

Master Thesis

The battle for urban space

Research on urban densification in Oostkanaalhaven



Radboud Universiteit

Teun Grauwelman
s4591224
Master Human Geography
Radboud University Nijmegen

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Author

Teun Grauwelman
s4591224

Radboud University Nijmegen
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Supervisor Radboud University:

Prof. Arnoud Lagendijk

Supervisors BCI:

Margreet Verwaal
Paul Bleumink

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Preface

This is the final part of the Master Economic Geography at Radboud University Nijmegen. After a bachelor's degree in Geography, Planning & Environment in Nijmegen, elective courses at Utrecht University and an internship, I started my Master in September 2019. This thesis allowed bundling experiences, knowledge and skills learned in the previous years.

Buck Consultants International (BCI) allowed me to conduct this research, especially from a practical angle. In cooperation with this internship organisation, I found a suitable mechanism for guiding urban area transformation. In this thesis, I tried to focus on key elements and urban practices which need to be taken into account when urban areas transform. To strengthen this thesis, Oostkanaalhaven (Nijmegen) served as a case study, which is a potential transformation area after 2030.

BCI provided space to gain practical experience, which was relevant while conducting this thesis. I want to thank Margreet Verwaal and Paul Bleumink, supervisors at BCI. Their knowledge and experience have been a great value to this thesis. Besides, their networks provided useful contacts within Oostkanaalhaven, which meant a lot while dealing with Covid-19 and its circumstances. Due to BCI, I was able to speak with various area users and other relevant respondents. I want to thank all experts and area users who were willing to participate in an interview. Moreover, I want to thank local residents who were willing to fill in the online questionnaire.

Finally, I want to thank Arnoud Lagendijk, supervisor at Radboud University. Without him, it would have been impossible to get my thesis to this level. During our collaboration there was a certain amount of chemistry, and I have always felt I could rely on him.

Nijmegen, October 6, 2020

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List of abbreviations

- ARN = Waste plant in the Nijmegen region
BCI = Buck Consultants International
BRZO-company = Decision risks of serious accidents-company
CBA = Costs and Benefit Analysis
MCA = Multi-Criteria Analysis
MGA = Mutual Gains Approach
ODRN = Environmental Service Region of Nijmegen
PVE = Participatory Value Evaluation
TPN-West = Trade Port Nijmegen-West

Chapter 1. Introduction

“There is a lot to build in the Netherlands” (Jansen & Rienstra, 2020). Until 2040 there is a great demand for residential construction and business space. These functions claim space, increasingly scarce space. It is a challenge for the coming years to make housing, working and other functions coexist in urban areas, while at the same time creating a lively urbanity (Jansen & Rienstra, 2020).

Mixing several functions and keeping urbanization compact has been a guiding principle in Dutch spatial policy for decades (Nabielek et al., 2012). Since the publication of the Structure Outline for Urban Areas in 1983 and the Fourth Policy Document in 1988, the so-called compact city policy attempted to make optimum use of existing urban areas (Nabielek et al., 2012). Urban densification is still a challenge, as the National Congress on the battle for urban space (PropertyNL, 2019) and recent publications show (Bayer, 2017; Jager, 2019; Roeloffzen, 2019; Van Schoonhoven, 2019; Vastgoedmarkt, 2019).

The urban population keeps growing, and more and more people want to be in cities due to the presence of facilities, places to work, and areas for leisure (NOS, 2017; Visser, 2019). The demand for space grows, which makes it increasingly complex to offer all functions sufficient space. Partly therefore, urban densification brings downsides. People tend to move out of urban areas, due to housing shortage, congestion, pollution and sustainability, which is at stake (Banister, 2011; Ten Teije, 2019).

This case study research investigates how different functions can coexist in urban areas. The knowledge and experience of users of Oostkanaalhaven are central to this. This thesis about urban densification and urban area transformation discusses several topics. First, societal and scientific relevance are discussed, followed by the objectives and research questions. A methodological chapter follows the theoretical framework. The operationalization precedes the findings, followed by a results chapter and conclusion. This thesis ends with references, appendices and an executive summary.

1.1 Societal relevance

As a result of the population- and economic growth, the municipality of Nijmegen struggles with a housing and job shortage. Between now and 2030, 10,000 additional houses and jobs are required to meet the economic growth of the city (Gemeente Nijmegen, 2020). Demand for houses and workplaces continues after 2030 as a result of the expanding city. Nijmegen aims to meet these challenges by following the motto “densify and mix and maintain work functions in the city” (Gemeente Nijmegen, 2020, p.87). Nijmegen remains a compact city with a clear identity, where it is attractive to live and stay due to the mix of functions and smart combinations (Gemeente Nijmegen, 2020).

Several sub-areas of Nijmegen are designated to meet the shortages. In these places, houses and workplaces develop and functions mix when possible. The Canal Zone, located in the west of Nijmegen, is one of these locations (Gemeente Nijmegen, 2020). Oostkanaalhaven serves as a case study in this thesis and is part of the Canal Zone. “We want to investigate whether this area offers opportunities for transformation in the long term (after 2030), taking into account the interests of already established companies” (Gemeente Nijmegen, 2020, p.39). Oostkanaalhaven is currently an area characterized by its work function, consisting of environmental zoning up to category 5.2 (Gebiedsvisie TPN-West, 2019).

This inner-city building, also known as infringement (‘inbreiden’ in Dutch), has several advantages. It contributes to maintaining or improving facilities. Besides, it increases the number of potential public

transport travellers. Moreover, vacant real estate transforms earlier, which helps to preserve iconic buildings and strengthen the city's identity (Stadszaken, 2017). In practice, infringement and function mix turns out to be complicated. "As a result of complaints about noise, odour or dust, companies fear they have to move or be limited in their production processes" (Jansen & Rienstra, 2020). Nevertheless, most landowners find the value jump attractive when work areas become residential areas. As a result, business activity is increasingly being driven away by complaints and land speculation (Jansen & Rienstra, 2020).

Partly as a result of current mixed-use, different functions conflict in Oostkanaalhaven. The environmental zone in Oostkanaalhaven protects companies in their sensitive business activities. However, after a law change, eight houseboats are currently allowed in the area (Van Ginneken, 2020). "If the companies want to expand, the houseboats are an obstacle, because the residents could object to odours and noise" (Van Ginneken, 2020). Further implementing mixed-use in Oostkanaalhaven, might cause comparable situations. Carefully examining the development possibilities in Oostkanaalhaven, to find out to what extent the area can meet city-wide challenges, is relevant for Oostkanaalhaven as well as the entire city of Nijmegen. Eventually, adding houses and workplaces in the city is required, and Oostkanaalhaven is partly responsible as a sub-area of the city (Gemeente Nijmegen, 2020). Which functions could develop in Oostkanaalhaven becomes clear from this thesis.

1.2 Scientific relevance

Densification and bundling of urbanization were guiding principles in Dutch spatial policy for decades (Nabielek et al., 2012). The central government is not pursuing its densification ambitions, as it is now up to provinces and municipalities. However, this new policy will ultimately not lead to a less compact urban structure, as there are currently hardly any plans for new large-scale explanation locations and business areas (Nabielek et al., 2012). Moreover, provinces and cities have grand ambitions to make optimal use of the existing built-up area, as the Omgevingsvisie of the municipality of Nijmegen shows (Gemeente Nijmegen, 2020).

Urban densification offers Dutch cities numerous opportunities concerning mobility, energy, living environment quality and the urban economy (Nabielek et al., 2012). Using space more optimally shortens distances, increases diversity and reduces demolition. Urban densification also has potential disadvantages. Inner-city building is associated with higher costs than building somewhere else, and it might lead to the displacement of existing functions to the edge of a city (Nabielek et al., 2012).

By using the correct means to guide urban densification, the benefits are more likely to show up than the disadvantages. A theory pleading for urban densification is the mixed-use principle. "Mixed-use has become a mantra in contemporary planning, its benefits are taken for granted" (Grant, 2002, p.71). Indeed, the advantages of function mix are emphasised often (Jacobs, 1961; Lynch, 1984; Rowley, 1996). According to Hoppenbrouwer & Louw (2005), it brings variety and vitality to urban areas. Following Herndon (2011), developers increasingly propose mixed-use developments to adapt projects to infill locations and gain access to greater densities.

Despite the widespread support mixed-use development garnered, its acceptance is not universal (Herndon, 2011). Many people, especially residents of suburban areas, see the re-emergence of mixed land use as a threat to their communities and believe greater density in suburban areas threatens social and economic attractiveness (Kotkin, 2010). When densifying and mixing the urban fabric, personal interests but also physical preconditions – such as water storage, air quality, noise pollution and external safety and mobility – need to be taken into account (Van Dam et al., 2010).

Until now, it does not remain easy to implement the mixed-use principle in urban areas. “New planning approaches treat mixing as necessary and desirable, yet often provide insufficient clarity about intended objectives or appropriate strategies” (Grant, 2002, p.71). Despite several attempts to implement the mixed-use principle in urban areas (Coupland, 1997; Dovey & Pafka, 2017; Hoek, 2008; Lagendijk, 2001; Rowley, 1996), an appropriate implementable, institutional method focussing on the interconnections between different functions, seems to miss (Grant, 2002; Nabielek et al., 2012). Yet ignoring crucial elements in area transformation is a pity as the benefits of urban densification are numerous.

Lefebvre’s insights could be used for a breakthrough in the literary search for optimizing urban densification. He sought to open up an understanding of the city as a complex whole, as a multitude of different desires and drives (Purcell, 2013). According to Lefebvre, the city is the place where all inhabitants live, attracting a lot of things (products, people, work, etc.). In doing so, it creates an opportunity in space through which all different things can come into contact with each other. Therefore, the city-oeuvre is literal an ‘ensemble of differences’ (Chiodelli, 2012). These differences can lead to new developments and insights but can conflict as well. Different users, practices and research communities tend to have very different views on what makes a particular organization of space ‘qualitatively’ rich (Moulaert et al., 2013). It might ultimately lead to different perspectives of stakeholders such as residents, companies and the municipality, as shown in the case of houseboats in Oostkanaalhaven (section 1.1).

A concept supporting Lefebvre’s insights is spatial quality. It was already used in The Fourth Policy Document of Spatial Planning (1988), subsequently often used in the development of residential areas and business parks. The concept takes integral quality into account, as it describes spatial quality as a coherent whole in which the experience-, user- and future value are in balance (De Zeeuw, 2018). Spatial quality occurs when the connection between different functions, institutions, persons and interests succeeds. Until now, the bringing together of different functions partly succeeded, but also led to non-optimal situations. Since the national and local government intend to densify the urban fabric further and to mix housing and business (Van Dam et al., 2010), there is still a call to find a way to optimize urban densification. “One thing is clear: every day we wait ensures we have less time to crack the code. Let us start, that is the only way to go forward” (Roeloffzen, 2019). Hopefully, this thesis contributes to this quest.

A quest in which Oostkanaalhaven might play a serving role. “In existing urban areas, there are still many spatial possibilities for urban densification of residential and work locations. Not only in and around the central areas of large cities but also in smaller municipalities and more peripheral locations within the existing built-up area” (Nabielek et al., 2012, p.9). Oostkanaalhaven is an excellent example of such an existing urban area, and here too spatial possibilities of functions on the scale of the urban region must be carefully weighed against each other.

This thesis uses different theories - mainly focused around Lefebvre's ideas - contributing to more optimal implementation of urban densification. This thesis attempts to fill in the gaps in the scientific literature about urban densification and to support urban area transformation in Oostkanaalhaven from a theoretical point of view.

1.3 Objectives

The societal and scientific relevance enable to formulate the objectives of this thesis.

The scientific objective of this research is *to get a better understanding of urban densification and to identify which elements and urban processes should be taken into account when transforming urban areas*. This objective will be achieved by researching relevant literature concerning urban development, and by questioning relevant parties at the case-study level.

The societal objective of this research is *to carefully examine the development opportunities in Oostkanaalhaven, and subsequently find out to what extent the area can meet city-wide challenges*. This objective will be achieved by questioning users of Oostkanaalhaven and policymakers, as well as delving into relevant documents.

1.4 Research questions

Lefebvre's ideas inspired the main research question in this thesis. According to Lefebvre, it is essential to take all relevant processes in urban development into account, to realize satisfaction among users after an urban area transformation. Oostkanaalhaven transforms to meet challenges existing at a broader urban level. It is therefore vital to find out which interests and goals there are in Nijmegen. Subsequently, the development opportunities of Oostkanaalhaven are examined, based on knowledge and experience of area users. After that, an investigation to what extent Oostkanaalhaven can contribute to city-wide challenges takes place, considering the knowledge and interests of users of Oostkanaalhaven. Altogether, this leads to the following main research question:

In what way can a densifying Oostkanaalhaven meet city-wide challenges, which urban processes and key elements are important within this transformation process, and what interests of users of Oostkanaalhaven need to be preserved to achieve a transformation supported by its users?

Several sub-questions help in answering the main research question. The first and third sub-question meet societal challenges. The second sub-question helps to close the knowledge gap as far as possible.

Sub questions:

1. Which interests do Nijmegen and users of Oostkanaalhaven have, and which city-wide challenges must they jointly meet?
2. Which urban processes and key elements are important in the process of urban area transformation in Oostkanaalhaven?
3. What development opportunities does Oostkanaalhaven have, taking into account the interests of relevant area users of Oostkanaalhaven?

Conducting literature research into assemblage theory, Lefebvre's spatial triad and concepts closely related to this forms the basis of the operationalisation. Formulating expectations precedes empirical research. The societal and scientific relevance, the theoretical framework and policy document study support the expectations. An indication of the primary basis for each expectation is in box 1. This indication includes a reference to societal or scientific relevance. Alternatively, this means a forward reference to a paragraph in the theoretical framework. The expectations give direction to finding an answer to the sub-questions. A check to what extent the expected answers correspond with the actual findings takes place after the empirical research.

Box 1 – Expectations

Concerning the first sub-question, the city-wide challenges to develop additional houses and jobs are given (societal relevance). The expectation is that entrepreneurs of Oostkanaalhaven will not be very eager regarding the construction of houses in Oostkanaalhaven, referring to the houseboat situation mentioned in the societal relevance. On the other hand, the expectation is that the municipality and entrepreneurs both experience the arrival of other workplaces as positive. The document study (section 5.2.1) inspires this expectation. The following expectation is the result.

1. The municipality of Nijmegen keeps all development options open for Oostkanaalhaven after 2030, while entrepreneurs applaud the development of new workplaces and are pessimistic about building houses in Oostkanaalhaven

Regarding the second sub-question, the expectation is that mixed-use, spatial quality and institutional planning methods are essential urban processes in area transformation in Oostkanaalhaven. Expectation 2 to 5 concern the second sub-question, with expectation five zooming in on essential key elements in the transformation of Oostkanaalhaven.

2. Entrepreneurs in Oostkanaalhaven have a negative attitude towards further implementation of mixed-use, while the municipality and local residents encourage it

The theoretical framework (section 2.3.1, focussing on mixed-use) inspires the first part of this expectation. The document study (section 5.2.1) provides input for the second part of this expectation.

3. The 'ensemble of differences' makes it hard to find an overarching vision for further development of Oostkanaalhaven, which causes not every stakeholder experiences the same amount of spatial quality

The scientific relevance and the theoretical framework (section 2.3.2, focussing on spatial quality) provide input for this expectation.

4. This case-study research provides insight into institutional planning methods, and there is a vital chance of finding an appropriate method for further development of Oostkanaalhaven

The theoretical framework (section 2.4.3, focussing on institutional planning methods) inspires this expectation.

5. Housing, working, liveability and the environment - as a result of the environmental zone - are key elements in the transformation process of Oostkanaalhaven

The text passage from Jansen & Rienstra (2020) mentioned in the introduction inspires this expectation. A discussion of the environmental zone took place in the societal relevance.

Concerning the third sub-question, finding an overarching vision for the development of the area will be hard. Urban densification is not easy, as there are often many stakeholders involved. The expectation is that local residents are pessimistic about the industrial area, as they might experience the nuisance of heavy industry. This refers back to Jansen & Rienstra (2020) in the societal relevance. By contrast, the expectation is that entrepreneurs embrace the environmental zone and emphasize this particular industrial area needs to be preserved (the document study largely supports this assumption). The current houseboat situation gives most entrepreneurs little confidence in the future. Expectation 6 and 7 are the result.

6. Since local residents have a negative attitude towards the heavy industry, adhering to their desired development direction for Oostkanaalhaven causes a radical change

The document study (section 5.2.1) supports this expectation.

7. The special environmental zone is the last means of protection for entrepreneurs in Oostkanaalhaven, which makes most of them hesitant about the future of their company

The text passage of Van Ginneken (2020) mentioned in the societal relevance inspires this expectation.

Chapter 2. Theoretical framework

The theoretical framework provides a scientific base for this thesis. Ideas of the assemblage theory serve as an underlying rationale and precede the exploration of the spatial triad of Lefebvre. Elements of mixed-use and spatial quality connect to the previous, overarching insights. Lastly, there is an exploration of institutional planning methods. Together these theories lead to a conceptual model, which hopefully optimizes urban densification and contributes to urban area transformation supported by area users.

2.1 Assemblage theory

Assemblage theory originates from philosophy and social theory and offers a way of thinking about the (urban) world as a relational process of composition (De Landa, 2006; Deleuze & Guattari, 1987; McFarlane, 2011). It refers to the intrinsic effect of the connection of heterogeneous elements, such as humans, organizations, tools, objects, organisms and other cities (Latour, 2005). Assemblages are never fixed or stable, but always in the process of (un)making. The fluidity and exchangeability of several functions in an assemblage are influenced by historical processes, as the past defines the elements in an assemblage (Deleuze & Guattari, 1987). Therefore, all assemblages have a full historical identity, and each of them is an individual entity, - community or - organization (De Landa, 2006).

An assemblage is dynamic. It takes individual elements and the synergy between them into account (Wise, 2005). A street is an example of an assemblage. It is not just a collection of things, since buildings, houses, shops, signs and cars all come together to become the street. What is crucial are the assembled connections between them, such as the flows of traffic, people and goods or interconnections of the public to private space. These flows of life, traffic, goods and money give the street its intensity and an emergent sense of place (Dovey, 2012). Assemblages have a strong dynamic character because relations between elements can constantly change without individual elements changing (Kooij et al., 2012). This approach to relationships is called relations of exteriority, which implies each assemblage has its dynamics, and therefore its contribution (Kooij et al., 2012). Therefore, an assemblage as a whole cannot be simply reduced to the aggregate properties of its parts. This is because an assemblage is characterised by connections and capacities rather than the properties of the parts (De Landa, 2006).

Beside 'relations of exteriority', coding and territorialisation are important processes which form relationships according to the assemblage theory. Coding refers to the role played by language in fixing the identity of a social whole (Kamalipour & Peimani, 2015). Coding plays a role in developing and retaining identity because it shapes and creates structure based on language (Kooij et al., 2012). Coding takes, for example, place in policy documents, since they set the ambitions, and describe how to achieve the policy goals. Territorialisation is the process of ordering, selecting, restricting and cooperation of elements which form an assemblage (Kooij et al., 2012). It refers to the determination of the boundaries of a whole, for instance, a city, but also to what extent a component of an assemblage is drawn from a certain repertoire (Kooij et al., 2012). The challenge is to get a strategy or project going and to keep it going, taking the historical identity and coding into account, to give it a well-defined place in social reality (Kooij et al., 2012).

Coding and territorialisation create relationships between different elements. Some processes create dysfunction of elements in an assemblage (Kamalipour & Peimani, 2015). Deterritorialization occurs when attributes disconnect, reterritorialization describes the new joining of attributes. Both can constitute a new assemblage. For example, new road construction can divide an area. Ultimately, this can affect the identity of that particular area, influencing the coding and potentially changing the meaning of an attribute within that assemblage (Kooij et al., 2012).

2.1.1 Assemblage theory and urban densification

This section focuses on how the assemblage theory can contribute to new insights into optimizing urban densification. The aim is that the assemblage theory, in combination with Lefebvre's spatial triad, contributes to new insights into urban area transformations, to guide urban densification. This mainly concerns the combination between the living and working function, as well as adjacent functions, at city- or (sub)area level. It does not relate to developments at the building level.

Urban areas and cities are ideal models for adopting assemblage thinking (Tonkiss, 2011). Assemblage thinking addresses the city as a multiplicity rather than a whole (Farías, 2011). For McFarlane (2011), the concept of assemblage is of value because the way it attends to why and how multiple bits-and-pieces come together over time. A key to understand urban issues in an urban area is geared to the exploration of the ways that area connects with urban environments. When limiting the analysis of an urban environment to a particular scale, the risk of overlooking relations to both larger and smaller scales occurs. In this way, multiscale thinking serves as a toolkit in reorganising urban space, which can help to unravel how urban assemblages work across different scales. Knowing more about what takes place between different levels and the connections within certain levels, might be of added value for (political) decision-making concerning urban densification.

Theory and practise both benefits from assemblage- and multiscale thinking, because it enables to stimulate integrated approaches in planning and design (Kamalipour & Peimani, 2015). Assemblage thinking provides useful insights into analysing urban space, which might lead to more optimal guidance of urban densification. Applying such insights to Oostkanaalhaven, might provide valuable inspiration for comparable urban densification cases as well (Coupland, 1997; Dovey & Pafka, 2017; Hoek, 2008; Hoppenbrouwer & Louw, 2005).

2.2 Lefebvre's spatial triad

A thinker who elaborates on the ideas of the assemblage theory is Henri Lefebvre. His main ideas, which are central to this thesis, are presented below.

2.2.1 Place and space

Before saying anything about space, it is vital to distinguish space and place. Place is a delimited area which people have a strong connection with. A place can be 'your place', like a bedroom (Creswell, 2015). Space is a more abstract concept, something people know of, but in which one does not have to feel at home immediately (Creswell, 2015). This distinction does not make it easier because space and place can be experienced very differently (Creswell, 2015; Tuan, 1977). While we hold common-sense ideas of what places and spaces are, these are often quite vague when subjected to critical reflection. When looking at the world as a world of places, one sees different things. One sees attachments and connections between people and place, as well as worlds of meaning and experience. However, "to think of an area of the world as a rich and complicated interplay of people and the environment – as a place – is to free us from thinking of it as facts and figures" (Creswell, 2015, p.18). Creswell (2015) is not entirely right, because facts and figures are in any case necessary to arrange cities differently. This quote does show that it is worth looking at cities and space in general from a different angle, which Lefebvre is attempting.

2.2.2 Perceived, conceived & lived space

Lefebvre sought to open up an understanding of the city as a complex whole, as a multitude of different desires and drives not reducible to economic imperatives (Purcell, 2013). In Lefebvre's opinion, the city should always be a city-oeuvre. This means the city should be characterized in all its parts by a 'surplus of art'. That is, the high urban quality and architectural style characterizing the entire urban fabric. The purpose of this 'surplus' is the creation of a sense of belonging, pride and civic affection for the city and the celebration of the city and all its inhabitants (Chiodelli, 2012). The

city where all inhabitants live attracts many things like products, people and work. In doing so, it creates the opportunity through which all different things can come into contact with each other. Therefore, the city-oeuvre is literal an 'ensemble of differences' (Chiodelli, 2012).

For Lefebvre, (social) space is composed of three mutually co-constituting spheres (Leary-Owhin, 2015; Pierce & Martin, 2015). The first space includes spatial practices (perceived space, or *what is seen*) (Pipitone & Raghavan, 2017). This is the space of day-to-day action and is perceptible through the senses. The second space includes the representations of space (conceived space, or *what is thought*). This space is produced by technocrats (such as planners, architects and engineers). This space is ordered, but at the same time, it is ordering, reinforcing and reproducing existing economic and social relations. The third space Lefebvre distinguishes is the spaces of representation (lived space, or *what is felt*). This is the "directly lived" space, a physical space in which people feel the world. It is crucial to mention that Lefebvre does not see these three spatial facets as separate spaces. Rather, they produce a simultaneous space through interaction (Pierce & Martin, 2015). In figure 1, Lefebvre's "spatial triad" is shown.

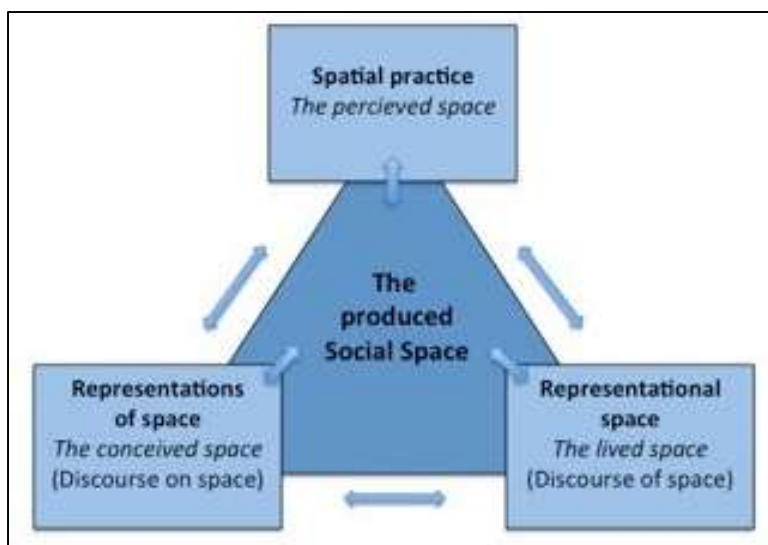


Figure 1: Lefebvre's spatial triad. Source: <https://ngathanblog.wordpress.com/2019/02/17/henri-lefebvre-the-production-of-space/>

Pierce & Martin (2015) build upon Lefebvre and see an opportunity for critical geographical theory to move beyond the crucial insights and substantively address the problem of how to conceptualize knowing space empirically. "The social relations of production have a social existence to the extent they have a spatial existence; they produce themselves into a space, becoming inscribed here, and in the process producing that space itself" (Pierce & Martin, 2015, p.1283). This means that several places situate within space. Together these places create space (Creswell, 2015). In this way, Lefebvre takes over the continuous process of 'becoming' of space from the assemblage theory.

"Places are sites where people live, work and move, and where they form attachments, practice their relations with each other, and relate to the rest of the world (...) they have distinct materiality, a material environment historically constructed" (Leitner et al., 2008, p.161). According to Pierce & Martin (2015), these places emerge from the conjunction of many elements, through the process of bundling of things that will also be brought into other place-bundles. Following Massey (2005) these place-bundles are constellations of various kinds of 'objects'. These 'objects' could be human beings, other life and networks of social relations. They could also be physical objects like rocks or mountains and the built environment. These objects are "bundled" by individuals into assemblages that exist at multiple scales. The shape and contents of those bundles negotiate socially and politically all the time, which indicates that area development is partly a political matter.

The relationship between functions in a place cannot be easily observed or measured. Place-making is an affective experience of individuals which is co-constituted through social interaction. Individuals experience (bundles of) places, but at the same time, these places are socially and/or politically produced (Pierce et al., 2011). Moreover, places have trajectory and path dependency, which causes place is sometimes difficult to reform due to choices made in the past (Pierce & Martin, 2015). Therefore, affective experiences – composed of individuals’ sensations – must be measured differently, using interviews or other methods that ask residents and stakeholders to articulate their (inevitably partial and limited) understandings of place-phenomena (Pierce & Martin, 2015). An important concept of Lefebvre which connects to this is the right to the city. This means the right for everybody to take part in full urban life (Chiodelli, 2012). Related to this, Lefebvre speaks of autogestion. This means people manage collective decisions themselves rather than surrendering those decisions to a cadre of state officials (Lefebvre, 2003). Such autogestion insists on grassroots decision making and the decentralization of control to autonomous local units. Furthermore, because it refuses to turn over responsibility to a managerial class, autogestion requires a great awakening on the part of regular people (Purcell, 2013). It is important to take the right to the city and autogestion into account, especially regarding the fact that place-making is partly a political matter. Politics do not experience a place as its users do, since politicians tend to make decisions remotely. It is therefore important to map as accurately as possible what is happening in a place, to make appropriate decisions. This connects well to the Lefebvrian approach, which highlights the “hyper complexity” of interactions between various functions in place production (Pierce & Martin, 2015).

Shifting to the three domains which Lefebvre addresses in his formulation of (social) space, interesting observations occur. Lefebvre’s notion of conceived space can be understood through observation, supplemented with (interview or other) accounts of intentionality (Pierce & Martin, 2015). Measuring the domain of perceived space is possible through a combination of observation and accounting of flows and movements of people and objects. These flows are important for Lefebvre’s understanding of unravelling social space. Finally, “directly lived” space requires an inquiry into the experiences, understandings, and influences of individuals. Relationally approaching space offers a way of thinking about the interaction between human and environment, which makes explicit room to capture the physical, political, economic and experiential. A relational place-making approach sees place not as a coherent, unitary whole, but as a variety of only roughly congruent place bundles or components. These are necessary fragments - also in decision making - that interact in places (Massey, 2005; Pierce & Martin, 2015).

Lefebvre’s spatial triad offers a whole product of (social) space but is difficult to separate into parts for observation or analysis conceptually. According to Pierce & Martin (2015), any attempt to do so illustrates only threads, incomplete segments of space itself. They endorse thinking of space/place as always incomplete and suggest that relational place fosters such theorizing. The convergence of parts of place is not always evident, and may at times need expounding, theorizing, as well as observing and measuring (Pierce & Martin, 2015, p.1295). Lefebvre himself also emphasized partial research leads to analytical failure (Pierce & Martin, 2015). Partly therefore, many different types of data are often brought together in analytical frameworks that should then require holism. However, in this way, the properties of individual elements are ignored.

The previous sections show it is difficult to conceptually separate the spatial triad into parts for observation or analysis. In this thesis, this is not the case, as the relationally used spatial triad serves as a guiding principle. Lefebvre’s philosophy fits in well with the assemblage theory, and together they form the theoretical base of this thesis. Combining both theories offers useful insights. Space is a bundling of different entities that interact and not going beyond individual elements ensures overlooking important aspects. Therefore, it is important to argue for a different angle in constructing space. “A theoretically robust critical appreciation of the production of urban space of

use for planning requires a careful engagement with the histories of the elements of Lefebvre's spatial triad (...). Such understandings will elevate diverse, inclusive urban public space theoretically, politically and practically to the status of one of the prime desired outcomes of planning practice" (Leary-Owhin, 2015, p.7).

2.3 Delving into space construction

The previous sections show that different elements interact in a particular space. How to deal with these elements can be decisive in the success or failure of a place. Mixed-use and spatial quality are important concepts which can help to optimize urban densification. Mixed-use largely corresponds to the conceived space, while spatial quality covers the conceived- and lived space. An elaboration of the role these main concepts play in the continuous conversion of social space follows below.

2.3.1 Mixed-use

It is worth exploring mixed-use, or function mix, and to demonstrate the benefits it has to offer for urban densification (Banister, 2011; Coupland, 1997; Grant, 2002; Hoppenbrouwer & Louw, 2005; Jacobs, 1961; James et al., 2009; Lagendijk, 2001; Lynch, 2000; Rowley, 1996). Mixed-use brings variety and vitality, as it enables functions to merge and converge. Due to the co-existence of several functions close to each other, the quality of life in an area could increase (Hoppenbrouwer & Louw, 2005). Secondly, mixed-use enlarges awareness about mobility, energy-saving and pollution. Since different functions are not isolated - especially at area level - functions and its users need to take each other into account (Banister, 2011; James et al., 2009). Thirdly, increasing the diversity of uses within the urban fabric by encouraging a compatible mix, generates synergy effects. "Compatible uses do not create conflict and may generate synergies. For instance, adding high-density residential uses to commercial and office districts may prove compatible because residents who live near businesses may patronize or work in those businesses" (Grant, 2002, p.73). Flexible, multiple uses of space even reduce the chance of moving existing functions to the edge of a city. The same place has different uses and therefore, might prevent potential (environmental) conflicts (Pols, et al., 2009).

These examples show that mixed-use takes existing functions in space into account, as well as the possibilities that are present to insert new functions in already existing usage. Taking existing and future entities into account are in line with the conceived space. A careful urban design, with attention to proper integration and coordination of buildings, facilities and public space, can positively change the image of a place. When one thinks differently about a place, the adverse effects of urban densification can even be compensated (Nabielek et al., 2012).

Since a couple of decades – Jacobs already wrote about function mix in 1961 – several authors write about mixed-use. As a result, a lot is known about mixing functions and its advantages. Nevertheless, it has not yet been possible to use insights from mixed-use to improve urban densification optimally. That is partly because the implementation of mixed-use in urban space is difficult (Bloemmen & Lüdtke, 2002; Kong et al., 2015). It is hard to develop a blueprint for mixed-use, as each place is different and contains particular entities. Also, due to location-specific jurisdictions, buffers between heavy industry and other urban areas are often required. Environmental effects, but also noise and traffic nuisance have to be taken into account when mixed-use is applied (Grant, 2002). Mixed-use is very likely to restrict environmentally protected businesses. The negative attitude of entrepreneurs towards this is reflected in expectation 2 (box 1). Beside jurisdictions, obstacles in policy-making, organization and additional costs are hurdles to take. To tackle these and other obstacles and to be able to see the added value of mixed-use in a particular urban space, mixed-use must be clearly identified and measured (Lynch, 2000; Rowley, 1996). To do this, it is again important to look at the individual elements that interact and come together in urban space. By including relevant stakeholders and individual elements in the design of a place, one can take a look at the necessary place details, which gives the conceived space a positive impulse.

This section showed that mixed-use has advantages for the urban fabric, but implementation is difficult. Mainly as a result of several obstacles, mixed-use is not always embraced in spatial construction. However, if mixed-use is appropriately applied, it can be of added value for the conceived space and ultimately in the continuous conversion of space. Therefore, mainly technocrats need to optimize the identification and measurement of mixed-use and integrate it into space. That enables urban densification to benefit from the advantages mixed-use offers.

2.3.2 Spatial quality

Beside mixed-use, spatial quality is also distinguished as an essential concept when analysing the construction of space. Spatial quality is a coherent whole in which the experience-, user- and future value are in balance (De Zeeuw, 2018). There is broad agreement on the importance of spatial quality as an analytical concept and a category for planning, design and policy-making. However, different users, practices and research communities tend to have very different views on what makes a particular organization of space 'qualitatively' rich, echoing the just described concept of mixed-use (Moulaert et al., 2013). This ties in with the 'ensemble of differences' as described in section 2.2.2. Due to the potentially large number of stakeholders in Oostkanaalhaven, it can be challenging to create the same degree of spatial quality for each actor. That is in line with expectation 3 (box 1), which is later verified based on empirical research. In the end, spatial quality occurs when the connection between different interests succeeds. Take, for instance, a dike which is used for flood defence as well as other functions, nicely integrated into the landscape. It is the task for planners and designers to take position in time and show craftsmanship and flexibility (Lucas, 2013).

A quick overview of the major theoretical and operational approaches to the concept of spatial quality in existing literature shows most publications do not define the concept in a straightforward way (Moulaert et al., 2013). Many dimensions are named and analysed by various authors addressing spatial quality, which points to the importance of recognizing different and complementary perspectives and methods to (de)construct spatial quality (De Zeeuw, 2018; Moulaert et al., 2013). Authors mention several dimensions and concepts such as 'good city form' (Lynch, 1984), 'urban quality' (Chapman & Larkham, 1999), 'planning performance' (Friedmann, 2004), 'place quality' (Healy, 2004), 'spatial justice' (Soja, 2010) and 'inclusive design' (Lang, 1990). This overview is not exhaustive, but it does show that the selection of elements which are relevant to spatial quality depends on the research or action questions, as well as the views and mindsets of actors involved (Moulaert et al., 2013). That connects to the conceived space, as the spatial quality of a place is (partly) determined by the way people think about a particular place. Reading and assessing the quality of a space or place is not based on the value inherent in objects, but on the experiential value of objects, formed by relational socio-subjective perceptions. This experiential value of objects is in line with the lived space, as it focuses on what one feels at a particular place. Therefore, personal and collective interest in specific characteristics of spatial quality depends on the nature of the objects experienced (Moulaert et al., 2013).

Referring to Lefebvre's spatial triad, in the 'everyday life' the role of design is a necessary societal function which serves the public good. Seeing place-making as an interaction between (urban) design and public life - a crucial link for broadening the concept of spatial quality - has a specific conceptual history in the theory of urbanism. Urban design is essentially about place-making, where places are not just a specific space, but all the activities and events which make it possible (Buchanan, 1988). One could say strategic spatial planning has become much more a mode of integrating complex agendas - through spatial strategy making - and democratic consultation as well as decision-making, rather than a structure for matching functional boxes with spatial availability (Moulaert et al., 2013). In other words, it has developed closer affinities with institutional planning by recognizing the social dynamics behind fields of functional tension (Moulaert et al., 2013).

This development is in line with the reduced use of the concept of spatial quality, and the emergence of the more comprehensive concept of 'environmental quality'. Environmental quality is a collection of environmental-, health- and safety quality, in combination with spatial quality and other recognized social values (such as social cohesion and economic vitality) (De Zeeuw, 2018). As one can imagine, environmental quality is more sensitive to location-specific developments than the narrower term spatial quality is. To understand the dynamics, a relational framework constructing space out of social, cultural, economic and ecological aspects can help. Moulaert et al. (2013, p.403) propose such a meta-framework to analyse, assess and improve spatial quality in places and spaces. Important aspects they mention are the focus on a relational methodology in determining the spatial quality, as well as stressing the agency-driven transformative character of the spatial quality building in places. In this way, it follows up on the desire of designers, planners or community developers to work in a more integrative and interactive way on the improvement of spatial quality. The ultimate challenge is to create unity or at least dialogue between diverse ways to look at cities. Transdisciplinary requires the identification of the roles of different actors in spatial quality reading, assessment and improvement initiatives (Moulaert et al., 2013). The analysis of the role of different 'spatial quality makers' within the meta-framework has a reflexive dimension. It should allow evaluating the role of different actors and the relations between them from an ethical and professional competence point of view. That goes beyond just describing the role of stakeholders, enabling to integrate different functions, which is in line with the previously described concept of mixed-use.

Theorizing public space through the lens of 'place-making' offers a productive dialogue across disciplines. It brings space central to socio-spatial analysis as a 'layered concept' that is always specific, unique and in the making (Massey, 2005). Moreover, it confronts Lefebvre's notion of space with the importance of 'materialities' that take part in producing connectivity and meaning through embodied experiences in urban public space (Moulaert et al., 2013). Space, place and use are thus increasingly seen as an interwoven socio-spatial process which influences each other, co-producing space in a dialectical movement where the experiencing human being is in a central position (Moulaert et al., 2013). However, it remains essential to zoom out of the conceived and lived space and take into account the perceived space as well. This reduces the risk of ending up with a too abstract representation of interdependencies and overlooking the 'dependencies' on the socio-spatial and socio-ecological contexts in which space making takes place (Moulaert et al., 2013; Zhang et al., 2004). However, one needs to take into account each space has its own, place-specific quality challenges, which came forward in the section on mixed-use as well. Actors that make a space act within that space according to their mindsets and their institutional embeddedness. Including more autogestion in this integrative and interactive process, could be helpful.

2.4 Institutional planning methods

This section explains the importance of unravelling institutional planning methods. Institutional planning methods are often used to guide urban densification, and to overcome negative effects such as liveability and congestion (Nabielek et al., 2012). In this thesis, the expectation is that planning methods influence substantive and related processes in space construction while acting as a background process. Therefore, the concept is explored and included in this research, but not labelled as a main concept. Investigating several themes is possible while carrying out an institutional planning method. Think, for instance, of the accessibility of an area, sustainable forms of energy, spatial quality, economic development and quality of life (Nabielek et al., 2012). The relationship between planning methods and other concepts is sought in useful elements of (different) institutional planning methods. This may be useful for the process of space construction in Oostkanaalhaven, as institutional planning methods are used to fit urban planning interventions carefully into existing areas.

2.4.1 Complexity and change of urban area transformation

Dutch municipalities traditionally do land assembly (Buitelaar & Segeren, 2010). Local authorities try to pursue an active land policy by buying land, preparing it for housing or other land uses and sell it to developers or housing associations (Needham, 1997). Apart from financial benefits, the active land policy provides Dutch local authorities with additional means in their quest to control land use, which fits the strong planning culture of the Netherlands (Faludi, 2005). Since the beginning of this century, the active land policy has come under pressure, mainly as a result of more private interest in land development (Segeren, 2007). Since owners decide how land is used, the temporary owners are first and foremost responsible for the result of the land development process. Local authorities, if they are not the owner, play an important role in setting those boundaries. In the end “it depends on the relative preferences, power, competencies and competitive advantages of both public and private parties, how land is delineated, assigned and developed and how that affects our urban fabric” (Buitelaar & Segeren, 2010, p.677). A factor widely recognised as adding to the complexity of urban area transformation is the fragmentation of land ownership. “Not only does this affect the process, but it also reveals itself in the outcome of urban regeneration—the urban morphology” (Buitelaar & Segeren, 2010, p.661). Initial landowners rarely take the initiative to redevelop a place that has become obsolete. They only do this when a more significant landowner, such as a housing association, owns the land.

Partly because the active land policy is under pressure, the way urban area transformation takes place is slowly changing. New developments are well integrated into the existing environment and are tried not to affect the existing landscape and recreational qualities of an area. In areas with a small-scale structure, bottom-up developments are better suited (Nabielek et al., 2012) than large-scale developments. A top-down procedure often characterizes the latter. This goes hand in hand with the (re-) emergence of invitation planning. This can be characterised as a form of land policy in which the government invites society – think of private individuals, project developers and other social actors – to (re)develop an area (Muñoz Gielen, 2014). “Invitation planning is part of organic area development because it is the society that decides whether or not to develop, without or with little coordination from above” (Muñoz Gielen, 2014, p.1038). This form of land policy is in line with the trend towards facilitating land policy. In this variant, it is not the government but other parties that conduct land exploitation and are responsible for the implementation of the spatial policy. By involving relevant actors in the planning process, creating a more supported design is possible, as participants are part of the space construction process.

2.4.2 Commonly used institutional planning methods

Several institutional planning methods are available to assist urban densification in connecting to the gradually changing way of planning. A full explanation of the methodologies does not follow. It entails a revealment of mostly elements connecting with the ideas of Lefebvre's spatial triad.

Although their boundaries are blurred, it is possible to distinguish between two families of institutional planning methods. Mono-criterion method is the first family, which assesses a given plan against a single and specific objective. An example is a cost-benefit analysis (CBA), which assesses a plan primarily against the objective of economic efficiency, by translating all impacts into discounted monetary terms (Dodgson et al., 2009; Rijksoverheid, n.d.). It is often used to make decisions about major spatial projects, used by governments, interest groups and companies. It is compulsory to use in large projects determining the future of an area. It makes sense to perform a CBA if a project or measure has many or significant consequences for citizens or the environment (Rijksoverheid, n.d.). While using a CBA, policymakers look objectively at new projects, and outsiders might better understand decisions. Organizations can check whether their interests (such as nature or safety) are included sufficiently. A CBA could be helpful in area development because project alternatives are often packages of measures that are the result of negotiations between many parties. Drawing up a

CBA is an important tool in the search for promising alternatives and variants and in selecting the most societal effective and efficient measure. Therefore, a CBA should not be limited to analysing one specific project proposal or policy package of measures. Several alternatives must be distinguished to achieve the same goal, for example, different ways to set up an area or to increase accessibility (Bos & Verrips, 2019).

The second family of institutional planning methods is the multi-criteria method. These methods appraise or evaluate a plan by explicitly taking into account multiple objectives and criteria, of which the multi-criteria analysis (MCA) is an example. "MCA establishes preferences between options by reference to an explicit set of objectives the decision-making body has identified, and for which it established measurable criteria to assess the extent to which the objectives have been achieved" (Dodgson et al., 2009, p.20). MCA offers several ways of aggregating the data on individual criteria to provide indicators of the overall performance of options. A key feature of MCA is its emphasis on the judgement of the decision-making team, in establishing objectives and criteria, estimating relative importance weights and, to some extent, in judging the contribution of each option to each performance criterion. MCA can bring a degree of structure, analysis and openness to classes of decision. One limitation of MCA is that it cannot show the degree of contribution of an action to welfare (addition or subtraction). Therefore, the 'best' option can be inconsistent with improving welfare, so doing nothing could, in principle, be preferable. Concerning urban area development, an advantage of using MCA is that the method is open and explicit. Moreover, the choice of objectives and criteria any decision group may make are open to analysis and to change if they feel inappropriate (Dodgson et al., 2009).

It is difficult to compare the mono- and multi-criteria analyses. A mono-criterion method such as a CBA is a single specific assessment method, whilst multi-criteria analysis as MCA encompasses a family of (very different) appraisal and evaluation techniques. However, to name a difference between the two methods, a CBA inherently accounts for the fact that social impacts of, for example, a transport project occur over many periods by discounting future impacts of the project. An MCA rarely includes this time dimension (Dodgson et al., 2009). As a result, this might lead to criteria and impacts which are likely to present inconsistencies in temporal scales.

An institutional method which also uses a discount foot is public land exploitation. Within public land exploitation, the municipality takes care of the purchase of the necessary land within the limits of a zoning plan. After that, these lots are made ready for their future destination by taking care of water, electricity, sewerage, etc. (Louw et al., 2009). Subsequently, the ground gets sold to market parties. These parties must develop the area in such a way the destination does not deviate from the zoning plan. The owners are responsible for the management of the buildings. The government is responsible for the management of the public area and infrastructure (Kersten et al., 2011, p.15). An important advantage of using public land exploitation is that the municipality has a significant influence on the future destination of an area. A disadvantage is that the municipality must have access to all lots in the plan area, which is not always the case. Buying out owners is often an expensive affair. Moreover, the municipality must be able to estimate beforehand whether the lands are for sale to market parties.

2.4.3 Tools for managing urban densification

As described, land policy in the Netherlands is gradually changing from a rigid top-down policy, towards a policy including bottom-up elements in which landowners can wield more influence. This influence also has its downside, because it causes more actors and interests, which increases the complexity within an urban area transformation. Oostkanaalhaven is a place where planning policy might need to change. The demand for extra houses and workplaces requires an integrated approach. The discussed institutional planning methods offer tools to assist urban densification in

the gradually changing planning policy. Therefore, the expectation is that one of the institutional planning methods just explained contributes to meeting the city-wide challenges. This refers to expectation 4 (box 1).

A CBA provides help in searching for promising alternatives and variants and in selecting the most societal effective and efficient measure to take in an urban area transformation. A CBA offers the opportunity to let organizations provide input, which ensures space for autogestion. An MCA is open and explicit, and the choice of objectives and criteria that any decision group may make are open for analysis and might change if they feel inappropriate. By providing room for adjustment and different groupings and scales, an MCA takes multiscalar thinking and the fact that space is always in the process of 'becoming' into account. When transforming an urban area which includes several landowners, land exploitation provides the municipality with a significant influence on the future destination of an area. In this way, the municipality serves as a leading party but recognizes that space does not stand alone, and multiple actors and their interests continually influence it.

2.5 Conceptual model

The previous sections discussed relevant theories which help in formulating an answer to the sub- and main research questions. The conceptual model (figure 2) shows the way these various concepts relate to each other. By drawing up a conceptual model, one translates theories into empirical elements (Vennix, 2011).

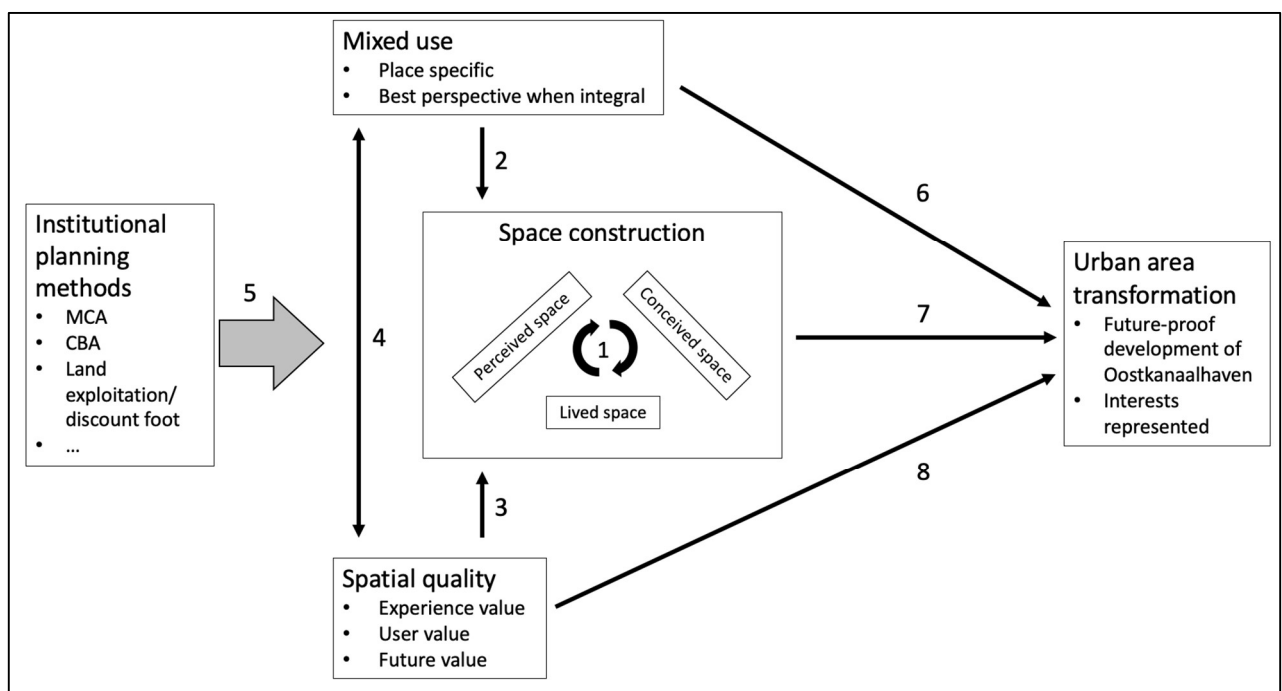


Figure 2: Conceptual model. Source: Own editing.

Assemblage theory serves as an underlying thought in this thesis and is therefore not directly visible in the conceptual model. However, the spatial triad of Lefebvre represents it, as this takes over the underlying ideas of assemblage theory. Lefebvre's spatial triad is central in the conceptual model, which is also visually represented. Theories connecting to space construction - mixed-use and spatial quality - are shown above and below the central triad. These two concepts affect urban area transformation directly, and indirectly via the continuous conversion of space construction. As earlier explained, it is not yet clear how and to which concept(s) the institutional planning methods connect. Therefore, line 5 points in the direction of the entire conceptual model, instead of towards one or multiple concepts. Table 1 briefly describes the numbered lines, as shown in the conceptual model.

The enumerations of key elements beneath the terms in the conceptual model are central to urban densification. Chapter 4 gives a further explanation of the conceptual model.

Description of numbered lines in the conceptual model	
1	Continuous conversion of perceived, conceived and lived space
2	A space construction process is required for successful mixed-use in the conceived space
3	Spatial quality is part of an intertwined social, spatial process in which the experience of the urban user is central
4	Unravelling layers of functions shows which functions benefit spatial quality and which function(s) could be mixed to improve the overall spatial quality of an area
5	Institutional planning methods influence the construction of space in general terms and might also influence the spatial quality and mixed-use on an individual level
6	Inventory of required functions among users in Oostkanaalhaven provides a transformation in line with the area
7	Space construction in Oostkanaalhaven with an eye for mixed-use and spatial quality, contributes to an urban area transformation supported by interested parties
8	Oostkanaalhaven, characterized by low-valued urban area functions, can be upgraded using area transformation if more attention is paid to (area-specific) spatial quality

Table 1: Description of numbered lines in the conceptual model. Source: Own editing.

Chapter 3. Methodology

This chapter discusses the methodology in this thesis. The chapter begins with an elaboration of the research approach. After that, the different kinds of data collection are discussed. The chapter ends with quality requirements.

3.1 Case study research

In a case study, the researcher aims to get a thorough and integral insight into one or a few time-spatially delimited objects or processes (Verschuren & Doorewaard, 2015; Vennix, 2011; Yin, 2003). This research consists of a single-case holistic design (Yin, 2003), which means a case (Oostkanaalhaven) is investigated entirely, looking at all relevant influences and taking into account the context of the case (economic development of Nijmegen). This relational, holistic research looks for linkages within Oostkanaalhaven, but also between Oostkanaalhaven and greater levels (Massey, 1993). These links exist in many ways and at many levels which all influence the construction of Oostkanaalhaven. Any profound understanding of Oostkanaalhaven necessitates standing back, taking a broader view, and setting it in a broader context. This indicates that case study research can be of added value when researching Oostkanaalhaven (Massey, 1993).

An advantage of a case study is the in-depth description of a phenomenon that would otherwise be lost and not investigated with pure quantitative research or a survey (Yin, 2003). In this way, this case study research allows to look at the uniqueness of Oostkanaalhaven, derived from the fact that no other place has quite the particular intersection as Oostkanaalhaven does (Massey, 1993). Besides, a case study is a typical field study with a high degree of flexibility in which the studied phenomenon guides the researcher (Verschuren & Doorewaard, 2015). In this way, new arrivals and new connections are incorporated (Massey, 1993). This fits in well with method-triangulation (Vennix, 2011), which enables to use both qualitative and quantitative data to understand Oostkanaalhaven.

Case studies answer questions like 'how' and 'why' because these questions are more explanatory and lead to the use of Oostkanaalhaven (Yin, 2003). Posing such questions is currently relevant since the municipality of Nijmegen explored its need to investigate possibilities for transformation options after 2030 (Gemeente Nijmegen, 2020). A common disadvantage of case study design is that results cannot be generalized since the research is phenomenon-specific (Yin, 2003). However, this thesis arose from continuous societal developments, which have an impact on many places, such as Oostkanaalhaven. Therefore, insights from this case-specific research might still inspire comparable places. To conclude, this is a relational, in-depth case study research, consisting of quantitative and qualitative research methods, investigated based on empirical insights and supported by desk research (Massey, 1993; Verschuren & Doorewaard, 2015).

Demarcation of the research area

Oostkanaalhaven lies in TPN-West (Gebiedsvisie TPN-West, 2019), an industrial area in the municipality of Nijmegen (Gemeente Nijmegen, 2020). It consists of a harbour of which the port arms were built in the mid-20th century. After that, the area grew into one of the largest inner-city ports in the east of the Netherlands. The red area in figure 3 is Oostkanaalhaven, serving as a research area in this thesis.



Figure 3: Map of Oostkanaalhaven. Source: <https://earth.google.com/web/>; Own editing with Microsoft PowerPoint.

3.2 Data collection

This section discusses the data collection in this research and explains the reason for using these methods. The data collection methods are document study, observation, interviews and online questionnaires.

3.2.1 Document study

Two relevant documents provide context for this case study research. First of all, the Gebiedsvisie TPN-West (2019). TPN-West is the name of a business association but has become inherent to a particular area over time, of which Oostkanaalhaven is a part. The Gebiedsvisie provides insight into the identity, values, interests, wishes and ambitions of TPN-West, as well as relevant future developments for the area. The second document is the Omgevingsvisie of the municipality of Nijmegen, which discusses the municipal goals and approach for the period of 2020-2040. These documents are considered as relevant because Oostkanaalhaven is part of both areas and policy-choices within TPN-West and the municipality of Nijmegen influence Oostkanaalhaven. This thesis enables to check whether relevant respondents agree or contradict with important findings from the policy documents. Besides, there is a comparison between the wishes and interests of area users and information from the policy documents.

3.2.2 Observation

Observation serves to get a good impression of Oostkanaalhaven. The area is studied based on an observation protocol (see appendix 1). The observation turned out to be a useful tool, as many area users mentioned observed elements during interviews. Studying Oostkanaalhaven myself enabled me to confirm which elements respondents meant. Moreover, as a result of the observation, I was able to understand respondents' feelings. Sometimes I had an uncanny feeling during the observation. During interviews, people mentioned, "I would like Oostkanaalhaven to become a safer area in the future". Due to observing and experiencing Oostkanaalhaven on my own, I could relate to

the respondents. That is why irrational factors are included in the observation protocol as well, besides the rational factors such as infrastructure and buildings. Using soft data in research increases the satisfaction of area users, as well as the municipality and the eventual developer (Zuijderwijk, 2020). The completed observation protocol is processed in the findings chapter. It mainly serves as a starting point for the discussion about the empirical research material.

3.2.3 Expert interviews

Several expert interviews with professionals and academia serve to learn more about urban area transformation and especially the institutional planning methods to use within these processes. The interviews are semi-structured, which means an interview guide – with both closed-ended and open-ended questions – is prepared (Corbin & Morse, 2003) (See appendix 2). During the interview, this setup allows adjusting and adding questions, depending on the context and/or the responses given. The relatively informal and spontaneous way of interacting fits the aim of these conversations: gain more knowledge and practical insight into the mentioned methodologies and related topics. Based on (inter) national examples, and experiences of respondents, more knowledge about various relevant subjects is gained. The expert interviews are recorded and partially transcribed. By using a systematic coding method, it can be traced in the findings chapter, which statement belongs to which respondent. In appendix 5, respondent 1 to 6 are the interviewed experts.

3.2.4 Area specific interviews

Beside expert interviews, semi-structured area specific interviews are conducted in Oostkanaalhaven. Predefined questions were set up and processed in an interview guide (see appendix 3). There is a clear distinction between persons to contact, bundled together in different groups. The focus is to distinguish between institutional knowledge (mainly the expert interviews), policy-wise knowledge and area knowledge. Ultimately, a representative number of knowledge carriers from all three groups was approached. The area specific respondents can be found in appendix 5 (respondent 7 to 23).

Policymakers develop ideas for the future of the city and its sub-areas. Wishes and ambitions are taken into account, attempting to meet the interests of area users. By examining Oostkanaalhaven from the policy side and the user side, an exciting image emerges, and a comparison between findings from both groups is possible. Interviewing both groups of respondents allows seeing to what extent the policy plans for Oostkanaalhaven match the actual wishes and ambitions of area users. Therefore, policy knowledge and area knowledge are central to the area specific interviews. This is an attempt to investigate all three vertices of Lefebvre's spatial triad empirically. Examining all three vertices enables to make statements about the continuous conversion between these corners and as a result, the final space construction in Oostkanaalhaven. The area specific interviews are fully transcribed and coded in the same way as the expert interviews. In this way, statements and quotes can be traced.

3.2.5 Online questionnaires

Companies and industry mainly occupy Oostkanaalhaven. As local residents from surrounding neighbourhoods could use the area as well, another group of knowledge carriers are local residents from the districts Waterkwartier and Hees. Due to Covid-19, it was not easy to conduct street interviews or enter people's houses. Therefore, 200 letters were distributed in letterboxes in Waterkwartier and Hees, as can be seen in appendix 6. The neighbourhoods are quite big, so the letters are distributed in those streets which are as close as possible to Oostkanaalhaven. Chimneys from industrial buildings, Google Maps and beforehand selected street names helped while distributing the letters. The letter is provided with a QR code and a web link, leading to a short questionnaire. The main goal of the online questionnaire was to find potential interviewees. People were able to leave their email address if they were willing to share more information. Forty-six

3.3 Quality requirements

This research takes several kinds of quality requirements into account. These are reliability, validity, controllability and usability.

3.3.1 Reliability

Reliability is about the presence of accidentally made mistakes. With reliable research, the used approach and found results are independent of the moment the research was carried out, the researcher who carries it out and the used measuring instrument(s) (Korzilius, 2008). Reliability questions to what extent repeated measurement yields the same result.

Several things affected the reliability of this thesis. First of all, the time of conducting this research. As a result of Covid-19, many approached respondents refused to participate. In a 'normal' time, these respondents might have participated, causing other respondents to participate than was ultimately the case. As a result, the research results may turn out differently in case of repetition. Another aspect to mention is that due to the unexpectedly high response to the online questionnaires, quantitative results were also included in this thesis. When repeating this research, the response to online questionnaires may turn out lower, leading to less or no quantitative data and ultimately, other research results.

3.3.2 Validity

This research distinguishes several forms of validity. These are content-, construct-, internal- and external validity.

Content validity

Content validity determines whether all aspects of a concept are properly measured (Korzilius, 2008; Vennix, 2011). Most parts of this thesis are content valid since accurate operationalization (see chapter 4) resulted in all concepts being elaborated and examined. One aspect elaborated insufficiently is the institutional planning methods. Due to a lack of prior knowledge, moderate operationalization and the ultimate findings from interviews, institutional planning methods were not as profoundly investigated as expected.

Construct validity

Construct validity indicates whether research measures what one wants to measure (Korzilius, 2008; Vennix, 2011; Yin, 2003). A tactic to increase construct validity is using multiple sources of evidence. This encouraged convergent lines of inquiry, which was especially crucial during the data collection (Yin, 2003). By using document study, observation, interviews and online questionnaires, the construct validity increased.

To check whether this research measured what was intended, a reference is made to chapter 1. Here the objectives of this research are described. The combination of qualitative and quantitative data collection gained a better understanding of urban densification. Moreover, elements and urban processes that should be taken into account when transforming urban areas are identified. Besides, the development opportunities in Oostkanaalhaven are explored, as well as to what extent the research area can meet city-wide challenges. Collecting knowledge of policymakers and area users highlighted several insights concerning Oostkanaalhaven, which increased the construct validity.

Internal validity

Research is internally valid when the right conclusions are drawn from the chosen research methods (Korzilius, 2008; Vennix, 2011). It says something about the quality of the research (Vennix, 2011). According to Verschuren & Doorewaard (2015), the internal validity of a case study is broad, due to in-depth research and labour intensive work. This research uses several forms of data collection,

which creates a large amount of data, increasing the internal validity. An implementation of the operationalization of the theoretical concepts into the measuring instruments as accurately as possible (Vennix, 2011), attempts to maximize the internal validity further.

A concern about internal validity for case study research may be extended to the broader problem of making inferences. A case study involves an inference every time an event cannot be directly observed. This means that I, as an investigator, 'infer' a particular event is the result of an earlier occurrence, based on interview and collected documentary evidence (Yin, 2003). To overcome this issue as much as possible, this thesis consists of an iterative process. A constant reflection on what is found and adjustments when possible, make this research more internal valid. For example, after a couple of interviews, some questions were not in line with the rest of the conversation. Organizing the question order organically, the conversations became more natural and respondents came up with more suitable answers. In this way, the right conclusions from the right research method were drawn.

External validity

External validity says something about the generalizability of research and indicates to what extent conclusions can be generalized to the entire population or other situations that could be investigated (Korzilius, 2008; Vennix, 2011; Yin, 2003). In this case study research, it is hard to prove the external validity, since only one case is investigated in-depth. Therefore, most of the findings and results in this thesis will be hard to generalize, as they only focus on Oostkanaalhaven. Nevertheless, this thesis arose from societal developments taking place in many places as Oostkanaalhaven. As a result, insights from this research might still inspire comparable places.

3.3.3 Controllability

Controllability means all considerations, decisions and steps have been accounted for and reflected. Controllability includes a division into three aspects: clarity, unambiguity and substantiation (Korzilius, 2008). Clarity means concepts, steps and conclusions must be defined in such a way an outsider can reproduce the research. To this end, necessary concepts were operationalized. Moreover, the thesis and its outcomes are made public in the thesis repository. Unambiguity means vagueness is out of the question in all respects. Mentioning literary sources, defining concepts and the choice of the case Oostkanaalhaven are therefore as precise and unambiguously as possible. Finally, all choices are appropriately substantiated, so nothing remains to be guessed at the background of various choices.

3.3.4 Usability

Usability is the extent to which knowledge put forward contributes to an improvement in decision-making (Korzilius, 2008). This usually consists of implementation and strategy. Implementation means the research is designed and executed in such a way it is suitable for proposed intervention. This case study does not aim to contribute to a practical intervention since the research mainly has a theoretical approach. However, what could become apparent in the future is whether a continuous conversion of Lefebvre's spatial triad, influenced by mixed-use, spatial quality and probably institutional planning methods, has a chance of success in further densifying Oostkanaalhaven.

Since this thesis meets the quality requirements mentioned above, the results could strategically be used in urban densification. The research results cannot be used for a general policy in Oostkanaalhaven, as the municipality of Nijmegen and TPN-West have already drawn up these policies. What can be done is further investigating and implementing the relevant concepts related to urban densification in Oostkanaalhaven. When other places want to implement one or more concepts as well, place-specific, follow-up research is recommended. This is mainly because the generalizability of this single case study research in Oostkanaalhaven is limited.

Chapter 4. Operationalization

Operationalization aims to set up research systematically, to enable to check the deployment of the research methods. Operationalization consists of several steps. First, a theoretical definition is set up, done in the theoretical framework. Secondly, an operational definition is set up. This means a concept is 'translated' into observable categories. The third step is to develop indicators, followed by the fourth step, which is to create an observation tool (Vennix, 2011, p.174).

The conceptual model serves as a guideline in this chapter. Following the numbered lines in the conceptual model, a description of theoretical definitions, operational definitions, indicators and observation instruments follows. Altogether, this is a recipe for collecting and analysing data as well as interpreting the results. A total of 8 numbered lines are in the conceptual model, with a division into three subgroups. These are centre of the conceptual model (line 1, 2 and 3), main concepts and background processes (line 4 and 5) and practical insights (line 6, 7 and 8).

4.1 Centre of the conceptual model

The first subgroup consists of line 1, 2 and 3. This is the centre of the conceptual model, with space construction as the central process, and the direct influence of mixed-use and spatial quality.

Line 1 (Continuous conversion between perceived-, conceived-, lived space)

The theoretical definitions of the perceived-, conceived- and lived space is in chapter 2.2.2. Place-making is an affective experience of individuals which is co-constituted through social interaction. It is vital to map as accurately as possible what is happening in Oostkanaalhaven concerning space construction, which supports an investigation via multiple research methods, indicating a relational place-making approach. This relational place-making approach includes observation, area specific interviews, online questionnaires and local resident interviews.

A combination of interviews and online questionnaires measures the perceived space. The area specific interviews focus on characteristic aspects of Oostkanaalhaven, or what 'makes' the area what it is. The local-resident interviews and online questionnaires focus on the pros and cons of Oostkanaalhaven, which could indicate what 'makes' Oostkanaalhaven.

Conceived space can be understood through observation, supplemented with online questionnaires and interviews. The observation mainly focuses on the spatial structure of Oostkanaalhaven, whether streams of traffic are separated and which kind of traffic dominates the area. Another central aspect of the conceived space is whether area users believe the current functions within and use of Oostkanaalhaven fit the area and its surrounding. The online questionnaires, area specific- and local resident interviews measure this.

Lived space requires an inquiry into the experiences, understandings and influences of individuals. The observation gives an impression of the general atmosphere of Oostkanaalhaven. The area specific interviews ask how area users experience Oostkanaalhaven, to get an impression of their understanding of place-phenomena. The online questionnaires and local resident interviews focus on the same aspect as the area specific interviews do.

Line 2 (Between mixed-use and space construction)

Mixed-use takes existing functions of Oostkanaalhaven into account and tries to find possibilities to insert new functions in already existing usage. As described in the theoretical framework, a lot is known about mixing functions and its advantages. Nevertheless, it is hard to develop a blueprint for mixed-use, as each place is different and contains particular entities. The advice is to focus on individual elements interacting and coming together in Oostkanaalhaven. A combination of data

collection methods serves to identify and measure mixed-use in a just way. These methods are observation, several kinds of interviews and the online questionnaires.

The observation serves as a starting point and focuses on vacancy, buffer zones and odour/noise. The local resident- and area specific interviews focus on eventual negative aspects in Oostkanaalhaven, as a result of mixed-use. Aspects found during the observation could be indicators coming forward in these interviews as well. The local resident- and area specific interviews ask whether the mix of functions fits Oostkanaalhaven. Here the focus lies on a combination of work functions in Oostkanaalhaven and housing functions in its surroundings. The area specific interviews focus on policy regarding mixed-use in Oostkanaalhaven. Missing functions and which should be included is asked in the area specific-, as well as the local resident interviews. Connecting to this, the expert interviews focus on how future users can be included in the future design of (comparable places as) Oostkanaalhaven. The different research methods serve to investigate in particular the link between mixed-use and the conceived space, as also described in the theoretical framework.

Line 3 (Between spatial quality and space construction)

The selection of relevant elements concerning spatial quality in Oostkanaalhaven depends on the views and mindsets of knowledge carriers. This research states that spatial quality occurs when the connection between different interests succeeds. Observation, area specific- and local resident interviews serve to find out whether this is the case in Oostkanaalhaven.

In everyday life, the role of design is a necessary societal function which means to serve the public good. This fits in well with the concept of spatial quality, as the user- and experience value are central to this. Investigating this in Oostkanaalhaven, it is essential to find out whether space use is as meant to be. Investigating the current use of Oostkanaalhaven goes through observation, by focusing on vacancy, buffer zones between functions, (alternative forms of) infrastructure, litter and empty parking lots.

To place 'space' as a central concept in socio-spatial analysis, it is necessary to ask about (past) developments, and how users of Oostkanaalhaven experienced these. Therefore, the area specific interviews ask for important places in Oostkanaalhaven, as well as whether respondents think their company contributes to the spatial quality of Oostkanaalhaven. Local residents are asked to indicate plus- and downsides of Oostkanaalhaven (such as the location of the area within the city, or odour/noise) to investigate how this connects to the user- and experience value of Oostkanaalhaven. Lastly, knowledge carriers are asked which future developments in the area they expect and to what extent these could contribute to the spatial quality of Oostkanaalhaven. The different research methods serve in particular to investigate the link between spatial quality and the conceived and/or lived space, as also described in the theoretical framework.

Summarizing the centre of the conceptual model

Line 1, 2 and 3 form the centre of the conceptual model. This section made explicit that observation, expert-, area specific- and local resident interviews and online questionnaires investigate the link between space construction and mixed-use/spatial quality. In this way, investigating how mixed-use and spatial quality mainly correspond to the conceived and/or lived space is possible.

4.2 Main concepts and background processes

This section operationalizes how main concepts link to each other and how background processes link to space construction. Line 4 operationalizes the link between mixed-use and spatial quality. Line 5 is operationalized but does not have the main focus in this research. It functions as a background process for other substantive processes.

Line 4 (Between mixed-use and spatial quality)

The previous section showed that mixed-use and spatial quality influence the process of space construction (line 2 and 3). Line 4 investigates to what extent these main concepts are linked directly to each other. The expert interviews serve to investigate this line.

A challenge in space development is to create a dialogue between diverse ways to look at an area. Expert interviews serve to investigate this by formulating the central question of how to include future users in the design phase of an area. Together with future users, investigating which functions to incorporate in an area is possible. Ultimately, this enables to investigate the possible function mix. The expert interviews help to find usable methods or tools to collect insights from different area users, to go beyond just describing the role of stakeholders ultimately. When transdisciplinary insights from relevant stakeholders are combined, the overall spatial quality could be improved.

Another challenge in space construction is to combine insights from mixed-use and spatial quality to improve urban densification. The particular entities of an area in combination with the layered concept of spatial quality makes it hard to ameliorate urban densification. The expert interviews serve to investigate this link, as is asked whether experts see advantages in a different approach for urban densification than regularly used. Asking experts for pilot projects and the role of spatial quality within these projects provides more insight into already developed areas and processes Oostkanaalhaven might need to go through as well. It is essential to collect insights from different experts and projects, to find an approach which suits Oostkanaalhaven best ultimately.

Line 5 (Between institutional planning methods and space construction and/or main concepts)

Institutional planning methods serve to guide urban densification, and they might relate to space construction in several ways. The expectation is that if there is a link between institutional planning methods and space construction, this is with the perceived-, conceived- and/or lived space. There may also be a link with mixed-use and spatial quality, but this is not assumed. Observation, area specific- and expert interviews serve to investigate the relation between elements of institutional planning methods and space construction.

A possible link with the conceived space might be found by exploring how certain institutional choices land in Oostkanaalhaven. Area specific interviews serve to learn more about ownership and the division of land in the area. Area users can indicate to what extent institutional choices, taken by the municipality, fit in Oostkanaalhaven.

An observation explores the relation between institutional planning methods and the perceived space. Focusing on signs of brokers or the municipality could indicate ownership in Oostkanaalhaven. Fragmented ownership might influence the potential development options for Oostkanaalhaven. Therefore, expert- and area specific interviews serve to ask about the current state of land ownership, as well as an allotment.

The expert interviews serve to ask for possible other methods to apply, besides the regular CBA, MCA and land exploitation. The combination between this and the previously mentioned elements enables to determine, via the process of space construction, which elements of institutional planning methods are applicable to improve Oostkanaalhaven - and its lived space - in the future.

Summarizing the main concepts and background processes

In this subgroup line 4 and 5 were operationalized, to investigate the link between mixed-use and spatial quality (line 4), as well as between institutional planning methods and space construction (line 5). Concerning line 5, the expectation is that there is a link between institutional planning methods and the components of space construction. A weaker link is assumed between institutional planning methods and mixed-use/spatial quality. Observation, expert- and area specific interviews investigate these lines.

4.3 Practical insights

The first and second subgroup mainly have a theoretical and conceptual purpose. The third subgroup, consisting of line 6, 7 and 8, serves a more practical aim.

Line 6 (Between mixed-use and urban area transformation)

Beside mixed-use having an impact on the construction of space (line 2), it influences urban area transformation in Oostkanaalhaven directly as well. Area specific- and local resident interviews serve to investigate this line.

First of all, it is worth investigating the policy position of Oostkanaalhaven concerning mixed-use. Asking area users for functions that should be relocated or are currently missing provides insight into the best mix of functions for the future of Oostkanaalhaven. The same question can be asked during the local resident interviews. To develop a capacity for future developments, including current users in the plan development, is vital. Asking area users for downsides (noise/odour) provides insight into the current opinion of area users. The functioning of buffer zones is another example of this. This information is needed to realize an urban area transformation which is supported by its users.

Line 7 (Between space construction and urban area transformation)

Hitting back to the conceptual model, one can see the main concepts influence the construction of space and therefore, in the end, influence the transformation of Oostkanaalhaven. What is essential to find out is to what extent the continuous conversion of space directly leads to an applicable urban area transformation in Oostkanaalhaven. Expert-, area specific-, local resident interviews, online questionnaires and policy documents are used to investigate this line.

Including the knowledge of current users of Oostkanaalhaven enables to transform the area optimally. The local resident interviews serve to learn more about the identity of Oostkanaalhaven and to find out to what extent this benefits the area. Area specific interviews serve to ask a comparable question, to find out whether area users feel part of Oostkanaalhaven. Moreover, asking what users of Oostkanaalhaven think the identity of Oostkanaalhaven should be in the future is included. Local resident- and area specific interviews serve to learn more about future changes that would benefit the area. Subsequently will be asked if there are organizations where one can share its opinion or make other comments about Oostkanaalhaven. This might be useful in collecting worthwhile information for the future of the area. The Gebiedsvisie TPN-West (2019) and the Omgevingsvisie (Gemeente Nijmegen, 2020) serve to investigate the future visions of Oostkanaalhaven.

This line might be challenging to investigate, as (certainly in case of inserting new functions) future users of Oostkanaalhaven are not yet known. Therefore, the expert interviews serve to find out which and how area users and their knowledge could be included in the development process of Oostkanaalhaven. The municipality can subsequently use this to realize a successful transformation, which can count on the capacity of the area and in particular current users who stay in Oostkanaalhaven in the future.

Line 8 (Between spatial quality and urban area transformation)

The last link in the conceptual model to elaborate is between spatial quality and urban area transformation. One needs to take into account that each space has its quality challenges, and actors act according to their mindsets and institutional embeddedness. Therefore, investigating the connection between spatial quality and urban area transformation holds the risk of ending up with a too abstract representation of interdependencies. A combination of expert- and area specific interviews serves to overcome this issue. Care is taken during these conversations to focus on the knowledge and mindset several groups of stakeholders have in Oostkanaalhaven. In the end, this gives more insight into the transformative potential of Oostkanaalhaven. Explaining the experience- and user value of the area happens by accurately depicting the current state of the area. This provides the best basis for a successful future value of Oostkanaalhaven.

Expert interviews serve to find out which indicators or criteria determine the image of an area. Learning more about decisive factors and how to include them in a transformation process can be a worthwhile exploration in optimizing the transformation of Oostkanaalhaven.

Oostkanaalhaven has a moderate spatial quality, partially because it is an outdated business park. Nevertheless, Oostkanaalhaven still has a particular appearance or identity, which can increase the transformation potential. Therefore, the area specific interviews serve to ask for valuable places in the area. For example, a respondent's own company. Asking area users about the current status of Oostkanaalhaven and potential developments which could increase the spatial quality of the area, might lead to valuable insights as well.

Summarizing the practical insights

This section operationalized line 6, 7 and 8. Data is collected through expert-, area specific- and local resident interviews, online questionnaires and policy documents. Thereafter it is indicated to what extent space construction, mixed-use and spatial quality influence the potential transformation of Oostkanaalhaven.

Chapter 5. Findings

Chapter 3 discussed the data collection methods in this thesis, while chapter 4 operationalized the conceptual model. This chapter shows the most important findings resulting from data collection. Section 5.6 concludes this chapter, including a first attempt to verify the expectations as formulated in box 1. Before continuing, saying something about the reference system is vital. Appendix 5 contains a list of interviewees. Each respondent corresponds to a number. All interviews are recorded, transcribed and provided with paragraphs. When, for example, (5,102) is mentioned after a text passage or quote, this refers to respondent number 5, paragraph 102. In this way, it is traceable who said what during an interview. Although all findings are traceable, the thesis does not include the full transcripts. If there is a need to see a transcript, this must be requested.

5.1 Observation

The observation in Oostkanaalhaven took place on May 19, 2020, by using the observation protocol in appendix 1. The observation started in the north of Oostkanaalhaven after which the circle continued along the west, south and east side. When passing a side street, this was entered immediately, whereafter the original route continued. Most of the pictures below are from May 19. Other observations originate from cycling to interviews. Therefore, certain photos are from a different date than the actual observation, mentioned below the photo.

The observation is equipped with beforehand selected elements. This entails a division into the following themes: buildings, mobility, ownership and experience. If there is triangulation, this is immediately indicated. However, most observations serve to give an impression of Oostkanaalhaven.

Buildings

The first thing noticed is there is hardly any vacancy in Oostkanaalhaven. Nearly all buildings seemed to be used. At one place, a new building was built (figure 5). Sometimes it seemed as if buildings were too close together, making the entrance to both buildings challenging to reach. On places where there were no buildings, infrastructure, greenery and water were observed.



Figure 5: Construction of a new building. Source: Own photo, taken on May 19, 2020.

Especially along the Energieweg, there are greenbelts (figure 6). Sometimes it was hard to look behind those greenbelts because the greenery was high and dense. Less greenery and more concrete and asphalt surround the harbour.



Figure 6: Green along the Energieweg. Source: Own photo, taken on May 19, 2020.

Mobility

The second observed aspect is mobility. First, separated streams of traffic were observed. Along the Energieweg, there is a cycle route, provided with a sign of all cycle routes in the neighbourhood (figure 7). Along the Energieweg there is also a service road next to the main road, which enables freight or customers to enter parking lots more quickly. Secondly, 'alternative' infrastructure was sought, for example, in the form of desired paths. Figure 8 shows such a desired path.



Figure 7: Sign with cycling routes. Source: Own photo, taken on May 19, 2020.



Figure 8: Desired path. Source: Own photo, taken on May 19, 2020.

The last observed element concerning mobility is about the division of work traffic and other road users. A lot of freight traffic drives on the road and parks along the roads. Sometimes this leads to less capability to cycle or walk safely.

Ownership

The third observed aspect concerns ownership. Signs of brokers and the municipality of Nijmegen served as indicators. During the observation, no signs were spotted, so no photos were taken.

Experience

The last observed and felt aspect is the experience. First experienced are the smell and noise of the area. In various places, roaring engines and construction noises are heard. It felt like this fits the raw, harbour environment. Dust in the eyes and becoming wet from a water sprinkler at a scrap metal company, while cycling to an interview, were less convenient experiences.

Another element was litter. In general, the area is nicely laid out, especially along the Energieweg (10,17; 12,19). In the rest of the area, it was sometimes crowded and cluttered along the road. The limited amount of greenery reflects this. Nevertheless, litter was found along the Energieweg (figure 9).



Figure 9: Litter along the southern part of the Energieweg. Source: Own photo, taken on May 19, 2020.

The third observed element concerns the number of empty parking spaces and other variants of empty infrastructures. Most parking spaces belong to a shop or a company. This was better maintained in one place than in the other. It was striking that a bus stop was full of weeds (figure 10). Several interviewees mentioned the infrastructural focus switched from rail to road traffic, as there used to be railway tracks in the port arms. Various port arms included overgrown railway tracks (figure 11; 16,16; 18,77).



Figure 10: Weeds at bus stop Energieweg. Source: Own photo, taken on May 19, 2020.



Figure 11: Overgrown railroad in the port-arm. Source: Own photo, taken on May 25, 2020.

The last element belonging to experience is the general atmosphere of Oostkanaalhaven. The place feels a bit empty despite the high amount of traffic on the main roads. A lively and vibrant atmosphere was not experienced, especially in the long and quiet roads along the port arms (figure 12). It feels like most visitors in the area come with a particular goal, go inside a building and stay there or leave with their car. The area feels like a real working area, with impressive machinery (figure 13). Visitors to the area have a purpose, like refuelling or washing their car, or visiting a hardware store. Recreation or leisure was not observed and is apparently not allowed (15,65; 16,19).

During the observation, a scary feeling emerged. In the backside of Oostkanaalhaven, a confused woman screamed unintelligible things. The unsafe feeling was reinforced by barking watchdogs behind high fences with sharp points on top, and rough truck drivers in several side streets.



Figure 12: Road between two port arms. Source: Own photo, taken on May 19, 2020.



Figure 13: Machinery in Oostkanaalhaven. Source: Own photo, taken on May 12, 2020.

5.2 Policy documents

This section shows the most important findings from the policy document study. It concerns the Gebiedsvisie TPN-West (2019) and the Omgevingsvisie Nijmegen (Gemeente Nijmegen, 2020). This section mainly has an informative role. In later sections, reference is made to the documents if there is any triangulation.

5.2.1 Gebiedsvisie TPN-West

A need among companies, residents and the municipality caused the creation of the Gebiedsvisie TPN-West. This document focuses on the development of the area. The goal of the document is to set up a collective vision, with a translation into implementation (Gebiedsvisie TPN-West, 2019, p.2). TPN-West (figure 14) includes around 460 companies and offers jobs for around 8,000 people. It focuses on working sectors as transport & storage, industry, car companies, construction industry and wholesale companies. It is a unique area due to its environmental zones (figure 15). The centre has the highest zone, descending towards the edges of the area (Gebiedsvisie TPN-West, 2019).

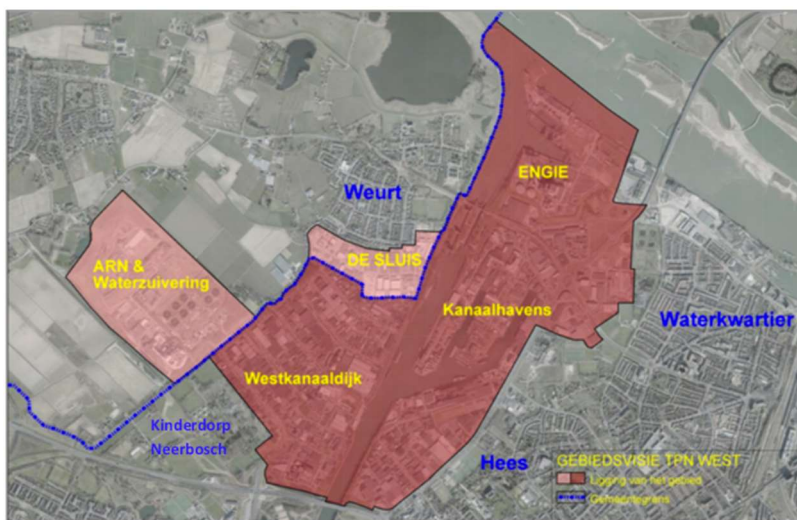


Figure 14: Map of TPN-West. Blue line indicates municipal border between Nijmegen and Beuningen. Source: Gebiedsvisie TPN-West (2019, p.4).

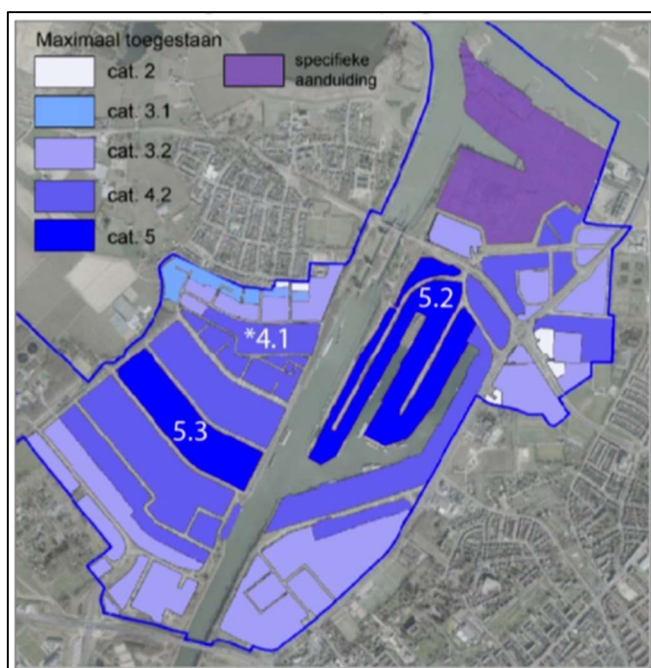


Figure 15: Map with environmental zones in TPN-West. Source: Gebiedsvisie TPN-West (2019, p.9).

Background

The past 10 to 15 years were important for TPN-West, due to a lot of changes in the area itself and its surroundings. With “Koers West”, Nijmegen focused on the transformation of the Waalfront into a residential area since 2003, increasing accessibility with the construction of De Oversteek, and improving the economic structure by revitalizing Noord-Oostkanaalhaven (Gebiedsvisie TPN-West, 2019). The more recent closure of the Sappi paper mill, the coal-fired power plant and the subsequent redevelopment of the ENGIE site also mean a significant change in the area.

All these developments cause companies to worry about their future prospects and local residents wonder what this means for them. In the Kronenburger Forum (box 2), the municipalities of Nijmegen and Beuningen have been held accountable for fragmented action without an overarching vision. The absence of an overarching vision, together with the redevelopment of the ENGIE site and the forthcoming Environmental Act, prompted the municipalities to look at the entire industrial area. In 2017, Nijmegen and Beuningen decided to draw up a Gebiedsvisie for TPN-West in close collaboration with a working group of companies and residents from the Kronenburger Forum. Until now, local residents were little involved in the design of the area. By paying attention to the wishes of local residents, the current setup of Oostkanaalhaven could change considerably. This is reflected in expectation 6, formulated in box 1. In the Gebiedsvisie, the focus is on the year 2030 (Gebiedsvisie TPN-West, 2019). The vision mainly tries to explore how work and living can be balanced and what this requires (Gebiedsvisie TPN-West, 2019).

Box 2 – Kronenburger Forum

The foundation of the Kronenburger Forum was in 2004. Local residents, companies, environmental organizations and the municipalities of Nijmegen and Beuningen meet in this forum about 3-4 times a year. The aim is an early discussion about the development of the area, in which the impact on the living environment is an important theme. The forum provides (un)solicited advice to governments. Discussion of individual permit applications does not take place in the Kronenburger Forum, but a permit application can be part of the Environmental Dialogue by the ODRN. The municipalities support the Kronenburger Forum with workforce and practical matters.

The long history of tensions between industry, transport, local residents, environmental groups and governments in Nijmegen-West and Weurt partly caused the foundation of the Kronenburger Forum. The so-called “Nijmegen model” includes preliminary consultations in case of permits, environmental information (presented on the website www.westweurt.nl), and the Kronenburger Forum since 2004 (Gebiedsvisie TPN-West, 2019, p.11).

Objective, themes & parties

The Gebiedsvisie aims to draw up a supported vision in collaboration with the surrounding. During the process, the following guiding principle came forward: sustainability, environment & liveability, and an attractive business climate. While reaching the overarching vision, a collaboration of different actors was set up. The role of the government changed from a regulatory role towards a more cooperating and facilitating role. Companies and residents ask government authorities for more space for their initiatives and local customization and expect to be actively involved in decision-making. Collaboration and support of initiatives from society are becoming more important for municipalities, at the expense of the government as initiator and (top-down) determiner. Communication and participation become increasingly important and will probably play an explicit role in licensing. Therefore, multiple other parties were asked to work on the desired development direction, roughly divided into four categories: businesses, residents, municipalities and others (among others the ODRN, Province of Gelderland, Rijkswaterstaat).

Important developments

In the Gebiedsvisie, relevant developments are divided into economic-, spatial- and societal developments. All three domains mention sustainability. In economic terms, it focuses on new work locations and commercial buildings, developed increasingly in an energy-efficient and climate-resistant manner. Circularity, and therefore the supply and removal of residual flows, plays an essential role in the industry. Sustainability in spatial terms focuses on integration. Due to scarce space, it is necessary to use opportunities for multiple uses of space, for example, by solar panels on roofs. In societal terms, sustainability goes further than energy transition, raw materials and mobility. It also includes a vital and healthy living environment (biodiversity, greenery and water) (Gebiedsvisie TPN-West, 2019, p.12-14).

Another important economic development is about transport and accessibility. With increasing freight transport by road and water, multimodal access and location on transport axes are increasingly valuable for companies (Gebiedsvisie TPN-West, 2019, p.12). An important spatial development relates to living and working. To facilitate the high demand for living space, space is sought in mixed-use (Gebiedsvisie TPN-West, 2019; Grant, 2002; Nabielek et al., 2012). More mixed-use might lead to a spatial change. In particular, this means a change in the working area of entrepreneurs. The call for spatial change comes from the municipality and local residents, reflected in expectation 2 (box 1). They state that lighter activity might go well with other functions such as living or relaxing. In sound-zoned industrial areas, separation of living and working serves the interests of residents and businesses. A second spatial development is about work locations. As a result of a shortage of (issuable) supply of water-bound lots, the focus switched to utilizing existing work locations, by making them future-proof. Business association TPN-West, the municipality of Nijmegen and the province of Gelderland aim to use available water-related lots as much as possible. This vision regarding water-bound work locations is part of the general call for extra workplaces in Oostkanaalhaven. Partly based on this is expectation 1 (box 1). A societal development which is worth mentioning is the forthcoming Environmental Act. The inviting approach of the Environmental Act goes hand in hand with greater responsibility for initiators. Communication and participation become increasingly important and possibly play an explicit role in licensing (Gebiedsvisie TPN-West, 2019, p.13).

Vision of TPN-West

The vision of TPN-West focuses on the medium term, the period up to 2030 (Gebiedsvisie TPN-West, 2019, p.19). The following guiding principles are leading in realizing the ambitions of TPN-West:

- TPN-West is an attractive work location, with a business climate focusing on the manufacturing industry, logistics, energy and water-related business
- Companies and governments work together on a clean, whole, safe, and healthy TPN-West
- Proactive and accessible contact between parties, nuisance is prevented and tackled
- The environmental pressure on the living environment is reduced
- TPN-West is energy-neutral in 2040
- The circular economy develops in TPN-West: from waste to raw material
- TPN-West goes for sustainable transport and mobility by road and water
- Various initiatives are designed to prevent unwanted activities in the area

Implementation and recommendations

An interim round, led by Beltman and Leroy, was inserted, to be able to implement the guiding principles. Through several interviews with involved parties, the ambitions for the Gebiedsvisie were sharpened and deepened. Moreover, the implementation agenda was formulated as more ambitious and smarter. This was the last step, carried out by the Kronenburger Forum before the municipal councils adopted the Gebiedsvisie. A formulation of 17 recommendations was the result of the discussions, held with neighbourhood associations, companies, environmental groups, the ODRN and

municipalities. The central ambition that came forward in these conversations: *“TPN-West is an industrial area focusing on sustainable economic development and liveability, both within the area and in surrounding residential areas. These core values are in balance with each other”* (Gebiedsvisie TPN-West, 2019, p.19). In particular, due to the efforts of the Kronenburger Forum, the Gebiedsvisie was adopted in October 2019 by the municipalities of Nijmegen and Beuningen and became a workable document. In this way, relevant parties were able to embrace an overarching vision, taking into account general developments that affect TPN-West now and in the future.

5.2.2 Omgevingsvisie municipality of Nijmegen

The second policy document is the Omgevingsvisie of the municipality of Nijmegen (Gemeente Nijmegen, 2020). In this document, relevant stakeholders describe the current city and what principles apply to the use of space in the city until 2040 (Gemeente Nijmegen, 2020). Based on socio-economic and spatial analyses, the biggest challenges for Nijmegen in the coming decades are identified and translated into four perspectives (Gemeente Nijmegen, 2020, p.14):

1. Economic resilient city: economically strong sectors in the city, with more employment for both highly skilled and practically employed.
2. Social and healthy city: diverse, mixed neighbourhoods, and reduced social contradictions, health differences and social discontent.
3. Attractive city: a maintained and propagated strong identity, a city with history in a green environment.
4. Sustainable city: at the forefront of implementing sustainability challenges, with ambition and potential to remain a leader in the field of sustainability and circularity.

Integral solutions must help to achieve the four tasks and their ambitions. A discussion of the two most relevant themes follows below.

The compact, dynamic city

This theme focuses on minimizing the impact of the city’s growth on the surrounding area. Nijmegen wants growth of 1,000 jobs per year and approximately 10,000 houses by 2030, with an extra increase of at least 5,000 houses between 2030 and 2040 (Gemeente Nijmegen, 2020, p.43). In the coming years, the greater centre area (1), the Canal Zone (2) and the campuses (3) are appointed to meet these challenges (figure 16). For the medium and long term, Oostkanaalhaven (as part of the Canal Zone) is investigated.

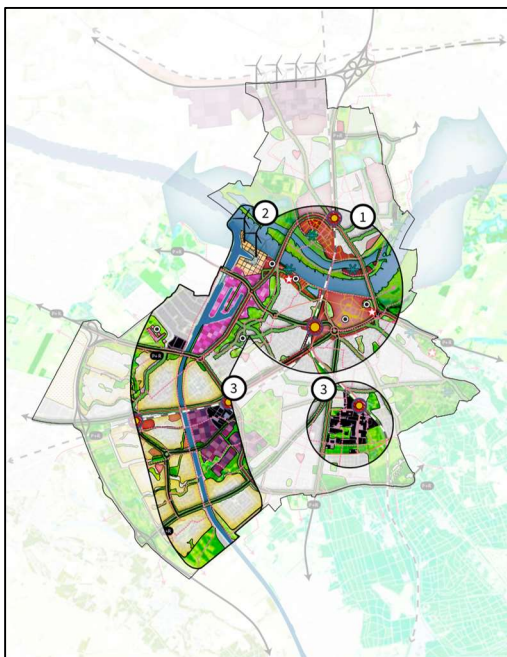


Figure 16: Focus areas. Source: Gemeente Nijmegen (2020, p.43).

We embrace the canal

This theme focuses on the sub-areas surrounding the Maas-Waal channel. For Oostkanaalhaven “we want to investigate whether this area offers opportunities for transformation in the longer term (after 2030), taking into account the interests of already established companies. A business climate is advocated for the next ten years, focusing on manufacturing industry, logistics, energy, water-related activities and transshipment, also on the ENGIE site” (Gemeente Nijmegen, 2020, p.86). Existing companies provide diversity in employment and a robust urban economy. The motto ‘densify and mix, and maintain work functions in the city’ is leading, while striving for space for both living and working (Gemeente Nijmegen, 2020, p.87). The Omgevingsvisie briefly mentions TPN-West and its Gebiedsvisie. It states that the Gebiedsvisie opts for intensification and sustainability for the next ten years, with a focus on environmental quality (Gemeente Nijmegen, 2020, p.87).

Summarizing the policy documents

In this section, it became clear that TPN-West faces many tasks. Sustainability, environment & liveability, and an attractive business climate are core themes in the future development of the area. Companies and residents ask government authorities for more space for their initiatives, which changes the role of the government towards a more cooperating and facilitating role. The setup of the overarching Gebiedsvisie enables different stakeholders to collaborate, to achieve economic, spatial and societal goals. Thanks in particular to the efforts of the Kronenburger Forum, the Gebiedsvisie was adopted by the municipalities.

The Omgevingsvisie shows Oostkanaalhaven is one of the sub-areas used after 2030 to meet the city-wide housing and/or workplace shortages, following the motto “densify and mix, and maintain work functions in the city”. An investigation needs to show which opportunities Oostkanaalhaven offers for the city-wide challenges in the long term. In the short term, the interests of already established companies are taken into account. Moreover, a business climate is advocated for the next ten years, focusing on manufacture, logistics, energy, water-related activity and transshipment.

5.3 Expert interviews

Six expert interviews with academics and people active in relevant work fields took place. A discussion of the most important findings follows. Findings regarding general processes, such as the role of institutional planning methods, do not always include triangulation. Nevertheless, these findings are shown, as they contribute to answering the research questions.

Institutional planning methods

Various expert interviews discussed institutional planning methods. A CBA is a very mechanical approach, with a tight theory behind it (1,2). It is a wealth economic tool, very non-spatial, and not so much about all kinds of geographical facets (4,6). A CBA asks the taxpayer question, and all costs and benefits are compared against each other over a particular time (2,43; 4,7), calculated back with a discount rate (4,11). “You can start a very philosophical discussion about that because it also means you think the benefits of future generations are less important than those of the current generation” (4,12). The tricky thing about a CBA is that it converts everything into monetary terms, which works from a social point of view. However, this might lead to negative CBA’s being carried out (2,46).

In area development, land exploitation is much more common than a CBA. This focuses on actual costs and asks the question of what a developer pays or what you get back from land sales (4,8). An MCA is a more straightforward form of the core of a CBA. It makes consideration of variables and criteria (3,3). An MCA is less institutionalized than a CBA, with a kinder generic category, weighing different things (4,13). The advantage of an MCA is that there are more degrees of freedom for the analyst, they are unlimited (1,5). A disadvantage of an MCA is that there is not a theory behind it. One might wonder how to interpret the results (1,6). This might lead to overlooking what lies below

the numbers (3,4), which relates to reductionism. “They try to narrow down a problem to some core variables, for the simple reason that if you include all the variables, no one understands, and the trade-off becomes far too complicated” (3,5). This makes an MCA very arbitrary (1,6), because in real life, people do not act from rationalism but from their interests and emotions (3,6). This underlies a kind of holy belief in methods. However, what is much more critical is what underlies those methods (3,7). For example, assemblage theory and Lefebvre’s spatial triad take softer elements like synergy into account (3,8; Grant, 2002; Wise, 2005).

Besides the regular CBA, MCA and land exploitation, new methodologies were found. The first is the Participatory Value Evaluation (PVE), which is a kind of improved CBA (4,21). It is based on a theory, but is more flexible, and includes valuations of civilians. These are not directly seen by an analyst (1,3) or policymaker (1,7). The power of the PVE is a certain amount of choices is made, and every citizen’s vote counts equally. “We value the effects of urban transformation, to the extent citizens believe a certain government budget should be allocated” (1,4).

Another methodology found is the Mutual Gains Approach (MGA). It creates a picture of the negotiating space between landowners and other stakeholders (6,27). In case of fragmented land ownership, you are dealing with a kind of mutual dependence, which means you have to negotiate with each other (6,28; Faludi, 2005; Nabielek et al., 2012). A government, as well as other parties, should know what must-haves and nice to have are (6,30). MGA is an appropriate method to explore this, as it deals with humans and soft skills (6,77).

Fragmented land ownership

It is tough to deal with fragmented land ownership (5,25). This is one of the main factors which makes area development a process of long breath (2,56; 5,30). It might take a long time before all owners go in the same direction. You have to look step by step at what can be realized (5,31). Involving corporations and large owners would be a very good thing because including them is already half or a third of the housing stock (5,32). “Often in these types of areas where you have fragmented land use and lots and lots of different parties, you just need a few things to come together (...) and if there are some handy people with all the lines to knot together (...) things can happen” (2,13).

Including future users in the design of an area

Including future users in the design of an area is difficult, “a bit of a million-dollar question” (2,6; 4,17; 6,56). Participation is very much about preserving the existing, as you might also want some kind of participation in the change, which is much more difficult (4,19). Including future users in the design of an area “is human behaviour, and that is the most difficult part of planning” (2,25). However, at some point you have to do something, otherwise, it will remain only on paper (2,9). At a particular moment, some things fit together, which may not be ideal from a planning perspective, but helps to get things going (2,12).

During the empirical research, different ways of including future users of an area in the design of an area emerged. Target groups, by using a colour mechanism, indicating groups such as starters or looking at the family composition, can be valuable (5,10). “In that way, you exclude some target groups. And during the process you always try to determine which target groups are possible in such an area” (5,13). Another instrument concerns which kind of housing is really in demand (5,18). Moreover, one can look at the financial component by looking at rents and construction costs. Besides, one needs to look at interests and whether those interests may be translated into a willingness to invest in an area (3,14). Rent (3,10), time, expertise and money can influence a transformation as well (3,14). Recently, sustainability has become an important element (5,22).

To make sure residents can participate in designing an area “is (...) the great disclosure of modernism” (4,29). Nevertheless, it is the end of the show if a municipality sends conflicting signals. An owner who suspects an area transforms will not structurally invest in its company. This threatens the entire area to stagnate (6,65). Organizational power within the area makes the difference (6,70). Let owners express their (future) wishes (6,34), and try to switch to who ultimately represents the end-user (6,46).

Combination of geography and planning methods

Various experts were asked about their opinion of combining geography and planning methods in this thesis, as it brings two uncommon things together (4,2). In area development, land exploitation and CBAs are often used, which are real methodical instrumental approaches (4,3). Lefebvre and assemblage theory also focus on what is desirable, which is conceptually exciting (4,4; Leary-Owhin, 2015; Purcell, 2013). “I also attended a planning conference, ESOP, in the summer. And it did catch on. Yes, those more participatory planning methods are very much in line with that (geographical insights)” (1,11).

Various experts talked about the upcoming Environmental Act. “That might be a big game-changer. Because it means a little less central role for the municipality” (2,19; 8,61; Gebiedsvisie TPN-West, 2019). It all becomes less strict because compensation might be possible, and strict environmental standards will become different (2,22). Therefore, mixed-use is very interesting, for example, related to environmental category companies (2,21). At the urban level, we want to be more and more circular (2,29; Gebiedsvisie TPN-West, 2019; Gemeente Nijmegen, 2020). Waste flows will change, which means they will be processed closer to the source of waste, causing traffic movement. Circular companies are under pressure from housing construction, causing a battle for space. Residential construction is becoming so dominant that it pushes necessary economic functions aside (2,30). Some municipalities are making policy to stop transformation (2,31). In that way, cities are gradually trying to protect inner-city business parks and try to preserve jobs for residents, as certain functions need to be kept in the city (2,63). Despite the enormous pressure from housing construction (2,64; 3,19; 6,50).

There is a scarcity of areas where companies with a high nuisance category can be established (2,21; 2,65; Gebiedsvisie TPN-West, 2019). One might therefore think about a built environment which is flexible. For example, many sustainable cities will no longer use ground-level parking but work with parking buildings instead, functioning as a kind of transition building. If the car is further phased-out of a highly urban area, the building can be used for living or another function (4,26-27). However, “it is complex, you cannot build a quarter tram or a quarter shopping centre and deliver it in phases. There is some sort of phasing problem somewhere” (4,30).

Summarizing expert interview knowledge

Several expert interviews discuss regular and newer institutional planning methods. The most essential elements for choosing the right planning method are fragmented land ownership and how to involve future users in the design of an area. Area development is a long process where it is not easy to get all stakeholders in the same direction. Unfortunately, experts could not indicate whether the combination of geographic insights and institutional planning methods solves this problem. Therefore, the combination of both worlds is not yet sufficiently exploited.

5.4 Area specific interviews

In addition to expert interviews, there were conversations with people closely involved in or using Oostkanaalhaven. These area specific interviewees are divided into policymakers and area users. In the following sections, quotes from respondents from other research group(s) follow, in case there is triangulation. This information is omitted in later sections, to make sure there are no doubles.

5.4.1 Policymakers

Policymakers consist of employees of the municipality of Nijmegen and Beuningen, (former) board members of the Kronenburger Forum, a board member of business association TPN-West, and business owners who have extensive experience with involving local residents in policy-making. The most important findings from conversations with these policy-knowledge carriers are discussed.

What is Oostkanaalhaven?

Oostkanaalhaven is not a common industrial area (23,7). It is the largest industrial area in the Netherlands, located in a city (8,102), offering a place for companies in the highest environmental zones (9,20; 13,9; Gebiedsvisie TPN-West, 2019). Oostkanaalhaven was created a hundred years ago, surrounded by working-class neighbourhoods (8,31). According to Baijens, responsible for ENGIE and board member of business association TPN-West, the industrial area has become entirely enclosed by residential areas (14,25). At some point, the surrounding residential area fanned out, and people started to work somewhere else instead of in Oostkanaalhaven (8,32). The area gentrified due to the pressure on the housing market in Nijmegen (8,49; 9,60; 11,40; 23,2), new people came in and allied with a critical environmental movement (8,33). These newcomers had completely different requirements than the original working-class population (8,42; 13,26). At some point, old inhabitants felt neglected, angry and overlooked (8,48). Although the newcomers were mostly against the industry (9,52), when the power plant of ENGIE shut down, people started to identify with the chimney (9,75). “They all saw it as the church tower of their area” (8,39) and wanted to preserve it.

Several spatial developments had a huge impact on the area (8,14). First of all, De Oversteek, the new bridge constructed in 2013 (9,84; 10,15; 18,26; 19,43; 24,24). Secondly, residents wanted companies to end their activities (8,18), by measuring traffic and noise emissions to find out whether additional measures had to be taken, such as green buffers. Living and working came too close together (8,44). Not only nuisance but also heavy trucks driving close to residential areas is seen as problematic (8,47). Third, the power plant of ENGIE came to an end, which meant tremendous relief for the area in terms of emissions. The heavy companies still located in Oostkanaalhaven are among others the asphalt factory (8,24; 9,81; observation) and the rubble crusher (8,25; 9,81; observation).

According to Baijens, the area does not really have a face. When you enter the area, it is not immediately clear what kind of industrial area it is (13,31; 14,40; Gebiedsvisie TPN-West, 2019). The area is a hodgepodge of everything with a little line in it. Both residents and companies experience it as a messy area, with bad accessibility, little green, and few cycling and walking opportunities (13,29). Nevertheless, Hurenkamp (economic affairs at the municipality of Beuningen), experiences an overarching, shared feeling on important themes such as sustainability, cleanliness, safety and accessibility (23,15).

Most of the land in Oostkanaalhaven is privately owned, which means the municipality needs to bring hundreds of millions to buy out owners if it wants to transform the area (8,88; 9,36; 13,60; 14,73). The municipality owns some grounds, and rent it (8,89; 14,74).

Mixed-use in Oostkanaalhaven

According to Jansen, Economic Account manager at the municipality of Nijmegen, mixed-use does not fit in Oostkanaalhaven, mainly due to the high environmental categories. Companies need to be protected by making sure they can grow (9,32; 14,78). According to Van Gorkum (director of ARN, Waste plant of Nijmegen region), hybrid housing in Oostkanaalhaven is the beginning of the end (11,69), as there is currently tension between living and working. It concerns risk, fire, hazardous substances, noise, stench and unhealthy air (8,10).

One could wonder to what extent facilities miss in Oostkanaalhaven. It is rather the reverse. At the back of, for example, the Gamma, there is water, which the company does not use at all (8,96; 9,13; 13,21; Gebiedsvisie TPN-West, 2019). "There are not that many ports in the east of the Netherlands" (8,98), once there is a harbour, one has to exploit the lots. Adding green to the area could be of added value (14,61), as well as focussing on the campus thought (14,62; 14,83). These are important aspects of spatial quality and for the identity of the area (14,63).

The intended purpose of the area and important parties

Originally, Oostkanaalhaven was intended for the manufacturing industry, port activities, transshipment, rubble, recycling, generating energy, logistics, recreation and cruise ships (8,66; 9,17; 23,9). Two trends to take into account in the further development of the area are the corona crisis (8,69; 9,91; 14,50) - maybe we will not get everything from far away anymore - and raw materials which are starting to run out worldwide (8,70; 9,86; 13,42). Concerning the circular economy, places for disassembling products are necessary. Cherishing Oostkanaalhaven, because it has the assets to set up this circular economy, is advised by various policymakers (8,71; 8,99; 9,87; 9,89; 13,41; 14,45). Moreover, the port offers a lot of work functions (8,81; 9,21; Gebiedsvisie TPN-West, 2019), which connects to the need to offer enough workplaces for residents of Nijmegen (9,66; 14,34; Gemeente Nijmegen, 2020).

It is difficult to get an overall idea of what lives in the area. There are 450 companies and 8,500 employees, but badly organized: only about 25-30% is affiliated with business association TPN-West (13,32; 23,14; Gebiedsvisie TPN-West, 2019), making it hard to find interlocutors. Beside TPN-West, the Kronenburger Forum is an important party. Luijten, old secretary of the Kronenburger Forum, tells the forum has existed for 15 years (8,4; Gebiedsvisie TPN-West, 2019). Hans Beltman, old chairman of the Kronenburger Forum: "It started as a consultation platform due to the fact there was an incredible amount of Council of State procedures, between residents and businesses in the area" (13,6). A second element is that there were many cancer incidences (8,34; 13,7). A link was made to the ARN, which was never really proven. Since last year things got a bit rough, regular people left, and the Kronenburger Forum stopped (8,5; 9,51; 13,15). Parallel to the Kronenburger Forum was the setup of the Gebiedsvisie TPN-West. "There were participants not completely satisfied with the process, which also started to radiate on the Kronenburger Forum (...) the energy was a bit gone" (8,7). To pull this out, Beltman and Leroy held talks and made 17 recommendations for the Gebiedsvisie TPN-West, of which 14 were approved (13,19; Gebiedsvisie TPN-West, 2019).

In addition to the Kronenburger Forum and TPN-West, the municipality of Nijmegen and Beuningen and the ODRN are important players (13,36; Gebiedsvisie TPN-West, 2019; Gemeente Nijmegen, 2020). "But real consultation between those parties, I do not see it", states Beltman (13,37). The Kronenburger Forum acted as a kind of catalyst between the parties. "And in that respect, it is quite a pity residents have left the Kronenburger Forum", says Beltman. Residents wanted to be able to advise on every intention of companies and governments concerning TPN-West. "Then we become a slowing factor in the whole process, which works against us" (13,39). The increase in the number of Council of State procedures might be a motive to restart the Kronenburger Forum, as residents realize what they miss now (13,51). Due to the discontinuation of the Kronenburger Forum, the decisiveness in the entire area became even less than it already was (13,52).

Future of Oostkanaalhaven

Important aspects for the future of the area are the circular energy transition, housing issues, recreation and nature, and current assets of the area (8,79; 9,93; 13,42; online questionnaires). “These could be important, stimulating and binding topics to get some fluff in the area” (13,43; Gebiedsvisie TPN-West, 2019). Bigger but also smaller companies need to play a role in this process (14,47), as well as resident organizations in Nijmegen and Beuningen (23,10). To get processes started, the Kronenburger Forum suggests using an establishment policy, especially to use the ports better (13,21; 14,72; Gebiedsvisie TPN-West, 2019).

Two companies, ARN (8,56) and ENGIE (8,57), are getting more and more in touch with its surroundings. In light of the new Environmental Act, they might take over the former role of the Kronenburger Forum. Van Gorkum about the Kronenburger Forum: “one of the big problems I think exists at the Kronenburger Forum, is they only start discussing if there is something to be discussed” (11,18). Despite the best intentions, this works preposterous (11,62). He advises creating a constant possibility for consultation, which could be short and quickly if everything is fine (11,19). Van Gorkum discourages the outsourcing of the communication process (11,48), while Beltman encourages it in situations where different parties disagree (11,61). However, building up trust with the surroundings and participants is a process of long breath (2,56; 5,30; 10,66; 11,66; 11,78; Gemeente Nijmegen, 2020).

Sand transshipment of the Beuningse Pond causes worries in the area (13,31; 20,2; 22,8), as required freight traffic goes straight through Oostkanaalhaven. The advise is to use Best Available Techniques, to lower environmental categories by preventing emission (9,22; 11,70; 13,55). On the other hand, the redevelopment of the vacant paper mill Sappi could be a promising development for the future of Oostkanaalhaven (9,81; 19,46; Gebiedsvisie TPN-West, 2019). Currently, EKI, a company who sells plastics and rubber, uses a part. The rest is a kind of event location, where Red Bull once organised a cycling tournament.

Summarizing policymaker knowledge

Policymakers describe Oostkanaalhaven as a special area with a versatile range of activities. The interviewed policymakers know the housing needs in Nijmegen, but wonder whether Oostkanaalhaven is the best place to meet the housing demand. They argue for more attention to work functions instead, especially in the field of energy transition and circular (water-related) activities. The size and versatility of the area currently make it difficult to stand out as a collective. The Kronenburger Forum, business association TPN-West, the ODRN, municipality, companies and local residents are the designated actors to overcome this by developing an overarching vision.

5.4.2 Area users

The other subgroup questioned during area specific interviews are area users. These are entrepreneurs occupying lots in the harbour or other parts of Oostkanaalhaven. Moreover, there was a conversation with the Nijmegen harbour master.

What is Oostkanaalhaven?

Oostkanaalhaven is experienced as multidimensional, scattered and busy in a positive sense (10,42; 12,10; 19,9; 21,16). The area is described as an old, industrial site (18,15; 19,9; 20,3; 22,12), with shipping-related companies (21,9). Technique, trade, logistics, technology, ship repair, chemicals and medicines are seen as key sectors in Oostkanaalhaven (10,41; 12,13; 15,17; 16,11; 17,5; 21,16). Everything for the entire construction cycle can be found in Oostkanaalhaven, including metal, electricity, construction and sanitary (10,43). The location in the city in combination with the heavy industrial zone enables companies to work close to their customers (22,16).

The identity of Oostkanaalhaven changed during the years, which is still happening and benefiting the area (7,6; 10,56). It is a real work location, due to its environmental zone and the fact recreation and tourism are not allowed (15,65; 16,19).

The Honig complex, Vasim and the former power plant of ENGIE are seen as iconic elements near Oostkanaalhaven (17,8; 18,19; 19,14). "Van der Valk is also a welcome addition to the entire area" (12,25). The old paper factory Sappi, Makro, HANOS (18,18; 19,11), as well as the locks (21,21; 22,11), are seen as iconic elements within the area.

The Energieweg is seen as a sight location, causing companies to move to a location along this road (10,2; 12,68; Gebiedsvisie TPN-West, 2019). The establishment of several companies on this sight location contributes to the identity of Oostkanaalhaven (12,75; 17,12; 18,20; 20,39; 22,52; observation).

The harbour

The soil of the harbour is municipal property, but Rijkswaterstaat owns the water (15,7; 17,59; 20,45; 21,40). "The dam walls are from the municipality, but the water is from Rijkswaterstaat. So that's always a bit, yes, a power game (...). I would say (...) do not oppose, but work together" (17,59).

The advantage of Nijmegen as an intermediate station is that it is reachable from both sides, via the Waal and the Maas. When water levels are lower, ships use the water level regulated Maas a lot (15,23; 17,72; 17,74; 20,25). This is unique and makes Nijmegen a strategic location between the harbour of Rotterdam and the hinterland (such as the Ruhr area), which contributed to the establishment of several companies in Oostkanaalhaven (17,76; 20,55; Gemeente Nijmegen, 2020).

Business association TPN-West was a bit too large to discuss port-related issues, whereafter the Working Group Harbours was founded (15,27; 16,9; 20,31). Hendriks, harbour master: "And here all the problems of the ports are discussed. There are several companies in there, the municipality is in. We are there as harbour masters" (15,27). Current and future issues are discussed, like needed adjustments in the port. The depth of the harbour is an example, as it is not deep enough for all the ships currently using the port (15,28). "The depth is not good enough everywhere, not according to the standards. Yes, by standards from the 1960s, but not current standards" (16,35). Therefore, dredging should be in the time plan.

"Looking at the companies separately, there will not be a sense of community at street level. The business park is too large and diverse for that" (23,17). This makes it, for example, challenging to monitor the area using camera surveillance (19,39). Nevertheless, besides the Working Group Harbours, a street consultation was established (16,10; 20,6; 23,16). During a meeting, companies discussed the construction of a turning loop on the Handelsweg (16,46; 18,83). Trucks currently have a difficult time to turn around. "The top part of our gate has already come off on both sides" (16,47). The companies in the street looked at the possibilities. However, there is currently a lack of money at the municipality (16,49). "I can imagine it has no priority but (...) we do pay port dues. However, we do not see it back in investments in the port-bound area" (16,51).

Developments during the last years

Oostkanaalhaven has been revitalized in a professional way (10,16), of which De Oversteek is a good example. Currently, the area is still maintained and looks neat (10,17). This is seen as a positive development, as the area used to be a real mess (10,19; 12,19). The increase in the quantity of green is seen as an advantage in Oostkanaalhaven, and "they are going to invest even more in green" (10,56). However, "from our point of view, I think the further you go in that direction (pointing towards the south), the more embellished the environment looks" (12,18). "Over the years this has changed, as a result of changes in the internet, online ordering (...) Impoverished is a big word, but

you do get some distance from the industrial estate. You no longer have to be physically present to be able to arrange and get something there. So the traffic is less" (20,35).

The old shipyard was closed and sold to a groundwork company (15,8). The location of the shipyard was unique because it was not sensitive to the water level (15,13). Moreover, the establishment of a shipyard was interesting for other companies, which often act as a supplier for customers (15,15). When building the port in the 1950s, future possibilities were already determined, since the construction depth determines how much soil could be removed. Partly as a result of this, longer dam walls were built, to eventually be able to deepen the port (15,31). Companies own some dam walls, the municipality later regretted the sale of those dam walls. "Back in 2006 quite a few meters of dam walls were renewed, but some parts were not, because those were old dam walls owned by the companies" (15,54). Some companies thought their dam walls were adequate for their purposes and were not willing to invest. The municipality should have repurchased it, to be able to eventually update the whole port in the future (15,55; 20,9).

Residential areas grew towards the industrial site, which resulted in objection procedures and complaints from especially newer residents (18,59; 19,42; 20,23; 22,35). "You do not hear the people who come from the Waterstraat or the Kanaalstraat. They are those who live where the Honig stood (...) where Nyma has been. That is where it starts" (18,59). Oostkanaalhaven is quite special concerning the residential function, as there are houseboats (17,63; 19,44; 20,20; observation; Van Ginneken, 2020). This is a difficulty for the municipality. The Council of State said a few years ago the houseboats had to be removed. Due to a law change, houseboats are currently allowed (17,64; 20,20; 22,62). "It is simply not possible that there are eight homes, in an industrial area, next to a BRZO-company" (17,65). According to several respondents, the houseboats should have no legal status (17,70; 20,15; 20,60). Several respondents say they have no problems with the residents. However, if someone comes up who strictly demands his living pleasure, he could disturb businesses with fine dust and noise nuisance (20,21; 20,61; 22,68). "And I do not rule out that in the future vision of the municipality, in which they promote mixed-use of the industrial area between living and working, they take a bit of a leap, 'there are already a few houses'" (17,67). It seems as if at some point, the residential function gets in anyway. "The Trojan Horse has arrived" (11,69; 22,68).

The intended purpose of the area

"The problem is there are also some non-water-related companies (...) along the harbour" (15,33). The harbour arms and their water-bound lots should be used more optimally (12,54; 16,12; 17,27; 18,40; Gebiedsvisie TPN-West, 2019), among others by stimulating water transport (10,68). Quite large, water-bound companies could occupy those lots. "Because it is all there, in essence there needs to be a bit of restoration, the accessibility is already there. (...) I think much more use could be made of it" (10,71). According to Hendriks, transshipment is mostly preferred in the harbour, as it yields port dues and transshipment fees. In the current situation, the rent of dam walls only generates money (15,39).

Nuisance and other disadvantages

Most entrepreneurs do not experience nuisance (7,13; 10,80; 17,34; 21,48). "That is the industry!" (18,64; 20,54; 21,51; 22,26). "Look if you do not want that, you may have to divert to the Westkanaalhaven" (18,64). "Yes, you are in a piece of the industry, it (nuisance) is part of it. But on the other hand, I can also imagine (...) there are vapours not meant for our nose" (12,39).

Van Schaik, located opposite to Dura Vermeer (a crusher): "They used to have the broken rubble here. And the rubble crusher stood at the gate in the initial phase. (...) We went to the province three times. We were able to shut it down twice. And then (...) they will take action. (...) The noise nuisance, you are in an industrial area, so you cannot do much with it. But dust does. Dust was the most important thing" (19,19). As Van Schaik started the objection procedure, other parties

interfered. "It is partly with the help of residents from Hees, which is a very fierce club (...). And the Kronenburger Forum also interfered with it. The municipality of Nijmegen also interfered" (19,21). Companies know they are at the maximum of nuisance (15,42) and become increasingly attentive to limiting nuisance. For example through built-in sprinkler systems to keep scrap wet (15,50; 16,55; 19,23). This prevents metal pieces from being blown around. Street consultations contribute to mutual understanding in case of a nuisance situation (16,56; 18,66). Nevertheless, the wind can cause nuisance (12,42; 20,54). "Most of the companies located here have a significant environmental impact. Sit in the heavier segment. Why? Equals settle together" (22,24). The establishment of a milieu zone must constrain the nuisance. "The acoustic space is tight here. But if you take into account you are really in an inner-city area, due to the zoning, it is still quite spacious, of course" (22,20).

Fragmented land ownership

Investors own most of the land in Oostkanaalhaven and occupy multiple properties. Ownership by companies is scarce, as they mainly rent from the investors (10,99; 12,48; 16,62; 18,87; 20,30). "Those big companies hardly buy anymore, it is just renting. And ten years max, or five years" (19,48). North from the former Sappi site, there is more ownership than to the south of Sappi (19,50). Swartjes Transport is an example, a company that owns several small lots of land in the northern part of Oostkanaalhaven (22,5). "But often it is property. Leasehold, as you often see in the Port of Rotterdam and the Port of Amsterdam, we do not know in Nijmegen" (17,53).

Due to fragmented quay properties, the harbour master cannot offer skippers what he wants to offer. Think of processing household waste or the storage of drinking water. Given the relatively high port dues, it would not be out of place if Nijmegen can offer these services, for example, the construction of shore power (15,70; 16,41; 21,53). A start has been made with the Green Award, to be able to give certified ships a discount of 15% on port dues. In this way, various measures are taken to improve the spatial quality of the area and contribute to a better environment (10,64; 14,63; 15,79).

Function mix

"Well, then I read the future vision of the municipality. And the future vision of the municipality, for the industrial area, is, I just call it flex. So living and working comes closer together. And in our eyes (...) that does not fit" (17,22). Implementing mixed-use in the area means either a limitation for the residential function or restrictions for the work function (17,24; Lynch, 2000; Rowley, 1996). The Omgevingsvisie is labelled as ambitious, and some even take it as if the municipality wants the industrial site no longer to exist in the long term (17,25; 18,49; 19,31; 20,18; 22,37). The housing construction should not wholly dispel the work function, and a combination needs to be maintained (10,74). The advice is to concentrate the residential construction more on the peripheral zone of the area, for example, where the bridges land (10,86).

Some companies are highly involved with the environment and would like to see more suppliers in their surroundings (12,29; 17,43; 21,8). Sijfa Cruises, situated in the harbour with their cruise ships: "We have local agreements with suppliers to carry out maintenance on ships and to purchase things. So we take a look at that" (21,8). Others are more self-supporting. "We are a bit of an odd man out. Because we mainly deal with customers from Germany (...). And we do not get anything from our direct surroundings" (17,30; 18,33; 19,52).

Future of Oostkanaalhaven

Several respondents think the industry will be gone in the next 20 to 50 years (19,60; 20,18; 22,37). Some respondents are a bit hesitant about the future of the area and argue for the preservation of the inner-city industrial area. Nevertheless, there are also other sounds. "The city needs space, the bigger the city and the closer to the centre, the higher the value of the land. At some point, land

value reaches a level a government or a project developer can say: You know what, I am going to buy out that industrial estate here" (22,40). "And at some point, they come here, they make a circle and tell: Swartjes you have to leave. And you cannot sit down, you just have to leave, because the land just gets expropriated" (22,41). This process is called outsourcing, which is expensive and can ensure companies are then away from Nijmegen. Many respondents say this process must be handled with care (10,85; 15,35; 16,12; 19,33), while someone else says companies will not leave Nijmegen, as the city itself will also grow (22,43).

Several companies mention that recognition and proudness of the port and its activities are important. "Rotterdam is very proud of its port. In Nijmegen it is labelled as old stuff (...). There must be a turnaround" (20,68). Money is earned in a business, and this does not always seem to be a priority for the municipality (16,36; 20,70). "I would say, bundle all the data, and see what you could do in the area concerning several issues, to make it public at least" (21,55). Entrepreneurs, business association TPN-West and the municipality should take the lead here together (10,22, 17,19; 18,44; 20,29; 20,35; 20,65). "Now that has taken shape a bit because there is a water-bound Working Group in TPN-West, which is now picking it up a bit" (20,31). About a year ago a boat trip was made with companies, councillors and municipal officials. It became clear many people (residents and councillors) are ignorant of the actual activity in the port (16,25; 17,14; 18,20; 20,26; 22,52).

The municipal policy was wrong for years, and Nijmegen has ruled with its back to the canal zone with a preposterous way of spending money (10,62; 12,58; 15,56; 20,63). "They (the municipality) try to do everything, to do nothing" (18,68). "If the companies are scared off, you will also lose employment" (16,39; 18,70; Gemeente Nijmegen, 2020). "Nijmegen must be careful not to reject all their manufacturing industry (...) You can already see we want to be at the high, academic level. Nijmegen focuses very much on that. Well, fine too, but the manufacturing industry is also very important" (19,37; Gebiedsvisie TPN-West, 2019; Gemeente Nijmegen, 2020). "As an association of entrepreneurs and with the municipality, you must remain in good contact. And the moment things take place like expelling (...) you need to ensure to keep the activity here as companies and do not sell it to project developers" (10,90). Besides, "the municipality of Nijmegen always says they have no money. Anyway, they should first pay more attention to how they spend their money and listen more to the environment" (12,58; 15,56; 16,49; 18,42). "They say okay this is allowed. But it is always, yes, but we are going to investigate this and that. (...) That is the problem" (20,59).

Scrap companies try to invest in topics such as sustainability and circularity. The future requires cooperation on these themes (16,28; 18,73; Gebiedsvisie TPN-West, 2020). For example, this could be done by investing in the Best Available Techniques (9,22; 11,70; 13,55; 17,35). Technology companies, start-ups and small companies from university, which gradually become technology companies, could play a role in these processes (10,50). It is important to "make commuting as small as possible (...) Make sure you allow companies to settle here" (10,35). "Make it interesting, students will stick around here too. And then a city will live automatically, with living and working around it" (10,36).

To use water-bound lots more optimally, an establishment policy must be used (16,14; 17,47; 21,56; Gebiedsvisie TPN-West, 2019; observation). "If they (Gamma) would leave, we could store many machines there. That would give us a huge advantage, and we can expand our service here, we will not be bothered with transports" (10,52; 10,77). Moreover, many quays are currently unused, which could offer space for passenger shipping by using dam walls and scaffolds (20,49). However, walking possibilities on the quays are required then as well (20,50). Sijfa Cruises, who could use those scaffolds: "We will not lie there (with our ships), it is not an inviting place to say, I will celebrate a wedding onboard there" (21,48).

Summarizing area users knowledge

Respondents describe Oostkanaalhaven as a work location that does not fit with other functions, especially the residential function. The harbour is important for Nijmegen because of its many workplaces and its future role in more sustainable, circular transshipment. In recent years, the residential function grew towards Oostkanaalhaven, which caused more (environmental) discussions between residents and industry. Nijmegen literally and policy-wise grew with its back towards the canal zone, which needs to change in the future overarching vision. Entrepreneurs, business association TPN-West and the municipality must take the lead to better organize and use the area. For example, through the Working Group Harbours. Water-related transport, optimization of infrastructure and fragmented land ownership are future core themes. Without necessary adjustments concerning those themes, mixed-use is not possible at all in Oostkanaalhaven.

5.5 Local residents

The last knowledge carriers are local residents from the neighbourhoods of Hees and Waterkwartier. There were interviews with three residents, and data collection with online questionnaires from 46 people. Not all findings are supported by triangulation, primarily due to the relatively small group of local residents interviewed. If there is triangulation, this is indicated.

5.5.1 Local resident interviews

A discussion of the most important findings from the three interviews follows below.

What is Oostkanaalhaven?

The identity of Oostkanaalhaven “cannot be summed up in a few words” (24,9). Oostkanaalhaven is a diverse area (24,7), as well as old-fashioned (25,11). Respondents describe Oostkanaalhaven as a peripheral zone of the city, with the busy Energieweg, and heavy industry in the port arms (26,6). The shipping company and dead-end roads are characteristics, as well as transshipment, chemicals and the area around Sappi (24,6; Gebiedsvisie TPN-West, 2019). Construction-, demolition companies and companies related to food and wholesale are characteristic, as well as iron material. “If you cycle in the direction of Weurt (...) you have many companies with large mountains of metal” (26,9).

The industrial area is also related to vast areas of vacancy (25,8; 26,17). “I do not immediately think of greenery. West Hees, old horticultural village, people say it is green. But that is not the first thing that comes to mind” (25,9).

The intended purpose of the area

According to one respondent, Oostkanaalhaven no longer completely fits its surroundings. “New housing estates surround it, Nijmegen-Noord is growing. You now have the beautiful Koningsdaal district. Surrounded by green parks. (...) It just does not fit anymore, that grey concrete” (25,14). Another respondent indicates he sees a place for a specific type of company. “What strikes me is that entrepreneurs are there, they have been there for years and are all, as far as I know, quite successful. And it is precise because they are located in places like this, where the focus is not so much on the shell of a building, and how you sell yourself. But more, what happens behind the doors and the quality you deliver” (20,35; 24,13).

Disadvantages and nuisance

According to one respondent, it is problematic that polluting companies are so close to the residential area. “I think the asphalt factory is very close to the residential area and you also hear people say that asphalt particles fall, soot particles, which you sometimes have if the wind is wrong. But more and more is being done about it” (26,20; observation). Besides the asphalt factory, which smells like burned rubber (25,27; 26,13; observation), the smell of the waste plant is present and the crusher is heard (24,15; observation).

According to various respondents, grim things take place in Oostkanaalhaven. "Have you ever been there in the evening? (...) When it gets dark, and then you go into those dead ends (...) you know what I mean" (24,25). One respondent even uses the term shifty to describe Oostkanaalhaven, "like grim things are happening" (25,11). Especially at night, when it is empty, undesirable practices take place (26,31). "There are motorcycle races in the evening (...)" (26,30).

Beside greenery (26,17), adding creative activities is welcome. If there is more commotion in the evening, undesirable things might gradually disappear (10,58; 24,26; 25,21; 26,32).

Neighbourhood association

In case there is a nuisance, residents report it. "It is a kind of unwritten agreement to do that anyway. To make it known (...) at the same time you know it does not make much sense, because of course they are allowed to do something within the policy, as they stick to the rules" (24,20). Beside reporting it, a neighbourhood association enables to discuss complaints. Dorpsbelang Hees is an association committed to the quality of life. They are occupied with health, infrastructure and green buffers (25,6; 26,15). "But in recent years they seem to have lost a bit of clout, I have the idea. I do not know why, but it is a bit quiet" (24,18).

Function mix

In light of the whole city of Nijmegen, it would be better if the real big businesses, such as an asphalt plant, a paper factory or the Makro, would be a bit more on the outskirts of the city. "This is, of course, an edge, but well, it shifts" (22,43; 24,23). Smaller companies, situated in Oostkanaalhaven as well, should get more opportunities. "Because especially in terms of infrastructure, and the location with the new bridge, and the Energieweg, it is a perfect base for that type of entrepreneur" (24,24). Local residents point to an adjustment of the type of work functions. They do not opt for the entire work area to disappear, which is "of course not feasible" (25,19; 26,23). Especially companies causing nuisance should be removed. "But then you move problems to another place, so in that sense, I am also realistic enough environmental requirements should be enforced, which plays a vital role" (26,24).

Future of the area

In the old paper mill "you could start anything. It is an event location but that is of course sporadically. It could be more permanent" (25,35). "That it is attractive to visit the area every day" (25,36). The old paper mill is transforming. Currently, EKI uses about a fifth of the building. The rest is an event hall where, for example, car shows take place (19,46; 25,37). Besides the development of Sappi, one local resident advises reusing more old real estate. "Nowadays you see that in old buildings, vegetables and fruit are grown, for example, in skyscrapers, or old buildings (...). Well, I mean, next to Hees, which used to be a horticultural village, filled with glass greenhouses (...) you could also start initiatives like that. (...) Then you can grow vegetables close to the city!" (25,24).

Several parties are necessary to bring about changes. "In the first place (...) the municipality, it is just not on the agenda now" (24,28). The municipality should become aware of the fact that the district should have a different function (25,32). Besides the municipality, entrepreneurs play a role and it would be great if "entrepreneurs see opportunities as well" (24,29; 25,32; 26,22). Lastly, local residents are mentioned as stakeholder (26,22).

Summarizing local resident knowledge

Local residents describe Oostkanaalhaven as a relevant working area, with heavy industrial functions that no longer fit their surroundings. Several significantly larger companies cause nuisance, which is discussed with the neighbourhood association. According to local residents, the application of an appropriate mix of functions in the area is possible, provided that the municipality recognizes other functions are more suitable than the current heavy work functions. To bring about changes, the

municipality, entrepreneurs and local residents are relevant stakeholders. Providing space for creative- and lighter industry, such as former Sappi, is future-proof according to local residents.

5.5.2 Data from online questionnaires

Distributed letters with a link to an online questionnaire led to 46 responses. A discussion of the most important findings derived from the collected qualitative and quantitative data follows below.

What is Oostkanaalhaven?

The questionnaire started with an open question, asking: *If you think of Oostkanaalhaven, what do you think of?* Respondents were able to enter multiple words. 29 of the 46 respondents mentioned the word industry. Furthermore, (comparable) words such as canal, nuisance, harbour (six times mentioned), ships, business park and pollution were mentioned.

Experience of Oostkanaalhaven

The second question concerned the experience of Oostkanaalhaven. Figure 17 shows the answer options and results. The green section, mentioned as 'others', represents the possibility to fill in an own answer. One respondent experiences Oostkanaalhaven as a "grey area, especially in the evenings. But at the same time an area with top entrepreneurs of a dying kind, who belong in these places". Others experience Oostkanaalhaven as a (boring) business and industrial site. Moreover, it was described as a grim area, as well as an "area where you never come".

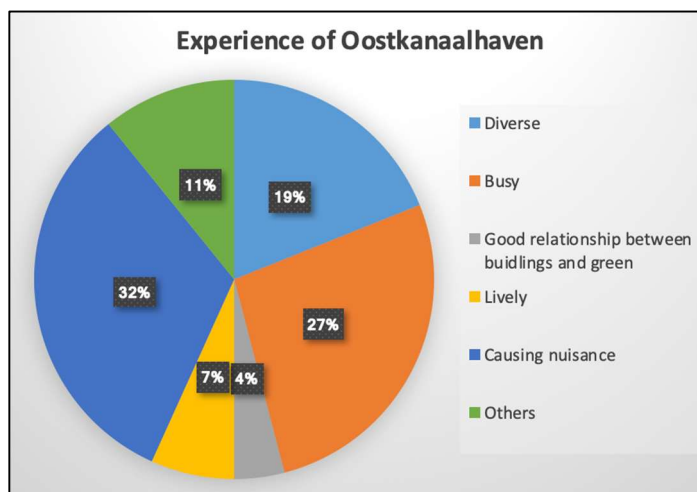


Figure 17: Experience of Oostkanaalhaven. Source: Microsoft Office Excel; Own editing.

Plus- and downsides of Oostkanaalhaven

Respondents were able to mention the advantages and disadvantages of Oostkanaalhaven. Seven respondents mention that Oostkanaalhaven brings employment. Moreover, it is mentioned that the area includes greenery, and has good infrastructure since car and bicycle traffic are well separated. Several respondents mentioned the area has hardware and similar stores, which is useful close to residential areas. Twelve respondents indicated they could not name any advantages of the area.

Regarding the downsides of the area, the nuisance was mentioned fourteen times. Odour nuisance was mentioned fourteen times, for example from the asphalt factory (five times). Noise pollution was mentioned as another inconvenient aspect (ten times). The area is secluded, with obscure companies and an unclear traffic square (Nymaplein) (12,65; 18,28). Last mentioned, was that the area has little greenery (observation).

Statement

In the online questionnaire, respondents were able to react on the following statement: *“The current combination of facilities (companies, industry, port, housing) in Oostkanaalhaven suits the area”*.

Figure 18 shows the results.

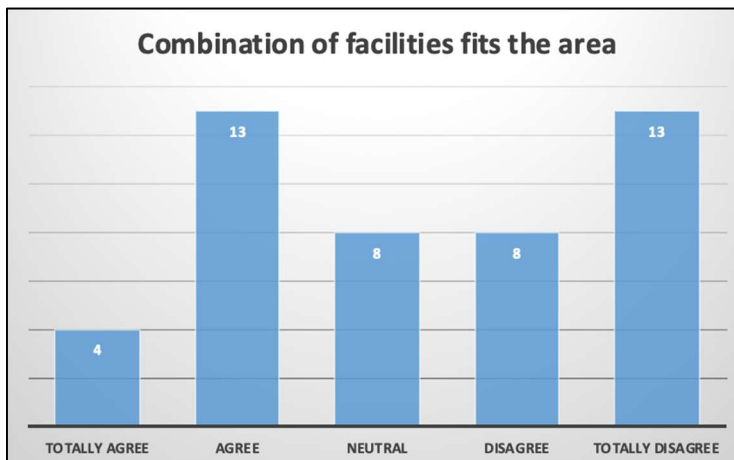


Figure 18: The combination of facilities in Oostkanaalhaven fits the area. Source: Microsoft Office Excel; Own editing.

Besides reacting to the statement, respondents were able to motivate their choice. What is striking from these motivations is that several respondents indicate the industry has been in Oostkanaalhaven for the longest time, and in particular water-related companies use the area (15,33; Gebiedsvisie TPN-West, 2019). Other functions, such as housing, grew towards the industrial area over time, creating conflicts with existing industry. Some say this is "unchangeable", others say "industry and housing should not be too close together".

Future of the area

The last question of the online questionnaire was: *“What would you like to change in Oostkanaalhaven to improve the area in the future?”* Respondents could fill in their answers. Fifteen respondents state that more space should be made free for greenery. Six respondents state something should be done about the various forms of nuisance, for example through sanctions against companies. Six respondents mention more consideration should be given to the residential function in (the vicinity of) the area. This is possible by reserving space for recreation (mentioned five times), such as bicycle- and walking paths. Four respondents mention traffic should be removed from the Energieweg, to relieve the residential area. Eleven respondents mention that heavy industry should be relocated, if possible. One respondent prefers to see "small 'clean' companies and industry without nuisance". Despite several quick and demanding requirements, most respondents seem to focus on a long-term vision: *“Ensure heavy industry (asphalt, concrete, demolition) is moved to other places and develop light industry and retail here”*.

Summarizing the online questionnaires

The findings from the online questionnaires correspond with the interviews conducted. Even though 46 online questionnaires yielded more data than three local resident interviews, it cannot be argued that the online questionnaires led to (noteworthy) new insights.

5.6 Conclusion findings

This chapter discussed the most important findings from observation, a document study, expert-, area specific- and local resident interviews, and online questionnaires. Although triangulation does not support several findings, these are included anyway. This is because they contribute to answering the research questions. Based on this chapter, the first verification of the formulated expectations follows below.

The observation served as an introductory part to get an impression of the research area. Photo material supports the observed findings. The document study made clear that TPN-West deals with sustainability, environment & liveability, and an attractive business climate. The role of the government changes towards a more cooperating and facilitating role. The setup of the overarching Gebiedsvisie enables different stakeholders to collaborate, to achieve economic-, spatial- and societal goals. Thanks in particular to the efforts of the Kronenburger Forum, the Gebiedsvisie was adopted by the municipalities. The Omgevingsvisie shows that Oostkanaalhaven is one of the sub-areas used after 2030 to meet the city-wide housing and/or workplace shortages. The motto “densify and mix, and maintain work functions in the city”, is leading in the eventual development of Oostkanaalhaven. Further investigation must show which opportunities Oostkanaalhaven ultimately offers for city-wide challenges in the long term. This is because the studied documents mainly focus on the short term. The municipality does not yet know precisely how Oostkanaalhaven can develop after 2030, while entrepreneurs already have a clearer picture of the future. Their ideas can be compared with the thin ideas from the municipality, which is in line with the first expectation (box 1).

Expert interviews discussed regular and newer institutional planning methods. Essential elements for choosing the right planning method are fragmented land ownership and how to involve future users in the design of an area. The expectation (number 4) was that a suitable planning method would be found for the further spatial development of Oostkanaalhaven. By asking experts about the combination between planning and geographic insights, an attempt was made to find a solution for the issue of many stakeholders in long term area development. A method and solution to the challenge posed were not found, as the combination of both worlds is not yet sufficiently exploited. As a result, a rejection of expectation four seems very likely.

The interviewed policymakers are familiar with the housing needs in Nijmegen but wonder whether Oostkanaalhaven is the best place to meet the housing demand. Policymakers are in close contact with entrepreneurs and thus know about their needs and desires concerning housing construction and workplace development. Entrepreneurs are optimistic about working in Oostkanaalhaven and reluctant about housing opportunities. This contradicts the findings from the document study, which is in line with expectation 1. Policymakers argue for more attention to work functions, especially in the field of energy transition and circular (water-related) activities. This points to a possible extension of the key elements in the transformation process of Oostkanaalhaven mentioned under expectation 5. The size and versatility of the area currently make it difficult to stand out as a collective. The Kronenburger Forum, business association TPN-West, the ODRN, municipality, companies and local residents are the designated actors to overcome this by developing an overarching vision. As long as this overarching vision is not found, the differences in the area will remain. As a result, the spatial quality is not guaranteed for every stakeholder in the area, as formulated in expectation 3.

According to entrepreneurs (area users), the environmental zone currently makes it impossible to fit mixed-use into the area. Implementing mixed-use would limit the development opportunities, which puts the preservation of current Oostkanaalhaven at stake. The municipality and local residents applaud a mixed area, with room for the lighter- and creative industry, as well as greenery. This apparent contradiction between stakeholders was expected, as formulated in expectation 2. The

harbour is important for Nijmegen because of its many workplaces and its future role in more sustainable, circular transshipment. In recent years, the residential function grew towards Oostkanaalhaven, which caused more (environmental) discussions between residents and industry. A division between opinions about environmental zoning exists among entrepreneurs. For some, it is indeed a last form of protection before business operations cease to exist. Yet this seems no reason for uncertainty for all entrepreneurs, as was formulated in expectation 7. Nijmegen literally and policy-wise grew with its back towards the canal zone, which needs to change in the future overarching vision. Water-related transport, optimization of infrastructure and fragmented land ownership are future key elements in the transformation process of Oostkanaalhaven. These concepts could be an extension of the terms mentioned under expectation 5.

Local residents describe Oostkanaalhaven as a relevant working area, with heavy industrial functions that no longer fit the current location. According to local residents, the application of an appropriate mix of functions in the area is possible, provided that the municipality recognizes other functions are more suitable than the current heavy work functions. Entrepreneurs hardly opt for function addition in Oostkanaalhaven. Meeting the wishes of local residents (room for the lighter- and creative industry) leads to a significant change within the area. From an entrepreneurial perspective, this seems to be in line with expectation 6. To bring about changes, the municipality, entrepreneurs and local residents are relevant stakeholders. Qualitative and quantitative data from online questionnaires conducted among residents from Hees and Waterkwartier supports the findings of the local resident interviews.

Chapter 6. Results

This chapter interprets the findings (chapter 5), by responding to the conceptual model, in line with the prepared research questions. The setup of this chapter is almost the same as chapter 4. A rough design from the outside of the conceptual model to the inside, to the right, is leading. First, there is a discussion concerning the interaction between the main concepts and background processes (line 4 and 5). This precedes the core of the conceptual model (line 2, 3 and 1) and the practical insights (line 6, 7 and 8). This chapter makes clear to what extent the conceptual model is investigated, and the research questions can be answered.

6.1 Main concepts and background processes

This results chapter starts with background processes and the interaction between main concepts. This includes a discussion of the link between mixed-use and spatial quality (line 4) and the presumable link between institutional planning methods and one or more concepts (line 5).

Line 4 (Between mixed-use and spatial quality)

Mainly expert interviews serve to investigate this line. The first thing noticed is including future users in the design phase of an area. This is a bit of a million-dollar question and quite hard to establish. Designing a place is about human behaviour, which is challenging to include in planning. However, some tools provide help for including future users in the design phase of an area. Target groups, looking at family composition and the current kind of housing demand can direct in making choices. Financial components (rents, construction costs), time, expertise and sustainability also influence a transformation. Switching to whom ultimately represents the end-user of an area, enables to investigate the desire for mixed-use and whether it can be incorporated. By doing this meticulously, the overall spatial quality of an area could improve. Unfortunately, how to do this is not discovered.

A second important element is about approaches for urban densification. Various experts were asked about their general opinion of combining geography and planning methods in this thesis, as it brings two uncommon things together. Most experts were not familiar with Lefebvre and assemblage theory. Therefore, it was hard to express their opinion about the relationship between institutional planning methods and Lefebvre's insights. A game-changer, in any case, is the upcoming Environmental Act. This law precludes a less central role for the municipality, which the Gebiedsvisie TPN-West also mentions. Things become less strict, which makes it possible to look more closely at local, specific wishes of different groups of users. This enables alignment of mixed-use and spatial quality. Nevertheless, it remains difficult to take mixed-use and spatial quality into account, mainly because of a phasing problem. This seamlessly connects to the idea of 'becoming' in space construction.

This line shows that elements of spatial quality and mixed-use influence each other. This concerns including future users in the design phase of an area and possible approaches for urban densification. Nevertheless, most elements of mixed-use and spatial quality directly affect space construction (via line 2 and 3). Following the findings chapter, this line helps in the verification of expectation 3.

Line 5 (Between institutional planning methods and space construction and/or main concepts)

Observation, area specific- and expert interviews serve to investigate elements of institutional planning methods and its relation with space construction. An important aspect – connecting to the conceived space – which delays space construction, is fragmented land ownership. In Oostkanaalhaven it is not easy to find out who owns the land, partly due to the size of the area. In the northern part of the area, there is more individual property than in the south. In the north, entrepreneurs own most property, while in the south, the land is mainly rented from investors. Besides this distinction between north and south, there are fragmented quay properties. This makes

it difficult for the port service to process household waste, store drink water, provide shore stream or other services.

This fragmented land ownership, unravelled into different sub-components, makes it challenging to choose a specific institutional planning method for developing Oostkanaalhaven. A useful indicator – connecting to the perceived space – is signs of brokers or the municipality, as this indicates ownership in Oostkanaalhaven. Unfortunately, this was not seen during the observation.

Regular and newer institutional planning methods – connecting to the lived space – were reviewed, which might be useful in the future development of Oostkanaalhaven. Beside the CBA, MCA and land exploitation, PVE and MGA were found. The power of PVE is that it values the effects of urban transformation to the extent that citizens believe a specific government budget should be allocated. MGA creates a picture of the negotiating space between landowners and other stakeholders. In the case of fragmented land ownership, you are dealing with mutual dependence, which means you have to negotiate with each other. MGA is an appropriate method to explore this, as it deals with humans and soft skills. PVE and MGA may be used in conjunction with regular planning methods to cover fragmented land ownership. Nevertheless, they are unable to guide urban area transformation alone from start to finish. PVE and MGA cannot wholly replace more regularly used methods.

As expected, this line did not find a direct link between institutional planning methods and spatial quality/mixed-use. However, it provides insights for the verification of expectation 4. A link was found between institutional planning methods and the process of space construction, unravelled in the three facets of space. Information about the ownership and the division of land connects to the conceived space, while there was no information found about fragmented land ownership (perceived space). An exploration of new institutional methods (lived space) did not lead to the discovery of a useful tool for the future development of Oostkanaalhaven. These moderate links confirm the expected general background function of this line.

6.2 Centre of the conceptual model

This section focuses on the core of the conceptual model and its related substantive processes. Line 2 and 3 focus on the link between mixed-use/spatial quality and the process of space construction. Line 1 focuses on the continuous conversion of space construction.

Line 2 (Between mixed-use and space construction)

A combination of observation, interviews and online questionnaires gives information about the link between mixed-use and space construction. Which first became apparent is the work, and residential function is currently well separated in Oostkanaalhaven. Along the Energieweg several greenbelts function as a buffer zone between work-and residential area. Within Oostkanaalhaven roaring engines and construction noises connect to the raw, harbour environment. When realizing mixed-use in Oostkanaalhaven, this means a change for the area, supported by the ambitious Omgevingsvisie. The current tension between living and working make many entrepreneurs hesitant about mixed-use. In any case, the established companies read the Omgevingsvisie as if the municipality would rather outplace the industry located in Oostkanaalhaven. The housing construction should not wholly dispel the work function, and a combination of functions should be maintained. However, the high environmental categories make it hard to map out a future path every stakeholder agrees with. Particular circumstances make Oostkanaalhaven a unique inner-city harbour, certainly in the east of the Netherlands. The water-bound lots must be optimized to exploit the harbour. Behind several companies lies water, which companies do not use. By working with an establishment policy, these water-bound lots can be used for their intention.

What becomes clear in this line is that Oostkanaalhaven appears unsuitable for mixed-use (conceived space). The work function must remain central to the area, provided that the area is better designed. The assets are present (located along the water). An establishment policy must ensure that space construction is optimized (conceived space). Making needed adjustments ensures the area feels better according to users (lived space). Only then a chance exists that entrepreneurs are open to the integration of mixed-use in Oostkanaalhaven. This information provides insight for verification of expectation 2.

Line 3 (Between spatial quality and space construction)

A combination of observation, area specific- and local resident interviews gives information about the link between spatial quality and space construction. Which first became apparent is that the opinion about the vacancy in Oostkanaalhaven strongly differs. The observation and interviews with entrepreneurs show there is hardly any vacancy in the area, while local residents indicate there are vast areas of vacancy in Oostkanaalhaven. These different views lay the foundation for a different opinion about optimizing spatial quality in Oostkanaalhaven. The switch from rail- to road traffic and the construction of De Oversteek in 2013 had a massive impact on Oostkanaalhaven. However, particularly companies in the harbour arms feel disadvantaged, as the revitalization of Oostkanaalhaven mainly took place along the Energieweg. The closure of the power plant of ENGIE meant a tremendous relief for the area in terms of emissions. Therefore, the remaining heavy industry – such as the asphalt factory and crusher – stands out even more. Entrepreneurs prefer maintaining their work function and optimization of the harbour arms into a modern workplace. Local residents, on the other hand, would like to renovate the whole area similar to the Energieweg. This entails that the lighter industry replaces the heavy industry.

Besides the differing development phases within the area, an increasing residential area around Oostkanaalhaven also affects the construction of space. Besides the eight houseboats within Oostkanaalhaven, the residential area grows towards Oostkanaalhaven. The environmental zone is the only thing protecting entrepreneurs since the location of heavy industry in the middle of the city is quite outdated. Most entrepreneurs do not have any problems with residents from the houseboats or in neighbouring districts. However, if someone comes up who strictly demands his living pleasure, he could disturb businesses. Therefore, it seems as if at some point, the residential function gets in anyway. This reduces the future perspectives of the area, which decreases the user- and experience value of current entrepreneurs in Oostkanaalhaven.

What becomes clear from this line is that there is almost a split in the ideal implementation of spatial quality in Oostkanaalhaven. The opinion regarding vacancy (conceived space) and the best future development direction of the area (lived space) puts entrepreneurs and local residents opposed to each other. This makes it difficult to accommodate all stakeholders, which harms the spatial quality of the area. To conclude, this line provides input for verification of expectation 1, 3, 6 and 7.

Line 1 (Continuous conversion between perceived-, conceived-, lived space)

This line was investigated by using observation, several kinds of interviews and online questionnaires. According to the interviews and online questionnaires, Oostkanaalhaven is perceived as an old, industrial site, which is scattered and busy in a positive sense. The technique, trade, logistics, technology, ship repair, chemicals and medicines are key sectors in Oostkanaalhaven. Iconic structures in the area are Sappi and the locks.

The spatial structure of Oostkanaalhaven says something about the conceived space. Streams of traffic are well separated along the revitalized Energieweg. In the rest of the area, the infrastructure is quite inadequate. Freight traffic has to detour and cannot deflect in time. Besides, the roundabout Nymaplein north of the area is very unclear. Beside infrastructural interventions, a milieu zone was established, to constrain nuisance. Most entrepreneurs themselves do not experience nuisance,

although they realize the amount of heavy industry is exceptional in the middle of a city. Most of the companies are at their maximum of nuisance and become increasingly attentive to limiting it. Contradictory, local residents do experience nuisance. They would like a replacement of asphalt, concrete and demolition companies to other sites. Especially the new housing districts along with the Waal cause Oostkanaalhaven no longer fits in its immediate surroundings.

The lived space is investigated by using the observation, to get an impression of the general atmosphere of Oostkanaalhaven. Oostkanaalhaven feels empty, despite the high amount of traffic on the main roads. A lively and vibrant atmosphere lacks, especially in the long and quiet roads along the port arms. Most visitors have a particular purpose and quickly leave the area, which gives the area a neutral feeling. This is confirmed by several respondents who state it is not clear what kind of industrial area Oostkanaalhaven is. It is a hodgepodge of everything with a little line in it. Various data sources indicate that Oostkanaalhaven is unpleasant in the evening. Illegal motorcycle races, drug dealing and other unwanted practices take place when it gets dark.

This line shows that Oostkanaalhaven is a large and diverse area. Differences in how the area is perceived, conceived and lived, confirm Oostkanaalhaven is the result of a continuous interaction between the three facets of social space. The involvement of many stakeholders and their interests makes it complicated to display an overarching image and identity of Oostkanaalhaven. This line does provide information for verifying expectation 2.

6.3 Practical insights

Section 6.1 and 6.2 discussed the centre and left part of the conceptual model (line 1 to 5). This section focuses on the right side and examines how space construction in Oostkanaalhaven leads to an urban area transformation supported by area users (line 7). Moreover, there is an examination of the connection between mixed-use and urban area transformation (line 6) and the connection between spatial quality and urban area transformation (line 8).

Line 6 (Between mixed-use and urban area transformation)

The expectation was that mixed-use would have a direct impact on urban area transformation. Area specific- and local resident interviews served to investigate this. After the research, it turned out the most essential elements regarding mixed-use in Oostkanaalhaven eventually ended up in urban area transformation, via space construction (line 2 and 1). Important elements concerning mixed-use (functions currently missing in Oostkanaalhaven and current disadvantages of the area), were therefore already discussed under line 2. As a result, line 2 becomes a bit 'thicker' and line 6 becomes a lot 'thinner' in comparison to the original conceptual model. The same might occur in other research. However, this cannot be confirmed based on this single-case study research. In similar or follow-up research, empirical findings may show that line 6 is useful. To ensure that line 6 is included in the research, the line is preserved in the conceptual model. If in another research it appears that line 6 is not investigated (as was also the case in this thesis in retrospect), the researcher can choose to delete line 6. The connection between mixed-use and urban area transformation then entirely takes place via space construction, which makes the conceptual model less complicated. This thesis, which examined the designed conceptual model for the first time, put this theoretical consideration forward.

Line 7 (Between space construction and urban area transformation)

This line of the conceptual model shows to what extent the continuous conversion of space directly leads to an applicable urban area transformation in Oostkanaalhaven. Expert-, area specific-, local resident interviews, online questionnaires and document study serve to investigate this.

The identity of Oostkanaalhaven is always developing, causing it is impossible, to sum up, the real identity of the area in a few words. What contributes to the identity of the area, in any case, is the establishment of several companies along the Energieweg. Making further identity improvements is possible in the economic-, spatial- and societal domain. The empirical research frequently reflected these policy domains. The circular energy transition, the amount of greenery and acknowledging the current assets of the area all connect to the policy domains. These overarching issues are important, stimulating and binding topics for further development of Oostkanaalhaven. Nevertheless, many entrepreneurs are hesitant about the future of the area, and some even think the current occupation of the area will no longer exist in 50 years. Outsourcing might occur, which is expensive and needs to be handled with care, as vital, societal functions could disappear. Nevertheless, the growing residential area and associated environmental struggles make relocation of heavy industrial companies inevitable.

The strategic location between Rotterdam and the hinterland contributes to the establishment of several companies in Oostkanaalhaven. The harbour is reachable via the Waal and the water level regulated Maas. Moreover, important societal, circular activities take place in Oostkanaalhaven, such as scrap processing. Recognition and pride of these assets and activities are vital for the future of Oostkanaalhaven, but municipal officials are unaware of actual activities in Oostkanaalhaven. The municipality can play a role in improving the image of Oostkanaalhaven. The municipal policy needs to change, as Nijmegen has ruled with its back to the canal zone with a preposterous way of spending money. To preserve employment, the municipality must pay attention to its way of spending money and listen to entrepreneurs in Oostkanaalhaven. A solution for dealing with heavy industry and satisfying local residents is using Best Available Techniques. These techniques lower environmental categories by preventing emission.

The infill of former paper mill Sappi is a positive example of possible cultural events in Oostkanaalhaven, which can ensure it is attractive to visit the area every day. Due to more commotion, undesirable things in the evening might gradually disappear. In addition to upgrading such real estate on dry lots, water-bound lots must be used more optimally, by implementing the already mentioned establishment policy.

To achieve the aforementioned desired developments, several parties must take the lead. Entrepreneurs, business association TPN-West, Dorpsbelang Hees, the municipality and local residents are key stakeholders. The Kronenburger Forum is another essential party. This catalyst between several parties, unfortunately, acts at a slow pace, which decreased the decisiveness in the area. Luckily, various groups are taking matters into their own hands. This resulted in the establishment of the Working Group Harbours and a street consultation along the Handelsweg. The foundation of these organizations is a positive development. However, they are not comprehensive since they are not in contact with local residents.

It became clear from this line that Oostkanaalhaven currently does not have an unambiguous identity. Via the data collection, themes emerged that could provide this specific identity in the future. Better use of water-bound lots, recognition of assets, circularity and spatial development are the most important themes. After the Kronenburger Forum came to a standstill, it is mainly small, local initiatives taking a similar role. Involving all stakeholders is the most challenging task, mainly due to the size and diversity of the area. It is the task of the municipality and business association TPN-West to implement the overarching vision further. The mentioned themes can help to realise the development supported by area users. Together this information provides input for verifying expectation 3, 5 and 6.

Line 8 (Between spatial quality and urban area transformation)

The expectation was that spatial quality would have a direct impact on urban area transformation. Expert- and area specific interviews served to investigate this. After the research, it turned out the most essential elements regarding spatial quality in Oostkanaalhaven eventually ended up in the urban area transformation, via space construction (line 3 and 1). Important elements concerning spatial quality (tools to indicate the image of an area and valuable places in the area), were therefore already discussed under line 3. As a result, line 3 becomes a bit 'thicker' and line 8 becomes a lot 'thinner' in comparison to the original conceptual model. The same might occur in other research (just as under line 6). However, this cannot be confirmed based on this single-case study research. In similar or follow-up research, empirical findings may show that line 8 is useful. To ensure that line 8 is included in the research, the line is preserved in the conceptual model. If in another research it appears that line 8 is not investigated (as was also the case in this thesis in retrospect), the researcher can choose to delete line 8. The connection between spatial quality and urban area transformation then entirely takes place via space construction, which makes the conceptual model less complicated. This thesis, which examined the designed conceptual model for the first time, put this second theoretical consideration forward.

6.4 Conclusion results

Section 6.1 showed which elements of mixed-use and spatial quality influence each other. Besides including future users in the design phase of an area and possible approaches for urban densification, most elements concerning these concepts directly affect space construction via line 2 and 3. Moreover, moderate links were found between institutional planning methods and facets of space construction. The links are present, so the empirical data gives information for verifying expectation 3 and 4. Nevertheless, the connection between the main concepts mainly takes place outside the space construction in Oostkanaalhaven. Therefore, line 4 and 5 are somewhat 'thinner' compared to the original conceptual model.

Section 6.2 showed that differences in the way Oostkanaalhaven is perceived, conceived and lived, confirm the area is the result of a continuous interaction between the three facets of social space. Adjustments are necessary to upgrade the conceived and lived space, to get all stakeholders on the same page. Concerning both mixed-use and spatial quality, it is currently challenging to accommodate all stakeholders. The work function of the area, current assets and an establishment policy are essential to enable the integration of mixed-use. Vacancy and the best future development direction of the area are vital in improving the spatial quality. The amount of information indicates the lines are as thick as expected, which enables to verify expectation 1, 2, 3, 6 and 7.

Section 6.3 showed that line 6 and 8 are not as 'thick' as expected beforehand. Nevertheless, theoretical considerations for possible follow-up research ensures preserving the lines in the conceptual model. Line 7 showed that Oostkanaalhaven currently does not have an unambiguous identity. Better use of water-bound lots, recognition of assets, circularity and spatial development are the most critical binding themes to provide an identity for the area. Involving all stakeholders is a difficult task, mainly due to the size and diversity of the area. The municipality and business association TPN-West should take the further implementation of an overarching vision into account. Only then a development supported by area users can be realised. The amount of information concerning line 7, enables to verify expectation 3, 5 and 6.

Consulting the empirical research, it appears that line 1, 2, 3 and 7 are 'thicker' in comparison with the original conceptual model. Line 4 and 5 appear to be 'thinner' compared to the original conceptual model. Line 6 and 8 are ultimately not examined and are therefore missing compared to the original conceptual model.

Chapter 7. Conclusion

This chapter summarizes the results found (chapter 6). The expectations as formulated in box 1 (chapter 1) help in answering the sub-questions. Integrated into the answer to a sub-question, is the verification of expectations belonging to the relevant sub-question. After that, sufficient material is available to provide an answer to the main research question. A reflection on the conducted research – including a look to the societal and scientific objectives – and recommendations for further research provides closure.

7.1 The expectations and sub research questions

Sub question 1

Which interests do Nijmegen and users of Oostkanaalhaven have, and which city-wide challenges must they jointly meet? is the first sub-question of this thesis. The first part of the sub-question concerns the interests of the municipality of Nijmegen retrieved from the Omgevingsvisie. Nijmegen wants to be economically resilient (more employment on all levels of society) and socially strong (reduce social contradictions and health differences). Moreover, Nijmegen wants to be attractive (maintain old and green identity) and sustainable (remain leader in sustainability and circularity). The second part of this question concerns the interests of users of Oostkanaalhaven, retrieved from the Gebiedsvisie TPN-West and conversations with various knowledge carriers. The overarching, binding terms are the economy (expected increase of inhabitants and working population), space (preserve existing work location and make it future-proof) and society (role between government, companies and residents changes, with greater responsibility for initiators). The third part of this question concerns the city-wide challenges that Nijmegen and area users of Oostkanaalhaven must jointly meet. This is the most exciting part of the sub-question, which expectation 1 reflects. The expectation was that the municipality of Nijmegen keeps all development options open for Oostkanaalhaven after 2030, while entrepreneurs prefer the development of new workplaces and are pessimistic about building houses in Oostkanaalhaven. Indeed, there is a clear distinction between the wishes of the municipality and entrepreneurs in Oostkanaalhaven. Nijmegen needs growth of 1.000 jobs and houses per year until 2030. After 2030, the construction of another 5.000 houses is necessary. Entrepreneurs in Oostkanaalhaven see opportunities for extra workplaces and wish for a better design of the area so the number of workplaces can increase. On the other hand, realizing houses in Oostkanaalhaven is unwise, as this restricts (heavy) industry and preludes the end of a unique inner-city harbour. To conclude, the municipality provides insight into challenges for the coming years. Entrepreneurs acknowledge these future tasks but want to insist that realizing houses in Oostkanaalhaven is just not possible. As a result, only the realization of extra workplaces is a ‘joint’ challenge.

Sub question 2

Which urban processes and key elements are important in the process of urban area transformation in Oostkanaalhaven? is the second sub-question in this thesis. The results chapter showed line 1, 2, 3 and 7 in the conceptual model are the thickest lines. This ensures space construction, mixed-use and spatial quality (*experience-, user- and future value are in balance*) are the most important urban processes in Oostkanaalhaven. The second expectation was that entrepreneurs have a negative attitude towards further implementation of the first main concept – mixed-use – while the municipality and local residents encourage it. Although municipal policy documents indicate that housing construction is an option after 2030, interviewed officials mention that the installation of houses is currently not feasible in Oostkanaalhaven. Entrepreneurs also see no room for mixing the current work function with living. Local residents see a benefit in a different form of mixed-use, as they would like that heavy industry makes place for lighter industry and creative hotspots. The irony in this is that all three parties currently agree on the work function conflicts with its surrounding. Nevertheless, entrepreneurs have the feeling – after they read the Omgevingsvisie – that there is no

more extended room for the current work function in their area. At the same time, only local residents suggest a serious development direction. Nevertheless, the policy document causes hesitation among entrepreneurs. This indicates poor communication between the municipality, entrepreneurs and residents, as there is no coordination in terms of functions to be mixed.

The third expectation states the 'ensemble of differences' makes it hard to find an overarching vision for further development of Oostkanaalhaven, resulting in spatial quality not being guaranteed for every stakeholder. There is indeed a multitude of stakeholders, with differing visions. This came to the fore during several consultations resulting in the Gebiedsvisie TPN-West. Entrepreneurs see the Energieweg has been revitalized, but believe that the harbour arms are still outdated. Local residents would like an upgrade of the rest of the area as well but in such a way that the heavy industry is relocated. The Gebiedsvisie TPN-West is an excellent first step in bringing these different visions together. Nevertheless, it is important to emphasize this document is at the beginning of the transformation process. The most important thing is that all parties embrace the same binding, overarching key elements. This is in line with expectation 5. Living, working, liveability and the environment are indeed core terms in the development of Oostkanaalhaven. However, it is better to divide these into economic-, spatial- and societal domains. An establishment policy for water-bound lots, fragmented land ownership, recognition of assets and circularity are conditions that affect all three domains. When meeting these requirements, only then guaranteeing a higher degree of spatial quality for all stakeholders is getting closer. It is the task of the municipality to bring business association TPN-West, the ODRN, companies and local residents together, to meet the mentioned needs.

Expectation 4 concerns institutional planning methods explored in this thesis, but which are of no further significance. As a result of insufficient prior knowledge, and a lack of coherence with other concepts, no suitable institutional method for further development of Oostkanaalhaven was found. This indicates one of the weaknesses of this research, making it impossible to confirm expectation 4. Nevertheless, the exploration of institutional planning methods provides tools for follow-up research. To conclude, mixed-use and spatial quality have a direct influence on the process of space construction, related to the conceived- (*what is thought*) and the lived space (*what is felt*). Mainly due to the weak findings regarding institutional planning methods, there is an underexposure of the perceived space (*what is seen*) in this research. However, this does not stand in the way of the advice given to allow space construction to form the basis for a desired future development of Oostkanaalhaven. An establishment policy for water-bound lots, fragmented land ownership, recognition of assets and circularity are the key elements in this desired development.

Sub question 3

What development opportunities does Oostkanaalhaven have, taking into account the interests of relevant area users of Oostkanaalhaven? is the third sub-question in this thesis. As said, the Gebiedsvisie TPN-West determines the rough, desired contours of the future of Oostkanaalhaven. Expectation 6 examines whether these desired contours match the wishes of local residents. It is correct that local residents have a negative attitude towards the heavy industry in Oostkanaalhaven. However, they do not believe the work function should entirely disappear. According to local residents, it is essential to replace the heavy industry, and smaller entrepreneurs must exploit the strategic location of the area. Expectation 7 deals with the desires of entrepreneurs. The expectation was that entrepreneurs are hesitant about the persistence of their company. Although some entrepreneurs criticize municipal policy and indicate that financial resources are far from well spent, some found acquiescence. They recognize the growing residential area comes in at some point, of which the houseboats are the first sign. In this sense, the environmental zone is currently a protective agent. On the other hand, it is only a slowing factor in a process that is already underway. However, the entrepreneurs do not want to dismiss the fact that the location of Oostkanaalhaven is

genuinely unique. There was a lack of recognition for the strategic location and societal processes that already take place for many years.

To conclude, the development opportunities for Oostkanaalhaven are already determined. It is no longer a matter of gathering interests of all parties involved to bring about a supported development. At this stage, the municipality could better focus on managing the inevitable development of the area and keeping as many stakeholders as possible satisfied. This can be done through information provision, (financial) compensation for bought-out companies, but above all attention. Attention to what Oostkanaalhaven is and to everyone involved in the area. After all, current and historical occurrences will always form the basis of the ultimate development of Oostkanaalhaven.

7.2 Main research question

After answering the sub-questions and verifying the expectations, it is time to answer the main research question. *In what way can a densifying Oostkanaalhaven meet city-wide challenges, which urban processes and key elements are important within this transformation process, and what interests of users of Oostkanaalhaven need to be preserved to achieve a transformation supported by its users?* is the main research question in this thesis.

The first part of the main research question is a *how* question. Several things are crucial to ensure Oostkanaalhaven can contribute to the city-wide challenge of workspace shortages. First of all, a different design of the area is needed, in which an establishment policy for water-bound lots is the most critical tool. Moreover, dealing with fragmented land ownership, recognition of assets and circularity form the basis of an overarching vision. Subsequently, this vision needs support from necessary stakeholders: the municipality, business association TPN-West, the ODRN, companies and local residents. Only then supported urban densification takes place. It is currently not recommended to build houses in Oostkanaalhaven. Resistance among entrepreneurs, the environmental zone and persistence of the unique inner harbour are the main motives for this. This research does not go beyond the foreseeable future, so the design of Oostkanaalhaven after 2030 will have to be reconsidered by then.

The second part of the main research question is a *what* question. The core of the conceptual model is the basis for answering this question. Space construction, mixed-use and spatial quality are most important in realizing a successful transformation in Oostkanaalhaven. Mixed-use and spatial quality intertwine with the conceived space and the lived space, creating an all-encompassing social space through the process of space construction. It is crucial that all stakeholders, with the municipality first, recognize this process forms the basis for the future development of Oostkanaalhaven. This indicates an essential element of the assemblage theory. Namely that historical and current developments form the basis of the future of an area. The economic-, spatial- and societal domain are at the heart of the transformation process in Oostkanaalhaven, to subsequently be able to attach important sub-elements to it. The answer to the first part of the main research question mentions these sub-elements.

The third part of the main research question is a combination of *what* and *how*. As mentioned in answering sub-question 3, the transformation process of Oostkanaalhaven has already started. The amendment to the law surrounding the houseboats ensured the residential function slowly but surely penetrates the environmentally zoned industrial area. Heavy industry is increasingly restricted, supported by the call from local residents to make the work area more connected to its immediate surroundings. Mainly entrepreneurs are difficult to satisfy because their working area might eventually disappear. Currently, it is essential to ensure that entrepreneurs are heard by recognizing their socially important business operations. Neglecting metal processing, demolition companies,

and other crucial branches is not smart, while the possible relocation of these companies could take decades. The municipality is the party to provide clarity so entrepreneurs and local residents can ultimately enter into dialogue with each other. The Kronenburger Forum was a good moderator in this process. The Working Group Harbours and street consultations cannot fully fulfil this role, as they only facilitate dialogue between companies. A revived Kronenburger Forum or a comparable organization seems crucial in bringing all parties together. Here the municipality has to step up a gear.

In short, entrepreneurs will be left with the short straw, while local residents will most likely benefit. It is far from certain the residential function will be further realized in Oostkanaalhaven, but that something will change, and the heaviest industry will suffer as a result, is for sure. To let Oostkanaalhaven meet city-wide challenges without encountering too much resistance in the transformation process, space construction, mixed-use and spatial quality must lead the way.

7.3 Reflection

After answering the main research question, it is possible to reflect on the research conducted. This also offers the opportunity to verify the societal and scientific relevance. As the research progressed, it became clear that urban densification, and the battle for urban space is a relatively planning matter. Tackling this subject as a geographer was both unusual and challenging. In addition to geographical theories (assemblage theory, Lefebvre's spatial triad, mixed-use and spatial quality), institutional planning methods were explored. The expert interviews provided useful insights into these planning methods, however, they were not profoundly investigated in this thesis. This is mainly because of inexperience with the subject and the complexity of concepts included in the conceptual model. More prior knowledge, a more intensive exploration and better operationalization, might have led to a better understanding of institutional planning methods. However, the exploration of new methods offers tools for possible follow-up research.

This thesis is well-thought-out research into urban densification in Oostkanaalhaven. Various groups of knowledge carriers were selected, approached via interviews and online questionnaires. No interview was possible with the ODRN, which was considered an essential stakeholder in advance. The same applies to business association TPN-West. However, several interviewed entrepreneurs are members of TPN-West and/or hold a board position within the business association. In combination with the Gebiedsvisie TPN-West – which both discuss knowledge carriers – sufficient information about the ODRN and TPN-West was collected.

The disadvantage of a single case study research is that it is difficult to generalize results. The data found is based on a specific location. Although many actors and time-bound processes are location-specific, this thesis arose from continuous societal developments, which have an impact on many places such as Oostkanaalhaven. In this way, insights from this research could be useful for other locations in the Netherlands. In particular, the exploration of combining geographic and planning insights offers a perspective for a future in which urban area transformations proceed smoother.

This section enables to reflect briefly on the scientific- and societal objective formulated in chapter 1. This thesis indeed provided more insight into urban densification. Moreover, there was a selection of elements and urban processes that should be included in the transformation of Oostkanaalhaven. Although this thesis could inspire comparable areas, it is impossible to say that this single case study research provides insight into the transformation of other urban areas. Nevertheless, it is possible to state that this research mostly meets its scientific objective. Various data collection methods gained insight into the development possibilities of Oostkanaalhaven. This enables to determine which city-wide challenges Oostkanaalhaven can meet. The expectation was an institutional tool would be

found to guide the eventual future transformation in the right direction, which unfortunately failed. Nevertheless, it is possible to say that this thesis mostly meets its societal objective.

7.4 Recommendations for further research

Recommendations for further research are mainly about the completeness of the research and the associated research design. As mentioned, the investigation of the institutional planning methods in this thesis went not as well as expected. For further research, the recommendation is to do more and better research on this. Ultimately finding a suitable method for transforming urban areas in the Netherlands is significant. The perception of what belongs in a city is continually changing, causing areas such as Oostkanaalhaven are more often at stake. The challenge is to maintain the values and identity of such places, even when the design of the place changes. Finding complete institutional methods than the PVE and MGA would be ideal.

Several respondents asked why this research is limited to Oostkanaalhaven and does not cover all of TPN-West. The time limit is the primary cause of this choice. Nevertheless, this is a legitimate question. Especially after it became apparent that Oostkanaalhaven acts not in isolation but is in direct contact with its immediate surroundings. More time should be made available for follow-up research or comparable research elsewhere, to be able to interview all crucial stakeholders. Sub-areas within and close to Oostkanaalhaven are interconnected and intertwined, which can lead to useful insights. For example, it might be useful to question local residents from adjacent residential areas in Weurt and Beuningen, beside Hees and Waterkwartier. Including all relevant sub-areas creates a complete picture which might lead to a different view upon city-wide challenges and possible solutions. A different, more total view on the industrial area occurs. This leads to a reconsideration of the formulated identity and key elements. Ultimately, this results in a transformation that fits into the area itself and its surroundings.

Another recommendation concerns the observation. In this study, there was an observation at the end of a sunny afternoon. During several interviews, it emerged grim things take place in the evening/at night. To verify this, another later observation - for example, around 22:00 o'clock – should take place. Just like a complete picture of stakeholders, the goal should be to have a complete picture as possible of the time frame of processes in the research area.

Perhaps the most crucial recommendation - also for other comparable areas in the Netherlands - concerns the current phase of an area transformation. In this thesis it eventually became clear Oostkanaalhaven is already changing, and certain choices (such as the law concerning houseboats) ensured several things are already determined. Especially according to entrepreneurs, some developments in the transformation process cannot reverse. As a result, it is impossible to expect that the municipality of Nijmegen represents all interests. Similar situations can occur in other urban areas, so a project manager - such as the municipality - must be well aware of the current phase of a transformation process. Only then it makes sense to consider which stakeholders should be involved and which city-wide challenges the area can tackle. This prevents delay and a long transformation process full of annoyance and objection procedures. When the municipality finds out what phase the transformation is in, communicating this to the stakeholders involved is crucial. Transparency leads to understanding and support among citizens and businesses, resulting in a smoother urban area transformation.

In short, follow-up or similar research should be as comprehensive as possible. First of all, this concerns the stakeholders involved. Moreover, it concerns the (surrounding) sub-areas involved. Besides, it is crucial to know the current phase of a transformation process and which follow-up steps are appropriate.

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