+	-
Public transport alternatives	+	-
Alternative transport forms/infrastructure	-	--
Supportive public policy	-	++

Table 15: Value change determinants in relation to value capture funding for light rail projects

In the table above the results are for the two case areas are displayed. The scores are calculated for the current 2020 situation which means that for the Berkel Westpolder location the transformation has already occurred a few years ago. For the Van Nelle location an upgrade of infrastructure as described in chapter 4.4 is used.

In terms of expected rise in value the Berkel Westpolder area scores better than the Van Nelle location mainly for the public transportation characteristics as the improvements of the public transportation as opposed to the previous situation are substantial and quality of the new public transportation form is high. Furthermore, the Van Nelle location scores high on the development areas characteristics as the development still has to commence and there are possibilities for densification on the location.

Using the values found above it is possible to look at the expected rise in value in relation to the transformation of the infrastructure. Taking input from the empirical research a rise in value can be estimated. Looking back at literature in chapter 2.22 the value change within the first kilometre from a station for newly opened stations is set at between 3 and 5 per cent for residential areas. As the Berkel Westpolder area scores high on the qualitative value determination test the area receives the maximum score of 5 per cent. This gives the value shown in the table below

	# of dwellings	**Amount of m2 of dwellings**	**Average m2 price residential**	**Average dwelling market value**	**Real estate market value**
Case area Berkel Westpolder	4937	619.658	€ 3.609	€ 452.948	€ 2.236.344.659
Expected real estate value attributable to transformation to Randstadrail					**€ 106.492.603**

Table 16: Real estate value expected to be attributable to transformation of infrastructure to Randstadrail light rail service at the Berkel Westpolder location

Calculating the expected rise in value for the Van Nelle location is more complicated as the area still has to be developed and it is not certain what the development will look like in the future in terms of type of housing and housing prices. This calculation therefore heavily relies on the business case developed for this research. Looking at the outcome for the Berkel Westpolder case and at the 3-5% bandwidth as found in chapter 2.22 the rise in real estate in value in relation to the addition of a station in the case location is set at 4% resulting in the value given in the table below.

	# of dwellings	Amount of m2 of dwellings	Average m2 price residential	Average dwelling market value	Real estate market value
Existing dwellings Van Nelle location	8540	741.406	€ 2.768	€ 240.305	€ 2.052.211.808
Park and sports accomodations		90.000	€ 2.768		€ 249,120,000
Railway strip		260.000	€ 2.768		€ 719,680,000
Van Nelle industrial areas		200.000	€ 2.768		€ 553,600,000
Total market value of real estate					€ 3.574.611.808
Expected real estate value attributable to transformation of Oude Lijn					**€ 142.984.472**

Table 17: Real estate value expected to be attributable to transformation of infrastructure at Oude Lijn light rail service on the Van Nelle location

Looking at the values that were found a few remarks can be made:

- The average m2 price used is the same as in the existing area and may be different as the market price concerns the free housing market price
- The calculation assumes the programme exists of free market housing only which in reality might be different
- Time of construction and time of development of an upgrade of the infrastructure is not represented in the calculation
- The calculation only looks at new dwellings and not at the existing stock of housing as this housing is already in the vicinity of similar forms of public transportation.

Looking at the outcomes for both cases the determined values are approximations that in reality may differ. Despite this, the amount of attributable value is quite substantial given the costs of realisation of the projects which will be considered at the end of this chapter. Furthermore, it appears that, mainly in the Van Nelle case, within the one kilometre range a different expected rise in value may occur as amenities are found around the circle of influence in the urban area.

5.3 CAPTURABLE VALUE

With the calculations in chapter 5.2 it becomes clear that private benefits from upgrades of public transportation infrastructure can be substantial. It also shows that over the past private parties have been able to benefit greatly from public investments in infrastructure whilst almost never directly contributing to this infrastructure. At the beginning of chapter 5.1 it was already mentioned that there are a few reasons for this which can be summarized as there being no capturable value if one is not able to capture at all.

Therefore more estimations have to be made to consider what value could be captured considering the capture space. It is the goal of this part of the chapter to deduce what part of the private benefits can be captured and how this can be estimated requiring further attention to the capture space concept.

5.31 The capture space concept

The capture space was first introduced in chapter 2.21 where it was defined as ‘’*The difference between the expected rise in value and the amount that cannot actually be captured given the situation’’* and is in this research also referred to as the ‘capturable value’. The capture space is determined by looking at the capture space determinants that can be found in table 4 of chapter 2.22 and based on Belzer et al. (2008) and Koster et al. (2010) and at the end of chapter 2.23 based on Fogarty et al. (2008).

From the sources listed above a list of capture space determinants was created that is shown below:

- Development level – In what phase of development is the real estate in the case area. If construction of real estate still needs to commence there is less real estate available for value capturing and there might be uncertainty about when the real estate is completed decreasing the value capture potential
- Type of land ownership – What type of parties and with what type of goals own land in the case area. Land speculation and parties not willing to cooperate in development projects may decrease value capture potential
- Land ownership dispersion – Number of land owners in the area. With more landowners in an area value capturing may become more difficult due to the amount of work required dealing with all land landowners
- Timing of contract – At what moment in the development will the instrument be applied as if a project is already completed value capturing becomes more difficult
- Degree of capitalization – To what extent has the increased quality of public transportation already been capitalized by parties in the area

Timing plays an important role in the estimation of the size of the capture space. As planners and decision makers make plans for an upgrade of an infrastructural work private parties may become active in capitalizing on the development which may cause different parties with speculative intentions to move into an area. An example of this can be seen in the Berkel Westpolder case where speculators became aware of potential for land price increases urging them to buy up the land and demand high prices for the land. Furthermore, timing is essential to be able to set up a value capture scheme as doing so in hindsight seems to reduce to potential return of value capturing.

5.32 Determinants that influence the value capture space

In this part of the chapter value capture space determinants are applied on the cases. If the value capture space is small and thus the amount of value that can be captured is small this does not necessarily mean that value capturing is not possible because depending on the instrument that is used for value capturing the value captures space may increase. For both case locations the different determinants can be found below.

Berkel Westpolder capture space

- Development level: Nearly all of the development in the area is completed creating a large capturable base
- Type of landownership: Currently the landownership is mainly for private home owners as developers and investors have nearly all left the area. This does eliminate the use of a few value capture instruments that are not used in this research. Furthermore, land is owned by the municipality
- Land ownership dispersion: Land ownership is dispersed over many homeowners at the moment
- Timing of contract: If value capturing instruments would be applied by now it would be years after completion of the infrastructure
- Degree of capitalization: The degree of capitalization is high as the project has been finished and the infrastructure is fully operational which means that the benefits are now fully accessible

Van Nelle capture space

- Development level: A basis of nearly 9000 dwellings already exists south of the location. This area can be characterised with a lot of social housing and is already scoring quite high in terms of accessibility and transportation alternatives. The major rise of value can therefore be expected for housing that is still to be developed in the area. This still has to be developed.
- Type of landownership: Land ownership is mainly for the municipality and companies residing in the Van Nelle industrial area
- Land ownership dispersion: The land ownership dispersion is currently low
- Timing of contract: As plans for development and the infrastructure are not yet public and are also not decided on there is still time
- Degree of capitalization: As the project has not yet commenced and plans are not yet available there is no degree capitalization

Looking at the table above one can see the Berkel Westpolder case area scores low on nearly all aspects. This is due to the fact that development of the area surrounding the case location is nearly completed and the infrastructure project was completed a few years ago. For the Van Nelle location there is still a greater possibility for value capturing as the infrastructure nor the area development project have been announced.

5.4 Application of value capturing instruments

Taking the value capture instruments selected in chapter 3.3 and using the input from the case analyses it becomes possible to look at the application of value capture instruments on the case area.

5.41 Application of instruments

The value capture instruments that were selected were the area property tax with TIF construction, redirection of property tax, betterment levy and additional transfer tax with next to this the possibility to additionally also consider the resident and access charge.
For the selection of instruments the instruments will be considered opposed to the value capture space which was determined above.

- **Area property tax with TIF construction**
    - Berkel Westpolder: Applying an area property tax with TIF construction can be done in the case of the Berkel Westpolder area. It may however not be reasonable to in hindsight ask parties to contribute for the development of the line as it was already finished and the rise in value is already capitalized
    - Van Nelle: For the Van Nelle location the instrument can be applied. As a rise in real estate is not yet capitalized and there is still time to come up with the contracts. The existing real estate may pose a problem as values of the social housing are low

- **Redirection of property tax**
    - Berkel Westpolder: The redirection of property tax mainly works if an area is growing in terms of urban development and therefore is less suitable for the Berkel Westpolder area as most of the development in the area is already completed
    - Van Nelle: Could be a useful tool for the dwellings completed in the area in the future to take parts of the tax and put them in an accessibility fund

- **Betterment levy**
    - Berkel Westpolder: As timing is key it is likely not possible to in hindsight apply a betterment levy as the betterment has already occurred a while ago and it therefore seems difficult from a legal standpoint
    - Van Nelle: A betterment levy could be useful tool in the area as the development has not yet commenced and therefore there is still time to apply this instrument and adapt it to the situation

- **Additional transfer tax**
    - Berkel Westpolder: As the capture space has already been diminished because the benefit has already been capitalized an additional transfer tax could be a solution. The problem is however that the additional transfer tax does not take into account transfers that have already taken place since the opening of the line
    - Van Nelle: Could work in the Van Nelle location as the project still needs to be developed. Revenue would be lower than the value increase as there is a lot of rental housing in the area. For the new development it could work although the stream of income would be dispersed over a long period

Furthermore the access charge is also considered although this is strictly speaking not a value capturing instrument it can be deployed as value capture instrument.

- **Access charge**
    - Berkel Westpolder: As the Berkel Westpolder area enjoys a high level accessibility this instrument could work to recoup the value resulting from this. The access charge could work in the Berkel Westpolder situation

- Van Nelle: Instrument can be used if there are beneficiaries which is not yet the case. It would furthermore also have to be applied on a wider basis taking away the catchment area aspect

Looking at the application of instruments on the cases a few remarks can be made considering the application of the instruments in relation to the capture space. What becomes clear is that the Berkel Westpolder area would have been an ideal location for the application of value capture instruments if a value capture scheme had been set up. This is due to the high potential for an expected increase in value and because the area was formerly undeveloped. The only option that could still be applied in the area would be the access charge which could be tuned in such a way that it becomes a value capture instrument. The funds deriving from such a charge could however not be spent in the area anymore and therefore not fund the improvement in the area but only improvements somewhere else.

Looking at the Van Nelle case area it seems that many of the instruments could still be applied in this case area which is mainly due to the fact that development has not yet commenced. The question that arises is however whether applying the tools above is logical as most of the land in the area is owned by the municipality of Rotterdam, likely the party that will fund the transformation to metro in the first place, which might make different instruments more useful. Next to this, the existing housing stock existing mostly of social housing and already finding itself in the vicinity of other public transportation amenities may not form a solid ground for value capture funding.

Both cases show that timing is of essence in applying value capture instruments. Furthermore, an underdeveloped greenfield location seems to hypothetically form a better basis for value capture funding as an inner city location may pose problematic in terms of existing development and type of land ownership and dispersion. Next to this, it is likely that when value capture funding would be applied, looking at foreign examples such as described by Alterman (2012) it seems logical that value capturing would occur at all stations near a new or transformed transportation line or around all new stations. Due to Dutch geography as described in chapter 2, with the already fine-meshed high quality transportation system and the existence of many medium sized towns around the Randstad it seems that an efficient one size fits all approach to value capturing along a line might not be possible due to the heterogeneity of station areas.

Although some capture instruments may find a way around these problems, such as an additional transfer tax, the height and timing of revenue is uncertain making the instrument a less reliable tool to use for funding purposes.

5.42 Financial feasibility of the application of instruments

Considering the application of value capture instruments it might be interesting to look at the relationship between the expected rise in value and what capturable value is left. Looking at the findings above considering the financial feasibility of the application of value capture instruments is key.

The financial feasibility of the application of value capture instruments is discussed in chapter 3.33 and was in this research defined as ''*Financial feasibility is in this research seen as whether the instrument has enough effect to be worthwhile using - does the instrument effectively contribute funding. Next to this, financial feasibility is considered in terms of whether there is a large risk of the amount expected to be captured differing from the amount of value that is actually retrieved*''.

Looking at the case locations and the selection of instruments it becomes clear that applying value capture instruments for the Berkel Westpolder location is difficult as it might already be too late for using the majority of instruments. Only the access charge seems to be a reasonable option for this location. For the Van Nelle location there are still numerous options left to apply value capturing instruments as the project is at the earliest phase of planning and development although there might be some problems.

Berkel Westpolder financial feasibility

From a legal viewpoint it is unlikely that now, about ten years after completion, it would still be possible to recoup benefits from beneficiaries in the Berkel Westpolder area as the benefits have for some time been capitalized already. This is likely for the reason that the municipality would be too late as the capture space has been diminished. From a political governance perspective it seems unlikely that the municipality would be able to set up a large value capture scheme as there is no necessity and because the municipality played a minor role in the funding of the project as this was arranged by the municipality of The Hague and Rotterdam. This also suggests that if it was decided twenty years ago to apply value capturing for the project this would likely been difficult for the small municipality to execute as they already had difficulty with the urban development in the area at the time and as the development rights were in the hands of project developers making the flow of capturable revenue uncertain due to the long duration of the urban development in the area; the original plans have not even been completed.

Value capturing in the Berkel westpolder area would therefore now only be feasible in the form of a regional access charge but not in the form of other value capture instruments. Next to this, if the desire to capture value had been around 20 years ago at the time when the project was still to commence it seems unlikely the small municipality of Berkel & Rodenrijs would have been capable of setting up a scheme and the risk of lower and later returns would have made setting up a scheme difficult and risky.

Van Nelle financial feasibility

For the Van Nelle case there is still potential for capturing value. The area seems to offer plenty of opportunity for development, land is mainly owned by the municipality, the timing is early and plans can still be adapted. Although the expected rise in value is limited to a smaller area and lower than in the Berkel Westpolder case it seems that the area shows good potential. Looking at the financial feasibility aspects for this area it seems that the largest problems would be to consider the relationship of this location to other locations along the line that is to be transformed and to different parts within the area of influence. As one person in the area may profit more than somebody else in the area the profit principle can make capturing value difficult. Therefore, proving what rise in value can be expected or finding an instrument that does not require proving this seems necessary. Furthermore, for this research only the new development areas are seen as potential ground for value capturing, in a conservative approach. It might be more proportionate to ask an equal contribution of all dwellings in the area except for when using an instrument that does not require this or if the municipality is able to calculate an expected rise in value for each separate dwelling in the area to be able to cope with the accountability problem.

To make value capturing financially feasible in the area this will require an instrument that reduces the risk for legal issues or the public organization desiring to do value capturing should be able to efficiently calculate benefits of parties in the area. On the scale of one location this might be costly. Increasing the capture area by also involving other station areas along the Oude Lijn might make setting up a complex value capturing scheme more worthwhile but

given the heterogeneity of station locations and limited amount of new stations added to the line not result in high revenues that make setting up a capturing scheme worthwhile.

5.5 Results of the value capture process

The goal of this chapter was to find what amount of private benefits stemming from public transportation infrastructure investments can be captured to fund infrastructure. The following questions were formulated:

- What real estate value increase can be expected from investments in public transportation infrastructure?
- To what extent can value accrued by private parties from an increase in real estate value be captured to fund the public actions?
- What contribution can value capturing make to funding public transportation infrastructure in an urban area development business case?

In order to be able to approach these questions and to find the potential of value capturing the capture process was translated in a step-by-step plan which can be found in chapter 5.1. In this chapter the value capture process as formulated in this research was applied on the Berkel Westpolder case and the Van Nelle case.

It was estimated that public transportation upgrades can generate substantial private benefits in the form of higher real estate prices. What has also become apparent is that timing as well as financial feasibility form large obstacles for the application of value capture instruments which in the Berkel Westpolder case means that although the private benefits are high it seems at this moment not possible to capture these benefits and it also seems as if it is not realistic to suggest that this has ever been a realistic option in the past. As of now, only the access charge seems to be a legitimate option.

For the Van Nelle case the timing issue is not present yet and the capture space is substantial. Private benefits in this area are expected to be lower than in the Berkel Westpolder case and legal difficulties may threaten the financial feasibility of this case. If value capturing is to be applied this would likely require upscaling and a form of value capturing that is capable of coping with different situations; different station locations and dwellings benefiting more and less in the areas of influence. Selecting the ideal value capturing instrument can therefore not be done based on one case along the Oude Lijn although many of the instruments still show potential in this area each situation may require a different approach.

Considering the contribution that could be made it seems that private benefits caused by public investments outweigh the investments as it is expected that the rise in real estate values are substantial with the model showing a 60 million and 140 million euros expected increase in real estate values. Given the costs of a station without the transformation of the infrastructure is said be about 25 million euros this suggests that the benefits are far greater and could therefore make a substantial contribution to the funding. Looking however at the findings in this chapter it seems that value capturing in the Berkel Westpolder could not have been executed by the municipality of Berkel & Rodenrijs and for the Van Nelle case it is not certain whether following the value capturing process is the best approach as most of the land is owned by the municipality. Looking at value capturing as an additional form of funding, supplying only a part of funding, considering legal risks and whether value capturing can effectively be performed is essential in considering what amount can be captured.

For the Van Nelle case this means that value capturing can form a ground for funding and it is up to the public party to decide how much to capture. It is probably not impossible to capture all of the expected benefits but it seems that choosing an instrument that does not capture all of the value is likely more effective at handling the capture space and may also be more financially feasible. Estimating a potential amount of capturable value is therefore not possible but it seems that a conservative approach, with low estimates, makes value capturing more financially feasible.

PART 5: CONCLUSIONS

6. CONCLUSIONS

The goal of this research was to identify to what extent value capture instruments can be applied to fund public transportation infrastructure in the Netherlands. To accomplish this goal a set of sub-objectives was created:

1. Research the relationship between urban development, mobility and value creation in the process of developing and funding the upgrade of public transportation infrastructure
2. To find out how value capturing can be done in the Dutch context
3. To find out what amount value capturing instruments can contribute to fund the upgrade of the Dutch public transportation network

To meet these objectives the following approach was taken: a literature review followed up by research into the Dutch context of infrastructure funding and value capturing after which an example of a light rail development project was analysed and lessons were drawn from infrastructure development and related urban development. This was combined with research into value capture instruments and their application in the Dutch context which combined to answer the following main research question:

How can the emerging public transportation infrastructure funding gap be filled by capturing value accrued by private parties benefiting from public investments in public transportation infrastructure in the Netherlands?

Looking at the sub-objectives set at the start of the research a few findings in the field of infrastructure funding and urban development are relevant to be able to answer the main research question:

CASE STUDY

From the case studies it has become clear that public transportation infrastructure development and urban development are hard to integrate on a financial level as planning and development horizons are different and planning and decision making occurs on different levels. Next to this, urban area development is prone to private involvement which gives private parties more influence as opposed to the case with infrastructure development which is a public affair. Integrating urban development and infrastructure development on a financial level is therefore hard. Next to this, a gradual change in Dutch development planning culture has caused a shift in responsibility for plan making and development to lower levels of government. This shift, a withdrawing national government, in combination with a rising demand for housing and rising mobility demand has on a local public level created a necessity for alternative sources of funding for public transportation infrastructure development.

CAPTURE PROCESS

Due to a lack of Dutch examples of value capturing and therefore also a lack of a process to determine what value capturing can yield in terms of funding for public transportation infrastructure a process to estimate the potential for value capturing was set up. A novelty in this process is the establishment of a qualitative estimation of a rise in value by looking at contextual, locational and transport characteristics. Another addition in the process is the introduction of the capture space concept that looks at what part of the rise in value found is capturable. The capture space adds a more precise image of the potential value capture yield as it considers factors that complicate the potential for value capture instruments. The next step in the process involves selecting a value capture instrument which after the first two

steps can be selected based on the case characteristics. The last step of the process considers the financial feasibility of the application of a value capture instruments by considering legal risks and governance issues.

CAPTURE POTENTIAL

With the introduction of a method to determine what impact the upgrade of public transportation infrastructure has on a location through value determinants it has become possible to determine the expected change in value in relation to public transportation infrastructure investments. This was necessary to be able to estimate the impact of infrastructure investments which was set at between 3 and 5 per cent within the first kilometre from new station locations. In this research three main categories of determinants were found being contextual, locational and infrastructure characteristics. Using the characteristics it is possible to determine the expected impact of transportation investments in a qualitative way for different locations.

The actual capturable value in this research also referred to as the capture space likely decreases over time and depends on locational characteristics. Landownership and timing of contract are important factors to find the capture space. The moment of setting up a value capture scheme for many instruments decides the applicability of the instrument as being too late reduces the potential return. Furthermore, dispersed landownership and speculative landowners can make value capturing more difficult.

Applying instruments on a location may not be financially feasible for legal and governance reasons. Public parties desiring to capture value need to fulfil legal requirement or otherwise be at risk of not being capable to capture value at all. Next to this, small public bodies may not have the capabilities to set up a value capture scheme as they have to fulfil the legal requirements which may pose a complex task. In this case, the benefits may not outweigh the effort and associated risk of not receiving the intended amount of funding through value capturing.

The capture space and financial feasibility of applying value capturing in an area is coherent to the instrument that is used. The right instrument may increase the size of the capture space but at the same time instruments may be legally difficult to apply or show uncertainty in terms of revenue that can be generated. It therefore seems that the instruments applied in this research differ in their applicability:

Capture instrument	Applicability
Area property tax with TIF construction	Useful for developed areas that can benefit from an upgrade of infrastructure. Uncertain whether it may yield a high return and financial feasibility is uncertain as the instrument is new.
Redirection of property tax	If an area is being developed instrument works but does however have to compete with funding for other amenities in an area and may therefore not yield high returns. Next to this, hard to integrate with infrastructure project.
Betterment levy	The betterment levy requires public parties to prove there is a betterment and estimate who benefits to what extent. This may become a costly and difficult procedure working with many real estate owners making it financially unfeasible in developed areas unless professionally set up.
Additional transfer tax	The additional transfer tax as instrument creates uncertainties in terms of financial return and requires public parties to set a starting point for the use of the instrument matching the infrastructure development and the point at which value is accrued. If this is not properly done, a party is either too early in using the instrument or too late may causing legal issues.
Access charge	The access charge, if used as value capture instrument, shows potential although it at the moment is not possible to use for an area. It this would be possible, an additional charge may form a flexible instrument to secure funding for infrastructure.

Table 18: Applicability of capture instruments

Answering the main research question

The emerging need for funding of public transportation infrastructure can be partly filled by giving local public bodies the means to capture value. In the research it was found that real estate owners in the case areas of the Berkel Westpolder and Van Nelle area receive or can receive substantial benefits in relation to public transportation infrastructure development. This may make the application of value capture instruments worthwhile as sources of funding are drying up and local public bodies have become responsible for funding and development of regional urban development and infrastructure development. This does however require the national government to decrease legal risks in capturing value by empowering local public bodies to levy real estate owners based on an expected rise in value in relation to a public transportation investment. Currently, instruments considered in this research show that local and regional public bodies lack the power and precedent to capture value.

To initiate the application of value capture instruments local public bodies are advised to take a few steps and fulfil the following requirements:

1. Clearly define the infrastructure project that is undertaken and estimate the expected potential rise in real estate value that can be related to a project
2. Select the right value capture instrument based on the situation looking at the different capture space aspects and specific characteristics of the instruments
3. Check whether applying a value capture instrument is financially feasible by looking at the potential return of using an instrument, legal requirements and if value capturing can efficiently be done on the location

Additionally, there are a few things that can be done to increase the capture space and to give public bodies more options for instruments to choose from:

- Start early with investigating options for value capturing as this gives time to fulfil the requirements listed above
- Starting early also decreases the chance for speculative landowners to take in land positions and next to this makes sure that an increase in value is not capitalized already
- Combining infrastructure development with urban development gives more options for value capturing although time horizon and scope of urban area development needs to be taken into consideration when using value capturing. Integration of urban development and infrastructure development is therefore on a development level not necessary. The infrastructure development is leading
- Preferably, a professional and regionally operating organization sets up the value capture scheme and may oversee the application of value capturing instruments as small parties may lack the capacity and funds to set up a value capture scheme

7. RECOMMENDATIONS

In relation the conclusions drawn in the last chapter some recommendations in relation to value capture funding can be made applicable to the Dutch context.

For the recommendations four main things can be said:

- If a municipality has the desire to perform value capturing starting early is recommended as this may increase the chances of succeeding
- Private parties are seen as the bottleneck for introducing value capture instruments in The Netherlands. This may be partly the case although, as was seen with the Randstadrail case, local public bodies are not equipped to take on large projects such as urban development schemes or regional public transportation projects. This can frustrate process and decrease efficiency of use of instruments making value capturing financially unfeasible. Professional, well equipped regional organisations are needed if value capturing is to be done for regional infrastructure projects
- Assessing the increase in real estate value deriving from infrastructure projects is hard and easily subject to problems. Real estate valuation is not an exact science and one real estate object can have multiple values depending on the way in which the value is determined. Monitoring value change and applying models to determine the value that can be allocated to one factor requires complex modelling. Without fixing this issue value capturing instruments are easily prone to legal issues as the profit principle cannot be proven entirely
- Examples where infrastructure is fully funded through value capturing are rare around the world. It is therefore that alternative funding is only an additional form of funding that will in almost any case have to be supported with public funds. Parties have the tendency to focus on the entire rise in value that can easily seem as if it is possible to recuperate all costs. It is unlikely all the value can be captured which is why the focus should lay more on concepts such as the value capture space and the instruments that are desired to be used. A conservative approach to estimating potential value capture values is required.

8. DISCUSSION

8.1 RESEARCH LIMITATIONS

Theoretical limitations

For the initial literature review ample use was made of international, mainly American and British literature. Gradually, throughout the first phases of research it became clear that concepts relevant to this research and which can be found in the conceptual framework int theory work the same. The theoretical framework however was not sufficient to be able to extent the research to the Dutch context which is why the focus of the literature review shifted to Dutch literature and research based on Dutch practice to find out how concepts work in the Dutch context. Although international literature can therefore be used, international examples have their limits if it comes to benchmarking the results of this research as the context is so different from the Dutch research context. This also implies that lessons learned in this research may not all be useful for foreign parties as the foreign context may differ too much from the context of this research.

This also limited the input for setting up the value capture process and the impact of value determinants differing from region to region. In more market oriented societies different tax systems make that what seems logical in these regions unusable in the Netherlands. This is why for setting up the value capture process, in chapter 5, input from the theoretical framework and from later chapters was selectively used and relies more than expected on empirical research. Lastly, the lack of Dutch examples of value capturing or alternative funding limits the theoretical part of the research as there is not a lot of theory on value capturing in the Dutch context.

Practical limitations

Lack of time and knowledge on complex statistical modelling made that the research lacks complex statistical modelling to calculate actual value changes in relation to Randstadrail public transportation upgrade. Next to this, the research is limited to 2 locations along two public transport lines. More locations along each line or looking at all locations along the line could have created a more broad research but given the time restraints and the research scope the choice was made to focus and dive deeper in single locations.

8.2 VALIDITY AND GENERALIZABILITY OF THE RESEARCH

The choice for undertaking a narrative literature review and semi-structured interviewing does inevitably create some form of a bias as in the role of researcher or interviewer the personal taste or opinion may become leading whilst doing a literature review or interviewing. On the other hand, the research techniques used gave the flexibility that the topic requires as the topic is quite new to the Dutch context. Qualitative research is at risk of leaning too much on the opinion or views of the researcher, although an interview protocol was used the semi-structured interview technique still allows the interviewer some flexibility and freedom in the interviewing process. Furthermore, the qualitative interpretation required to analyse the cases for the value capture process was based on views of the researcher and verified with interviewees.

The capture process that is created in this research with relating characteristics and determinants can be used in other cases in the Dutch context. Whether the model is fully complete is a question that cannot be answered as the process forms an indication and with the diversity of situations might not always be able to cover any situation. The model could

for instance be extended to contain more characteristics and if parts of it become quantitative make it more valid and generalizable.

The second case study, the Van Nelle case, required a hypothetical development concept. For the case study only one scenario was considered and the scenario was based on an interview and logical reasoning. The hypothetical case therefore may be interpreted or filled in differently by other parties as there are no publicly available plans for the location and plans may change over time. Numbers deriving from this part of the report therefore form an indication where another party may find different numbers based on different sources or different form of creating a development concept.

Lastly, the two case studies were both in the southern part of the Randstad region. The research scope is within the Netherlands. The greater part of the lesson learned and the created process is generalizable for the entire country although some circumstances may only exist in the Randstad region. Copying lessons learned from this area and input from the literature review to situations in other parts of the country will therefore not work for all other locations. The capture process is capable of compensating for this but it does however depend on the person interpreting the capture process to be able to correctly use it.

8.3 Recommendations for further research

For further research two main directions are interesting to pursue. The first category is in relation to the concepts that are relevant for the value capture process. In the case of this research these are the several different characteristics and determinants that influence the value capture potential. The second category is more research into the consequences of applying value capture instruments in the Dutch context.

The qualitative model created in this research could be verified by doing quantitative research into the effects of the different characteristics that were found and may be repeated if a value capture process is actually initiated in the Netherlands. More research into the effects of upgrades of public transportation infrastructure and the related benefits accrued by real estate owners may make it easier for public parties to use value capture instruments as a wider base of research exists to base capture instruments on possibly reducing legal issues.

As still little is known about the actual functioning of the instruments and whether they can be used more research into the legal feasibility and practical application is useful if the desire to perform value capturing in the Netherlands exists.

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PERSONAL REFLECTION

CHOICE OF METHOD AND ARGUMENTATION

At the start of the process the choice was made to conduct a case study on the research topic and to approach the topic from an urban development management perspective and from a transport and planning perspective. The topic can be approached in multiple ways and from a Management in the Built Environment an obvious perspective would have been to take a law perspective or finance/valuation perspective. In the end, both additional directions were involved in the final product but were part of the later stages of research and mainly the law part was not researched extensively. Next to this, the law and financial part were covered through interviews and guidance from the graduation company making the choice for an urban development management and transport planning perspective useful to form a basis for the research to develop and extent the research on.

To gain a greater understanding of the practice of urban development and transport planning an early start was made with research into the Randstadrail project. This enabled me to align the literature research with the case and create a direction in the narrative literature research. The Randstadrail project, an example of a successful light rail transformation project initially seemed irrelevant for the research into value capture instruments although with perseverance it made for a good case to find out more about the process of development and lessons could be learned to be combined with the research into value capturing. Choosing this form of research turned out to be a good choice.

The Van Nelle case also made for an interesting case as opposed to the Berkel Wesptolder case this location finds itself in the planning phase and is therefore interesting to apply lessons learned on and to see the potential of value capturing instruments. For the case analysis both cases could have been treated differently as now both cases were looked at mainly in qualitative terms and with some data about ownership and real estate values. A more model-based and quantitative form of research where the cases that were described are carefully quantitatively modelled to find more exact values and use statistical analyses could have been applied. Although it was initially the purpose to perform substantial quantitative modelling interviewees indicated that a focus on a quantitative approach to the research would take too much time and would probably not yield useful results. The quantitative modelling was taken out and replaced for a qualitative approach to find an expected rise in value, this turned out to be a good choice as this enabled me to compare different locations based on locational characteristics making the qualitative model used in the research capable of being adapted for use in different locations. Next to this, the approach became an integral part of the value capture process approach that forms the basis for the final results of the research.

Therefore I think that the initial approach where a broad narrative literature research was chosen and followed by case studies and research into value capture instruments was a good approach.

PROCESS

A clear planning and regular planned meetings with mentors from both the TU and Rebel have worked to keep on schedule until at least P3. It was around the P3 moment that Corona

arrived in The Netherlands completely changing the working routine and confining me to my bedroom workplace. This has, inevitably had its impact. Working from home brings complications such as decrease of concentration levels and an atmosphere of solitary graduation confinement. A next door construction site and occasional internet problems are not beneficial to a student that is used to preferring to switch from a library silence room till working in another place every day. After P3 this has lowered productivity and ambitions in relation to the research.

I do however feel that I have learned a lot about tackling a complex problems and now see that there are many more angles to approach the issues I have approached in this thesis. The more I learn the less I think I understand the issue and the more the concept becomes mixed in a system of concepts and conventions that have been carefully build up over time. It goes to show that trying to change one thing in the existing system of taxation, funding and area development inevitably results in a multitude of problems and consequences.

To look back at the process as a whole there have been some key moments. The key moments mainly revolve around the moments when I got the opportunity to start interviewing experts and people involved in the field. Being able to see different views towards the cases and towards the research topic made it possible to progress the research and helped to keep on track. Two other moments were key in progress for this research being on the one hand a long struggle with finding out how to interpret and frame the two cases in such a way that it benefits the thesis structure and research as a whole. The other key moment was the implementation of the value capture process as this commenced after P3 and basically for the first time really showed results in the cases in terms of value changes and the practical application of the process. This allowed me, with commentary of the mentor team, to adapt and finalize the process and frame it in such a way that it was aligned with the research. The sequence of expert interviews, framing the cases and getting the data on the cases occurred mainly after P2 and clearly encompasses the main part of the research.

Although at the start of the graduation process I figured I would want to improve on my planning and organization skills I can see that, looking at my initial planning and the one created at P2 I have managed to stay on track by pushing forward and through struggling with the contents of study. Next to this, regular meetings with mentors from both the TU Delft and my graduation company forced me to produce work and helped me to stay on track.

PRODUCT

Looking at the product it is interesting to consider its relation to practice and to see the relevance of the work. In chapter 1.34, conceived at the beginning of the graduation process, the audience for the research is defined and separated in three groups being local and regional public bodies, private parties and the academic world. During the research and considering the final product it becomes clear that private parties are not as much involved in the research as expected as the focus lays more on the public side by looking at the way public parties operate and could operate in relation to value capturing. If public parties consider to look into value capturing as an alternative funding method for infrastructure using this research may help this party to consider what steps are required and may save them from plunging into an elaborate and complex value capture process whilst there are many problems and risks

related to such a process that are reflected on in this research. In relation to the academic world it has become clear that there is quite some foreign research on the topic but research in the Dutch context is not abundant. Next to this, the capture process and estimation of value determinants are a collection of existing concepts put together in this research where the capture space and findings on what can increase the potential of value capturing are likely the largest addition to the academic world.

Reflecting on the results of the research it seems that in the end problems with defining the different capture instruments and understanding the way they work in combination with finding out that choosing an instrument depends on factors outside of the extent of this made it impossible to make final conclusions and choices for instruments. Decision making in this respect lays beyond the scope of the research and becomes a more political decision. Next to this, a percentage that can be expected to be captured from the revenues gained by parties was also not found as this can not be estimated as this is a question of what amount is realistic or feasible to capture which in theory is hard to answer. The initial expectation of what the final conclusions would be therefore differ as the expectation was to find numbers, percentages and a picture of what value capturing could mean for future funding whilst the actual final conclusions stay more on the conservative side and careful in making predictions in terms of numbers. It is in the end that I realize that this is likely prone to happen given the subject of research that is complex and depends on so many variables and circumstances.

APPENDIX

A. ETHICAL CONSIDERATIONS

According to Sanjari et al. (2014) ethics in qualitative research methods is about the relationship between the researcher and the interviewees and the communication form and nature of the communication has to be considered. The findings for the research are collected and analysed by the researcher and are therefore open to the interpretation of the researcher. It is therefore that a few ethical guidelines are used in this research.

It is therefore that the four principles as described by Diener & Crandall (1978) are followed in order to describe the ethical considerations for this research. The four questions one has to consider are:

-Is deception involved in the research?
-Is there a case of harm to participants?
-Is there a lack of informed consent?
-Is there an invasion of privacy?

For the research interviews are held, this is done to make the research more valid reducing the risk of deception. The interviewees are protected by asking for their consent upfront and providing them with a summary of the research and goals of the research. Next to this, the interviews will be recorded to make sure the interviews can be conducted smoothly. Recording is only done with the consent of the interviewee and recordings are stored offline and only accessible for the researcher. Furthermore, the data collected will be deleted upon graduation with transcripts kept available for one year. Additionally the interviewees are kept anonymous by describing them by their role in the case study and organisation this role was executed for. Lastly, participants are allowed to cancel their consent at any time in which case the collected data is destroyed.

B. INTERVIEW PROTOCOL

1.0 Algemene interview introductie

Locatie:
Datum:
Organisatie:
Geïnterviewde:

Introductie onderzoek
Voor mijn master Management in the Built Environment aan de TU Delft doe ik bij Rebel Group mijn afstudeeronderzoek naar alternatieve bekostiging van mobiliteit binnen gebiedsontwikkeling. Bij het onderzoek wordt specifiek gekeken naar de bekostiging van OV infrastructuur in Zuid-Holland. Voor het onderzoek wordt er gekeken naar de invloed van de upgrade van OV infrastructuur op gebiedsontwikkeling en vastgoedwaarde en hoe dit een basis kan vormen voor het gebruik van alternatieve bekostigingsinstrumenten. Hierbij wordt er onderzoek gedaan naar de Randstadrail, waar de upgrade van OV en gebiedsontwikkeling hand in hand gingen en de werking en het effect van alternatieve bekostigingsmethodes met betrekking op gebiedsontwikkeling en vastgoed.

Achtergrond bij onderzoek
Nederland en met name de Randstad kampt met een grote woningbouwopgave. Daarnaast neemt de vraag naar mobiliteit jaar op jaar harder toe dan verwacht waardoor er een noodzaak ontstaat om het huidige vervoersnetwerk uit te breiden. Naast de natuurlijke groei van vraag naar mobiliteit dienen locaties waar nieuwe woningen worden gebouwd ook bereikbaar te worden gemaakt en leidt de komst van honderd duizenden woningen ook tot meer vraag naar mobiliteit. Budgetten voor de bekostiging van de noodzakelijke investeringen in het openbaar vervoer netwerk zijn echter komende jaren niet toereikend wat er voor zorgt dat er op zoek moet worden gegaan naar alternatieve vormen van bekostiging. Alternatieve bekostigingsinstrumenten worden in het buitenland gebruikt maar zijn voor Nederland nog betrekkelijk nieuw. Is daarom weinig bekend over de werking van alternatieve bekostigingsinstrumenten, of ze kunnen worden toegepast in de Nederlandse context en wat de instrumenten kunnen opleveren.

Onderzoeksmethode
Het onderzoek wordt gedaan doormiddel van een case studie waarbij er wordt gekeken naar de Randstadrail en de invloed van de upgrade van de Hofpleinlijn op de ontwikkeling en vastgoedwaarde langs de Randstadrail. Daarnaast is het doel om door interviews meer inzicht te krijgen in de werking en haalbaarheid van het gebruik van alternatieve bekostigingsmethodes in Nederland.

Voor het interview begint zou ik graag uw toestemming vragen om het gesprek op te nemen. De opname van het gesprek wordt gebruikt om de belangrijkste onderdelen uit het gesprek te halen en worden gebruikt bij het onderzoek. De opnames zullen alleen worden gebruikt voor kennisdoeleinden en resultaten worden geanonimiseerd. Het interview zal bestaan uit een aantal vooraf opgestelde vragen en er zal ruimte zijn voor aanvullende vragen die eventueel volgen uit het gesprek.

Bij voorbaat dank voor uw medewerking.

Met vriendelijke groet,
Bernard Murre,

2.1. Interview sheet Randstadrail

Onderstaande vragen zijn een richtlijn voor het interview

Introductie

- Wat is uw rol geweest bij met betrekking tot Randstadrail?
- In welke fase was u betrokken bij Randstadrail?

Stakeholders

- Wie waren de stakeholders en met welk belang zaten ze in het project?
- Hoe zijn de verantwoordelijken voor de vinex-locaties langs de Hofpleinlijn betrokken bij het proces?

Proces

- Hoe was de aanleg van de Randstadrail afgestemd met de gebiedsontwikkeling langs de Randstadrail?
- Hoe zag het proces van besluitvorming/totstandkoming er uit in aanloop tot de aanleg van Randstadrail en hoe is daarbij rekening gehouden met de ruimtelijke ontwikkelingen?

Bekostiging

- Hoe was de bekostiging van de Randstadrail verdeeld over de partijen en hoe is deze verdeling tot stand gekomen?
- (Is er rekening gehouden met de mogelijkheid om kosten voor de aanleg van de lijn te verhalen op directe profijthebbers?)

Ruimtelijke ontwikkeling/project succes

- Hoe kijkt u aan tegen integrale ontwikkeling van mobiliteit en woningen?
- *Wat was de invloed van de realisatie van Randstadrail op de ruimtelijke ontwikkeling in het gebied rondom de Randstadrail?*
- In hoeverre heeft de komst van Randstadrail bijgedragen aan de aantrekkelijkheid van de gebieden langs de lijn en heeft dit invloed gehad op de waarde van deze gebieden?
- Wat was de vooraf voorziene impact van de Randstadrail en in hoeverre is deze waar gemaakt?

Dat was het voor dit interview. Veel dank voor de medewerking! Mochten er nog vragen of opmerkingen zijn naar aanleiding van het interview kunt u deze altijd stellen.

2.2 Interview sheet Alternatieve Bekostiging

Introductie

- Wat is uw positie en rol binnen de organisatie waarvoor u werkzaam bent?
- Bent u voor uw rol betrokken bij de bekostiging of financiering van infrastructuur?

Alternatieve bekostiging

- Bent u bekend met het begrip alternatieve bekostiging en wat houdt dit volgens u in?
- In mijn onderzoek wordt er specifiek gekeken naar alternatieve bekostiging met betrekking nieuwbouw en bestaand vastgoed en bij gebiedsontwikkeling. Heeft u ervaring met het gebruik van instrumenten die betrekking hebben op vastgoed of gebiedsontwikkeling en wat is uw ervaring hiermee?

Haalbaarheid

- Alternatieve bekostigingsinstrumenten zijn nog niet of bijna niet gebruikt in de Nederlandse context maar in het buitenland soms al wel op een grotere schaal toegepast. Hoe haalbaar acht u de toepassing van alternatieve bekostiging instrumenten waarbij bekostiging deels uit het gebied wordt gehaald waar de lijn doorheen komt? Hoe ziet u dit in de Zuidelijke Randstad?

Er zijn veel alternatieve manieren om infrastructuur te bekostigen buiten de algemene budgetten om. In dit onderzoek wordt er specifiek gefocust op instrumenten die direct te maken hebben met de waardestijging die voortkomt uit een verbeterde bereikbaarheid van een locatie. Een verbeterde bereikbaarheid veroorzaakt in theorie een stijging van de grondwaarde. Daar investeringen in nieuwe infrastructuur worden gedaan met publieke middelen en de baten daarvan deels indirect terechtkomen bij de grondeigenaren in de buurt van deze OV infrastructuur zou het kunnen dat een deel van deze baten wordt gebruikt voor de bekostiging van de OV infrastructuur. Het volgende deel van het interview gaat over de haalbaarheid van de toepassing van deze instrumenten met betrekking tot bestaande bouw en nieuwbouw/gebiedsontwikkeling.

Nieuwbouw/nieuwe gebiedsontwikkeling

- Haalbaarheid gebruik OZB
  - Politiek
  - Juridisch
  - Financieel
- Haalbaarheid value capturing/betterment tax
  - Politiek
  - Juridisch
  - Financieel
- Haalbaarheid vrijwillige bijdrage ontwikkelaar/grondeigenaar
  - Politiek
  - Juridisch
  - Financieel
- Haalbaarheid onvrijwillige bijdrage ontwikkelaar/grondeigenaar
  - Noem een voorbeeld van een wijze waarop dit zou kunnen?
  - Politiek
  - Juridisch

    - Financieel

Bestaande bebouwde gebieden

- Haalbaarheid gebruik OZB
    - Politiek
    - Juridisch
    - Financieel/impact
- Gebruik ingezetenenheffing
    - Politiek
    - Juridisch
    - Financieel/impact
- Value capturing/betterment taks
    - Politiek
    - Juridisch
    - Financieel/impact

C. LIST OF INTERVIEWEES

INTERVIEWEES FOR CASES

Names, functions and dates of interview have been anonymized. The overview shows the dispersion of sources for interviews per topic and governance levels. A green area represents an interviewee. Interviews in this section were conducted in relation to the cases, the Randstadrail, Berkel Westpolder and the Oude Lijn, Van Nelle

Sub-onderwerp	Lokaal	Regionaal	Rijk	Overig
Mobiliteit	**Gemeente Rotterdam**	**Stedenbaan**	**Infrastructuur en Waterstaat (I&W)**	**TU Delft**
	Gemeente Den haag			
RO/GO	**Gemeente Rotterdam**	**Stedenbaan**	**Binnenlandse Zaken/VROM**	

INTERVIEWEES FOR VALUE CAPTURE FUNDING

Names, functions and dates of interview have been anonymized. The overview shows the dispersion of sources for interviews per topic and governance levels. A green area represents an interviewee. Interviews in this section were conducted to explore the working and application of value capture instruments in the Dutch context.

Sub-onderwerp	Lokale stakeholders	Regionaal	Landelijk	Overig
Werking instrumenten			**Infrastructuur en Waterstaat (I&W)**	**CPB**
			BZK	
				TU Delft
Toepassing instrumenten	**Gemeente**	**MRDH**		**Adviseurs**
	Ontwikkelaar			

D. REAL ESTATE VALUATION BERKEL WESTPOLDER

Rijlabels	Gemiddelde van Verkoopprijs	Gemiddelde van Prijs per m2	Gemiddelde van Oppervlakte
2-onder-1-kap	**614889**	**4105**	**151**
Anne de Vriessingel	650000	4248	153
Annie M.G. Schmidtlaan 14	600000	4762	126
Gouden Podium	569000	3743	152
Jan Lighthartsingel 11	625000	4058	154
Jan Lighthartsingel 25	625000	4464	140
Klapwijkse eilanden 56	515000	3280	157
Paul van Ostaijenlaan 36	700000	4375	160
Seth Gaaikemastraat 34	625000	4596	136
Waterlinie 17	625000	3415	183
Appartement	**379833**	**3773**	**100**
Jan Wolkerslaan 65	475000	4095	116
Westpolderplein 16	375000	3606	104
Westpolderstraat 72	289500	3619	80
Hoekwoning	**487500**	**3558**	**137**
Fort 2	487500	3558	137
Penthouse appartement	**469750**	**4397**	**107**
Poldermolenplein 100	489500	4618	106
Poldermolenplein 13	450000	4176	108
Rijtjeshuis	**390316**	**3007**	**130**
Brouwershavenstraat	325000	3186	102
Burcht 4	369500	2980	124
Castellum 6	435000	3107	140
Deventerpad 35	289000	3284	88
Ellen vogelstraat 1	485000	3464	140
Gouden Harp 436	399000	3192	125
Havenstraat 14	415000	2964	140
Havenstraat 57	335000	2839	118
Havenstraat 81	325000	2664	122
Klapwijkse Zoom 231	495000	3075	161
Klapwijkse Zoom 243	450000	3191	141
Louis Paul Boonstraat 1	425000	3400	125
Lunet 3	360000	2687	134
Mosroos 1	349500	2496	140
Oostmeerlaan 37	439000	3158	139
Romenpad 59	450000	3125	144
Rozenoord 84	345000	2654	130
Vesting 11	375000	2778	135
Vesting 23	350000	2893	121
Vrijstaand	**824500**	**4848**	**170**
Annie M.G. Schmidtlaan 1	795000	4760	167
Bastille 19	689000	4719	146
Lea Smulderssingel	875000	4755	184
Willem Wilminkstraat 15	939000	5159	182
Eindtotaal	**495118**	**3609**	**136**

Percentage stijging door Randstadrail	5.00	%		(prijspeil 2020)		
	Oppervlak in ha	**Aantal woningen**	**Aantal m2 woningen**	**m2 prijs woning**	**Gem. Waarde woning**	**Vastgoedwaarde**
Bebouwd oppervlak bij station (rood)	197	4266	535406	€ 3,609		
Te bebouwen oppervlak (oranje)	31	671	84252	€ 3,609		
Oppervlak rondom Station (Radius1000)	314.15	4937	619658	€ 3,609	€ 452,948.96	€ 2,236,344,659
Gedeelte waarde te wijten aan Randstadrail						**€ 106,492,603**

E. REAL ESTATE VALUATION VAN NELLE

Rijlabels	Gemiddelde van Verkoopprijs	Gemiddelde van Prijs per m2	Gemiddelde van Oppervlakte
Appartement	**244214**	**2698**	**90**
Beukelsweg 60 A2	245000	3551	69
Beukelsweg 91B3	300000	3000	100
Bigantijstraat 13C	159000	2446	65
Bigantijstraat 5B	175000	2612	67
Brigantijnstraat 41B	125000	2155	58
Dirk Danestraat 10D	325000	2955	110
Essenburgsingel 104B	350000	3182	110
Essenburgsingel 118A2	269500	2695	100
Essenburgsingel 121A	449500	3211	140
Fluitstraat 24D	129500	2590	50
Fluitstraat 9B	145000	2231	65
Grote Visserijstraat 14C	275000	2926	94
Grote Visserijstraat 4B	175000	3125	56
Grote Visserijstraat 8D	275000	2183	126
Hulkstraat 12C	145000	2685	54
Mathenesserdijk 275B	395000	2992	132
Mathenesserplein 85G	219000	2433	90
Mathenesserweg 117 C2	219500	2311	95
Mathenesserweg 27B2	148000	2387	62
Mathenesserweg 27B3	245000	1801	136
Mathenesserweg 37A	200000	2597	77
Mathenesserweg 44A2	275000	2311	119
Nicolaas Beetsstraat 96B	350000	2869	122
Piet Paaltjensplein 39	215000	2590	83
Piet Paaltjensplein 79	265000	2912	91
Spangekade 43	275000	2619	105
Spangekade 44F	215000	2363	91
Spangekade 55E	250000	2907	86
Spangekade 79D	288800	3282	88
Spangekade 91D	175000	2917	60
Spangekade 95D		3074	81
Van Adrichemweg 271	175000	1923	91
Van Citterstraat 40B	450000	3309	136
Willem Beukelszstraat 3K	250000	2525	99
Willem Beukelszstraat 3L	260000	2653	98
Willem Beukelszstraat 8A	139900	2798	50
Willem Beukelsztraat 17	239000	2716	88
Appartement, benedenwoning	**299833**	**2963**	**102**
Beukelsweg 12B	210000	3000	70
Beukelsweg 84A	460000	3710	124
Mathenesserweg 109A	269500	2105	128
Mathenesserweg 18B	325000	2851	114
Multatulistraat 52	300000	2778	108
Multatulistraat 60	275000	2523	109
Nicolaas Beetsstraat 96A	169000	3314	51
Van Citterstraat 51A	365000	2967	123
Vosmaerstraat 7B	325000	3421	95
Rijtjeshuis	**517667**	**3048**	**169**
Balkenstraat 19	618000	3341	185
Bellamystraat 44	335000	2863	117
Nicolaas Beetsstraat 37	600000	2941	204
Eindtotaal	**271733**	**2768**	**97**

Percentage stijging door Randstadrail	4%							
						(Prijspeil 2020)		
	Oppervlak in ha	**Te bebouwer**	**Te bebouwe**	**Aantal woning**	**Aantal m2 woni**	**m2 prijs woning**	**Gem. Waarde woning**	**Vastgoedwaarde**
Bebouwd oppervlak bij station (rood)	86	1	0	8540	741406	€ 2,768	€ 240,305.83	€ 2,052,211,808.00
Te bebouwen gebied			43					
Park en sportvelden	38	0.25	9		90000	€ 2,768		€ 249,120,000
Spoorzone	17	0.75	13		260000	€ 2,768		€ 719,680,000
Bedrijventerreinen Van Nelle	41	0.5	20		200000	€ 2,768		€ 553,600,000
Oppervlak rondom Station (Radius1000)	314.15							
Totale vastgoedwaarde inclusief ontwikkeling								€ 3,574,611,808.00
Gedeelte toe te bedelen aan bestaand gebied								€ 82,088,472.32
Gedeelte toe te bedelen aan transformatie								€ 60,896,000
Gedeelte waarde te wijten aan Randstadrail								**€ 142,984,472**

F. COMPARISON AND SELECTION OF LITERATURE ON IMPACT OF RAIL INFRASTRUCTURE ON REAL ESTATE

Bruikbaarheid	Study	Location	Description	Value determining variables	Capture space decreasing variables	Model	Findings	Comments	Source
	Koster, Ommeren & Rietveld (2010)	The Netherlands, 30 new sprinter stations constructed between 1995 and 2007	S-bahn concept heavy rail trains		**Timing of contract (Anticipation effects)**	Semiparametric panel data, repeated sales dataset, 1995-2007. Small stations on existing tracks that are announced only two or three years before the actual opening of the station, which makes it easier to identify anticipation effects. These new stations are constructed in cities that have 90,000 to 300,000 inhabitants. Furthermore, the new stations are located in the suburbs of these cities, have comparable railway service levels and provide stops for local commuter trains only.	**About 5% increase in RE value in the first kilometer from the station. Property value increase by 1,5-2% per km getting closer to a station at a max. range of 3,5 km. The range in which an effect on house prices can be seen is smaller abroad which is likely due to the cycling culture in the Netherlands. Findings are expected to be on the low side of the spectrum, as stations researched show a minimal level of service.**	Research takes into account the existence of anticipation effects by taking a data set over a longer time period. It is well known that people adjust their current behaviour to events that will take place in the future	H.R.A. Koster, J.N. van Ommeren, P. Rietveld. (2010). Estimating the benefits of improved rail access; geographical range and anticipation effects, Tinbergen Institute Discussion Paper, No. 10-094/3, Tinbergen Institute, Amsterdam and Rotterdam
	Ossokina (2010)	Amsterdam	The impact of rail stations, for heavy rail	**Nuisance from public transport infrastructure, nearness of consumption amenity, proximity of rail alternatives**		Hedonic analysis of the effects of proximity to a railway station. . In a simple theoretical residential location model, we showed that the amenity benefits are capitalized in the residential rents and that the geographical range of these benefits can be determined as the minimal distance to the amenity beyond which residential rents are independent of the changes in this distance	**Until a range of 1.1 kilometre a premium of 5% is paid on apartments. In locations with nuisance from the public transportation infrastructure (next to it), this is lower at 3% although**	The local character of the amenity benefits leads to considerable differences in estimation of the benefits. Situation and location of a station greatly influence the value changes	Ossokina, I.V. (2010). Geographical range of amenity benefits: hedonic price analysis for railway stations. Centraal Planbureau, discussion paper 146
	Debrezion, Pels & Rietveld (2006)	Overview of multiple hedonic price models (73)	A study in which through meta-analysis 73 studies to the impact of stations on property value are estimated	**Closeness to CBD, nearness to highway can diminish effects of rail on value**		Through a meta-analysis of 73 different estimation results to the effects of railway stations on property value numbers are evaluated. In the end 57 of these are used as input to come for commercial and housing property value increase	**On average, commercial properties within ¼ mile of the station sell or rent 12.2% Higher than residential properties in the same distance range. Where the price gap between the railway station zone and the rest is about 4.2% for the average residence, it is about 16.4% for the average commercial property. Note that the reference group for both**	Commuter rail sees the biggest impact followed by heavy rail with light rail showing the lowest amount of impact. Throughout the analysis, commuter railway stations show a significantly higher impact on property values compared to light or heavy railway/Metro stations. Their higher service coverage adds to the attraction of the area surrounding the stations. In addition the number of	Debrezion, G., E. Pels and P. Rietveld (2006), The impact of Railway Stations on Residential and Commercial Property Values: A Meta Analysis, Journal of Real Estate Finance and Economics, 35, 161-180.
	Belzer, D., Eaton, N., Fogarty, N., & Ohland, G. (2008). *Capturing the Value of Transit* . Center for Transit-Oriented Development.	USA, multiple studies	Research looks at a multitude of studies and determines variables causing increases in value as well as decreasing the possibility of land value capture	**System's regional connectivity, frequency of service, link to center(s) of employment, healthy RE market (demand), traffic congestion**	**Degree of capitalization, market tenure, supportive public policy, land speculation**	Comparison of multiple studies that look into the impact of transit on real estate values (land values)	**There is a wide range of changes in values between different projects and for different real estate functions. This study tries to determine the reason for these differences**	New development can be designed to maximize the transit premium that can be achieved at any particular location. Other things being equal, the cost to build higher density development, especially buildings over five stories, is more expensive on a per square foot basis than lower density development. As a result, projects must be able to achieve higher per-square foot revenues to make more intensive development financially feasible. The fact that transit-oriented development can command higher sales prices and/or rents makes it more likely that a more expensive construction type will be feasible to build.	Belzer, D., Eaton, N., Fogarty, N., & Ohland, G. (2008). Capturing the Value of Transit. Center for Transit-Oriented Development.
	Billings (2011)	USA, North Caroline, Charlotte	A new light rail line in Charlotte connecting the southern part of the town, line of about 20 km			Difference in difference over a range of hedonic models	4% for distance till 1 mile for single family properties and 11,3% for condominium appartements till 1 mile. Until ¼ mile the value increase for condominiums is even greater at 13,4%.	The effect of nuisance is greater to single family homes close the the light rail transit	Billings (2011). Estimating the value of a new transit option. Regional science and urban economics, 41(6), 525-536.
	Gibbons and Machin (2005)	UK, London	Transport access is used as basis for hedonic pricing model			In this paper we consider links between house prices and transport access, providing evidence that consumers do strongly value better transport access. We use hedonic valuation models applied to the London area between 1997 and 2001, and implement a strong test based on a transport infrastructure innovation. The innovation we consider entailed the building of new stations, so we can look at what happened to house prices when the distances to the nearest station was reduced	Our initial finding is that house prices rose over the period by 9.3 percentage points more in places affected by these transport infrastructure changes, relative to places that were unaffected.	We also compare these results with cross-sectional estimates. Whilst the patterns are similar, the - 21 - cross-section estimates are all substantially higher. We argue that our innovations-based methodology is more appropriate since it takes better account of unobserved spatial effects. **The effects are also compared to the calculation of the value of travel time savings (VTTS)**. The resulting outcome is comparable to the one found through the hedonic method.	S. Gibbons & S. Machin. (2005). Valuing rail access using transport innovations, Centre for Economic Performance London School of Economics and Political Science Houghton Street London WC2A 2AE
	Debrezion, Pels & Rietveld (2009)	Netherlands, multiple locations	Because of the transport cost and time	**Urbanisation of region and choice of station (in more urban regions, people tempt to choose quality of the station over railway station proximity)**		This paper has analysed the effect of railway station accessibility on house prices. A crosssectional hedonic price model was estimated based on Dutch residential house transactions in the years from 1996 to 2001. The model accounted for physical, environmental, temporal and accessibility features of the residential houses	Correcting for a wide range of other determinants of house prices, we found that prices of real estate are influenced more by the most frequently chosen station than by the nearest railway station to the dwelling. Thus, the model based on the most frequently chosen station outperforms the one based on the nearest railway station in terms of capturing the effect related to railway accessibility. In addition, our analysis found that the differences in results of the estimation are bigger for more urbanised areas than for less urbanised areas. This is because the instances where the most frequently chosen station is different from the nearest railway station occur more in urbanised areas than in less urbanised areas.	In our analysis, we determine the impact of the three railway features on residential property prices: namely, railway station proximity; rail service levels; and proximity to a railway line	Debrezion, G., E. Pels and P. Rietveld (2009), Modeling the Joint Access Mode and Railway Station Choice, Transportation Research E, 45, 270-283.
	Kim & Lahr (2013)	Hudson-Bergen Rail line (HBLR)	Light rail transit line running parallel to the manhattan peninsula. Stations connecting with this peninsula reek higher benefits.			Alonso-Wingo and Hedonic, repeated house sales dataset	18,4% appreciation premium. Decreasing at 1% per 15 meter disappearing at 400 meters	Light rail lines often run through already deise areas with high property prices. A transit system is likely to designed and built in an area with high RE values and density. Furthermore, anticipation effects may beforo operation of a line already influence prices	K. Kim, M.L. Lahr. (2013). The impact of Hudson-Bergen light rail on residential property appreciation. Papers in regional science, volume 93
	Chatman, Tulach & Kim (2011)	USA, New Jersey, between Camden and Mercer	The line runs for 55 kilometres along suburban towns between the two cities. The towns see increase in developments in relation to the opening of the line. Built on the location of an existing line, in the end exceeding expected ridership numbers			Repeated sales data on properties, hedonic pricing analysis, between 2000 and 2004	1/10 of a per cent per 1 1/10 of a mile of a rail station. The cumulative effect in a 5 mile radius along the entire line is negative or at best neutral.	Accessibility increases can result in higher values for properties where accessibility increases whilst in locations where accessibility remains the same this can result in lower values, balancing out the effects; value transfer (Mohring, 1961). – Upon groundbreaking, prices fell over 10 per cent between 1 and 2 miles, after opening, they rose again.	D.G. Chatman, N.K. Tulach, K. Kim. (2011). Evaluating the economic impact of light rail by measuring home appreciation: A first look at New Jersey's River line. Urban studies, 49(3) 467-487
	Weinberger (2001)	USA, Santa clara county	LRT line in Santa Clara county and rent levels in for commercial properties in the vicinity of this line			Hedonic price model with comparison of highway accessibility and transit accessibility. Model uses rent instead of sale prices for higher robustness	Commercial property rents rise until half a mile away from the LRT, no specific amount is given	Developer community is not entirely convinced that accessibility really raises property/land value.	R.R. Weinberger. (2001) Commercial Property Value and Proximity to Light Rail: A Hedonic Price Application
	Ahlfeldt (2013)	UK, London, Jubilee line and Docklands Light Railway	Measure of accessibiltiy by light-rail or commute train			Gravity type variables to evaluate labour market access. A model comparing travel time. Capturing basic urban accessibility patterns in the presence of network-based transport systems	Utility increases by 12%, leading to better labour catchment. Effects are greater at longer distance from CBD, due to relative more change in travel time and greater for younger lower income households	Key contribution is to develop a simple empirical framework that can be used to more efficiently predict the property price effects of transport innovations.	G.M. Ahlfeldt. (2013). If we build it, will they pay? Predicting property price effects of transport innovations. Environment and planning A, 45(8). pp. 1977-1994.
	F. Medda (2012). Land value capture finance for transport accessibility: a review		Page 2, an increase according to research reviewed in this paper exists. This increase is however not linear and shows different results.			.	.	The appreciation in value is often estimated by hedonic price modeling (Rosen, 1974; Freeman, 1979), which nonetheless suffers some drawbacks and shortcomings, particularly when localized impacts may occur at the expense of whole urban growth (Dye and Merriman, 2000). As noted by Zhao and Larson (2011), the evaluations following econometric techniques are often "impractical due	F. Medda (2012). Land value capture finance for transport accessibility: a review

G. Overview of foreign value capturing and alternative funding instruments

Overview of existing instruments for value capturing and alternative funding

	Instrument (ENG)	Instrument (NL-talig)	Example	Location	Explanation	Source
Based on location/area	Betterment tax	Ingezetenenheffing	-	-	A fixed tax for all citizens of a city/region to fund public wo	CPB (2019). Policybrief Profijt en bekostiging van ruimtelijke ontwikkeling
	Betterment tax / access charge	Bereikbaarheidsheffing	Versement Transport	Paris	Companies in the Paris region with a certain size pay a premium to the local transport agency in Paris	
	BT land based levy (property owners)		-	-		Fogarty N, Eaton N, Belzer D, Ohland G (2008) Capturing the value of transit, Reconnecting America's Center for Transit - Oriented I
	BT economic prosperity based levy (business)		Crossrail	London	Levy on commercial properties in the catchment area of ne	Roukouni A, Medda F (2012) Evaluation of value capture mecha-nisms as a funding source for urban transport: the case of London'
	Incentive / upzoning	Ontwikkelbijdrage / luchtrechten	South Lake Union	Seattle	Developer pays an extra fee per floor/sqm above allowed i	Ruimte voor Durf en Diversiteit, TU Delft
	Betterment taks, (Hong Kong)		MTR corporation	Hong Kong	Based on land rent theory all windfall from increased acces	EIB, 2012. Stedelijke ontwikkeling en infrastructuur
	Real estate tax increase	Gebiedsgerichte OZB verhoging				
New location/development	Total developer	Totaalontwikkelaar	NS			
	PPP developer/landowner/mobility	PPS voor gebied	Sijtwende	Netherlan	There has to be a performance agreement dividing revenues and risks. Not certain whether this was the case with Sijtwende actually??	
	PPP dbfmo (USA)	PPP in dbfmo constructie	Denver Regional Transit District (RTD)		Public side pays private party in dbfmo kind of contract to c	http://www.reconnectingamerica.org/assets/Uploads/ctodvalcapture110508v2.pdf
	PPP concession model (Britain)	Angelsaksisch concessiemodel		Britain	Concession model with dbfo contract, public body is client,	EIB, 2012. Stedelijke ontwikkeling en infrastructuur
	PPP joint venture model (France)	Franse PPS model	TGV / Communite urbane, Straatsburg	France	Joint venture model where public and private parties are in	EIB, 2012. Stedelijke ontwikkeling en infrastructuur
	Voluntary development contribution	Vrijwillige bijdrage ontwikkelaar	Sijtwende	Netherlan	Cooperation between municipality and developer where de	Edelenbos, J., Teisman, G.R. (2008). Public-private partnership on the edge of project and process management: Insights from Dutc
	Air rights (Japan)	Luchtrechten	Public Transport Oriented Compact City D	Japan, Toy	Developer can construct more than allowed in zoning plan	EIB, 2012. Stedelijke ontwikkeling en infrastructuur
	Air rights (Development rights?) (USA)	Luchtrechten	Seattel	USA	Developer contributes extra to public space or fund in return for getting greater development rights	
	Lower parking norm	Lagere parkeernorm	Merwedekanaal gebied	Utrecht		
	GREX/VEX, additional land costs	GREX met kostenverhaal en bovenplanse verevening				
	Additional land cost per dwelling	Bereikbaarheidscomponent grondkosten				
	Public development party	Publieke ontwikkelmaatschappij	Orestad	Denmark	First new metro was developed, than same developer/cont	EIB, 2012. Stedelijke ontwikkeling en infrastructuur
	TIF, Tax Increment Financing	OZB gebiedsafroming	Chicago	USA	Mechanism that allows public bodies to capture increase in	http://www.reconnectingamerica.org/assets/Uploads/ctodvalcapture110508v2.pdf
	TIF (NL)	TIF via OZB en verhoging parkeergelden	Waalfront	Nijmegen		Root, van der Krabben and Spit, 2015. Between structures and norms: assessing tax increment financing for the Dutch spatial plann
	Developer fee/impact fee	Kostenverhaal	-	-	A fee assessed on new development to earn back investme	http://www.reconnectingamerica.org/assets/Uploads/ctodvalcapture110508v2.pdf
	Cost recovery	Kostenverhaal	-	-	Fee to indemnify particular infrastructure costs	Altermann (2012)
	Accessibility increment contribution	Alle vormen van TIF	-	-	All tools that are based on earmarking a future increase in revenue from an improved accessibility.	
						Medda (2012). Land value capture finance for transport accessibility: a review