



TINY HOUSES: SEARCHING FOR A PLACE IN A TIGHT HOUSING MARKET

A case study on tiny houses in Rotterdam

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Summary

The tiny house movement is growing in appeal in America and Australia. Although tiny houses are already established, there are problems with the localization and the fitting in within the institutional frameworks. The movement has also taken root in the Netherlands, which requires research into these themes in a Dutch context. In 2017, the municipality of Rotterdam was commissioned to designate one or more tiny house locations within the municipal boundaries. This was the reason to explore how tiny houses and the associated challenges relate to this in a Dutch municipality. The following central research question has been formulated:

"Which aspects influence the demand and possibilities for the construction of tiny houses and their locations within the institutional context of Rotterdam?"

To answer this question, it was explored how tiny houses fit into the housing policy framework that applies in Rotterdam. Subsequently, it was explored what the preferences are for tiny house features and their locations among people who want to live with a tiny house in Rotterdam. Finally, the opportunities and barriers of the different ways of land search and acquisitions were investigated for tiny houses.

Answers to these questions were made possible by conducting a case study in combination with desk research. Various methods of data collection were used, both quantitative and qualitative. First of all, a questionnaire was conducted among people who want to live with a tiny house in Rotterdam, which asked about the preferences in tiny house features and their locations. In addition, people who already live with a tiny house at a different location in the Netherlands and who have therefore already gone through the entire process of searching for land were interviewed. Finally, officials from the municipality of Rotterdam were interviewed, in combination with content analysis, in this way the integration of tiny houses in the institutional context could be clarified.

The results of this research show that there are few very context-specific aspects that influence the construction of tiny houses in Rotterdam. The housing and restructuring task in particular constitutes competition on the land market. In addition, the municipality has a surplus of small (low quality) houses. On the other hand, are the characteristics that offer opportunities for tiny houses. First, the quality policy for small homes is being updated, allowing smaller living areas. Finally, the unique flat roof landscape and the presence of harbours make tiny houses on roofs and water an option.

Keywords: Tiny houses, Tiny house communities, The Netherlands, Rotterdam, land acquisition, institutional barriers.

Preface

In front of you lies my master thesis: "*Tiny Houses: Searching for a place in a tight housing market*". The master thesis is written in the period from March to August 2020. The master thesis project is about conducting independent research and forms the closure of the one-year master Spatial Planning (specialisation Land, Planning and Real Estate Developments) at Radboud University in Nijmegen. This master thesis symbolizes what I have learned in academic skills over the past four years.

In addition, it has been an educational process in terms of content. During the master my interest in self-build houses, in particular tiny houses, has increased enormously. In the past five months, I have had the opportunity to learn a lot about this subject.

This master thesis was written in response to the decision of the municipality of Rotterdam to designate tiny house locations within the city. In addition to my interest in tiny houses, Rotterdam is the city where I was born and still live. For me this was the ultimate combination.

Writing a master thesis is a personal project, but I certainly did not do it alone. I would therefore like to personally thank a number of people. First of all my supervisor, dr. Pascal Beckers, his interest in this topic was reflected in the enthusiasm with which he took the trouble to provide detailed feedback. Especially at an academic level, I learned a lot from him in the last few months. I would also like to thank Britt van Niederek for her input, especially in the exploratory phase of the research. She informed me about the state of affairs of tiny houses in Rotterdam, so that I could give a specific direction to my research. Thanks to all respondents and interviewees who took the time and effort to participate in this research. Finally, thanks to my mother, Maria Lima, for the love, support and taking care of tasks so that I could focus on completing my research.

Enjoy Reading!

Robyn Isabel Lima

17th August, 2020

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1. Introduction

"Rotterdam is making land available for tiny houses: Fortunately, they now understand that we deserve a place," the AD headlines in July 2019 (AD, July 25, 2019). The article describes that the municipality of Rotterdam makes land available in Zuidwijk for tiny houses, and thus joins around 30 other Dutch municipalities that (will) do the same. This is a little too late for pioneers after they have made several attempts to persuade the municipality, but eventually had to move to other municipalities, such as Delft and Dronten. Nevertheless, according to the founder of the Tiny House Academy in Rotterdam, there is currently enough enthusiasm.

1.1 Tiny houses specified

There is no clear definition of what a tiny house exactly is. According to Shearer and Burton (2019), the main defining factors are size and mobility. Various ranges of surface area are used in the literature. For example, Stephens & Parsons (2018) use a range from 9 to 37 m². Minyoya (2015) is a bit more specific with around 18 m². Shearer and Burton (2019) have a broader approach and describe that tiny houses are generally less than 40 m². As mentioned, mobility is an important factor in addition to size. There are tiny houses that are mobile as well as tiny houses that are permanently fixed (Brokenshire, 2019). Mobile tiny houses can be placed on wheels (tiny houses on wheels [THOWs]) as well as on skids, the latter makes it possible to tow them (on a truck, for example) (Alexander et al., 2018).

The above specifications are mainly based on the tiny house movement in America and Australia. The Netherlands does not have an official definition either, but the Tiny House Nederland [THN] foundation (n.d.) describes tiny houses as: "*Small, fully-fledged and detached houses with a floor area of up to 50 square meters, with the smallest possible ecological footprint. There is permanent living in Tiny Houses, so they are not intended as a holiday home.*" The context-dependent regulations ensure that this number of square meters is leading in this research.

It is striking that there are different forms in which tiny houses can come. First of all the iconic tiny houses on wheels and skids, but also cottages, townhouse, converted sheds, bus or trucks and container houses (Weetman, 2019; Shearer & Burton, 2019). It is important that RVs are not recognized as a tiny house within the movement. Nevertheless, Shearer and Burton (2019) make an exception if these are purposefully modified as a tiny house. This is also the case in this research.

1.2 The rise of tiny houses

Tiny houses are becoming increasingly popular, especially in the United States and Australia, where individual tiny houses and sometimes communities are being constructed (Evans, 2019). The tiny house movement describes itself as a social movement aimed at people who want to downsize or live a simpler life (Weetman, 2019). The general interest is "*minimizing, de-cluttering, and downsizing*" (Anson, 2014; Morrison, 2014), influenced in part by the minimalist idea of "less is more" (Ford & Gomez-Lanier, 2017). Ford and Gomez-Lanier (2017, p. 1) argue that the main assumption is that in tiny houses "*homeowners can reduce the environmental impact and increase affordability by reducing their spatial footprint*". In addition, there would be concerns about the mainstream houses that were considered "*too big*", while at the same time a growing number of people wanted to downsize due to environmental considerations of simplicity (Brokenshire, 2019). To the latter, mobility, a flexible

lifestyle, a desire for community, and self-expression through self-construction can be added as other motivations (Mutter; in Weetman, 2019). Tiny houses could be an alternative that is “*more beautiful*”, more sustainable and more affordable than the large houses in which the middle classes in the US and Australia live, which are seen as socially, economically and environmentally unsustainable (Shearer & Burton, 2019).

Furthermore, this movement can be seen as a direct response to problems in housing affordability and housing unsustainability, caused in the Global Financial Crisis, the housing crisis and concerns about climate change (Weetman, 2019; Anson, 2014; Evans, 2018). Brokenshire (2019) does not see this as a new concept either, but rather as an answer to the increased housing costs, financial stress and economic depression. The Global Financial Crisis, for example, is said to have triggered the emergence of tiny houses, due to the high unemployment, lending declines and housing costs sometimes being prohibitive. According to Waitt et. al. (2016), the trend to live smaller is likely to grow due to the decline in affordable houses, housing credits restrictions, rising energy prices and the focus on urban sustainability. Evans (2018) agrees by stating that the biggest driving factor in tiny housing is housing affordability. As problems in this area seem to be increasing and are resistant to policy interventions (Shearer & Burton, 2019), the interest in living smaller will grow (Evans, 2019).

Nowadays, buying and / or building a tiny house has become somewhat more accessible. Tiny houses are made more popular worldwide by TV programs and YouTube channels about building and buying tiny houses. In addition, there is a growing number of companies that sell complete tiny houses or offer plans for self-build (Wenban, 2019).

1.3 Barriers to proliferation

Although tiny houses could offer a solution to several points, there are still barriers to the movement. The growth of the tiny house industry in the US (but also other countries) is mainly hindered by the lack of availability of land that tiny houses are allowed to permanently stand on (Wenban, 2019).

Besides land there are two major legal obstacles to the growth of the tiny house movement, namely the zoning law and building code requirements (Vial, 2016). Despite the fact that several municipalities accept tiny houses, these institutional barriers continue to play a role (Shearer & Burton, 2019). In particular, the concept of transportable houses seems to be at odds with the planning and building framework set up in the housing industry (Brokenshire, 2019). In Australia, fixed tiny houses are classified as ancillary dwellings and may be on residential land, but mobile tiny houses are often thought of as caravans and may therefore only stand there for a very short time. Moreover, laws and statutes in the US and Australia vary from state to state, so there is no consistent process for residents to clarify their options (Wenban, 2019). These institutional barriers are the main reason that keeps people from living in a tiny house (Shearer, 2015a). In the US, an attempt has been made to clarify the status of tiny houses by adding a tiny house appendix in the International Residential Code [IRC]. Despite this, complaints are still being received from illegally parked (mobile) tiny houses in urban areas or rural properties.

1.4 Research aim and research questions

The fact that the growth in popularity for tiny houses is now also visible in the Netherlands makes it interesting to investigate the characteristics and barriers in the context of a Dutch municipality. The aim of this research is to explore how the demand for tiny houses can be brought together with the opportunities that exist within the municipality of Rotterdam, with specific attention to the possibilities

to overcome barriers in the field of land acquisition and restrictive legal framework.

The exploration of the scientific literature and the input from practice have led to the following research question:

"Which aspects influence the demand and possibilities for the construction of tiny houses and their locations within the institutional context of Rotterdam?"

In order to answer this research question, the following sub-questions must be answered:

1. How do tiny houses fit within the housing policy framework that applies within the municipality of Rotterdam?
2. What are the preferences for tiny house features and locations among (potential) tiny house residents who want to settle in the municipality of Rotterdam, and what are the explanatory factors of these preferences?
3. What are the possibilities and barriers of different types of land search and acquisition for tiny houses (within the municipality of Rotterdam)?

1.5 Scientific and societal relevance

This research will contribute to academic knowledge in various ways. First of all, quite a lot has been written about this relatively new movement. For the time being, research mainly focuses on the characteristics of tiny houses and locations in the US and Australia (Shearer & Burton, 2019; Boeckermann, Kaczynski and King, 2018; Mangold & Zschau, 2019; Penfold et al., 2019; Brokenshire, 2019 etc.). The solutions for the barriers also apply in these Anglo-Saxon countries (Vial, 2016; Ford & Gomez-Lanier; Evans, 2018ab; Evans, 2019; Wenban, 2019). By placing tiny houses in the Dutch planning culture, it can be ascertained whether the characteristics and barriers apply to the whole movement or are context specific.

In addition to scientific, this research also has social relevance. The assumption exists that tiny houses are a solution to the 'crisis' in affordable houses and climate change (Weetman, 2019; Anson, 2014; Evans, 2018). The pressure on the housing market is particularly challenging in Rotterdam. The municipality of Rotterdam predicts that the demand for housing will grow and feels the need to realize about 30,000 more houses until 2030 (Municipality of Rotterdam, 2019). Moreover, the number of houses with a higher WOZ value (from 174,999) is increasing compared to houses with a lower WOZ value (up to 174,999) (BAG, edited by the municipality of Rotterdam, 2019). In addition, in line with the national target, the municipality of Rotterdam wants to commit to a 49 percent CO₂ reduction in 2030 compared to 1990 and they want to be free of natural gas in 2050 (Municipality of Rotterdam, 2019). Insights from this research can be used to examine whether and how tiny houses can play a role in tackling these challenges.

2. Theoretical Framework

In this chapter an introduction to relevant theoretical frameworks and a critical overview of the academic literature of relevance to tiny houses are given. The first paragraph explains the demand for tiny living on the basis of existing moving theories and shows the specific drivers to build or buy a tiny house. The following paragraph explains the different types of tiny houses. Then the institutional barriers for the proliferation of tiny houses are given. The fourth section shows how tiny houses can be established on different types of land, including by overcoming the previous institutional barriers. Finally, there will be a conceptual/analytical framework based on the previous paragraphs.

2.1 Demand for smaller houses

2.1.1 Moving theories

Life cycle theory

One theory that can explain the demand for smaller houses is the life cycle theory of Rossi (1955). Changes in demographic characteristics cause changes in housing needs and requirements. Rossi (1995) specifically point to household composition and age as explanatory characteristics. Demographically, Western countries and Japan are in the second transition, characterized by smaller households (Lesthaeghe, 2010). In addition to household size, age is also important in which type of house one wants to live. Younger and older people generally live smaller (Mulder, 2009; Herbers et al., 2014). Young people are not yet that far in their housing career because they come from their parental home or student room (Helderman 2007; Mulder, 2009). In contrast, older people are led by a decreasing household size, as a result of the moving out of children or the death of a partner (Helderman, 2007). This corresponds to what is known in literature about the part of the population that lives in tiny houses, namely: young adults, students, retirees, seniors, and those interested in tiny house communities (Mutter, 2013).

Priemus (1984) argues that the position on the labour market would also influence the tendency to move. He describes that a better job and income means that people can afford a better house. Additionally, people with a better job can live further away from work (due to transport costs). Priemus (1984) combines these insights with the life cycle theory of Rossi (1955) and calls this the modified life cycle / work cycle mode. The socio-economic characteristics are often operationalized on the basis of household income (Clark, 2013; Dane et al., 2014; Van Ommeren & Van Leuvensteijn, 2005). This in turn influences the desired size of the house. According to Clark et al. (2006), lower income households tend towards smaller houses because they cannot afford a larger house. Although the costs (size and simplicity) of tiny houses lend themselves to a wider range of incomes, it is often the wealthy downsizers who opt for this (Mingoya, 2015). A survey on 3,000 tiny house enthusiasts shows that people who want to live in a tiny house earn a higher than average income per capita, have greater savings in the bank, and less credit card debt (Mitchell, 2013). According to Evans (2019), this suggests that the tiny house movement (but also small living) is driven by choice rather than necessity (at least in the US).

The life course theory

The life course model of Mulder and Hoomeijer (1999) is useful to explain the demand for smaller houses as well. The educational career, housing career and macro context are included in this model.

At the micro level, are the household career, work career, educational career and housing career that would affect the tendency to move. These largely correspond to the life- and labour cycle. But where Mulder and Hooimeijer (1999) choose to include the educational career as a separate factor, Priemus (1984) makes this part of the work cycle.

The level of education is often used as an indicator for socio-economic characteristics, because people with a higher level of education are more likely to have a higher income (CBS, 2012). The survey conducted by Mitchell (2013) shows that people who want to live in a tiny house are twice as likely to have a master's degree (Mitchell, 2013). This is an interesting fact, but in this study it was decided to follow the example of Priemus (1984) to include education in the work cycle (with income as the only indicator). This is because income, unlike the level of education, can be directly linked to the ability to live larger, as previously mentioned in the addition of Priemus (1984) to the life cycle theory.

As mentioned, this model also includes the housing career. The theory behind this is that people have a hierarchical course of the housing career until they buy a house (between 35 and 50 years). At the beginning and end of the career are therefore the moments with smaller houses. Age (treated in the previous model as an explanatory demographic factor) thus coincides with the housing career.

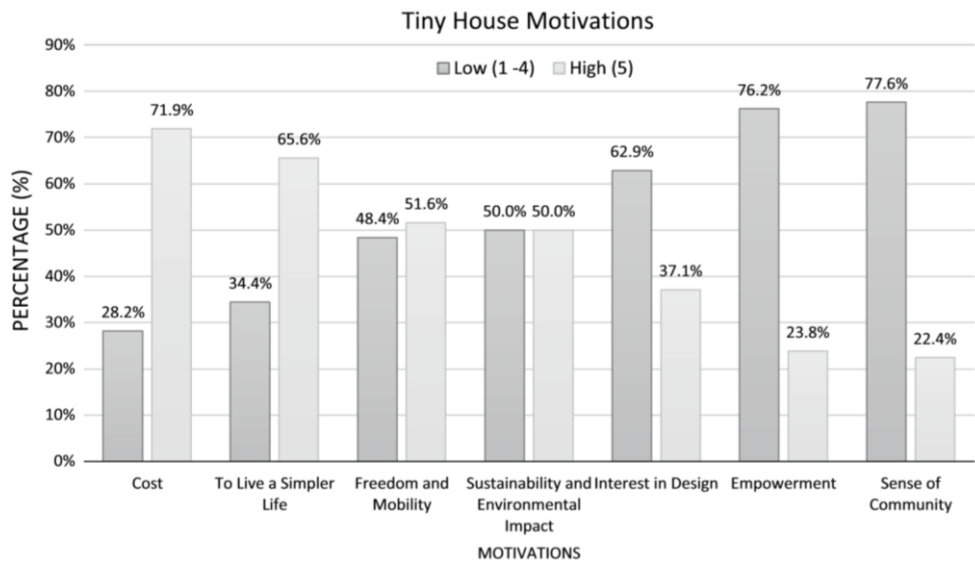
At a regional (macro) level, it is the housing market that exerts influence. An important indicator on the regional housing market is the price per square meter of living space (Kauko, 2005). If this price is high, it is difficult to move to a larger house. This is the case in a tight housing market, caused by limited supply (Deidda, 2005). In this case, the average living area is usually smaller (Lee & Myers, 2003), as can be seen in the Randstad (Boelhouwer & Hoekstra, 2009).

Ultimately, the four life-course pathways cause changes in the housing preferences on the one hand and the (financial) restrictions and resources lead to the tendency to relocate on the other hand.

2.1.2 Drivers for living in a tiny house

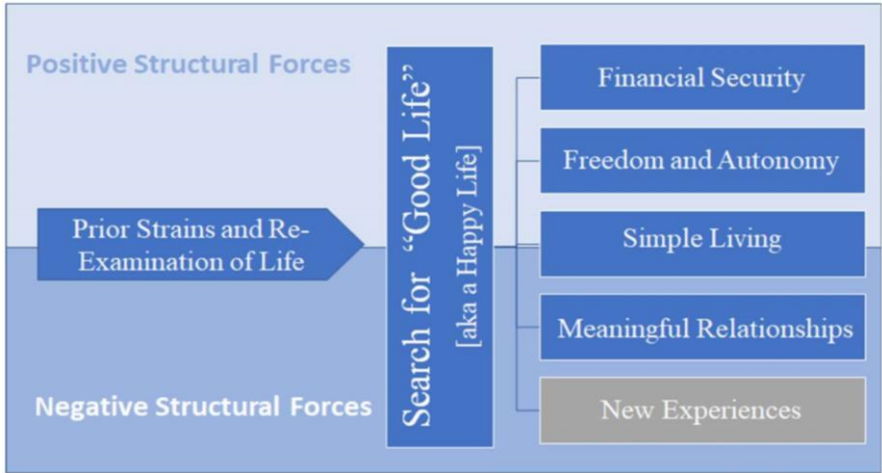
There are several studies conducted on the motivations to live in a tiny house. One is the Tiny House Community Survey that has been conducted by Boeckermann et. al. (2018). This research showed that for more than half of the participants the decreased costs, a simplified lifestyle, and increased freedom and mobility were salient motivations (see figure 2.1). Cost was the most salient motivation for living in a tiny house (71,9 percent). Following the costs were the desire to live a simple life with less consumerism (65,6 percent) and having the freedom and independence to move about (51,6 percent). In terms of sustainability and environmental concerns, there was an equal split between residents with high and low motivation. This is followed by around a third of whom an interest in design was a strong motivation. Finally, less than one-fourth indicated that empowerment and sense of community was a strong motivation.

Figure 2.1: Tiny house motivations (Boeckermann et al., 2018)



Mangold and Zschau (2019) replicated this study on motivations for tiny living and offered a new conceptual framework (see figure 2.2). They argue that the tiny house movement is a new attempt to answer an old question: How does one live a Good Life? People would use a tiny house lifestyle as a means to achieve a Good Life. Just like in the research of Boeckermann et al. (2018), sustainability issues turn out to be secondary motivations. More important is the individualistic and pragmatic view of simple living, autonomy, as well as experiences and relationships as a means towards happiness.

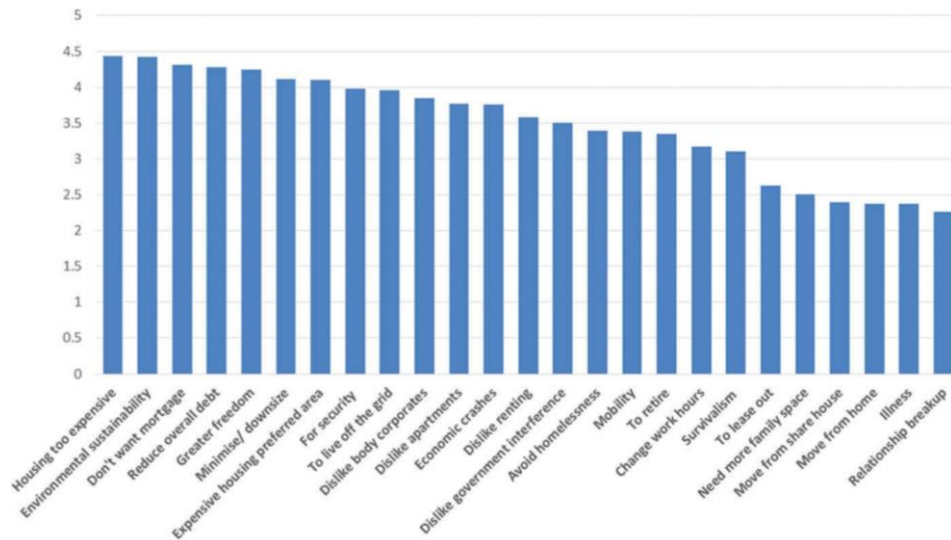
Figure 2.2: Conceptual model for the tiny house lifestyle appeal (Mangold & Zschau, 2019)



Finally, an online survey was conducted by Shearer in 2014/15 and repeated in 2017 (Shearer & Burton, 2019). One section treated the drivers for building a tiny house and produced a large and diverse number of drivers. On the y-axis of figure 2.3 it shows how respondents on average value the drivers (5 being the most important and 0 the least important). In this survey, the main reason for building a small house is that current houses are too expensive. In contrast to the research by Boeckermann et

al. (2018), but as in the research by Mangold and Zschau (2019), environmental and sustainability motivators are high in second place. These are followed by not wanting a mortgage and reducing total debt. Research by Shearer (2015b; 2014) also shows that economic motivations are at the top, such as cost reduction, mortgage debt and affordability of houses. Gaining more freedom and the focus on minimalism are secondary in this survey to cost and sustainability.

Figure 2.3: Main drivers for building tiny houses (Survey, 2017; in Shearer & Burton, 2019)

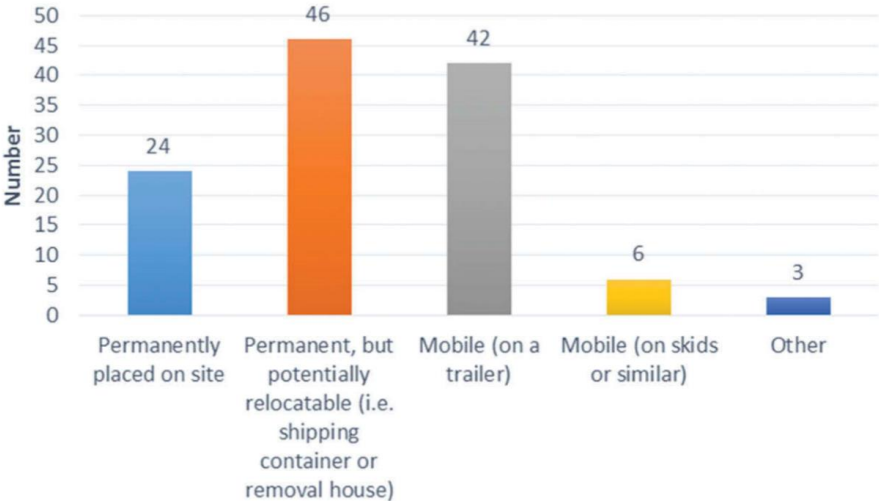


2.2 Typology for tiny houses

2.2.1 Tiny house characteristics

Tiny houses are becoming more popular, nevertheless there is no single definition. Shearer and Burton (2019) have made the first attempt to present a typology of tiny houses. Naturally, size is the most important characteristic of tiny houses. In Appendix Q of the IRC (US), a tiny house is defined as a house with a floor space of up to 37 m² (excluding the attic). However, size can be seen as a cultural norm. A tiny house in the US is probably larger than in Hong Kong or Germany, for example. In addition, there are transport regulations in the EU that ensure that (mobile) tiny houses are defined more by weight than by dimensions (under 3,5 tonnes). Nevertheless, the dimensions of mobile tiny houses in the EU are often the same as in the US. Although size is important, this is not the only defining feature for a tiny house. As mentioned, size is normative, which means that it is common in some countries to have very small dwelling. With only size as characteristic, tiny studio apartments could also be seen as tiny houses. In addition to size, mobility is an important defining feature and can be distinguished into fully mobile, partly mobile or permanent. Shearer and Burton (2019) see the partly mobile tiny houses as a subcategory of the mobiles ones, because they can be moved and look like the entire mobiles because they are moved very little. A study in Australia shows that the majority of the tiny houses have a degree of mobility (see figure 2.4).

Figure 2.4: Mobility of tiny houses (Survey, 2017; in Shearer & Burton, 2019)



2.2.2 Mobile tiny houses

Shearer and Burton (2019) have distinguished two categories that are subdivided into subcategories (see table 2.1). The first category, ‘type 1: mobile’, is small and mobile tiny houses. This type of tiny houses is mostly built or purchased by individuals for their own living purposes. Which can be divided into three subcategories (Shearer & Burton, 2019):

Type 1a ‘tiny house on wheels’ [THOWs]: This type of tiny house is the one most associated with the current tiny house movement. THOWs are built like a standard house, but on a trailer base. Typically, they are small to be registered as a road vehicle and narrow to comply with transportation regulations. Despite being fully mobile, it is not the intention (mainly for practical reasons) to move them regularly. Often THOWs are on land that is rented to tiny house dwellers or is given out for free in exchange for work.

Type 1b ‘potentially mobile tiny houses’: This type of tiny houses consists of any type of moveable dwelling including manufactured (prefabricated) homes, sheds, container houses, kit homes, granny flat kits, site huts or pop-up houses. In general, they are larger than tiny houses on wheels because they are not related to transport regulations. They are usually on land owned by the tiny house dwellers or on specific zones (such as an RV park), from these locations this type of tiny house is rarely moved.

Type 1c ‘converted fully mobile dwellings’: This type is permanently mobile and includes caravans, boats, RVs, converted buses, and even tents. Some argue that tiny houses should be distinguished from RVs, yet a large proportion of tiny house advocates live in a RVs or other mobile vehicle. It is possible that this type is on owned land, but usually it is on rented land or specific zones (such as caravan park or marinas).

2.2.3 Permanent tiny houses

The second category, 'type 2: permanent', is a small and permanent tiny house. Compared to the previous category, in addition to personal residences, these are also built for letting purposes, cohousing or social welfare purposes. This category can also be divided into three subcategories (Shearer & Burton, 2019):

Type 2a 'permanent purpose built tiny house': Just like the tiny houses on wheels (type 1a), the permanent tiny houses are very well known within the tiny house movement. This type includes granny flats, country cottages and cabins. Usually these are built on the builder's land, sometimes as secondary dwelling (for more living space, dependent relatives or extra income). Often these are built for holiday houses or rural retreats.

Type 2b 'conversion of other permanent structure': These converted non-residential buildings are usually permanent structures on a foundation, so cannot be easily moved. This type includes sheds, garages and barns and is on land owned by the tiny house dweller or land owned by a friend or relative.

Type 2c 'tiny house community': These houses can be attached (e.g. apartments in a community apartment block) or detached (e.g. townhouses or cottages in a cohousing community or a collection of mobile tiny houses). In this setup, the land is permanently intended for this purpose and the dwellings do not usually move. Tiny house communities can be located in both inner city areas and rural areas and the land can then be rented, owned outright, or government provided social housing. Typically, facilities such as kitchens and laundries are shared.

In the categorization of Shearer and Burton (2019) by means of mobility and type of dwelling, it can be seen that several types of dwellings can be seen as tiny houses. Besides these two characteristics, tiny houses share, for example, *"a strong sense of bespoke design, reflecting their origins in the architectural professions, a motivation to achieve greater environmental sustainability, living off the grid and minimizing possessions, some degree of anti-establishmentarian philosophy, and a strong focus on community and sharing resources"* (Shearer & Burton, 2019, p. 19).

Table 2.1: Types of tiny houses. (Shearer & Burton, 2019, p. 307)

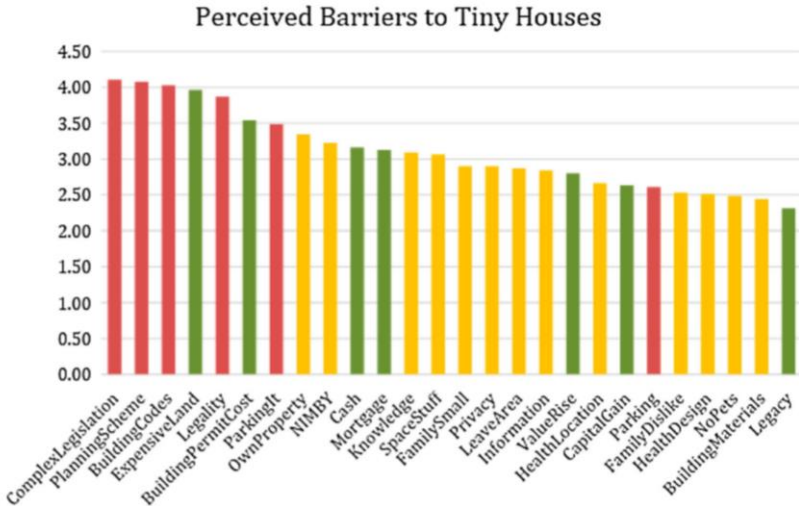
Typology	Description
Type 1. Mobile (fully or partially)	
1a	<p>Iconic tiny house on a trailer.</p> <ul style="list-style-type: none"> • Size: < max dimensions allowable (around 20 m² or <3.5 tonnes (EU)) • Mobile, on a trailer • Owner/friends/family built • House fully owned, trailer and vehicle possibly financed • Legal as a "caravan" or RV, varies depending on location • Moves from construction site to permanent or semi-permanent site in urban or rural land, free campsites, friends/family land, caravan parks • Dwellers often have strong environmental focus, and often off-grid • Can have a community focus, urban tiny house dwellers report size of house forces community activities
1b	<p>Relocatable tiny house, moved to site then fixed or semi-permanent. Prefab, cabin, shipping container, "tiny house", mine hut, kit home etc.</p> <ul style="list-style-type: none"> • Size – larger than 1a; mostly <40 m² • Moved infrequently (<6 months is general minimum lease time) • Owner/friends/family build, purchased second-hand or as a kit • Cost (likely greater than 1a). House often fully owned, land owned, mortgaged or rented • Legal as primary/secondary/ancillary dwelling on own or rented land • No specific environmental or community focus (other than the individual)
1c	<p>Fully mobile dwellings: Caravans, boats, bus, trucks, tents, tepees</p> <ul style="list-style-type: none"> • Very small (smaller than 1a and 1b) • Highly mobile and often temporary structures • Not generally built from scratch, purchased new/used or repurposed (e.g. bus/truck) • Cost, varies wildly (<\$1000-\$100,000+) • Environmental ethos as per tiny house movement • Legal to park in designated areas, such as caravan parks, free camping, state forests; if on others (friends/family) property, time permitted depends on council • Often a strong community focus. Environmental sustainability not a prime motive, depends on individual
Type 2. Permanent (non-mobile)	
2a	<p>Purpose built tiny house/cottage</p> <ul style="list-style-type: none"> • Size, generally under 50 m² • Semi/detached, usually built by registered builder, or owner, friends and family • Cost (varies widely, likely \$50 k plus, depending on construction material, builders) • Fully legal (subject to council restrictions, such as on potable water and sewage) on own land. Generally in a rural/rural residential area • No particular environmental or community focus (other than the individual)
2b	<p>Converted non-residential building (shed, garage, barn)</p> <ul style="list-style-type: none"> • Under 70 m² • Can be a temporary dwelling but is not usually moved • Detached or semi-detached (attached to a larger property) • Cost? Mostly relatively inexpensive <\$20,000. Often rented or built on family/friend's land • Legal, but councils differ widely regarding these dwellings, and length of permitted residence. Located in all areas, from suburban to rural • No particular environmental or community focus (other than the individual)
2c	<p>Tiny house village (apartment complex/cottage/townhouse in intentional or co-housing community). These include apartments.</p> <ul style="list-style-type: none"> • Generally the individual's private space is small (mostly under 40 m²), with shared facilities (i.e. kitchen, garden, tools) • Designs vary widely, and may include "alternate" dwellings such as converted railway carriages and yurts • Cost is variable, and depends on tenure and location. Either rented or owned or subject to alternate tenures such as tenants in common or social housing • Fully legal in many countries. Located from city centres to rural and regional areas. • Frequently have a strong fundamental ecological and/or social philosophy and rules.

2.3 Institutional barriers

Shearer (2015a) showed that institutional barriers were the most important reason for people to not build or purchase a tiny house (see figure 2.5). At the moment there are two major legal barriers for the proliferation of tiny houses (Vial, 2016). First, the legal status of tiny houses is prevented by the zoning laws and building code requirements. With the attempt to bypass this first obstacles comes the second; building tiny houses on trailers. They are considered recreational vehicles (RVs), with the result that building codes no longer apply. However, this creates other problems.

This is also reflected in the study by Hesselberth (2019), which investigated the Netherlands (and in particular the Proeftuin Erasmusveld in The Hague) as a case study. On the one hand, she found that members of the tiny house community were expected to be self-organizing. On the other hand, with regard to the landowner-imposed regulations, they had relatively little say or autonomy.

Figure 2.5: Perceived barriers to tiny houses (Shearer et al., 2018)



2.3.1 Restricting building codes

Even in the United States, where most of the tiny houses are, they are generally not allowed in most jurisdictions. A tiny house appendix has recently been added to IRC to clarify their regulatory status. Nevertheless, many (mobile) tiny houses are still (semi-) illegally parked in urban areas or rural properties (where there is less complaining). The typology is therefore important here, because the legal status differs per type of tiny house (Shearer & Burton, 2019).

Building codes contain specifications about the minimum square footage and specification for habitable living space. Further, they contain requirements regarding water and sewer conditions, which obstruct sustainable features, such as greywater recycling systems and compostable toilets. Building codes also include relatively large plumbing clearances and permanent heating requirements (Turner, 2016). The building codes form a barrier, especially for THOWs, because there is no consensus on how to define and regulate them. For this reasons it is unclear which building regulations THOWs it must comply with.

Tiny houses are located in a grey area between trailer, mobile homes, recreational vehicle and house. If tiny houses are classified as houses, size building codes are violated. If tiny houses are classified as mobile houses, there are rules that hinder parking (Anson, 2014). Municipalities have rules regarding where and for how long trailers can be parked on a particular property (Vial, 2016). Additionally, tiny houses classified as RVs or campers make permanent living illegal, because this type is not land-bound, so property tax requirements would not be mandatory (Evans, 2019). Local residents are therefore concerned about their tax base and the impact of tiny houses on their property values.

According to Hesselberth (2019), tiny living is also about off-gridding, mainly to achieve autonomy. This means that people are not connected to infrastructure such as electricity, municipal water supplies, gas, and sewer systems. Instead, the tiny houses are equipped “with onsite renewable energy sources (such as solar panels), rainwater harvesting and sanitation pumps and filtration, other energy-saving solutions like high efficiency insulation and wood burning stoves, a so-called dry (or composting) toilet, and other more elaborate recycling systems” (Hesselberth, 2019, p. 122).

The Dutch Building Order (*Bouwbesluit 2012*) states that houses must be connected to sewer and running water and must have a minimum of insulation at the expense of mobility and tininess (Hesselberth, 2019). Although exceptions are made, the rule applies that for occupation a basic grid must be installed and each house must apply for its own environmental license and / or a residence permit. This means that a lot of time, money and energy has to be invested. Buying the land yourself is not an alternative. Firstly, the Building order and regulations still apply. Second, a plot of land cannot be occupied by more than one house unless it is formally split and each house must meet the above requirements.

2.3.2 Restricting land-use plans

In addition to the building codes, zoning codes are a major obstacle for tiny houses. The land-use plans include various rules that can make the establishment of tiny houses more difficult. First of all, the minimum square footage requirements are greater than tiny houses. They can also prohibit Accessory dwelling units [ADUs] (more on this later). The aforementioned rules regarding the length of stay are also included here. As well as the spacing or dwelling and the number of dwelling allowed on a property (Turner, 2016). Density regulations, dwelling spacing requirements and lot coverage ratios are especially important for the desire to establish multiple tiny houses on a plot. Finally, land-use plans also include parking space minimums (per household), something that tiny houses generally do not need.

By approaching these building codes and zoning as obstacles, it must at the same time be taken into account why they apply. Namely, as tools to mitigate health and safety issues due to mass immigration and outbreaks of slums. The provisions ensure that people have enough living space and adequate sanitation and that slumlords cannot make use of people that are in need. The return of slums, for example, by lifting the requirements of minimum square footage is one of the fears of lifting the provisions. Vial (2016) argues that instead of removing these provisions, tiny houses should be provided with their own provisions in the codes. However, according to (Fischel 2004; Ross 2014; in Evans, 2019), the focus has shifted to protecting private property values. Especially in the US where a house is often the largest financial investment. Communities can advocate for land-use plans that require all houses to meet specific square footage requirements, or a large lot size.

If land-use plans allow tiny houses, the land must first be designated as a living zone in the land-use plan or development plan. Changing the land-use plan takes time and requires a strategy from the

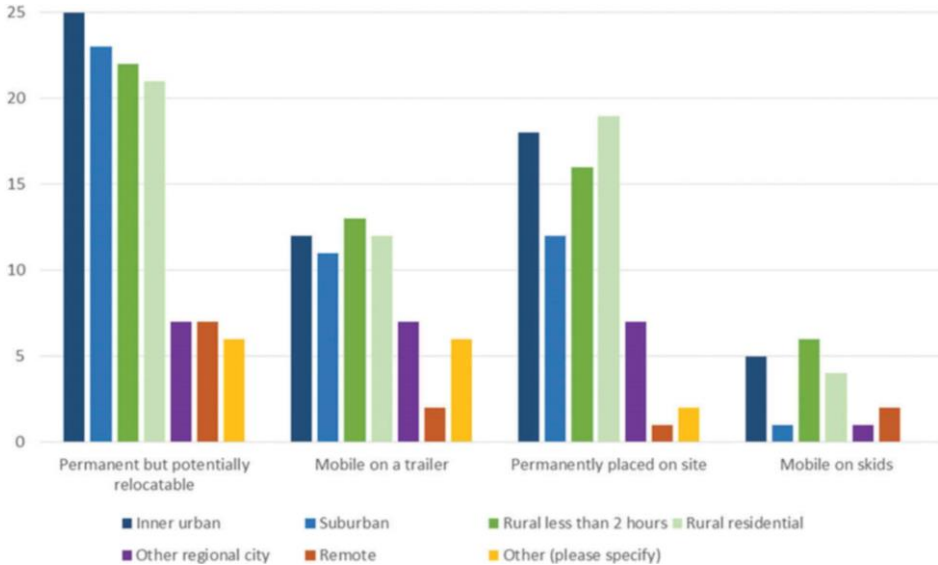
developers or landowners that the tiny house residents depend on. Further conditions may be imposed, such as a maximum or minimum number of houses, depending on the wishes of the land owner (Hesselberth, 2019). As is often the case in the Netherlands, the tiny house residents of Proeftuin Erasmusveld live under tolerated but not legal circumstances. These circumstances are legally seen below living standards. They know that these standards are there for a reason. But the irony is that these basic conditions of living are glorified within the movement. Although the pioneers are willing to compromise, they are also frustrated that corporate and government agencies are pursuing their own goals and controlling tiny house projects, which can lead to initiatives and thus projects being killed. *"Instead of a breeding space for tiny initiatives, a plot of land turns into a temporary parking lot for tiny houses until a next destination is found"* (Hesselberth, 2019. p. 130).

2.4 Land for tiny houses

Kilman (2016) appoints how finding a plot of land is a major impediment for (potential) tiny house residents. The institutional barriers described in the previous paragraph make it difficult to locate tiny houses at a specific location. Kilman (2016) describes that there are four feasible locations for tiny houses. Namely, parking on own property, parking on someone else’s backyard as a RV, parking in a RV park or at a tiny house community.

It is striking that the degree of mobility of tiny houses is significantly related to the type and location of the tiny house (see figure 2.6). The (potential) residents of THOWs prefer to settle in the inner and middle suburbs or capital cities. On the other hand, there are the (potential) residents of permanent tiny houses who prefer to settle in rural residential or rural areas. This relationship probably has to do with the difference in the amount of land prices. Hesselberth (2019) argues that Dutch metropolitan areas are too expensive for tiny house builder to buy a plot of land.

Figure 2. 6: Location of tiny houses (Survey, 2017; in Shearer & Burton, 2019)



2.4.1 Infill methods to make land available

The literature describes several ways to overcome these institutional barriers and enable the establishment of tiny houses in different types of locations. First of all, several municipalities in Australia, for example, allow ADUs (granny flats) (Shearer et al., 2018). ADUs are small units on the same lot as the primary house often located at the side or back of the lot (Evans, 2019). Generally, ADUs are rented out by the primary homeowner, eliminating homeownership and the associated motivation for financial independence (Evans, 2018a). Nonetheless, ADU infill does have its share of opponents. Some communities are concerned that infill might result in more infrastructure, like parking (Chapple et al. 2011).

In addition, tiny backyard leases can be set up specifically for tiny houses on wheels. A THOWs is parked on someone else's property in exchange for rent or barter to the owner (Shearer et al., 2018). Compared to ADUs, this is a bit more complicated in legal terms and it depends on the distinction made between temporary dwellings / house and camping. In contrast to ADUs this will not overload the existing infrastructure, although they may require additional parking.

Tiny houses could stand on their own land between other housing types and sizes, and lot sizes. This can be done by increasing density standards, decreasing residential square footage requirements (Chapin, 2011) or by decreasing lot size requirements (Sanders & Mosena: in Evans, 2019). This would require more flexible land-use plans or using form-based codes [FBCs] instead of traditional zoning (Chapin, 2011). These FBCs do not specifically enable tiny houses, but they do allow cottages (Evans, 2019). Lot sizes can be reduced in the form of tiny lots (from 150 m²) (Shearer et al., 2018). Tiny lots could be referred to as freehold or Community Title. These can be sold to place their own tiny house or potential dwellers can rent a lot and / or existing tiny house. Land-use policy changes may offer a solution for tiny houses, but are likely to expect political rebellion due to concerns about a decline in nearby property values (Evans, 2018a).

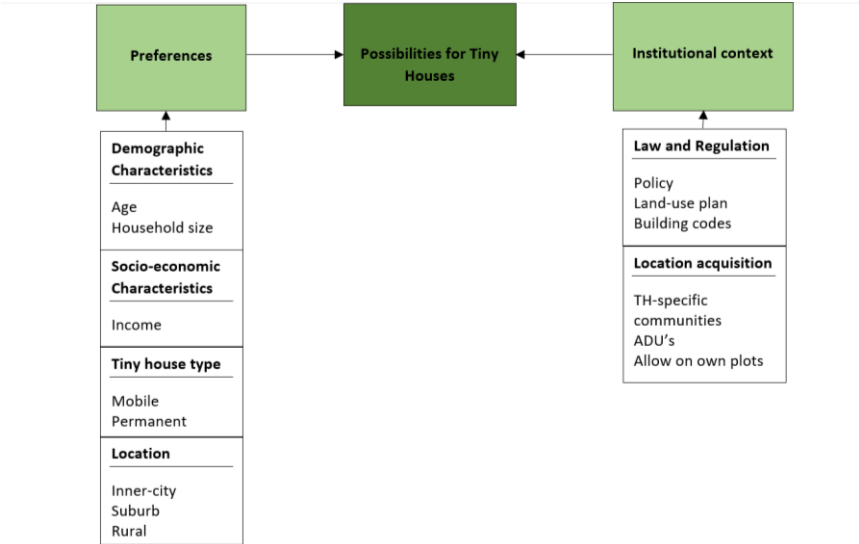
Finally, tiny houses can also be integrated into urban areas by means of tiny and / or small house-specific developments (Evans, 2018b). Municipalities can designate special zones for such developments. Again this is achieved by increasing density standards, in combination with decreasing lot size and residential square footage requirements. A distinction can be made here between tiny villages and tiny house parks (Shearer et al., 2018). A tiny house village can consist of about 4 to 8 houses. Here, the resident would be able to buy or rent the house and the owner would have land rights. Tiny house parks are especially suitable for THOWs, because it is comparable to a caravan park. Here the owner has no right to the land. With some minor legalization adjustments, existing caravan parks could integrate sections for tiny houses (Shearer et al., 2018). Currently, caravan parks in desirable areas are under development pressure, thus tiny houses may not be considered the highest and best use of land. On the other hand, the caravans parks in less desirable areas often have relatively few services and a low frequency of public transportation. Finally, these types of locations are stigmatized as places for people who live there permanently because they cannot enter the rental market (Shearer et al., 2018).

2.5 Conceptual / analytical model

This chapter has shown that the development of tiny houses and the way in which this development becomes possible is influenced from two sides. These influences are reflected in the conceptual model. On the one hand, demographic and socio-economic characteristics, in combination with the pressure on the housing market, influence the demand for tiny houses. Preferences for tiny house features and locations also play a role in what is possible. On the other hand, the institutional context influences

this development. Legislation and regulations and the scarcity of land are barriers to the realization of tiny houses. As mentioned above, there are several ways to deal with this and still make tiny houses possible.

Figure 2.7: Conceptual model



3. Methodology

In this research, a lot of choices have been made with regard to research strategies and research methods. This chapter examines which choices have been made and why. First of all, the underlying research philosophy as well as the research approach are discussed. Subsequently, it is argued why the relevant research strategies and methods of data collection have been chosen. Finally, there is a critical look at scientific quality and the ethical considerations of this research.

3.1 Considerations with regards to research philosophy

On the continuum of research paradigms, this research can be placed between post-positivism and constructivism (excluding Critical Theory). With regard to ontology, on the one hand there is a "real" reality. First of all, research was conducted into how tiny houses fit into the housing policy framework that applies to the municipality of Rotterdam. This framework is fixed to a certain extent and is therefore regarded as a "real" reality that is apprehendable through desk research (content analysis). The same goes for figuring out preferences for tiny house features and locations. In a general sense, these preferences really exist, which made it possible to find out through a questionnaire. However, through basically flawed human mechanisms this can only be done imperfectly in both cases. This makes the difference between the post-positivist approach over that of the positivist. The epistemology of post-positivism is modified dualistic / objectivist and that of constructivism is transactional and subjectivist (Guba & Lincoln, 1994). In the desk research and questionnaire it has been possible to be more objective. Typical for post-positivist approach is that, in contrast to positivist, qualitative research methods are also used, this is also the case in this research (more about this in this chapter).

On the other hand, there is constructivism. Policy can be interpreted in different ways, which means that multiple realities can exist. The question of how tiny houses fits into policy therefore depends on time, context and individuals (in this case politicians and officials). The same goes for the question of what the preferences for tiny house features and locations are. These preferences exist in a general sense and can be exposed, but are highly dependent on individuals and their personal mental constructions, experiences and location. The personal nature of constructions makes it possible to elicit and redefine this only through interaction between investigator and respondents (Guba & Lincoln, 1994). The methodology is therefore characterized by hermeneutical and dialectical techniques. This and the flawed human mechanisms of the post-positivistic approach led that interviews were also chosen as a method. In general, interviews involve an interaction in which actions, reactions and emotions / interpretation play a subconscious role (Guba & Lincoln, 1994). However, the researcher is aware of this and the goal has always been to remain as objective as possible.

3.2 Research approach

A distinction is made between quantitative and qualitative research. Broadly speaking, it is said that quantitative research explains more how things are and qualitative research can explain why things are the way they are. However, Bryman (2016) describes that there is more than just the difference between qualitative and quantitative research than the fact that quantitative research does employ measurements (numbers) and qualitative research does not (words).

In addition to the emphasis on quantification in the collection and analysis of quantitative research, there is mainly deduction, in which theories are tested (Bryman, 2016). In contrast, qualitative research focuses more on words in the collection and analysis of data and the emphasis is on induction in which an attempt is made to generate theory.

Furthermore, because of the large scale on which qualitative research is conducted, researchers can generalize results to the relevant population (Bryman, 2016). On the other hand, qualitative research is conducted on a smaller scale, in which researchers want to understand the behaviour, values and beliefs of the participants in more detail (and are therefore more concerned with the context). These characteristics mean that in terms of reliability and validity in qualitative research it is more of a concern. Qualitative research is therefore criticized for being too impressionistic and subjective, also because it would be too dependent on the researcher's views what is significant. Subjectivity also has to do with the attitude of the researcher towards the participants (Bryman, 2016). In quantitative research, the researcher is more distant to the participants than in qualitative research. The reasoning behind this is that in quantitative research the researcher can remain so objective, while in qualitative research the researcher can understand the world of the participants through their eyes.

In this study, mixed methods were used, which means that quantitative and qualitative research has been integrated. This benefits the completeness of answering the questions, because gaps left by one method (as read in the previous section) have been filled by the other (Bryman, 2016). Later in this chapter, the methods are discussed and the reasons why they are chosen are explained.

3.3 Research Strategy

Van Thiel (2014) distinguishes four research strategies: experiment, survey, case study and desk research. In this study, it was decided to carry out a case study in combination with desk research.

3.3.1 Case study

In a case study, one or more cases are studied in an everyday, real-life setting (Van Thiel, 2014). The case can be anything, but in this case it is a city: Rotterdam. Within a case study it is necessary to choose how many cases are studied (Van Thiel, 2014). As mentioned, this study examines one case, the city of Rotterdam. Only one case was chosen, because each city has its own land and housing market and has different visions and objectives. The city of Rotterdam was specifically chosen because tiny house interested have a feeling that Rotterdam is behind on the development of this new concept compared to other Dutch municipalities that has already allowed and realized tiny houses within their municipal boundaries (AD, July 25, 2019; Personal communication municipal official Rotterdam, March 2020). Moreover, it is interesting that at the time of writing an initiative group, Tiny House Rotterdam [THR], is looking for land for their tiny houses within Rotterdam. Finally, in the field of affordability of houses and sustainability, there are issues in Rotterdam that link up with the motivators and the (possibly positive) contribution of tiny house to this (more about this in the next section)

Furthermore, a case study was chosen because this holistic approach lends itself best to answering the research question. Case studies are characterized by the fact that triangulation is often used to achieve this holistic character (Van Thiel, 2014). The sub-questions of this research require this. For example, the preferences regarding tiny house features and locations (and the explanatory factors) can easily be answered solely by a questionnaire. But connecting these preferences to what is possible within the municipality of Rotterdam requires interviews with officials who can provide more specific answers.

3.3.2 Desk research

The second strategy, desk research, differs from other research strategies because the data is not acquired by the researcher himself, but instead existing data sources are used (Van Thiel, 2014). Desk research was chosen to answer the first sub-question: *"How do tiny houses fit within the housing policy framework that applies within the municipality of Rotterdam?"*. This sub-question requires the analysis of different policy documents. The information already exists and so it is more efficient than just conducting interviews to answer this question. The desk research makes it possible to use interviews as a supplement to ask specific and targeted questions. This efficiency is therefore the main advantage of desk research (Van Thiel, 2014).

There are three documents that have been particularly important here. Firstly, the housing vision *'Woonvisie Rotterdam: Koers naar 2030, agenda tot 2020'* (Gemeente Rotterdam, 2016) and its concept addendum *'Thuis in Rotterdam: addendum Woonvisie Rotterdam 2030'* (Gemeente Rotterdam, 2019). In addition, the program *'Naar een Rotterdams dakenlandschap: programma voor multifunctionele daken 2019-2022'* is relevant when investigating the considerations for tiny houses on roofs. In addition to the policy documents, two council letters in response to two motions (*'Op de kleintjes letten'* and *'Klein wonen, groots leven'*) were also analysed that specifically concerned tiny houses.

3.4 Housing market in Rotterdam

As stated earlier, each region has its own context concerning the housing market. Characteristics in the housing market are important because they indicate the supply and demand within the municipality and it is therefore possible to see how tiny houses fit in.

The municipality of Rotterdam predicts that the demand for housing will grow and feels compelled to realize about 30,000 more houses in 2030. This goal was set in 2017 when the amount of houses was 309,692 (Municipality of Rotterdam, 2019). Currently, Rotterdam has a total of 311,597 houses (BAG, edited by the municipality of Rotterdam, 2019). In the past two years, the number of houses has not grown that fast. At the same time, there is an increase in the number of people who are actively looking for a house in Rotterdam. In 2015 there were 62,490 and in 2018 there were 67,991 (Woonnet Rijnmond, edited by the municipality of Rotterdam, 2019). In the first half of 2019, 51,582 people were looking for a house in Rotterdam, of which people who are moving and starters were approximately equally divided (Municipality of Rotterdam, 2019). The majority of these consisted of one-person households (28,983). In total, 2,990 succeeded in looking for a house in the first half of 2019 (Municipality of Rotterdam, 2019). Here, too, the majority consists of one-person households (1,860), but the difference with the number of house hunters is large. The chances of success were 5.7 percent in Rotterdam in the first half of 2019, and of the graduates, the average registration time was 34 months.

While there is more pressure on the housing market, changes are also visible in house prices. The share of houses with a WOZ value from 174,999 increased between 2018 and 2019, while the share of houses with a WOZ value till 174,999 decreased (BAG, edited by the municipality of Rotterdam, 2019). In addition, the average sales price of existing houses increased from 155,000 to 260,000 euros between 2014 and 2018 (NVM, edited by the municipality of Rotterdam, 2019). Despite the fact that the increased prices of the existing private owner-occupied houses in Rotterdam is smaller than in recent years, it was 5.6 percent higher in the third quarter of 2019 compared to a year earlier (CBS, 2019).

Numbers from the housing market in Rotterdam show that there is currently a shortage of housing and at the same time these houses are becoming increasingly expensive. It is striking that the demand for single-person households is greatest. Looking at the motivators of tiny houses, where financial considerations are high, this should increase the demand for tiny houses. According to Brokenshire (2019), tiny houses offer a flexible and affordable option for people dealing with housing construction that is homogeneous and does not adapt quickly enough to changing demand and needs. Moreover, current housing markets would focus on double-income household, but there are too few options for, among others, single-person households, couples without children and the elderly. A tiny house can be an attractive alternative because it is somewhere between 3,000 and 10,000 euros while an average house costs around 250,000 euros (Brokenshire, 2019).

In addition, in line with the national target, the municipality of Rotterdam wants to commit to a 49 percent CO2 reduction in 2030 compared to 1990 and they want to be free of natural gas in 2050 (Municipality of Rotterdam, 2019). Compared to traditional housing, tiny houses have lower energy and water requirements and fewer resources are used because they are often made from recycled or natural materials. Not only the construction, but also a more sustainable lifestyle is a motivator to live in a tiny house (e.g. through downsize and minimize possessions and living off-the-grid).

As can be seen, there are there are indications that tiny houses fit to a greater or lesser extent in the context of the Rotterdam housing market, from both a financial and sustainability perspective. What these specific preferences look like and what the municipality's view of tiny houses is, will be explored in this research.

3.5 Methods of data collection

In this research a questionnaire, semi-structured (expert) interviews and content analysis are used as methods of data collection. The questionnaire, interview guide and code tree can be found in the appendix (1,2 and 3).

3.5.1 Questionnaire

Data collection & sampling

First of all, a questionnaire was distributed online. the content of this questionnaire is about preferences of tiny house features, environment and methods of land acquisition. The target group for this questionnaire consists of people who have or want a tiny house and want to establish themselves within the municipality of Rotterdam. The questionnaire was distributed via various online platforms, so this is a random sample. First, it was distributed via email to members of the THR initiative group. In addition, the link to the questionnaire has been placed on LinkedIn and within the Facebook groups "Tiny House Netherland" and "Tiny House Techniek". Finally, the municipality of Rotterdam has placed the link to the questionnaire on their online tiny house page.

Data collection of the questionnaire started on April 25, 2020 and ended on July 1, 2020. This ultimately led to a total of 82 respondents. Ideally, the data collection would be extended to attract as many respondents as possible, but due to time constraints for the graduation period, it was decided that 82 respondents were enough. Moreover, there are indications that 82 respondents are representative enough for the entire population of tiny house interested in Rotterdam (despite the fact that no specific research has been done on it).

In the Netherlands, the number of households who prefer to live in a house up to 40 m² has risen to 4 percent in 2015 and in highly urban municipalities this increased to 5 percent. These small houses include both micro-houses and tiny houses, but according to Dopper and Geuting (2017), tiny houses cover a specific niche market. The number of households who prefer to live in a tiny house up to 40 m² is therefore much lower. This lower number therefore translates to the number of members of the official Facebook group of Tiny house Netherlands, around 11,000 members at the time of writing, taking into account that not everyone is interested in living with a tiny house in Rotterdam. Tiny house pioneer, ambassador and project leader at Tiny House Netherlands - Marjolein Jonkers - has drawn up a register for (aspiring) tiny house residents. In 2019, there were 650 of which 195 are interested in living with their tiny house in the province of South Holland (Marjolein Jonkers, 2019).

There are a number of advantages of performing a questionnaire. First of all, the researcher can collect a considerable amount of data in a shorter time (Van Thiel, 2014). The aspects covered in the questionnaire are strongly theory driven. This makes it possible to take measurements to standardize and makes a questionnaire and suitable research methods (Van Thiel, 2014). These two aspects make it useful to generalize data, which benefits external validity.

On the other hand, there are things that affect the validity and reliability of a questionnaire. The operationalization of variable and a clean formulation of the items are necessary to guarantee internal validity. Van Thiel (2014) describes that a pilot can improve this. In addition, a pilot can test technical aspects and check whether the content is complete. For these reasons, two members of the initiative group THR completed the survey and provided feedback. In addition, non-response can cause problems with external validity, especially with online questionnaires (Wright, 2006). A total of 82 people completed the questionnaire. But for some distributions in observations this did not make it possible to perform certain statistical analysis. Merging codes has made more possible. The non-response of people with certain personal characteristics can also influence reliability and validity. Of the 82 respondents, more are women (52) than men (30). It seems the least important of all personal characteristics, so it is expected that this will have little influence on the results. Finally, answering tendencies must be taken into account. This is expected to have little impact on results as the questionnaire does not address sensitive issues.

Operationalisation

The preferred features for tiny houses and their locations in Rotterdam is measured in various ways, so the questionnaire is divided into different sections. The first section asks for demographic characteristics, including gender, age and income (Shearer & Burton, 2019). Such control variables might be of influence on people's answering patterns (van Thiel, 2014). The place of residence has been added to see whether it concerns people who already live in Rotterdam or people from another city.

The following question are specifically about the preferences about the specifications of the tiny houses. Drivers categorizations is based on a combination of research done by Boeckermann et al. (2018) and Shearer and Burton (2019). Only the most important drivers are asked because the question requires a ranking and should therefore not be too long. In the next question there is room for adding a driver that is not given. Questions about the type of tiny house is of course based on the typology of Shearer and Burton (2019). With insight into the different types of tiny houses, more guidance can be given to the search for pieces of land that suit this. It is also conceivable that, for mobile tiny houses, for example, the demand for temporarily issued land is likely to be greater. Finally,

the question is asked whether the tiny houses are or will be off-the-grid, because this is also relevant for the type of land and the manner of land allocation required for this.

The following section asks about the wishes of the potential residents of the location for their tiny house. These questions go from abstract to specific, starting with a choice between inner-city, suburban and rural residential based on Shearer and Burton's (2019) research. Hereafter, preferences are asked for specific parts within Rotterdam. These location preferences can be kept alongside the preferences from the municipality.

Finally, as described in the previous chapter, the availability of land and its legality is a barrier to the establishment of tiny houses. The last part of the questionnaire is not intended to solve these problems, but rather to get an idea of the preferences for the ways of acquiring land. The questions here are about preference regarding renting or buying a piece of land and whether this is preferable alone or in groups (Shearer et al., 2018; Evans, 2018a; Evans, 2018b; Evans, 2019). It is also important to visualize the desired duration of establishment, as this influences the way of land issue.

Analysis

The questionnaire is conducted via Qualtrics, after which the data is transferred to SPSS version 24. As mentioned, there are 82 people who have fully completed the questionnaire. After the inspection and merging of several codes, the analysis started, consisting of the descriptive statistical techniques and inferential statistical techniques. For all analysis, a significance level was set at $p < 0.05$.

Descriptive statistics were used for all questions. The descriptive analysis shows the number of characteristics of the variables and the relationship between these variables. For the questions where possible, a chi-square test was performed. First of all based on the personal characteristics (gender, age and income). Then on the preferences among themselves, for example the desire for a mobile tiny house and the degree of self-sufficiency of the tiny house. The latter is only displayed if a relationship is (almost) visible or, contrary to expectations, there is no relationship. The principle behind the chi-square test is that it can be said that there is a relationship between two variables in the population (Van Thiel, 2014). The test calculates for each cell in the table what the expected frequency would be based on probability. Finally it is calculated what the difference is between the expected and the observed frequencies. If this difference is significant, it means that the variables are dependent on each other and therefore a relationship exists (Vocht, 2017).

In addition to the chi squared test, regression analyses were performed. This has the added value of not only looking at the effects of the personal characteristics separately, but as personal characteristics as a whole. Regression analysis tests whether the relationship between two variables (the dependent variable and the independent variable) is linear; the analysis results in a mathematical expression of that relation (Van Thiel, 2014). A linear regression that requires an interval or ratio measurement scale. However, the variables from this study are at the nominal, ordinal, or dichotomous (sometimes after merging) level. Therefore, logistic and multinomial regression analyses were performed.

Logistic regression analysis were performed for questions involving dichotomous variables. A logistic regression analysis calculates the probability of one or two categories of a dichotomous variable, based on independent variables (Vocht, 2017). The personal characteristics here are the dependent variables and the dichotomous questions the independent variables. Despite the fact that the desired surface area of the tiny house is on the ordinal scale, it has been decided to perform a logistic regression here, because of the insufficient number of observations to perform an ordinal regression analysis. The following distribution has been made 'up to and including 39 m²' and '40 m² and more'. The questions

about the degree of self-sufficiency of the tiny house and the desired duration of stay with a tiny house in Rotterdam (both ordinal measurement scales) also had too few observations to perform an ordinal regression, nor was a binary logistic regression possible.

The principle behind a multiple linear regression is to investigate the causal linear relationship between an independent variable and multiple independent variables (Vocht, 2017). Again, an interval or ratio scale is needed here. However, categorical variables can also be used as long as these are first converted to dummies (i.e. dichotomous variables). This was done to investigate if there is a relationship between the personal characteristics (dependent variable) and multiple independent variables. In cases where the frequencies per category were too low to perform this analysis, the categorical variables were combined into two variables to perform a logistic regression analysis. Unfortunately it was not possible to perform multiple regression analysis on the questions about environment preferences, because of the possibility in the questionnaire to give multiple answers.

3.5.2 Interviews

Data collection & sampling

Interviews are held to clarify and supplement the data obtained from the questionnaire. Interviews enable flexible collection of data. This is because supplementary questions can be asked so that the answers can be discussed in more detail. This flexibility can be at the expense of reliability, because every interview is slightly different (Robson, 2002). Regarding reliability of the interviews, where possible, as much structure as possible is used in close relationship to the theoretical framework (operationalization). Also, the interview proceeds to an certain extend in a fixed pattern with the help of an interview manual (which also benefits the replicability). However, the number of respondents is quite low, but this is not a major problem as the data is collected in combination with a questionnaire and desk research. Because of Covid-19 it was not possible to conduct face-to-face interviews, so telephone interviews were chosen. This has the disadvantage that there was less personal interaction and body language could not be observed. On the other hand, this does promote the objectivity of the researcher.

A total of eight people were interviewed spread over seven interviews (see table 3.1). The first three people (including a couple) are interested in living in a tiny house in Rotterdam and are therefore also members of the THR initiative group. They were approached via mail and LinkedIn to answer questions about their preferences regarding tiny house characteristics, location and land acquisition. It is striking that one will live with his family in a tiny house in Dordrecht for about a year to bridge the time until a location becomes available in Rotterdam. Besides being a member of the initiative group THR, he is also treasurer at THN. Moreover, following a message on LinkedIn, the researcher was contacted by a woman who was looking for a location to live tiny in Rotterdam a few years ago, but because she could not find land she now lives on a boat.

In addition to tiny house interested in Rotterdam, two interviews were also held with people living in a tiny house in other municipalities. These people also responded to a call via LinkedIn. The results of these interviews mainly served to gain insight into the possibilities and barriers in the acquisition of land for tiny houses.

Finally, two officials from the municipality of Rotterdam, cluster urban development, were interviewed. In general attempt was made to gain insight into how the municipality views tiny houses and what strategies have been used to develop them. Because there is no specific policy for tiny

houses, the interview questions are mainly about how the municipality of Rotterdam sees the integration of tiny houses in the context of Rotterdam. Tiny houses could collide or coincide well with the set objectives. Questions are asked about preferences in terms of the type of tiny house, target group, location and land issue, to see whether this corresponds to the demand for (potential) tiny house residents.

Table 3.1: list of interviewees

Referred to as	Organization	Additional information	Date of interview
(Couple) Member of THR	Tiny House Rotterdam	Lives in Rotterdam and wants to live in Rotterdam with Tiny house	June 25, 2020
(Couple) Member of THR	Tiny House Rotterdam	Lives in Rotterdam and wants to live in Rotterdam with Tiny house	June 25, 2002
Treasurer of THN and member of THR	Tiny House Nederland & Tiny House Rotterdam	Lives in Rotterdam and wants to live in Rotterdam with tiny house, but will first live in a tiny house in Dordrecht for a year.	June 15, 2020
Boat resident	-	Lives on a Boat in Rotterdam	June 28, 2020
Tiny house Resident	-	Lives in a tiny house community elsewhere in the Netherlands	June 8, 2020
Tiny house Resident	-	Lives in a tiny house community elsewhere in the Netherlands	June 8, 2020
Official municipality of Rotterdam	Department Urban Development	Provided information about the integration of tiny house into policy	June 3, 2020
Official municipality of Rotterdam	Department Urban Development	Provided information on the land allocation methods	July 1, 2020

Analysis

All participants have given permission to record the interviews for transcribing, with the agreement that they remain anonymous. The transcripts are uploaded in Atlas.ti 8 for coding. When coding, attempts were made to use the operationalization and the sub-questions as a guideline. Van Thiel (2014) describes that as an exhaustive set of codes has been generated, the process of axial coding begins. Here there is searched for patterns and codes that could be redistributed, which can be seen

in the "groups" that have been created (see appendix 3). The sub-questions and research question were then answered.

Content analysis

Desk research can be performed in different ways; content analysis, secondary analysis and meta-analysis. According to van Thiel (2014), content analysis fits within explanatory research. Based on text analysis, the content of the documents (given in paragraph 3.3.2.) is analysed. By means of content analysis facts and opinions can be recorded and arguments can be reconstructed from the text (Van Thiel, 2014). The documents have been uploaded to Atlas.ti 8 along with the interview transcripts. The texts are analysed by assigning qualitative value to parts of the text, just like the coding process of the interview transcripts. The focus is on parts of the texts that describe the objectives. This can refer to the amount of houses, type of houses and price range of houses. An inductive-deductive content analysis has been used (Bryman, 2016). The texts are first open coded and then merged in the axial coding process with the codes created from the interview transcripts.

3.6 Scientific quality

The reliability and validity of the different methods have already been addressed individually. In addition, the use of mixed methods in a case study means that something can also be said about reliability and validity in a broader sense. In case study studies, there is a high degree of internal validity compared to limited external validity (Van Thiel, 2014). The level of detail and the extensive description about a limited number of cases provides a rich collection of information that makes the internal validity high. However, the same characteristics make it difficult to generalize outcomes to other situations (Flyvbjerg, 2006). Finally, the small number of units (in this case one) can also limit reliability.

A main way to tackle problems in validity and reliability is to apply triangulation in research methods. As can be seen above, this study also attempts to do this by using interviews, a questionnaire and content analysis. *"By taking a diversified approach, the researcher gathers as much information as possible, so as to ensure that the data collected are valid, irrespective of the number of units studied"* (Van Thiel, 2014, p. 92).

3.7 Ethical considerations

In this research, four ethical principles have been taken into account. The first principle assumes that no harm to participants is done (Van Thiel, 2014; Bryman, 2016). This is not the case in this study, first of all because tiny houses are not associated with sensitive statements by participants that could cause them problems. Although that would have been the case, one can fall back on the second principle; privacy.

Participants have the right to privacy, they may withdraw from the research or withhold information (Van Thiel, 2014). For both the participants in the questionnaire and the interviewees, their privacy has been taken into account. The questionnaire was anonymous (as stated in the introduction), the personal characteristics (gender, age, income and place of residence) are so broad that privacy can be guaranteed. In the inviting emails to potential interviewees it is stated in advance that it is completely anonymous if they wish to do so and whether there is any objection to the recording of the interview (this was repeated at the beginning of the interview). In particular, the anonymity of the tiny house residents in other municipalities can be jeopardized as soon as the municipality is mentioned by name.

There are often only a few tiny house residents at a location, which may lead to suspicions about the identity of the participant. For this reason, these municipalities are not mentioned by name. Finally, a member of the initiative group THR and treasurer of THN has indicated that he has no objection to revealing his identity, which is why his positions have been made public.

Furthermore, informed consent was taken into account, both in the questionnaire and in the interviews. At the front, participants should be given as much information as possible so that they can make an informed opinion about whether they want to participate in the study (Bryman, 2016). The introduction to the questionnaire states what the purpose of the research is and that the results will be used for the thesis and perhaps a scientific publication. In the invitation for the interviews, the same happened first by e-mail and also at the beginning of the interview.

Finally, research should never be misleading (Van Thiel, 2014; Bryman, 2016). Both the introduction to the questionnaire and the emails to the interviewees briefly explain what the research is about, what the purpose of the research is, including draft research questions. In this way, a fair picture has been drawn of where the participants would participate in.

4. Fitting of tiny houses in institutional context of Rotterdam

This chapter answers the question: *'How do tiny houses fit within the housing policy framework that applies within the municipality of Rotterdam?'.* When writing the housing vision of Rotterdam no explicit statements were made about the possible establishment of tiny houses within the city. However, a motion was filed in 2017 that requested the College of B&W to look for suitable locations for tiny houses and to find solutions to obstacles in the existing regulations. Another motion was filed in 2018, which requests the College of B&W to make tiny houses part of the construction program, to designate a location for 5-15 tiny houses before the summer of 2019 and to investigate how the concept can take of pressure of the housing market and can and contribute to the restructuring challenge. The College of B&W has adopted both motions. They replied to the above issues in two council letters. In this chapter, the scope of these two council letters, the housing vision and interviews are used to see whether tiny houses can contribute to or hinder the ambitions, objectives and policy of the municipality of Rotterdam.

4.1 Housing market in Rotterdam

In its own words, the municipality of Rotterdam has a huge task in terms of housing construction until 2030 (Gemeente Rotterdam, 2016). The number of inhabitants has increased by 33,500 since 2008 and this increase is expected to continue. The forecast is that the number of inhabitants will increase to 767,000 inhabitants by 2030 (Rotterdam had 650,597 inhabitants in January 2020) (BRP, processed by the municipality of Rotterdam, 2020). Not only population growth, but also the number of households is expected to increase. Specifically, the number of single people households is expected to grow until 2030. In 2015, this group already constitutes almost half of all Rotterdam households. At the same time, the number of families with children will also increase. However, the number of two-person households is decreasing. The municipality of Rotterdam also expects an aging population (18 percent in 2030). In addition, they see that for various reasons people continue to live independently at home for longer.

In the past, households in the family-forming phase and older people left the city more often on average. Especially because large-scale new-build locations with family houses have been developed outside Rotterdam (Gemeente Rotterdam, 2016). Now the tide seems to be turning. Finally, the municipality has seen interest in the rental sector grow in recent years. At the same time, the housing stock in the private rental sector (above 711 euros p.m.) is deficient by thousands.

4.2 Ambitions and objectives

The aforementioned trends (and others) are the driving forces behind the ambitions and objectives formulated in the housing vision. The municipality has three broader themes with corresponding objectives that they want to have achieved by 2030. For all three ambitions will be describe how they correspond with tiny houses.

4.2.1 New construction and restructuring

First of all, the municipality of Rotterdam wants to realize more attractive residential environments. It is mainly the intention that the housing stock is in balance. This means that there must be a balance

between the cheap, medium and high segment. This will mainly benefit the middle and higher income groups.

The municipality estimates that the housing stock must have at least 31,100 more houses in 2030 than in 2017. In addition, there is also a quality task, which means that 10,900 houses have to be replaced. In total, 42,000 houses will have to be built until 2030. (Apart from that, 2,000 student houses will be built.) For a better balance, the guideline for new construction is: 20 percent social segment, 30 percent middle segment, 30 percent higher segment and 20 percent top segment. To be able to guarantee the balance sheet, the focus is mainly on the middle and higher segments, because the middle incomes are said to be squeezed in the Rotterdam housing market. For the middle segment, the focus is mainly on the rental sector. All this would lead to the middle segment moving on to the higher segment, and risers in the social segment moving on to the middle segment. Resulting in less competition for people who depend on the social segment with their income.

In the two council information letters, the College of B&W describes that they see tiny houses as a niche market in housing programming. In the current college period, the ambition is to build 18,000 houses. They see the contribution of tiny houses in this as limited, because the demand for regular houses is many times greater. According to an official from the municipality of Rotterdam, tiny houses were first seen as a risk, *"as a kind of bear on the road"*. This was because when the first motion was filed, it was just announced that 50,000 houses had to be built until 2040 (preferably inner city). The official points out that tiny houses generally need a lot of land, because they are *"mini detached houses"*. This land competes with the demand for regular housing. The official wonders, *"Do you want to do that in Rotterdam? Can't we make better use of the land? Is that more applicable in the East of the Netherlands, in Twente where they have more grassland?"*.

With regard to the restructuring task, this mainly concerns the social segment. According to the official, this concerns people who have to leave their social rental house and then want another 'ordinary' house such as an apartment or a single-family house and not necessarily a tiny house. The official explains that within the municipality think that they cannot use tiny houses to solve the restructuring problem, because it is this different target group.

In conclusion, the municipality of Rotterdam is cautious about what they can achieve with the pressure on the housing market and the contribution to the restructuring challenge. *"It's a bit of a drop in the ocean,"* the official said. With regard to this issue, reference is also made to the publication *"Klein wonen: functies, doelgroepen en praktijk"* (2018) of the Dutch enterprise Agency. It states that tiny house residents are not driven by pressure on the housing market but ideology.

4.2.2 Future value

Secondly, the municipality wants the housing stock to have a good future value (Gemeente Rotterdam, 2016). This applies both in an energetic sense as in flexibility in houses and diversity in the housing stock. This means that the housing stock can respond to changes in the changing life phase, household composition and care needs. The aim is that there should be more differentiation in the housing stock where this is now one-sided and the quality is under pressure. It is indicated that steps have already been taken to replace cheap, poor, small houses with more expensive, larger and better quality houses. However, it is stated that this goal is far from being achieved.

An official makes the link between the goal of differentiation and the initial response to tiny houses. He describes that the first reluctance with tiny houses has to do with the Rotterdam context of many small houses (especially on the south). People (in particular families) who want to move out of those

houses have no choice to live larger in the neighbourhood and therefore leave the city for surrounding cities such as Barendrecht or the Zuidplaspolder. The municipality has therefore made the choice to demolish a number of these houses and rebuild larger houses for them. According to him, tiny houses fits less into that policy issue, *"... because we then add small houses, while we are actually working on offering larger houses and family houses."*

Part of this second ambition is to update the Rotterdam *'Kwaliteitsbeleid: onderdeel kleine woningen'*. The quality of houses is determined, among other things, by building regulations. It is not just about the technical quality of construction, but also, for example, housing surface and access. The housing vision states that the requirements differ per residential environment and target group, so the new policy does not assume one standard. The official explains that small houses (under 50 m², but at least 40 m²) are allowed on some conditions. One could score on certain points, such as on a communal laundry room or a collective outdoor area, making it logical that the house is slightly smaller. *"So maybe in the future if a tiny house request comes up that is under 50 square meters and you can show that it is part of a concept that compensates for that smaller living space with other things, then it will also be possible to grant permission,"* the official predicts.

The second and third part of this ambition are the most important for the argumentation for tiny houses in Rotterdam. Namely, "Provide space for temporality, flexibility, innovation and experiment" and "Promote energy-efficient and environmentally friendly housing". In response to the motion from 2017, the College of B&W states the following: *"They (tiny houses) fit in with the ambition of the Rotterdam Vision for Housing 2030 to make more room for temporality, innovation and experiment. They also contribute to sustainable living and ensure more diversity in the housing stock."* The answer to the second motion is roughly the same, but is slightly more concrete: *"The College recognizes the social need for new, innovative home products. Due to the innovative and sustainable character of tiny houses, the College wants to offer space for this. It is expected that the proposed number of 5-15 tiny houses can be realized until 2022."*

In conclusion, the College of B&W takes the position that, in contrast to the contribution to solving the housing shortage and restructuring task, tiny houses can make a positive contribution in the field of innovation and sustainability. The official of the municipality of Rotterdam feels that since the new coalition agreement of 2018, tiny houses have been seen as more of an opportunity. He mentions that the idea is that there can be learned from the sustainable characteristics from tiny houses for regular houses in the future. According to the official, tiny houses will then serve as a kind of pilot.

This point of view is also reflected in the addendum to the Rotterdam Woonvisie 2030. Here, tiny houses are explicitly mentioned under the guise of "innovation in living". It states that: *"Social and economic developments lead to new forms of living and living together. These offer added value in the diversity of residential products in the city. We therefore expressly want to offer scope for innovation in living, building and new forms of housing. Think of DIY buildings, tiny houses, nature-inclusive construction and housing cooperatives."*

4.2.3 The base in order

The third ambition relates to a sufficient supply of cheap rental houses for households with a low income. The aim of the housing vision is that about 10,000 social housing units can be demolished, because the supply of these is greater than the demand (even with the housing shortage). As mentioned, the people who made a career move (especially families) would like to live bigger and

therefore live outside Rotterdam. The focus on the middle and upper segments would promote the flow on the housing market. It is implicitly said that skewed housing is not desirable.

4.3 Social management

Based on the three larger ambitions, the above has shown how tiny houses do or do not fit within the Rotterdam institutional context. The College of B&W adds that tiny houses can also contribute to the development of an area (by placemaking) and increasing the vibrancy and safety. The interviews also show that this is an important part for other municipalities.

In one municipality the tiny houses are subordinate to the purpose of social management at the location where the construction of a new housing development will start next year. According to a tiny house resident at this location, the initiative has arisen to keep the location liveable (against hangouts with nuisance) and at the same time organize activities for surrounding neighbourhoods. The tiny house resident describes, *"It makes a lot of sense if you want to do real good social management, even in the evenings and on weekends, that you don't live ten kilometres away"*. In another municipality the tiny house residents are obliged to maintain a piece of land on which they can build things that are for the neighbourhood (such as a chicken coop and greenhouse). The tiny house resident living there describes that here are no requirements for what exactly needs to be done, but with everything they do they think about what it could mean for the neighbourhood.

4.4 Tiny houses on roofs and water

The College of B&W writes in its council letter that there are also possibilities for tiny houses on roofs and water. The *'Programma Multifunctionele Daken'* (2019) describes that the Rotterdam roof landscape is unique. The reconstruction after World War II has ensured that there are many flat roofs of large surface within the city. The municipality sees that space for various functions is becoming scarce, where at the same time the 18 square kilometres offers opportunities for the development of a second ground level. The aim of the program is to enable various functions, such as green roofs (against heat stress), blue roofs (for water collection) and yellow roofs (for energy generation). In addition, the municipality has also distinguished the so-called "purple roofs" that must function as residential roofs. The program mentions the possibility of establishing a group of tiny houses on utility buildings.

This idea stems from a conversation between the Rotterdam Dakendagen and employees of Walden Studio in 2016. She drew an impression of tiny houses in the centre of Rotterdam (Rotterdamse Dakendagen, n.d.) (see image 4.1). A year later, an existing tiny house was hoisted on a roof near Hofplein in collaboration with Walden Studio and the Tiny House Academy. Since 2019, a research project is underway for roof villages in a technical, financial, legal and ecological sense with a subsidy from the municipality of Rotterdam. According to an official from the municipality of Rotterdam, there were questions about fire safety, because there is no solution yet to create escape routes. In addition, the isolation is also a point of attention, because the walls of tiny houses are often thin, while it mainly concerns inner-city locations where you are unprotected from sound on a roof.

Image 4.1: Impression of tiny houses on roofs (Rotterdam Dakendagen, n.d.)



Although living on water is becoming increasingly topical, no specific thought has yet been given to tiny houses on water, according to an official of the municipality from Rotterdam. The official says the following about this: *"I can imagine that if you make the association with a houseboat and a tiny house, it will be received less well."*

This does not always appear to be the case. A woman who was first looking for land to live tiny but now lives on a boat in a Rotterdam harbour, sees overlapping between the two forms of housing. In particular, in making efficient use of space and having less stuff. She lives on a boat of 11 by 3.5 meters. *"Certainly in boats, many things are multipurpose. So I have a dining area, where the sofas are storage space and I can convert my dining area into a bed and also into a sofa,"* she describes.

The woman describes that, just like tiny houses, boats can also be self-sufficient to a certain extent. *"... And number of people I know who actually do not have a permanent place, but who sail all over the world must be self-sufficient,"* she explains. She describes that houseboats are connected to water and sewerage, and she herself has a solar panel to generate some energy. They also have the option to refill their water tank. She highlights that, *"...with many moveable tiny houses you have that kind of constructions. Then they often work with water tanks and they often get that kind of things from shops that are for boats."*

5.5 Conclusion

Until 2030, the municipality of Rotterdam has a major task when it comes to housing. The growth in the number of inhabitants and households in the city is forcing the municipality to have realized more than 40,000 houses up to that time. This concerns both new construction and restructuring. The focus here is on restoring the balance in the housing stock and thus mainly building for the middle and upper segments. Particularly in Rotterdam South, small inexpensive houses are therefore being replaced by larger, more expensive houses (for families). With this major challenge in focus, tiny houses first seemed like an obstacle, because they need a lot of land and therefore compete with large-scale

housing. Tiny houses would not contribute much to these goals and therefore only be seen as a niche market. It is striking that the municipality mainly bases itself on the ideological and sustainability principles for tiny houses. It is not yet recognized that the financial aspect is also important for those interested in tiny houses. It is conceivable that the current policy with a focus on the middle and high segments is a breeding ground for the growth in the popularity of tiny houses.

Although tiny houses would not contribute much to the pressure on the housing market and the restructuring task, opportunities are seen in the areas of temporality, flexibility, innovation and sustainability. Tiny house could teach on a smaller scale for regular housing. In that sense, tiny houses are more a means than an end in themselves. The fact that tiny houses are more of a means is also clear from the comment of the College of B&W that it can contribute to the development of an area (by placemaking) and increasing the vibrancy and safety. It is striking that the quality policy for living is being updated, which might make more possible for tiny houses

Finally, in addition to tiny houses on land, the College of B&W also sees opportunities for tiny houses on water and roofs. The realization of tiny houses on roofs is already being examined concretely in the context of smart and efficient use of space. However, tiny water houses have not yet been explored.

5. Preferences for tiny house features and locations

This chapter answers the second sub-question: *‘What are the preferences for tiny house features and locations among (potential) tiny house residents who want to settle in the municipality of Rotterdam, and what are the explanatory factors?’*. This chapter gives an overview of the characteristics and wishes of people who want to live with a tiny house in Rotterdam. The results are based on 82 respondents who completed the online questionnaire. Given that the number of respondents is below 100, absolute numbers are used instead of percentages.

5.1 Demographic characteristics

The sample consists of more women (52) than men (30). The majority of respondents (40) fall in the age category ‘young’ (up to 34 years), followed by the middle age category (up to 54 years) (29) (see figure 5.1 and 5.2). About half of the respondents (43) already live in Rotterdam. It is striking that (except for six) the rest live in the province of South Holland. Surrounding cities such as Gouda, Delft, The Hague and Capelle aan de IJssel were mentioned several times. The net monthly income per household of most respondents (33) is between 1,500 and 2,499 euros (see figure 5.3). Finally, it is striking that only five respondents own a tiny house, while the vast majority are still orientating (60). The rest (17) is already designing or building their tiny houses (see figure 5.4).

Figure 5.1: Gender

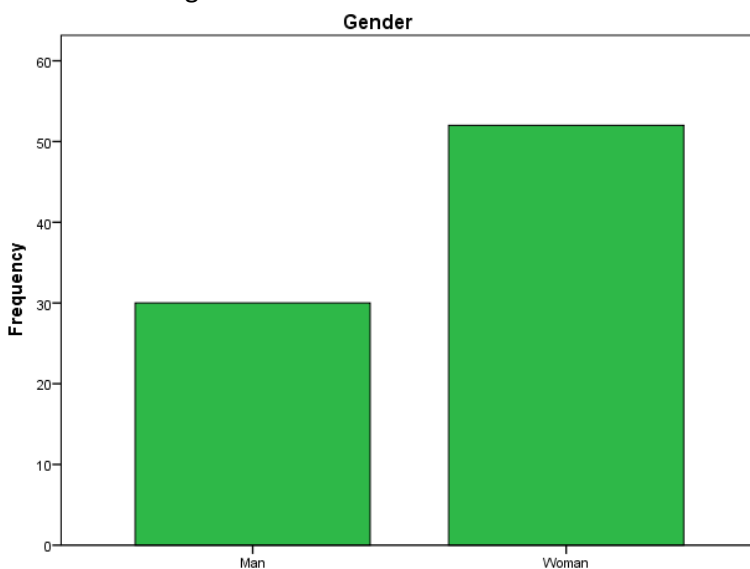


Figure 5.2: Age (in years)

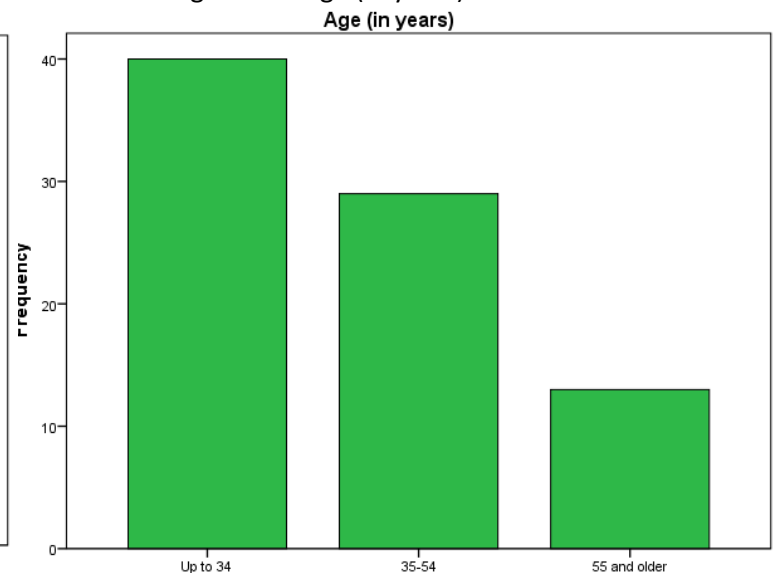
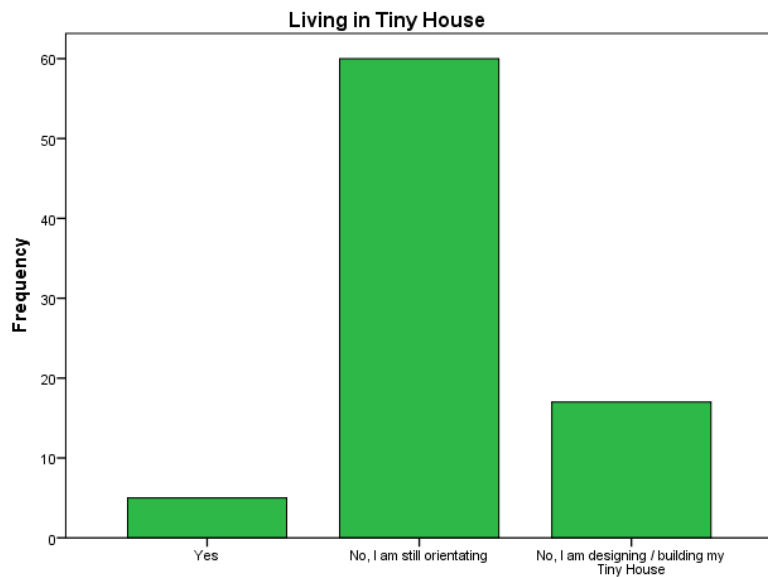
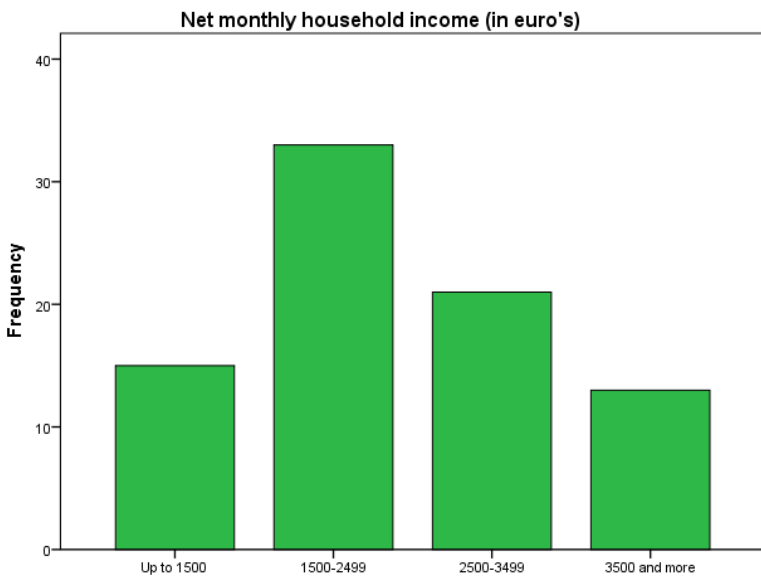


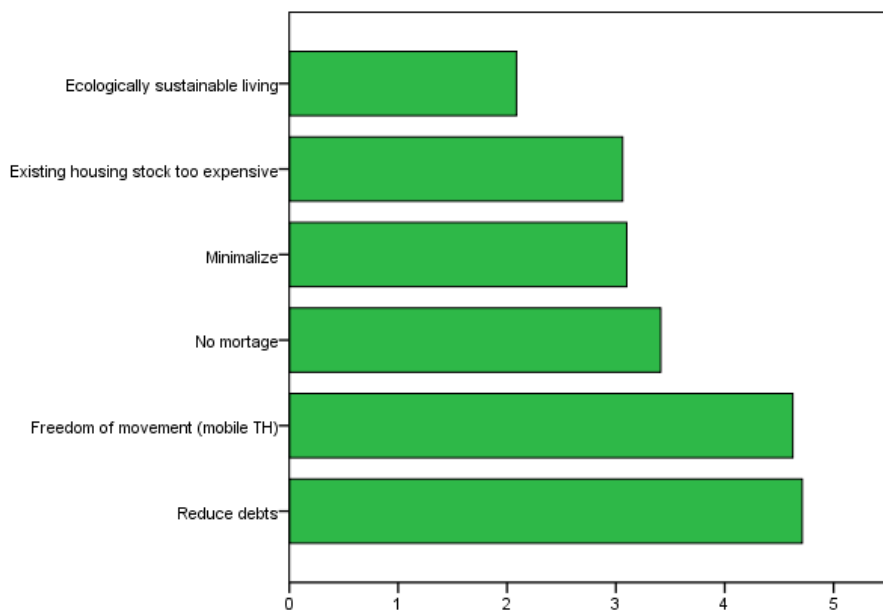
Figure 5.3: Net monthly household income (in euro's) Figure 5.4: Current status on tiny living



In the questionnaire, people had the opportunity to rank six motives for living in a tiny house, where one was the most important and six the least important. The average has been calculated for each motive and is shown in figure 5.5. As can be seen, the respondents consider ecologically sustainable living the most important motive. This is followed by a financial issue, namely finding the existing housing stock too expensive. It is striking that there is no clear dividing line between the more ideological motives and the financial ones, they alternate. Of the 82 respondents, 53 indicated that there were also other important drivers. Living closer to nature and in a community have been mentioned very often. But people also find the feeling of financial freedom important, by having to work less and not to participate in 'the system'. Finally, several respondents also find it important to design their own house, so that they do not end up in a "catalog house".

Figure 5.5: Ranking motivation for living in a tiny house

Mean rank motivation to live in Tiny House



An almost tiny house resident, who is a member of THR and is treasurer of THN, has been looking for a location in Rotterdam together with his wife and children. For them, there were three reasons why he and his family want to live in a tiny house. *"Mortgage-free living and low housing costs. To build our own house, that just seems cool. And to reduce our own footprint, to have less stuff and to be self-sufficient,"* he mentions. He describes that they paid 1,400 euros per month for their house in Nesselande (Rotterdam). He and his family could afford it but simply didn't want to anymore. He adds that *"the housing stock in Rotterdam is too expensive"*. An official realizes that there are people who earn more and who want to live small. This can also be seen in the income distribution (see figure 5.3); about half of the respondents have a net monthly household income of 2,500 euros or more.

A couple who is a member of THR also have three reasons to live in a tiny house. Namely, (financial) freedom, sustainability and the community feeling. According to them, living in a tiny house offers freedom in how much and what kind of work they take on, thanks to the low housing costs. *"If you want to switch jobs now, you are still insecure because you still have to pay your rent. ... Now you can take on projects that you really like apart from money,"* one of the two explains. Moreover, one of the two has the plan to start his own company. The lower housing costs make it possible for one of them to experiment while the other has a more secure job.

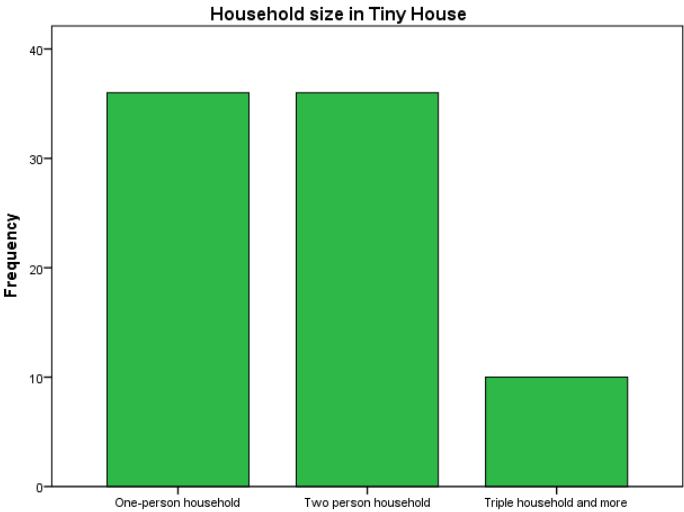
The boat resident (and still tiny house interested) who is especially attracted to the minimalist and more efficient lifestyle describes that the financial aspect is also an important factor. She describes, *"I am alone and if you want to buy a house alone it is more difficult. You have very few options to be able to buy due to the rising housing market in Rotterdam. And I don't want the options out there. I really don't feel like living in an apartment, where you can hear the neighbours walking, so to speak."* When her search for land in Rotterdam failed, she chose to live on a boat. She mentions that, *"In Rotterdam you have a lot of apartments that go away for 500,000 or 600,000 euros. And then it's funny that you live on the same street and pay a fraction of that."* According to her, many people around her also think negatively about taking out a high mortgage for their house. *"They say: I don't want to work all my life as a kind of slave for my house, which you can enjoy when you retire, but then you can no longer enjoy it physically."*

5.2 Tiny house features

5.2.1 Household size

In general, it can be said that most people want to live alone (36) or together with one other person (36) in a tiny house (see figure 5.6). Only 10 respondents indicate that they will live in a tiny house with three or more people.

Figure 5.6: Household size in tiny house



5.2.2 Mobility

Descriptive

The majority of respondents (51) have indicated that they (want to) live in a tiny house that is mobile (see figure 5.7). It is striking that this type of mobile tiny houses covers the stereotype tiny house (whether on wheels or not), but not a converted mobile unit such as a caravan or truck (only one) (see figure 5.8). The preference for the type of permanent tiny house (non-mobile) is also that of a purpose-built tiny house, no respondent has explicitly indicated that they have a preference for a converted non-residential building such as a shed (see figure 5.9).

Figure 5.7: Desire to live in a mobile tiny house

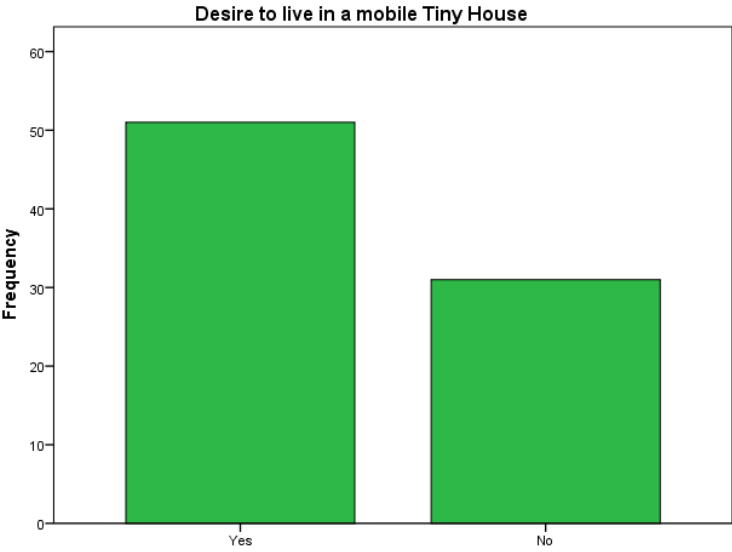


Figure 5.8: Desired type of mobile tiny house

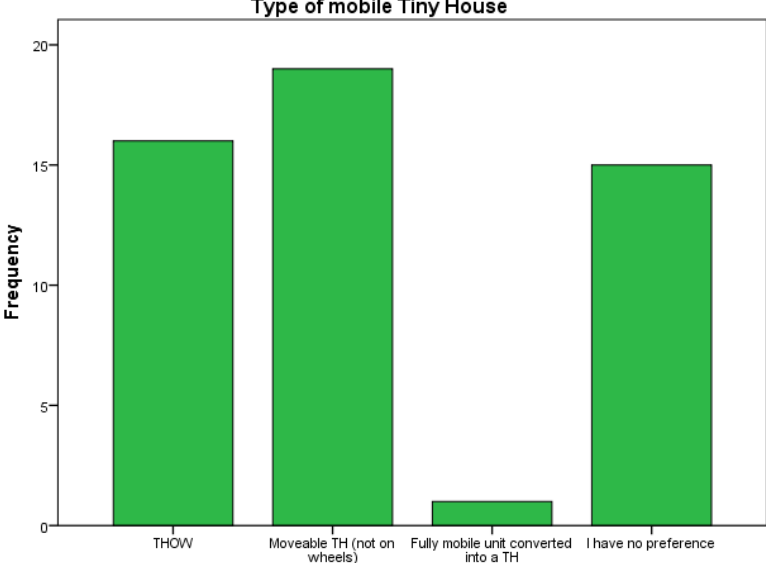
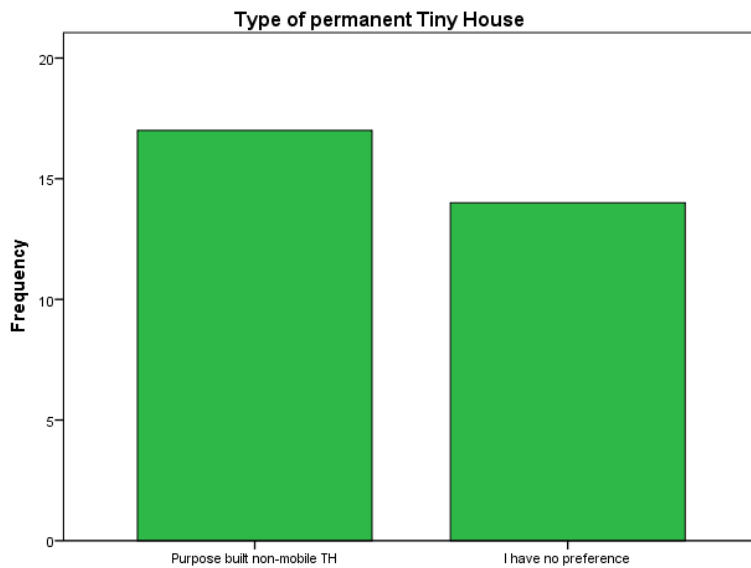


Figure 5.9: Desired type of permanent tiny house



Chi-square test

Bases on the sample, there appeared to be no significant association between gender¹, age groups² (young (up to 44) and old (from 45)) and income groups³ (low (up to 2,499) and high (from 2,500)) and preference for a tiny house that is mobile. This means that this preference for a mobile tiny house is independent of these demographic characteristics.

Logistic regression

The logistic regression analysis also showed that there is no significant effect of gender, age, income on the preference for a non-mobile (permanent) tiny house compared to a mobile one. The model correctly classifies 62.2 percent of the observations⁴.

Table 5.1: Logistic regression analysis for (preferred) mobility tiny houses

	<i>B</i>	<i>Sig.</i>	<i>Exp(B)</i>
<i>Female</i>	,421	,377	1,524
<i>Age</i>	-,299	,572	,741
<i>Income</i>	-,271	,591	,763
<i>Constant</i>	-,291	,523	,747

¹ $\chi^2(1) = 0,615; p = 0,443, V = 0,087.$

² $\chi^2(1) = 0,857; p = 0,444, V = 0,085.$

³ $\chi^2(1) = 0,501; p = 0,479, V = 0,078.$

⁴ $\chi^2(3) = 1.568, p = 0.667, Nagelkerke R^2 = 0.026.$

The couple member of THR that is busy with the design of their tiny house indicates that they want a movable tiny house, but not one on wheels. At the moment they do not have a concrete desire to move a lot, especially because there are now only a limited number of locations. However, if there will be more locations available then it would be more of an option. They do not rule out that, for example, because of less location-dependent work in the future, their housing needs may change. *"It is nice that you have the freedom if your housing needs change that you can switch easily,"* one of the two highlights.

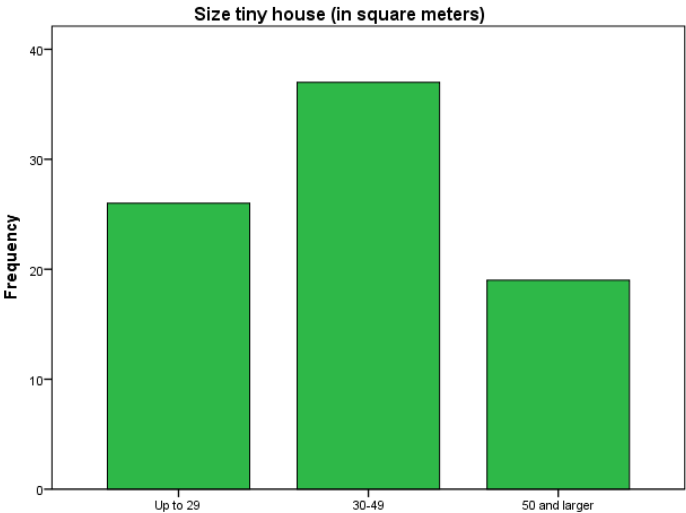
The member of THR and treasurer THN is also building a tiny house that is movable but not on wheels. He mentions that moving their tiny house requires a truck. He continues, *"Tiny houses are movable, but you prefer to do that as little as possible, because it is also hassle and often entails costs."* He also describes that there is a different context in the Netherlands than in the United States, considering that tiny houses were initially a way to move during hurricanes. He advocates that, *"Movability is part of the tiny house concept, but I think it applies a lot less in the Netherlands than in America. We don't need it that much, because the weather is not that extreme and we are just a smaller country."*

5.2.3 Size tiny house

Descriptive

As can be seen in figure 5.10, there is division over the (desired) surface of a tiny house. The majority (37) indicate that they want a tiny house between 30 and 49 m².

Figure 5.10: Desired size of tiny house



Chi-square test

To test whether there is a significant connection between the (desired) surface and the demographic characteristics, the surface is subdivided into 'up to and including 39 m²' and '40 and more m²'. Women

are more often than expected (29) and more than men (10) represented in the group that wants a tiny house of more than 39 m² (see table 5.2). This association was found to be significant, but weak⁵.

Table 5.2: Chi-square test for (desired) surface of tiny house and gender

		Gender			Total
		Man	Woman		
Surface	Up to and including 39	Count	20	23	43
		Expected	15,7	27,3	43,0
	40 and more	Count	10	29	39
		Expected	14,3	24,7	39,0
	Total	Count	30	52	82
		Expected	30,0	52,0	82,0
	Count				

In addition, people of young age (up to and including 34) were more often represented (28) in the group that wanted a tiny house ‘up to and including 39 m²’, compared the middle age (35-54) (12) and older ones (55 and older) (table 5.3). This appears to be a moderately strong significant relationship⁶. The lower income groups (up to and including 2,499) were also more represented (30) in the group that wants a tiny house ‘up to and including 39 m²’, than the higher income groups (13). This appears to be a moderately strongly significant relationship⁷.

Table 5.3: Chi-square test for (desired) surface of tiny house and age

		Age			Total	
		Young	Middle-age	Old		
Surface	Up to and including 39	Count	28	12	3	43
		Expected	21	15,2	6,8	43,0
	40 and more	Count	12	17	10	39
		Expected	19	13,8	6,2	39,0
	Total	Count	40	29	13	82
		Expected	40,0	29,0	13,0	82,0
	Count					

Finally, respondents who want a mobile tiny house are more often represented (than expected) in the group that wants a tiny house with an surface of ‘up to and including 39 m²’ (31), than the group that does not want a mobile tiny house (12). However, there appeared to be no significant link between

⁵ $\chi^2(1) = 3.840; p = 0.005, V = 0.216.$
⁶ $\chi^2(2) = 10.862; p = 0.004, V = 0.364.$
⁷ $\chi^2(3) = 7.848; p = 0.049, V = 0.309.$

the mobility and surface area of a tiny house⁸. It is conceivable that the household size influences the desired surface area of the tiny house. However, there appeared to be no differences and therefore no significant relationship⁹.

Logistic regression

The logistic regression analysis has shown that there is a significant effect of gender, age and income on the desire for a smaller tiny house compared to a larger one. The model correctly classifies 68.3 percent of the observations¹⁰. For women, the chance of a larger tiny house is a factor of 0.413 smaller than men. For the elderly, the odds ratio is 0.357 smaller than the young. And for people with a higher income, the chance of a larger tiny house is 0.603 smaller than people with a lower income.

Table 5.4: Binary logistic regression analysis for (desired) surface of tiny house

	<i>B</i>	<i>Sig.</i>	<i>Exp(B)</i>
<i>Female</i>	-,885	,076	,413
<i>Age</i>	-1,030	,062	,357
<i>Income</i>	-,506	,320	,603
<i>Constant</i>	1,243	,016	3,465

The member of THR and treasurer of THN used to live in a house of 138 m² with his family, but their tiny house this will be only 38 m². The striking thing is that they consider a relatively small house to be large and therefore call it a "tiny house XL". Moreover, they really describe it as a luxury that they "allow" themselves.

It is striking that the couple, who is a member of THR, consider the outdoor space to compensate for the smaller living room they will have. Nevertheless it is officially not part of the living surface, they think they will benefit from their large veranda, especially in summer.

5.2.4 Off-the-grid

Descriptive

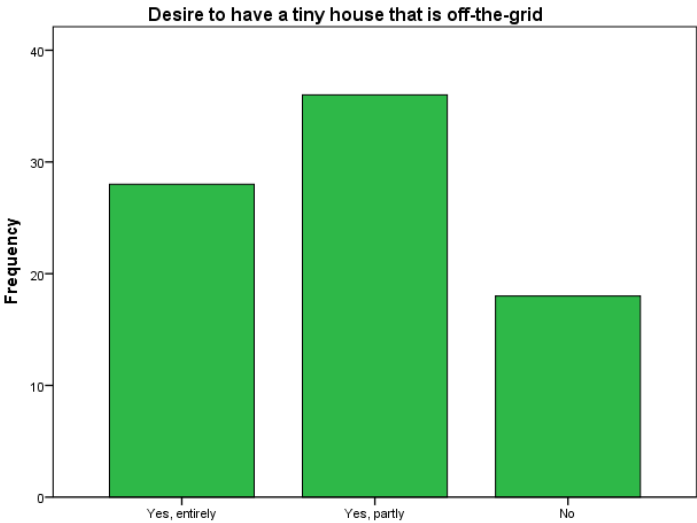
The majority of people indicate that they prefer a tiny house that is off-the-grid, partially (36) or entirely (28) (see figure 5.11). The respondents that want it partly off-the-grid, generally want to be connected to water and sewerage, but they want to be self-sufficient in electricity (for example through solar panels).

⁸ $\chi^2(1) = 3,767; p = 0,052, V = 0,214.$

⁹ $\chi^2(2) = 2,229, p = 3,17, Phi = 0,167$

¹⁰ $\chi^2(3) = 10,661, p = 0.014, Nagelkerke R^2 = 0.163.$

Figure 5.11: Desired degree of off-the-grid tiny house



A tiny house resident argues that there is a difference in going completely off-the-grid and wanting to live in a tiny house because of sustainability considerations. *"Because in the Netherlands you cannot be off-the-grid without fossil fuels,"* he argues. The couple member of THR recognize this, but emphasize that you have to find a good balance. One of the two describes, *"You also have to look for the recycling options. You have to stock up on wood, yes, but enough wood is thrown away."*

Chi-square test

There is no significant relationship between gender¹¹, age¹² and income groups¹³ and the preference for a tiny house that is off-the-grid. There do appear to be differences in the desired degree of self-sufficiency and preference for mobility (see table 5.5). Respondents who want their tiny house completely (23) or partially off-the-grid (23) are more represented in the group that has or wants a mobile tiny house, than the group does not want their tiny house off-the-grid (5). This appears to be a moderately strongly significant association¹⁴.

¹¹ $\chi^2(2) = 0,174; p = 0,917, V = 0,046.$
¹² $\chi^2(2) = 2,870; p = 0,238, V = 0,187.$
¹³ $\chi^2(2) = 1,160; p = 0,560, V = 0,119.$
¹⁴ $\chi^2(2) = 13.851, p = 0.001, V = 0.411.$

Table 5.5: chi-square test for degree of self-sufficiency and (desired) mobility of tiny house

		<i>Is / do you want your tiny house to be mobile?</i>			
		Yes	No	Total	
<i>Is / do you want your tiny house to be off-the-grid?</i>	Yes, entirely	Count	23	5	28
		Expected	17,4	10,6	28,0
	Yes, partly	Count	23	13	36
		Expected	22,4	13,6	36,0
	No	Count	5	13	18
		Expected	11,2	6,8	18,0
	Total	Count	51	31	82
		Expected	51,0	31,0	82,0
		Count			

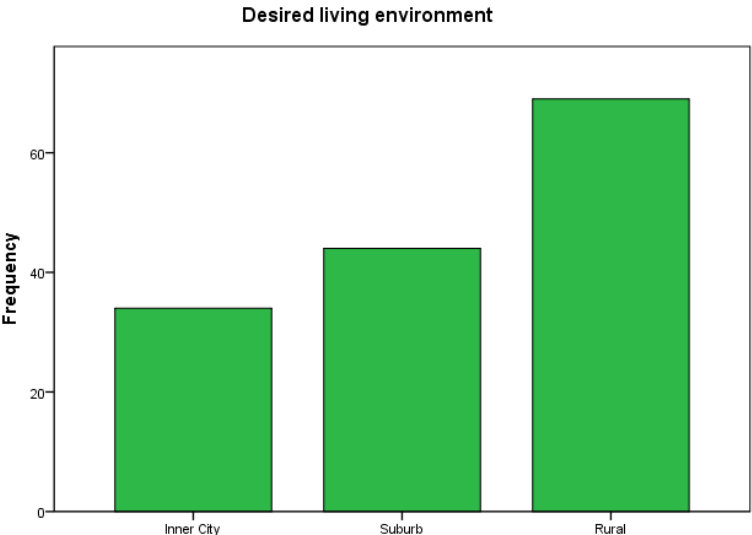
5.3 Location preferences

5.3.1 Environment

Descriptive

Figure 5.12 clearly shows that the further away from an urban living environment, the more the environments are chosen as a desired space to settle with a tiny house. This is in line with the aforementioned motivation to live close to or in nature. The rural living environment was therefore chosen by 69 of the respondents. This was a multiple answer question, so the sum of answers is not 82 but 147. The rural environment covers 46 percent of the answers given.

Figure 5.12: Desired living environment to live with tiny house



Chi-square test

There appeared to be no significant relationship between gender¹⁵, age¹⁶ and income¹⁷ and the desired living environment.

5.3.2 Location

Descriptive

As can be seen in figure 5.13, respondents most often want to stand on land with their tiny house. This is also a multiple answer question, with 146 answers given. Although standing on land stands out with 79 answers, water (35) and roofs (32) are certainly not undesirable. These numbers refute the idea of an official who thought that, “if you make the association with a houseboat and a tiny house, it will be received less well.”

Figure 5.13: Desired location to live with tiny house



Chi-square test

There were no statistical links between gender¹⁸, age¹⁹ and income²⁰ and the three settlement options. However, there is a significant connection between wanting to establish on land, water or roof and the environment where people want to live their tiny house in Rotterdam²¹ (see table 5.6). The people

¹⁵ $\chi^2(3) = 2,973; p = 3,396$.

¹⁶ $\chi^2(3) = 0,522; p = 0,914$.

¹⁷ $\chi^2(3) = 1,534; p = 0,675$.

¹⁸ $\chi^2(3) = 2,046; p = 0,563$.

¹⁹ $\chi^2(3) = 2,353; p = 0,592$.

²⁰ $\chi^2(3) = 2,091; p = 0,554$.

²¹ $\chi^2(9) = 32,704; p = 0,000150$.

who want a tiny house on land or water prefer it in a rural environment (86,1 and 82,9 percent) followed by a suburb (55,7 and 54,3 percent). People who want a tiny house on a roof initially want it in a rural environment (75 percent), but an inner city environment is in second place (68,8 percent).

Table 5.6: chi-square test for desired environment and location for tiny house

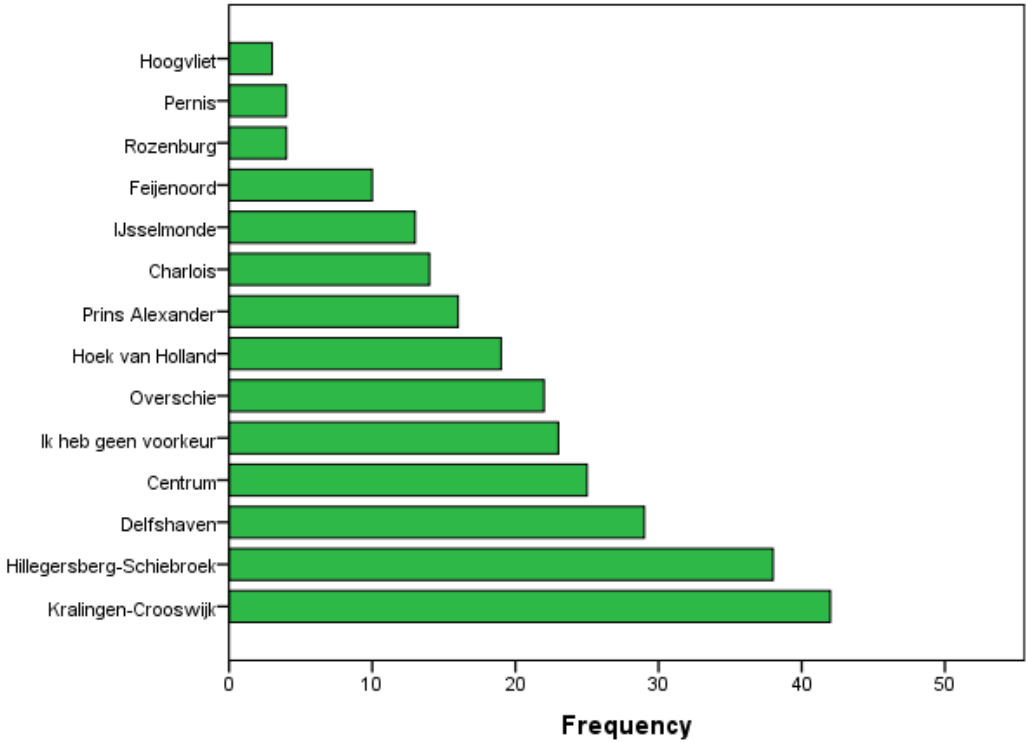
		<i>Location</i>					
		Land		Water		Roof	
		Count	Column N %	Count	Column N %	Count	Column N %
<i>Desired environment</i>	Inner-city	32	40,5	18	51,4	22	68,8
	Rural	68	86,1	29	82,9	24	75,0
	Suburb	44	55,7	19	54,3	16	50,0

5.3.3 City district

Respondents also had the opportunity to designate (multiple) city districts where they would like to live with their tiny house (see figure 5.14). In total, the 82 respondents gave 271 answers. The districts of Kralingen-Crooswijk (42), Hillegersberg-Schiebroek (38), Delfshaven (28) and Rotterdam Centrum (25) are the most popular and together account for 49.4 percent of the answers given.

Figure 5.14: Desired city district to live with tiny house in Rotterdam

Desired city district



A survey was once held within the initiative group THR, which also asked about location preferences. *"Then you notice that one would find it interesting to live on a roof somewhere on a high tower in the city of Rotterdam. And the other just on the outskirts of the city or in a park. The differences are very large. That really has to do with your personal preference,"* a member describes.

Personally the member of THR and treasurer of THN wants to live in nature, but mentioned that this is not so easy if you want to live in the city. Moreover, because of the children, they have to take into account a primary school in their turn. He describes that as a tiny house resident you can be less picky than usual when looking for a place to live. *"Of course you try to find a location that fits perfectly, where you want to live, what it should look like and with whom you want to live. But there is really a limit to that,"* he argues.

Ideally they would like to live near Nesselande (Rotterdam), also because their children go to primary school there. But they have seized the opportunity at another municipality to be sure of a place to live as soon as their tiny house is finished. *"The number of residential locations is limited, so as soon as the opportunity arises to get a place in a vacant location, you should actually take it. It's as simple as that."* As a result, they also stood up for a location outside the Randstad for some time. *"We definitely wanted to stay here in Rotterdam, but if you find that you are not sure whether this will work out, then you will definitely look further than this region."*

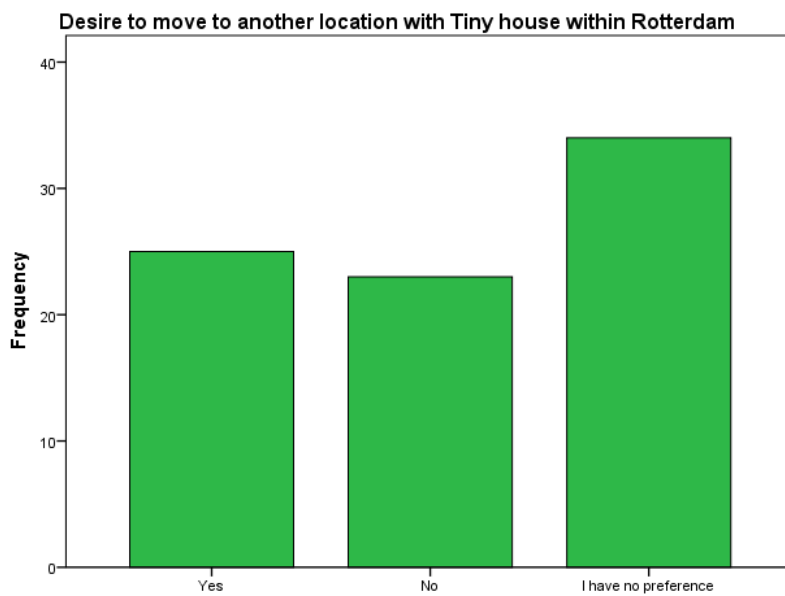
The couple member of THR mainly look for balance in their location. On the one hand, they want to live in nature near a forest with water and be a bit isolated from the crowds. On the other hand, they want to look up the crowds when they feel like it and they want to be close to shops and public transport. The latter because otherwise they are dependent on a car. In terms of sustainability, that feels a bit skewed to them. They recognize that it is a difficult task to get the best of both worlds in a city like Rotterdam. Thereby they indicate that a specific city district does not really matter, because it ultimately depends on the specific place within it. *"If you say Kralingseplas - a wooded area - I say yes, but not somewhere in the middle of houses,"* the woman argues.

5.3.4 Move within Rotterdam

Descriptive

There is no clear answer regarding the wish to move within tiny house within Rotterdam. The majority indicate that they do not have a preference (34), and the group that wants it (25) is almost the same size as they does not (23) (see figure 5.15).

Figure 5.15: Desire to move to another location with tiny house withing Rotterdam



Chi-square test

It also appears that there is no significant relationship between gender²², age²³ and income groups²⁴ and the desire to move within Rotterdam with tiny house. Logically, there is a strongly significant connection between the group of people who want a mobile tiny house and who want to move with a tiny house within Rotterdam²⁵ (see table 5.7). This connection is still being named, because wanting a mobile tiny house could also mean that it would enable them to establish exclusively outside of Rotterdam.

Table 5.7: Chi-square test for the desire to move within Rotterdam and mobility of tiny house

		<i>Is / do you want your tiny house to be mobile?</i>			
		Yes	No	Total	
<i>Do you want to move to another location within Rotterdam with tiny house?</i>	Yes	Count	23	2	25
		Expected	15,5	9,5	25,0
		Count			
	No	Count	4	19	23
		Expected	14,3	8,7	23,0
		Count			
	I have no preference	Count	24	10	34
		Expected	21,1	12,9	34,0
		Count			
	Total	Count	51	31	82
		Expected	51,0	31,0	82,0
		Count			

²² $\chi^2(2) = 2,010; p = 0,366, V = 0,157.$

²³ $\chi^2(2) = 1,844, p = 0,398, V = 0,150.$

²⁴ $\chi^2(2) = 0,158; p = 0,924, V = 0,044.$

²⁵ $\chi^2(2) = 30,100; p = 0.000, V = 606.$

Just like mobility, there are differences in the group who prefer a tiny house that is off-the-grid and move with a tiny house within Rotterdam (see table 5.8). The respondents who would like to move within Rotterdam are more often represented in the group that wants a tiny house that is (partially) off-the-grid (10 and 11), than the group of respondents who do not want to (4). However, this difference was not found to be significant²⁶.

Table 5.8: Chi-square test for the desire to move within Rotterdam and degree of self-sufficiency of tiny house

		<i>Is / do you want your tiny house to be off-the-grid?</i>				
		Yes, entirely	Yes, partly	No	Total	
<i>Do you want to move to another location within Rotterdam with tiny house?</i>	Yes	Count	11	10	4	25
		Expected Count	8,5	11,0	5,5	25,0
	No	Count	8	6	9	23
		Expected Count	7,9	10,1	5,0	23,0
	I have no preference	Count	9	20	5	34
		Expected Count	11,6	14,9	7,5	34,0
	Total	Count	28	36	18	82
		Expected Count	28,0	36,0	18,0	82,0

Finally, there is a significant connection between wanting to move to a different location within Rotterdam and wanting to live on land, water or the roof with a tiny house²⁷. Respondents who want to move within Rotterdam, want to live on water (60 percent) more often after living on land (92 percent). Respondents who do not want to move, want to live on a roof (39,1 percent) after living on land (95,7 percent).

²⁶ $\chi^2(4) = 9,083; p = 0,059, V = 0,333$.

²⁷ $\chi^2(6) = 13,624; p = 0,034$.

Table 5.8: Chi-square test for the location and the desire to move within Rotterdam with tiny house

Do you want to move to another location within Rotterdam with tiny house?

<i>Location</i>	Yes		No		I have a no preference	
	Count	Column N %	Count	Column N %	Count	Column N %
Land	23	92	22	95,7	34	100,
Water	15	60	6	26,1	14	41,2
Roof	14	56	9	39,1	9	26,5

Multinomial regression

A multinomial regression analysis showed that there is no significant relationship of gender, age and income with the preference to move with a tiny house within Rotterdam. The regression model explains 43.9 percent of the variation.

Table 5.10: multinomial regression analysis for the desire to move within Rotterdam with tiny house

			<i>B</i>	<i>Sig.</i>	<i>Exp(B)</i>
<i>Do you want to move to another location within Rotterdam with tiny house? (a)</i>	No	Intercept	-,405	,479	
		Men	,501	,403	1,650
		Woman	0b	.	.
		Young	,542	,416	1,719
		Old	0b	.	.
		Low Income	-,410	,526	,664
		High Income	0b	.	.
		I have no preference	Intercept	-,059	,911
	Men	-,333	,561	,717	
	Woman	0b	.	.	
	Young	,887	,159	2,428	
	Old	0b	.	.	
	Low Income	-,219	,716	,803	
	High Income	0b	.	.	

- a. The reference category is: Yes
- b. This parameter is set to zero because it is redundant.

5.4 Conclusion

In this chapter, a questionnaire and interviews were used to explore what kind of tiny house features and location preferences people have who want to live with a tiny house in Rotterdam. In addition, attempts have also been made to investigate the explanatory factors of these preferences. First of all, the desire for ecologically sustainable living is on average highest as a motivator for living in a tiny house. After this, finding the current housing stock too expensive and wanting to minimize it are in second and third place.

The questionnaire shows that the majority of people wants a tiny house that is mobile (with or without wheels). However, there is generally no preference to move specifically within Rotterdam. Gender, age and income were found to have no effect on either preference. These personal characteristics did have

an effect on the desired surface area of the tiny house. Most people indicate that they want (or have) a tiny house between 30 and 49 m². If you divide the desired area into two groups (up to 39 m² and from 40 m²), the chance is greater that women, the elderly and people with a higher income want / have a tiny house up to 39 m². Most people also want their tiny house to be partially or completely off-the-grid. The chi-square test shows that there are no significant relationships between this preference and the personal characteristics. However, there appeared to be a moderately strongly significant relationship between off-the-grid preference and mobility preferences. Respondents who want their tiny house completely or partially off-the-grid are more represented in the group that has or wants a mobile tiny house, than the group does not want their tiny house off-the-grid.

Regarding the location, most people want to stand on land in a rural environment with their tiny house. These preferences turned out to be independent of gender, age and income. However, there is a significant connection between wanting to establish on land, water or a roof and the environment where people want to live their tiny house in Rotterdam. People who would like to live on a roof, for example, turned out to want this more often in the inner city than people who want to stand on land or water. Finally, Kralingen-Crooswijk, Hillegersberg-Schiebroek and Delfshaven proved to be the most desirable districts to live with a tiny house.

6. Land search and acquisition for tiny houses

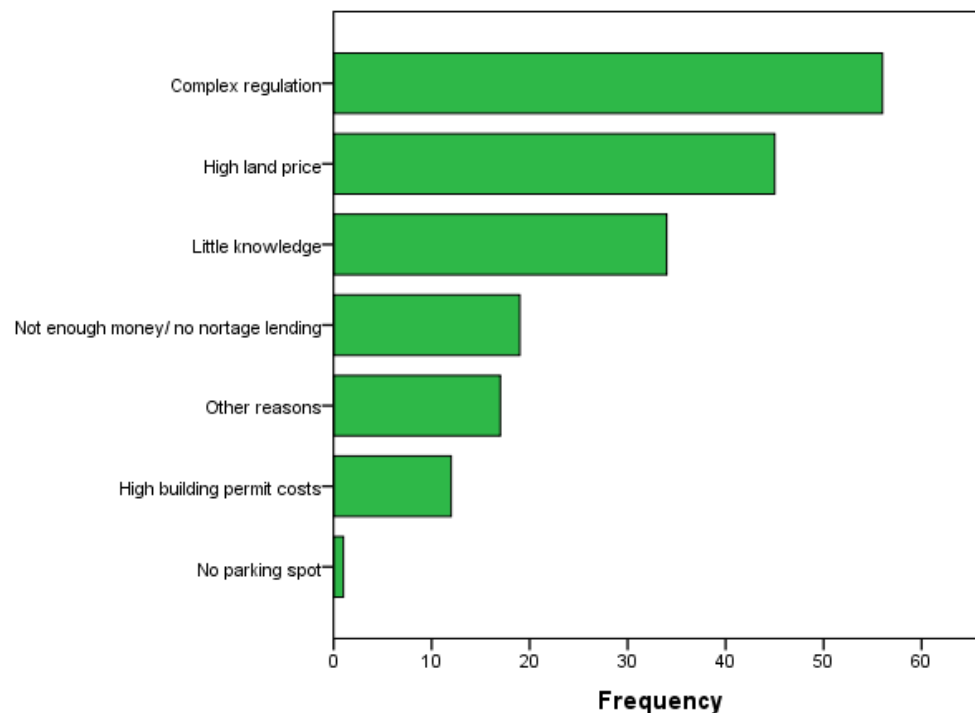
In this chapter, the following question is answered: “What are the possibilities and barriers of different types of land search and acquisition for tiny houses (within the municipality of Rotterdam)?”. In addition to the questionnaire and interviews with tiny house interested for Rotterdam, interviews were conducted with tiny house residents experienced with land acquisition on two other tiny house locations. Subsequently, the first choices with regard to land allocation for tiny houses in Rotterdam are brought to light.

6.1 Barriers

The majority of the respondents (72) has been looking for a location for a tiny house in Rotterdam for less than 3 years. As described in the literature, there are several barriers that prevent or hinder people from living in a tiny house. Of the barriers formulated in advance, complex regulations appear to be the most important (65), followed by a high land price (45) and little knowledge of the subject (34) (see figure 6.1). Some of the respondents indicated that there are other important barriers to living in a tiny house. These answers show that not being able to find a piece of land and / or an (appropriate) community to live with are also important barriers.

Figure 6.1: Barriers for living in a tiny house

Barriers for living in a Tiny House



Although a tiny house resident came up with a location within two months due to coincidence and a good convergence of circumstances, he still thinks finding a location is the biggest barrier. *"There are a lot of people who want to live in a tiny house, but just can't because they can't find land. Through my neighbors I hear that other people often go back and forth with the municipality and then the municipality does not dare to do it anyway,"* he addresses. The reason why he has had little trouble finding a location is because two months after starting his search, he came across an advertisement in the local newspaper. Two people he already knew from church were already setting up an initiative for tiny houses on a vacant lot of the municipality. He acknowledges that he was very lucky. In this case it was the initiator who was involved in the consultation with the municipality. After being elected, he had to do nothing more than build his tiny house.

An official of the municipality of Rotterdam also thinks that finding a location for tiny house residents is the biggest barrier. However, he does question whether it is necessarily a municipal task to reserve locations for this. He argues, *"Many parties want a housing location. You could also buy a piece of land yourself. You only run into it that it does not fit in the land-use plan or that it does not fit in with the wealth requirements."*

The couple member of THR indicates that they were first worried about the construction, but afterwards this turned out to be not too bad. Ultimately, finding the location and financing proved to be the most difficult and is now the only thing holding them back. Moreover, they see disadvantages of the growth in popularity of tiny houses. Although the woman would like to see more people living tiny, she thinks it would also be negative. According to her, it would be undesirable and unrealistic since there is already too little land.

The extent to which not finding land can be a problem is shown by the example of the woman who now lives on a boat in Rotterdam. About 4-5 years ago she went looking for a vacant piece of land that she could buy to live tiny in Rotterdam. However, she could not find suitable ground, in her opinion also because it was not yet a trend at the time, so she let it go. In her search she came across building land of around 350.000 euros. Though, she found that the investment was not worth it, mainly because her motivations were based on a minimalist and more efficient life with less costs. She argues that she, *"... thinks it is ridiculous to spend almost 400,000 euros on just a small piece of land. In addition, your costs of building your house are added."*

According to the treasurer of THN and member of THR getting permission from the municipality is also a major barrier after finding a location. He describes, *"Before you get a permit to live somewhere, entire departments of the municipality must consider it, make plans and then the councillor must say yes and things. That can take quite a long time."*

6.2 Tiny House communities in the Netherlands

Tiny house Nederland (n.d.) has mapped out successful Dutch tiny house projects (read: communities) on their website. There they interviewed the municipality and initiators and shared the information on their website. In total, this concerns 15 tiny house projects spread over 14 Dutch municipalities, with the number of tiny house varying between 3 and 16 tiny houses per location. A complete overview of the characteristics can be found in Appendix 5.

6.2.1 Desire to live in a community

According to the treasurer of THN and member of THR there are reasons why there are mainly tiny house communities compared to single tiny houses. First of all, people looking for a location often have to rely on the municipality that has rented out or leased a large plot of land. According to him they pay between 50 and 200 euros per month for it. This would only become financially interesting for the municipality if there are several houses on it. In addition, people who want to live in a tiny house would also do this to be able to live mortgage-free (see figure 5.5). A tiny house resident explains that if you want to stand on a piece of land alone, you should probably buy it. *"But then you have to have the money for it, otherwise you have to borrow it and then you have to take out a mortgage again,"* he explains.

The treasurer of THN and member of THR says that if he had the money he wouldn't necessarily have to be in a community. But because they want to live mortgage-free, they have to rely on the municipal locations. However, they think this is just as good. Meanwhile, he and his family met their neighbours. He describes it as "neighbour plus" because the contact with each other is more intense. He explains, *"The location is being developed together, paths are being built and the flowers and trees are being cared for. If you need something to maintain your home, knock on the door."*

A tiny house resident also emphasizes that he and his family did not consciously had the idea to live in a community. Nevertheless, they really like the community in which they live. Especially since the management of the site is done in a natural way without many rules. Another tiny house resident indicates that it was only when he lived there that he realized the community feeling, which eventually became the biggest advantage. Especially in times of COVID-19 he feels less alone. If he wants contact, he walks to their garden, where there is always someone working. He also says that they all cook individually and eat it together outside. *"I am not saying that everyone should live in a tiny house, that is not possible, but I would almost say we should put the whole of the Netherlands in communities. I really think that goes back to our roots to who we are, we really need that contact with each other,"* he argues. Finally, all three indicate that living with like-minded people is an advantage.

6.2.2 Temporality

THN's inventory shows that the tiny house projects are generally temporary. A permit can be granted for a maximum of 10 years to deviate from a land-use plan. Temporary projects therefore last no longer than 10 years. There are also a number of cases where a permit has been granted for 5 years with an extension possibility of another 5 years. The degree to which the houses must be off-the-grid comes with temporality. Most houses are therefore partly off-the-grid. The facilities to which the houses are connected differ.

A tiny house resident describes that his community can be on the site for another eight years. After that, the plan is to put a road there. He explains that that's why it was so important that the houses are completely off-the-grid. The municipality would be afraid of lawsuits if they were stuck on the

ground and they would not want to leave. Nonetheless, he is not yet worried about what to do after those eight years, because he sees this time as a luxury. Moreover, he hopes to have children after that, which would not fit in his current tiny house.

One of the locations is much shorter intended for the tiny houses (until September 2021). Nevertheless, a tiny house resident does not worry about whether they have a different place in time to live. Moreover, he emphasizes that this gives them freedom. Another tiny house resident who will live here addressed that he is a bit concerned about the short stay. However, he believes that everything works out as long as you put healthy pressure on yourself, so they sold their house before they knew where they went to build their tiny house and eventually live. Finally, they have registered for a location in Rotterdam (see next section).

6.2.3 Land issue

The inventory of THN shows that in most cases the municipality is the landowner of the location. There are also two locations where a developer owns the land and two cases where tiny house residents have bought the land from a municipality. In addition, there is not one clear way of land issue that is used at tiny house locations. It is striking that a number of municipalities have not opted for the standard rent, lease or sale, but have opted for a loan agreement (*bruikleenovereenkomst*). In contrast to rental, this option would not lead to rental or lease protection (*overeenkomst.nl*, n.d.). In addition, with rent there is an obligation of the tenant (whether or not in the form of money), this is not obligatory for a loan agreement (Snijders Advocaten, n.d.).

A tiny house resident addresses that their community does not pay money to the municipality for standing on the location. They do have a lease agreement, but the number of hours per household in common tasks for the site and the surrounding area is their compensation. Another tiny house resident describes that an association is established that rents from the municipality. According to the tiny house resident, it was decided there, because the municipality was not allowed to ask nothing because of unfair competition with rental houses in the area. The residents pay the association and the same money is used if they need anything (e.g. to build something).

The municipalities have offered various options for applying for permits to the tiny house residents (THN, n.d.). A municipality indicates that they helped the people by means of a meeting to make a permit application via "Building Decree temporary housing" (*Bouwbesluit tijdelijk wonen*). Another municipality indicates that they would have preferred to do so, but that they used a tolerance decision (Gedooogbeleid) due to time constraints. In addition, several municipalities have had potential tiny house residents apply for a permit to temporarily deviate from the land-use plan. A number of municipalities have also invoked the principle of equivalence within the 2012 Building Decree (*Bouwbesluit 2012*). This allows for certain requirements not to be met if at least the same degree of safety, protection of health, usability, energy efficiency and protection of the environment is offered.

A number of municipalities indicate that not only the legal frameworks, but also attitude is important when granting the permits. *"An open attitude on the part of the licensing authorities is necessary in order to look for space in the legislation and to use the margins of the possibilities, sometimes even going over it. This requires administrative back support,"* one official argues.

6.2.4 Selection

A tiny house resident describes that their selection went through the initiator. The initiator was allowed to choose who came to live with them on the site. According to the tiny house resident, this went very well, because that person was able to judge well with what kind of approach someone came, to then coordinate the people well. In addition, he appoints that the advertisement states that it was for people from the municipality and surroundings. However, they happen to have a couple from Rotterdam.

Another tiny house resident describes that their process was roughly the same. The first people got together through the initiator. The tiny house resident says that he already knew the initiator, because their children were in the same class. The last residents were then chosen by the first residents.

At another existing tiny house location, an official indicates that especially the strict selection by the established tiny house housing cooperative was an important success factor of the project. According to him, the higher demand than supply would have made this possible.

6.2.5 Integration in the neighbourhood

Tiny houses are not always received as a good idea. An official from a municipality with a tiny house location indicates that there are sometimes biased ideas that refer to a campsite or caravan camp. There are therefore tiny house projects in which local residents have objected. According to an official from another municipality this problem could be mitigated by, *"... letting future residents present themselves to the neighbourhood. Pictures of and honest information about the tiny houses can remove the resistance."*

Even if no objection is submitted, local residents may be dissatisfied with tiny houses in their neighbourhood. A tiny house resident describes negative reactions on Facebook:

"We use a lot of residual wood here and that is less tight. ... People also thought: why they don't build a stone house? But they don't realize that it will have to go in eight years and those houses will have to be demolished. They also thought: give them all the same house, then it looks less messy. But then the whole creative of the process will also go away."

The tiny house resident describes that sometimes there are young people who shout at their location. *"... that we are gay, that we are wanderers, the hippy houses. they don't know it so they think it's weird,"* he recalls. The tiny house resident indicates that it made quite an impression on him. Nevertheless, they want to focus more on social media to get the neighbourhood on their side.

6.3 Tiny house location in Rotterdam

6.3.1 Pilot Keyenburg, Zuidwijk

Municipal wide, the assignment was to designate one or more locations before the summer of 2019 for the development of 5-15 tiny houses. At the time of writing, the municipality has designated its first tiny house location; Keyenburg in Zuidwijk. This is a utility park next to allotments and can accommodate 7 to 10 tiny houses for up to 10 years. This location has been managed by the municipality and, if it were not made available to tiny houses, it would be made available as public

green space (Municipality of Rotterdam, n.d.). The municipality of Rotterdam uses the following definition for this location. A tiny house is:

- is a small house with a usable area of up to 50 m²
- has a maximum ground area of 35 m²
- is movable / mobile, in any case has no fixed foundation
- is detached in a shared outdoor space
- has a minimal ecological footprint
- is maximally self-sufficient.

According to the official of the municipality of Rotterdam, there would be a different definition for another location where tiny houses can be permanently located (and therefore have a foundation and can't be moved). But for this location it is important that they can be removed after 10 years.

The official has the idea that the location has been positively received by potential tiny house residents, especially because it is an offshoot of the Zuiderpark. *"You see that other tiny house locations in other parts of the Netherlands often lie on a scrap piece along a train or along the highway or along a business park and that is less attractive,"* the official highlights.

The treasurer of THN and member of THR confirmed that the Keyenburg location was received very positively by the initiative group and everyone who wants to live with a tiny house in Rotterdam. *"It is a beautiful place, next to a park and beautiful greenery. You are close to public transport, shops and a residential area, so also a bit of liveliness, it is near the highway. Yes, it is actually an ideal location."* He also thinks the duration of ten years is important because you can really make it a place to live compared to the short projects.

As previously described, the couple member of THR wants the best of both worlds and recognizes that this is a difficult task in Rotterdam. Nevertheless, they see this location as a unique place. *"It is near a park, at allotment gardens, in the back of the busy area of the neighbourhood and also very green,"* they note.

Selection

The municipality of Rotterdam does not have a specific target group for which they want to facilitate tiny houses. In general, an official sees that it mainly concerns one- or two-person households, young starters as older people who want to leave their large house. But it is not the case that there will be a distribution per location per target group within the tiny house residents.

The treasurer of THN and member of THR will also register for the Keyenburg location in Rotterdam. He explains that the municipality of Rotterdam has a rather unique procedure, because you have to register as a group instead of an individual resident. According to him, they will sign up with THR as a whole to increase their chances compared to other groups. Once they are elected, they must decide among themselves within the group who can live there, because there are not enough places. *"That is exciting. A bit like cycling you go as a group to the finish, you try to stay ahead and at the end you have to sprint and then see who wins,"* he compares.

A member of THR indicates that there are currently 14 interested people within THR for the Keyenburg location, so that at least four people will not be given a place. They do not yet know how this selection

should take place among themselves. She does indicate that the conversation is now a bit avoided. *"You don't want to fight each other, especially because you are going to form a community together and you really like everyone. ... I also want it to remain social and not to have a bad atmosphere in the community because you fought for your place,"* she emphasizes.

6.3.2 Other locations

An official stated that although the Keyenburg location is an experiment and they do not immediately roll out the concept across the entire city, 15 tiny houses is not necessarily a hard boundary. In addition to Keyenburg, the municipality is also investigating other locations. First of all, a location in a regular building plan where tiny houses could be added, but it is not yet certain whether there is still room for tiny houses. Furthermore, a school is rented for 15 years at SKAR in Hoogvliet. This organization creates affordable workspace for artists and wanted the artists to be able to live in the schoolyard with their tiny houses. According to the official, it looked quite concrete that they would get that school site this year for the workspace and the tiny houses. Finally, as previously described, in the context of smart use of space, the location of tiny houses on roofs is being investigated.

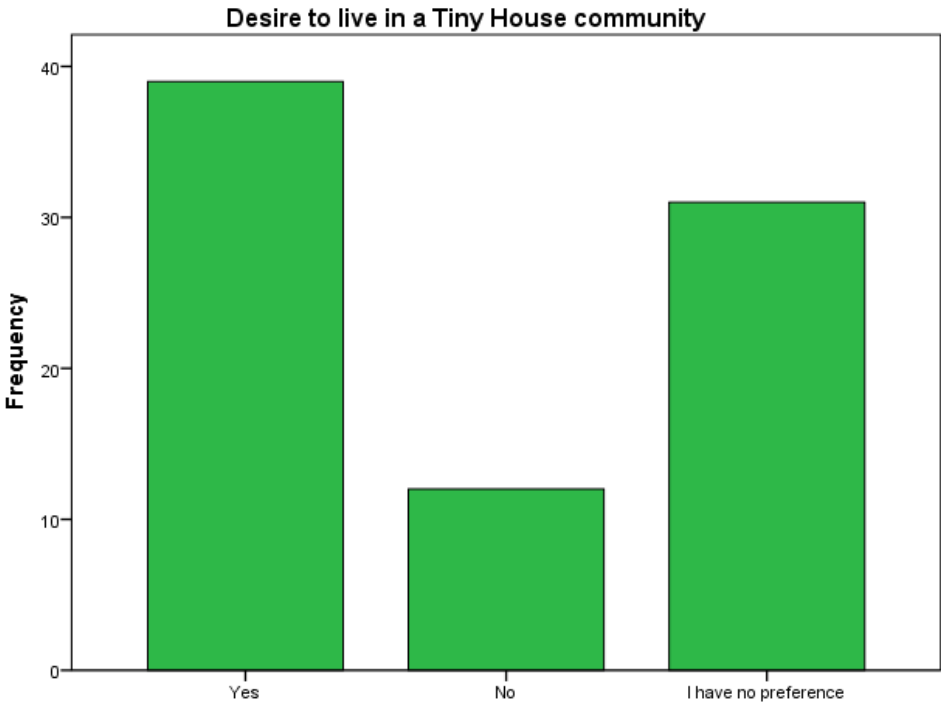
In the search for the locations, there are no specific requirements for the environment or geographical location set by the municipality of Rotterdam. The official explains that multiple locations have been explored, both north and south, as well as in downtown and in suburbs. According to the official, speed was especially important. The Keyenburg location therefore accidentally came into the hands of the municipality in January 2020. The location in Hoogvliet was also an initiative that happened to happen. The official adds: *"It could also mean something good for a turn there - it is a bit of a boring schoolyard - to add some eyes on the streets."* The other existing regular building plan was already an ongoing plan. The official argues that this would be more efficient than coming up with a whole new plan which takes an average of seven years.

6.3.3 Desire to live in a community

Descriptive

The majority of respondents (39) would like to live in a community with their tiny house (see figure 6.2). In chapter 5 we saw that this is an important motivation to live in a tiny house at all. Only a small part (12) does not want to live in a tiny house community.

Figure 6.2: Desire to live in a tiny house community



The couple member of THR indicates that living in a community was not that important at first. *"Back then I thought as long as we find land it is fine, but actually that has become increasingly important in the whole process,"* the woman said. They actually want to experience a bit of village feeling and be able to build on each other and work together. *"Just that you know who lives there, instead of the anonymity you often experience in the city,"* she continued.

Chi-square test

There appeared to be no significant differences and therefore links between gender²⁸, age²⁹ and income groups³⁰ and whether or not to live in a tiny house community.

Multinomial regression

Using a multinomial regression model, it was shown that there is no significant association of gender, age with community preference. There is a significant relationship between wanting to live in a tiny house community and income. Respondents with a low income more often than not want to live in a tiny house community, compared to respondents with a high income. The regression model explains 51.2 percent of the variance (see table 6.1).

²⁸ $\chi^2 (2) = 4,058; p = 0,131, V = 0,222.$
²⁹ $\chi^2 (2) = 0,188, p = 0,910, V = 0,048.$
³⁰ $\chi^2 (2) = 4,838; p = 0,089, V = 0,243.$

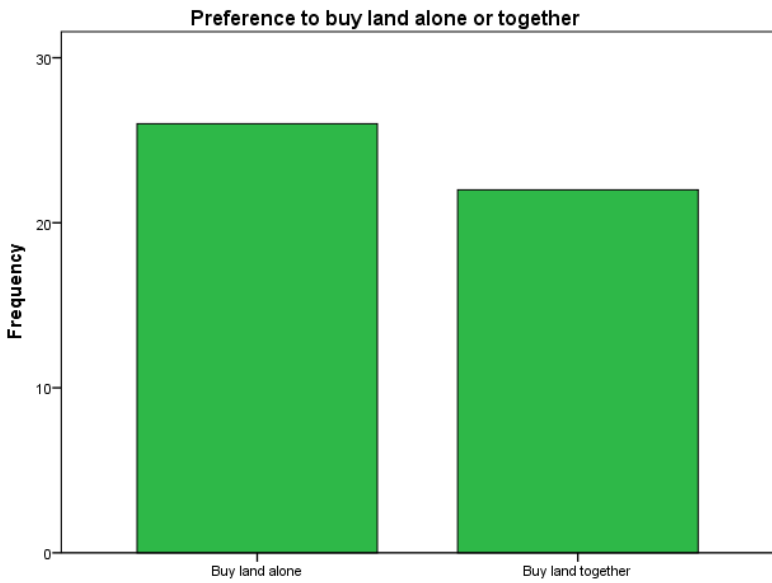
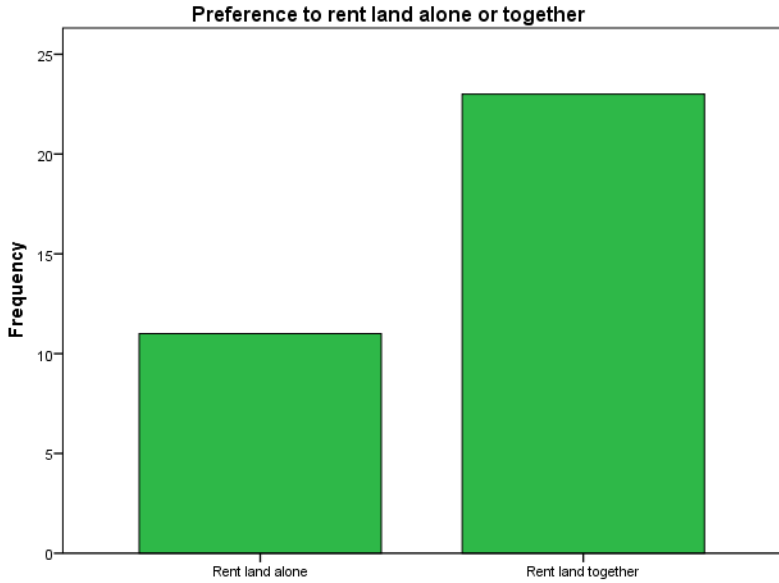
Table 6.1: multinomial regression analysis for desire to live in a tiny house community

			<i>B</i>	<i>Sig.</i>	<i>Exp(B)</i>
<i>Do you want to live in a tiny house community? (a)</i>	No	Intercept	-,962	,168	
		Men	,980	,163	2,665
		Woman	0b	.	.
		Young	,225	,774	1,252
		Old	0b	.	.
		Low Income	-1,478	,049	,228
		High Income	0b	.	.
	I have no preference	Intercept	,335	,503	
		Men	-,487	,365	,614
		Woman	0b	.	.
		Young	,205	,727	1,228
		Old	0b	.	.
		Low Income	-,890	,111	,411
		High Income	0b	.	.

The results of the questionnaire show that there is a difference in wanting to buy a piece of land together or alone and renting or buying it. The respondents who want to rent land for their tiny house prefer to do this together with others (see figure 6.3). Interestingly, the opposite is true for the respondents who want to buy land for their tiny house, they prefer to do it alone than with others (see figure 6.4).

Figure 6.3: Preference to rent or buy land for tiny house

Figure 6.4: Preference to buy land alone or together



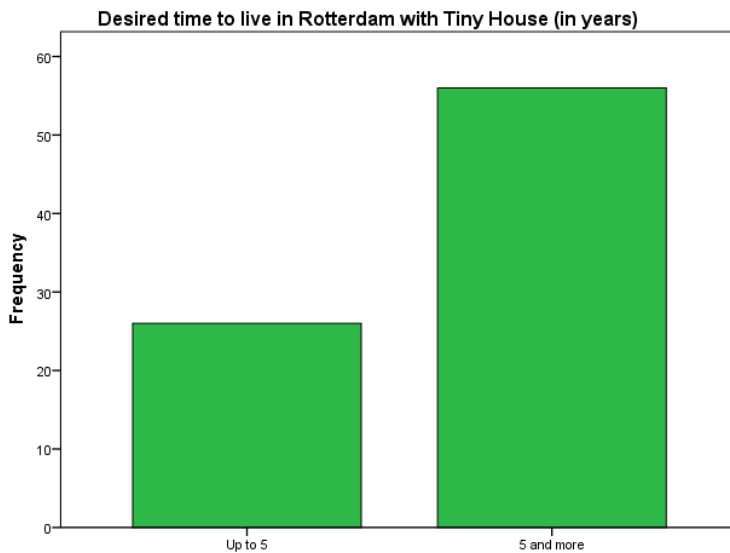
The woman who was first looking for building land and now lives on a boat also wanted to buy a piece of land alone. When she was unable to find land in Rotterdam, she came across projects in Delft and Barendrecht where the idea was to form communities. She did not want this and it also prevented her from living there.

6.3.4 Temporality

Descriptive

The majority of respondents (56) want to live in a tiny house for more than five years in Rotterdam (see figure 6.5).

Figure 6.5: Desired time to live in Rotterdam with tiny house (in years)



Chi-square test

There is no significant relationship between gender and the desired length of stay with a tiny house in Rotterdam³¹. However, there was a significant relationship between the age groups young and old and the desired length of stay³² (see table 6.2). Young people (up to and including 54 years) are more represented in the group that wants to stay with a tiny house for up to five years (22), than older people (4). It appears to be a weakly significant link.

³¹ $\chi^2(2) = 0.527$, $p = 0.464$, $V = 0.081$.

³² $\chi^2(1) = 4.098$; $p = 0.043$, $V = 0.224$

Table 6.2: chi-square test for the desired duration of stay with tiny house in Rotterdam

			<i>Age</i>		
			Young	Old	Total
<i>Desired duration of stay in with tiny house in Rotterdam</i>	Up to and including 5 years	Count	22	4	26
		Expected Count	18,1	7,9	26,0
	Longer dan 5 years	Count	35	21	56
		Expected Count	38,9	17,1	56,0
	Total	Count	57	25	82
		Expected Count	57,0	25,0	82,0

There is also a weakly significant link between the income groups low (up to and including 2499) and high (from 2500) and de duration of stay³³ (see table 6.3). The lower income groups are more often represented in the group that wants to stay with a tiny house for up to 5 years (20), than the high income group (6). The high income group is more than expected represented in the group that wants to stay longer than five years (27 instead of 22,5).

Table 6.3: Chi-square test for the desired duration of stay with tiny house in Rotterdam

			<i>Income</i>		
			Low	High	Total
<i>Desired duration of stay with tiny house in Rotterdam</i>	Up to and including 5 years	Count	20	6	26
		Expected Count	15,5	10,5	26,0
	Longer than 5 years	Count	29	27	56
		Expected Count	33,5	22,5	56,0
	Total	Count	49	33	82
		Expected Count	49,0	33,0	82,0

Logistic regression

The logistic regression analysis shows that there is no significant effect on gender, age and income and wanting to stay with a tiny house in Rotterdam up to five years compared to from five years. The model classifies 68.3 percent observations³⁴. For women, the chance of wanting 5 years or more is a factor of 0.769 smaller than men. For the elderly, the probability ratio of wanting to stay from 5 years is a factor 0.413 smaller than the young. For people with a higher income, the chance of wanting to stay from 5 years or more is a factor 0.427 smaller than people with a lower income.

³³ $\chi^2(1) = 4,666$; $p = 0.031$, $V = 0.239$.

³⁴ $\chi^2(3) = 7.172$, $p = 0.067$, Nagelkerke $R^2 = 0.117$.

Table 6.4: Binary logistic regression analysis for the desired duration of stay within Rotterdam with tiny house

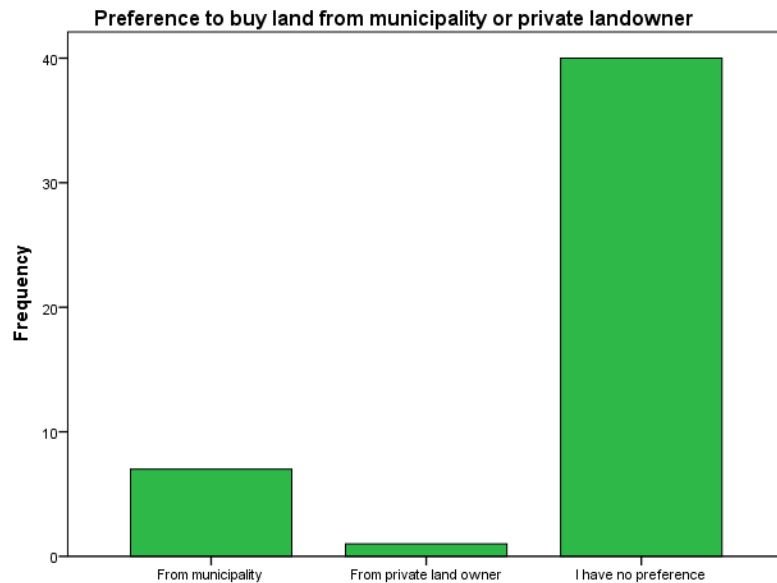
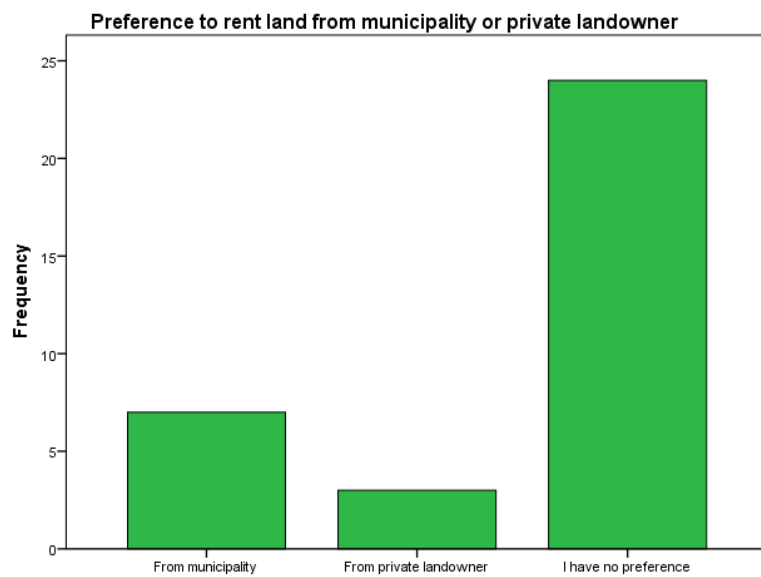
	<i>B</i>	<i>Sig.</i>	<i>Exp(B)</i>
<i>Female</i>	-,262	,605	,769
<i>Old</i>	-,883	,170	,413
<i>High Income</i>	-,851	,134	,427
<i>Constant</i>	2,083	,001	8,030

6.3.5 Search for a location: municipality or private land owner

The questionnaire shows that the respondents generally have no preference for the municipality or a private individual to buy or rent land from for their tiny house (see figure 6.6 and 6.7)

Figure 6.6: Rent land from municipality or private landowner

Figure 6.7: Buy land from municipality or private landowner



Although the couple member of THR indicate that their expectation - that municipal land is relatively cheaper - is a factor, it does not mean that they have only looked at municipal land. On this matter an official from the municipality of Rotterdam explains that with their pilot a market-standard rental is asked, but in practice this means that it will cover the costs. He argues, "You also can't ask for much higher rents because then people just won't come."

A member of THR sees that people within THR have had contact with private landowners who are interested. He and his wife have also entered into contact with private individuals in the area of Rotterdam. In an adjacent municipality, they had contact with an organic farmer who has a piece of lawn with which he does nothing. This contact is the result of coincidence when his wife visited several

farmers in the search for a construction shed for their tiny house. The farmer in question has expressed his interest to have five tiny houses on his land.

In addition, a member of THR points out the initiative group from Drechtsteden, who had appealed to individual landowners in a local newspaper to ask if they would like to use their land for tiny houses. There seem to have been a lot of reactions from private landowners. He explains that THR has the idea to follow that example and also appeal to private landowners in regional newspapers in Rotterdam.

The tiny house resident from another municipality describes that before he saw the ad, he was looking for a private piece of land but came across the high prices in the Randstad. He also indicated that you are then dependent on affordable land in the East of the Netherlands, but he doubted if he wanted that. He describes, *"I also know people who are enthusiastic about our houses and who are thinking about buying a piece of land here and having tiny houses set up."* He also thought about placing his tiny house in his parents' backyard.

The couple member of THR mentioned that they are also active in the group in an adjacent municipality and that they have appealed to private landowners, meanwhile there are two reactions. For Rotterdam she indicates that the municipality would be open to it. She continued, *"It is certainly still an option, but where do you start? You still have to place a call and hope that the right people respond. You just don't know who owns which land and how it all works and whether the destination is good and whether the municipality wants to cooperate. Then you are a few months further before you know if you can live there."*

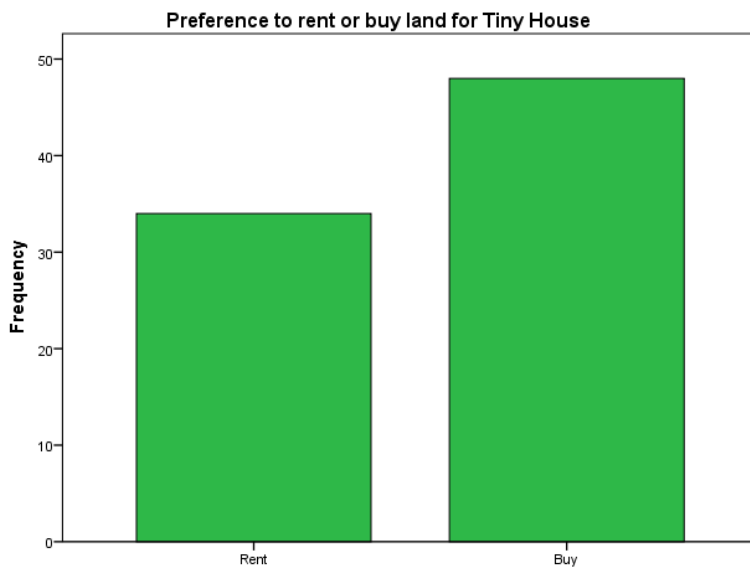
An official from the municipality of Rotterdam thinks it makes more possible if you already have a piece of land yourself, otherwise you will end up at the back of the line of people who want building land from the municipality. However, this does not immediately solve all problems (unless one literally builds a house of 50 m² with foundation according to the building decree). The official continues, *"I wouldn't say that is the quickest solution. ... As soon as you start to deviate with other materials, or want to go through a different permit procedure for temporary private land, you will encounter the same things as with municipal land. The more it does not look like a standard house, the more difficult it is."* Furthermore, he states that finding a location in an urban area is more difficult than with a rural municipality.

6.3.6 Land issue

Descriptive

As seen in figure 6.8, the majority (48) prefer to buy land for their tiny house rather than rent it (34).

Figure 6.8: Preference to rent or buy land for tiny house



Chi-square test

There was no significant relationship between gender³⁵, age³⁶ and income groups³⁷ and renting or buying land for a tiny house. However, there was a weakly significant link between the mobility of the tiny house and the renting or buying of land for it³⁸ (see table 6.5). In general, respondents who want or have a mobile tiny house want to rent the land more often (27 out of 34) and people who have a non-mobile tiny house want to buy the land more often (24 out of 48).

Table 6.5: chi-square test for de preferred type of land issue and mobility of tiny house

		<i>Is/ do you want your tiny house to be mobile?</i>			
		Yes	No	Total	
<i>Do you want to rent or buy land for tiny house?</i>	Rent	Count	27	7	34
		Expected Count	21,1	12,9	34,0
	Buy	Count	24	24	48
		Expected Count	29,9	18,1	48,0
	Total	Count	51	31	82
		Expected Count	51,0	31,0	82,0

³⁵ $\chi^2(1) = 2,561; p = 0,110, V = 0,177.$

³⁶ $\chi^2(1) = 0,095; p = 0,757, V = 0,034.$

³⁷ $\chi^2(1) = 0,097; p = 0,755, V = 0,034.$

³⁸ $\chi^2(1) = 7,322, p = 0,007, V = 0,299.$

Logically, there is also a moderately strong connection between wanting to move with a tiny house within Rotterdam and wanting to rent or buy land for it³⁹ (see table 6.6). People who do not want to move with their tiny house within Rotterdam are more represented in the group that wants to buy (19) than rent land (4), vice versa.

Table 6.6: chi-square test for the preferred type land issue and the desire to move within Rotterdam with tiny house

		<i>Do you have the desire to move with tiny house within Rotterdam?</i>				
		Yes	No	I have no preference	Total	
<i>Do you want to buying or Renting land for tiny house?</i>	Rent	Count	13	4	17	34
		Expected Count	10,4	9,5	14,1	34,0
	Buy	Count	12	19	17	48
		Expected Count	14,6	13,5	19,9	48,0
	Total	Count	25	23	34	82
		Expected Count	25,0	23,0	34,0	82,0

In addition, there are also differences in wanting to live in a community and wanting to rent or buy land for a tiny house⁴⁰. The respondents who want to rent the land want to live in a community more often (20) than those who do not want to rent (2). Respondents who want to buy land are more represented in the group (than expected) that does not want to live in a community (10). This difference did not appear to be a significant connection.

Logistic regression

The logistic regression analysis showed that there is no significant effect of gender, age and income on the preference to buy land for a tiny house compared to renting⁴¹ (see table 6.7). The model correctly classifies 58.5 percent of the observations. For women, the odds of wanting to buy land are a factor of 2.216 greater than men. For the elderly, the chance of wanting to buy land is a factor of 1.261 greater than the young. For people with a higher income, the chance of buying land is a factor of 0.729 smaller than for people with a higher income.

Table 6.7: logistic regression analysis for the preferred type of land issue

	<i>B</i>	<i>Sig.</i>	<i>Exp(B)</i>
<i>Female</i>	,796	,105	2,216
<i>Old</i>	,232	,665	1,261
<i>High Income</i>	-,316	,536	,729
<i>Constant</i>	,098	,831	1,103

³⁹ $\chi^2(2) = 7,656, p = 0,022, V = 0,306.$

⁴⁰ $\chi^2(2) = 4,686, p = 0,096, V = 0,239.$

⁴¹ $\chi^2(3) = 3.043, p = 0.385, Nagelkerke R^2 = 0.049.$

The couple member of THR indicates that they have delved into buying a piece of land, but that this proves to be difficult. Especially since they finance their house themselves, so there is no money left to buy land. *"The problem now is often that the lot size, they are often very large lots for a villa and if you divide that into small lots, you will get a reasonable amount at some locations - between 50,000 and 100,000 euros,"* one of the two describes.

She indicates that this is still too much for her and her boyfriend. But it could be an option to save and buy jointly with the community in those 10 years, provided the people are fun. She says, *"Especially if you want to buy with everyone, you want to know if those people are cool. In the worst case scenario, if people are not nice, then you can move. But if you buy land together, you will leave less easily I think."*

Rent or leasehold

An official from the municipality of Rotterdam indicates that they probably want to set up an association for the Keyenburg location. According to him, the municipality does not want to keep ten different tenants and contracts, they prefer a single point of contact. *"You become the administrator of this location. You ensure that it remains filled and that it is all in accordance with the rules that we have agreed with you. You pay us the annual amount, but how you get money from the tenants is then the responsibility of your own association,"* he advocates.

As shown in the previous section in the inventory of THN, there are several ways to issue land for tiny houses. For the Keyenburg location, the municipality will rent unbuilt land to a housing cooperative set up for this purpose, which will then rent it out to tiny house residents. There are two aspects that have influenced this choice; legal and financial.

Meanwhile, the chief lawyer of the municipality of Rotterdam has advised that in case "temporary housing" (including tiny houses) it is better to opt for renting unbuilt real estate. An official from the municipality of Rotterdam describes that he was briefly involved in the project and advised to lease the land. According to him, this has a number of advantages. *"Leasehold is a business right that you can also resell and you could get a mortgage on it,"* said the official.

However, there are a number of drawbacks to this way of land issue. First of all, the short duration of 10 years is not usual, given the nature of the leasehold, it is normally not issued under 25 years. Moreover, this is also not in line with the Rotterdam land policy. *"In principle, the Rotterdam land policy is based on an issuing system of leasehold rights that are issued perpetually,"* the official emphasizes.

In addition, there is a risk that the municipality will owe a fee when the leasehold expires. This compensation applies to real estate; the buildings, works and plants left behind. The tiny houses themselves do not fall under real estate, but movable property. Nevertheless, the municipality wants to limit the risk of compensation. The official also emphasizes that leaseholds are subject to rent protection on the rental of built real estate intended for residential purposes and not on the rental and rental of movable housing, unless it concerns a caravan. The official argues, *"If tenants do not enjoy rent protection, it is easier for the leaseholder to remove the houses at the end of the lease, as the termination options are more extensive."*

The municipality can control the risk of rent protection by recording agreements in the deed. For example, the real estate does not qualify as a caravan and allows the lease contracts for up to two years. The municipality is dependent on whether the housing association also adheres to these agreements. The official describes, *"If he does not do this or does not do so properly, there is a real risk that the houses cannot be removed on the expiry date of the lease, due to the continuous lease contracts. In addition, the rental agreements no longer qualify as temporary rental of housing, but as regular rental of housing to which the rental protection provisions therefore fully apply."*

If this happens, the municipality is obliged to take over the lease contracts from the housing association. There are grounds on which the municipality can terminate these (urgent personal use and / or realization of the land-use plan), but then the municipality should offer residents an alternative and contribute to the moving and furnishing costs (6,253 euros).

Ultimately, the advice is therefore to go for temporary land rental contracts for temporary living. First of all, when renting immovable property, there is in principle no rental protection provision and there are more grounds for termination of the lease, unless the unbuilt immovable property qualifies as a location (for a caravan). If this is not the case, the lease ends due to the lapse of time and there is no mandatory takeover of the lease.

"In the event of default by the housing association, the legal position of the municipality is stronger in the rental variant than in the leasehold variant. After the tenant (housing association) has been in default, the municipality can dissolve the rent out of court, without the municipality being obliged to pay compensation to the tenant," the official concluded.

Finally, the official emphasizes the financial consequences for choosing rent instead of leasehold. Namely, that the rental income lands at the Real Estate department (the initiator of the Keyenburg project). On long lease, the income would go to another department.

A member of THR was present at the meeting with the municipality that was about land issue. Here they would also have expressed their fear of tenancy rights. *"Actually, there wasn't really any discussion about that and they just said that's what we always do and that's what we're going to do now,"* she said. According to her, the choice for renting is also the reason why a selection must be made and that it is not possible to work directly with THR.

6.4 Satisfaction with possibilities

According to a member of THR, the process depends on the extent to which you have a municipality on your side. She has the impression that, compared to other municipalities, the municipality of Rotterdam is taking on a fairly active developer role and the stage of convincing political parties and aldermen has passed. However, she believes that the municipality should not necessarily act as a developer. According to her, the initiative group THR could take of that task for Keyenburg.

An official describes that the role of the municipality within the development of tiny houses is twofold. On the one hand, people come to the municipality because they want a piece of land. According to the official, they often want to temporarily rent a vacant piece of land at a low rent. In that sense, the municipality is a landlord to tiny house residents. *"However, this is not a core task of the municipality and they have therefore always been cautious in that respect,"* the official argues.

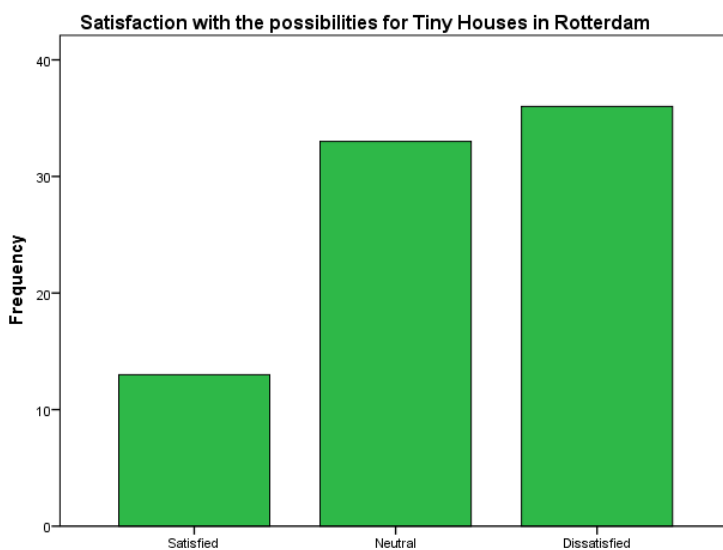
As for the search for land, one of the couple thinks that this could be done in collaboration between the municipality and THR. *"We had to give a presentation to the municipality and during that presentation they were quite overwhelmed with the information and knowledge that we had in house,"*

he highlights. His partner adds that she finds it difficult that the municipality does not always is equally transparent about locations. For example, they addressed a location to the municipality with the questions to whom it belongs and what they could do with it, but no real answer was given there. She thinks it's a shame that the location is left vacant in the meantime. She continues, *"And if only for two years, then people can still live there. I don't expect them to do anything there right now - and certainly not with the corona crisis- after all these years,"* she criticizes.

An official indicates that next to land the municipality is about what may or may not be built. He mentions that the land-use plan is a steering instrument for making tiny houses possible or not. Although the couple member of THR thinks they do have the municipality of Rotterdam on their side, they do describe the initiative group as being very enterprising while the municipality is still very busy making everything legal and making things realistic. *"I think that tiny house residents have a higher speed than the municipality and I definitely think that tiny house residents should be able to have a greater role in this. At the same time, I think that the municipalities could be a bit tougher in this and that they should just take the risk,"* one of the two said. She points to projects that, for example, only last two years with the possibility of being granted. She argues, *"Not that that's ideal, but it's better than no location. Because there are now just a few people who have finished their house in September and therefore have to move to alternative options."*

With regard to satisfaction with the possibilities for tiny houses in Rotterdam, the majority is dissatisfied (36), followed by the group that is neutral about this (33).

Figure 6.9: Satisfaction with the possibilities for tiny houses in Rotterdam



An official also feels that potential tiny house residents are not satisfied with the current situation in Rotterdam and understands that too. *"We've been working on it for so long, it's a bit embarrassing at times, too,"* the official admits. He continues, *"We had to do a soil study, a flora and fauna study, an acoustic study, you have to go through your crumbling procedure for that land-use plan, urban preconditions ... Things like that just take months. It is not that we can only designate a location, open the gates and people can drive in with their tiny houses."*

The size of the municipality could also play a role in this. The official describes that the lines in a large municipality such as Rotterdam are much longer and one does not know the people that work in other departments. *"They don't feel that it is really a necessity to come up with something new for someone from another department who is working on something completely different. They are trying to make things fit into existing procedures rather than tailor-make something that works faster,"* he described.

In addition, he mentions that it is difficult to learn from other municipalities, even though they have visited them. *"Actually, if you are going to ask about the municipal procedures, they do not clarify how they did this with a permit application, with adjusting the land-use plan, how you ensure that temporary rent does not yield rental rights. ... It seems as if they have – I will just call it - pioneered for a little,"* the official suspects. He adds that it seems that each location has invented its own wheel, but no model has yet been developed that can be used in every municipality.

Finally, he admits that it is also a matter of time division between tiny houses and all other assignments that need his attention much more. Tiny houses often remain in the background. He concluded, *"It is not the case that one person is busy with tiny houses full-time. Then perhaps something would have been possible sooner."*

6.5 Conclusion

In this last chapter we looked at how to acquire land for tiny houses. In addition to the complex regulations, the search for (affordable) land appears to be a major barrier for people who want to live in a tiny house. The Netherlands has a number of tiny house locations in the form of communities. According to a member of THR and treasurer of THN, these are mainly communities because municipalities earn more from this and tiny house residents often cannot buy land (without taking a loan). The municipality of Rotterdam has designated the Keyenburg location in Zuidwijk as a pilot for a community for 7 to 10 houses. This is in line with the majority of respondents who indicate that they would like to live in a community. Personal characteristics did not appear to have a significant effect on this preference.

Locations for tiny houses are mainly issued temporarily (maximum ten years). This means that a certain degree of self-sufficiency is required for the tiny houses. At the first tiny house location in Rotterdam, Keyenburg, the tiny houses can stand for 10 years and it is therefore important that they are completely off-the-grid so that they can be moved easily afterwards. The land allocation methods vary between purchase, rent, leasehold and loan. In some cases, residents do not pay money to the municipality, but social management is seen as the consideration. The municipality of Rotterdam is currently advised to opt for temporary houses (including tiny houses) for the rental of unbuilt real estate. The municipality rents the land to a specially established housing corporation, which again rents to the tiny house residents. The choice of rental would better protect the municipality against rent protection and compensation as soon as the housing corporation does not meet its agreements (compared to leasehold). The choice of rental for the community is in line with the preference of the people who have indicated that they prefer to rent, that they prefer to do this with others than alone. However, the majority of people indicate that they would rather buy land for their tiny house than rent it (and prefer to do it alone). In both cases, there is no clear preference from whom to buy or rent the land, the municipality or a private landowner. According to an official, appealing to private land makes a huge difference in the search for land, but even then there would still be a nuisance when applying for the permits.

In Rotterdam and the other municipalities, the demand for locations exceeds supply, so that a selection has to be found. Examples of other locations show that people can register individually and that, for example, the initiator can choose. The municipality of Rotterdam chooses to have people register as a community. This is of concern to some members of THR, since they have to determine among themselves who may or may not live, provided they are elected. The choice also makes it difficult for people who would like to live on location but who had not (yet) joined an initiative group / interested parties.

Although the municipality is working on tiny houses, the majority of respondents are dissatisfied with the possibilities that exist within the municipality of Rotterdam. In addition to Keyenburg, other locations are still being explored, with the most important criteria being that it can be realized quickly. An official understands that people are dissatisfied and acknowledges that it takes a long time. This is partly due to the fitting of tiny houses into municipal procedures that normally take a long time. But it is also a matter of a lower prioritization of tiny houses compared to the task for regular housing.

7. Conclusion & Discussion

In this research the following question was central: *“Which aspects influence the demand and possibilities for the construction of tiny houses and their locations within the institutional context of Rotterdam?”*. The conceptual model shows that this is influenced from two directions: the demand side and the institutional context.

7.1 Preferences for tiny house features and locations

The demand side is determined, among other things, by age and income. Most of the respondents are 34 years or younger. The income of the sample is divided almost evenly between the group that has a net monthly household income up to 2499 euros and 2500 and more euros. It was already known in the literature that tiny house residents often involve wealthy downsizers (Mingoya, 2015), as they earn more than the average (Mitchell, 2013). Evans (2019) concluded that there is therefore a choice rather than necessity. An ecologically sustainable life is ranked highest as a motivation to live in a tiny house. Looking at the income distribution, it is striking that finding the existing housing stock too expensive is ranked as number two. It is conceivable that some of the respondents do have the money to pay for a regular home but simply do not want to.

In addition to the personal characteristics, the construction of tiny houses is determined by preferences for tiny house features and locations. Most of the respondents want a tiny house that is mobile, between 30 and 49 m², and partially or completely off the grid. With a tiny house they would predominantly prefer to be on land in a rural environment. In the search for land, the preference is to buy on the land rather than rent, and the people who want to buy prefer to do so on their own (regardless of whether this is from the municipality or a private landowner).

7.2 Tiny houses in the Institutional context of Rotterdam

The conceptual model of this research shows that, on the other hand, the institutional context consists of various points that influence the construction of tiny houses. First of all, this is determined by the integration into the existing housing policy framework. Due to the enormous housing task, tiny houses were first seen as a bear on the road within the municipality of Rotterdam. Particularly because Rotterdam has a context of many small houses of low quality. The municipality already had plans to replace this with larger housing for the middle class, especially families.

However, since 2017, the municipality had been instructed to appoint one or more tiny house locations. Although the tendency is that tiny houses cannot contribute to the reduction of pressure on the housing market and the restructuring task. Opportunities are seen in areas such as innovation and sustainability, especially to learn for regular houses in the future.

In the short term, the updating of the quality policy for small houses will offer more space for the construction of tiny houses in Rotterdam, since the surface area of a house may be smaller if, for example, it is compensated by a common laundry room.

It is clear what the preferences regarding the location and methods of land acquisition are for the respondents. However, the construction of tiny houses is also determined by what is possible within the institutional context. This research has shown that finding an (affordable) piece of land and the complex regulations are the most important barriers to live in a tiny house. As can be seen in the

conceptual model, there are different ways in which tiny houses can get a place. One of these is the development of tiny house-specific communities. Almost half of the respondents want to live in a community. The municipality's choice for the tiny house community in Keyenburg fits in well with this.

In addition to municipal land, an appeal can also be made on a private plot (including renting from a private land owner). Buying your own plot of land or renting it from a private person could only shorten the search for land, according to an official. Nevertheless, the municipal procedures would still hinder when applying for a permit when there is a deviation from the standards.

Furthermore, it is interesting that due to the bombing of Rotterdam during the Second World War the roofs are predominantly flat and therefore there are possibilities for tiny houses on them. The questionnaire shows that a reasonable proportion of people are interested in this. Tiny houses on roofs could offer a good alternative to the space-consuming tiny houses on land that compete with land for the enormous regular housing task. Interestingly, the people who would like to live with a tiny house on a roof, want this more often in the inner city than the people who want to stand on land. Finally, some of the respondents would also be interested in a tiny house on water, but the possibilities for this have not yet been investigated.

To conclude, the given preferences for tiny house features and locations largely correspond to what is already known in the literature. Especially, the characteristics in the institutional context create specific opportunities and barriers for the construction of tiny houses in Rotterdam. The specific barriers are formed by competition with the enormous housing and restructuring task, characterized by the surplus of small houses of low quality. On the other hand, there are context-specific opportunities as a result of a unique flat roof landscape and the many harbours that enable tiny houses on roofs and water. Additionally, the updating of the quality policy for small houses creates more space in regulation. Finally, tiny houses are seen more as a means than an end in themselves. This attitude towards tiny houses does raise questions about the structural nature of tiny house. The Keyenburg location has been issued for ten years. It remains unclear what the position of tiny houses will be if enough has been learned for regular housing after those ten years.

7.3 Discussion

The choice to classify tiny houses under the heading of innovation, experimentation and sustainability does not fully do justice to the motivators of people who want to live in a tiny house. A sustainable lifestyle may be number one, but finding the existing housing stock too expensive comes second. Moreover, rising house prices are very topical and are also becoming increasingly visible in Rotterdam ((BAG, edited by the municipality of Rotterdam, 2019). It is conceivable that the current policy with a focus on the middle and high segments is a breeding ground for the growth in the popularity of tiny houses. It is interesting that in contrast to previous research (Shearer & Burton, 2019; Boeckermann et al., 2018; Mangold & Zschau, 2019), the motivator for sustainable living is superior to that of financial motivators. This could be related to the fact that this research is conducted in a different context .

Tiny houses would be made possible by using flexible land-use plans (Chapin, 2011). This ambition has not yet been expressed with regard to tiny houses. But perhaps this will become an option in the future under the Environmental Planning Act, in which flexibility is an important pillar. In the shorter term, the updating of the quality policy for small houses will offer more space for the construction of tiny houses in Rotterdam. Nevertheless, affordability of land would still remain a barrier. Hesselberth (2019) already argued that Dutch metropolitan areas are too expensive for tiny house builders. This

research also shows that tiny house builders do not have the money for this, don't want to spend that much money or do not want to take out a loan.

In addition to the scarcity of locations, the problems surrounding the integration into municipal procedures will continue to hinder the development of tiny houses for the time being. Solving the latter requires customization and prioritization which is not yet the case within the municipal system. If there are no structural adjustments within the municipality, the construction of tiny houses will continue to be based on patience and luck. Patience on the availability of municipal land and going through procedures. Finally, the luck that these locations match the preferences or that private land becomes available. The municipality had no specific location requirements until so far except that these must be realized quickly. By coincidence, this worked out well with the release of Keyenburg in Zuidwijk. The question then is whether a possible next location will match the preferences too.

7.4 Recommendation for praxis

Insights from this research result in recommendation for praxis, on both a local and national scale. The questionnaire showed that complex regulations and high land prices are the two biggest barriers to living in a tiny house.

Firstly, the municipality could make land-use plans more flexible, so that a procedure would not have to be started to deviate from the land-use plan every time. When addressing land-use plans, specific consideration should also be given to the possibility of dividing larger plots into smaller plots if there is a demand. This would have a positive effect on the high land prices that potential tiny house residents are currently facing. As a result, potential tiny house residents become less dependent on the municipality that makes land available. Moreover, this is also in line with the majority of the respondents who indicate that they would rather buy than rent land for their tiny house.

In the above, it would help if guidelines are given at a national level for the integration of tiny houses, so that municipalities spend less time and manpower on reinventing the wheel. The national government can take an example from the US, where steps have already been taken by including a tiny house appendix in the International Residential Code. These efforts first require recognition of the financial motivations behind the tiny house movement. This realization ensures that the link can be made between tiny houses and larger housing affordability issues, so that tiny houses will be prioritized.

7.5 Insight for theory

In addition to praxis, the insights of this research can also contribute to theory. Shearer and Burton (2019) have made a first attempt to come up with a typology of tiny houses. First, in the typology, tiny house communities (2c) fall under the category permanent, with the description that *"the land is permanently intended for this purpose and dwellings do not usually move"* (shearer & Burton, 2019, p. 314). However, of the 13 projects known by THN (excluding Rotterdam), only 4 are permanently intended for tiny houses. The municipality of Rotterdam will also temporarily issue the Keyenburg location for 10 years (which is the maximum number of years there can be deviated from the land-use plan). There are municipalities that issued the land for even less than 5 years. Thus, the categorization of tiny houses under the category permanent does not always apply, at least not in the Netherlands. Instead, tiny house communities could be considered as a separate category.

Second, Shearer and Burton (2019) use size and mobility as defining features. However, in this research it has become clear that the degree of self-sufficiency, off-the-grid, is a determining characteristic for

the possibility of tiny houses at some locations. With tiny house communities on municipal land, the municipality can set requirements for the degree of self-sufficiency. This has to do with the temporary nature of the project and the fear that the tiny house residents do not want to leave and the fear that (legally) they would not have to leave. The temporary nature of tiny house communities (in the Netherlands) reinforces the argument for referring to the degree of self-sufficiency as a defining feature. In this case mobility of the tiny houses is not enough.

7.6 Research limitations and recommendations for further research

There are a number of limitations to this research and new questions have emerged that can contribute to future research. First of all, the results are difficult to generalize because it is a case study. Rotterdam is faced with an enormous housing and restructuring task, a surplus of small houses and a unique flat roof landscape. These characteristics influence the integration of tiny houses within the city that do not apply in another city. Nevertheless, the combination of a questionnaire, interviews and content analysis has resulted in interesting insights that are relevant to both theory and practice.

It should be noted, however, that the insights would be of more significance if more respondents had completed the questionnaire. Because the population is relatively small, the sample was sufficient. However, more statistical tests would be useful if the number of respondents were higher, as can be seen from the unusable ordinal regression analysis (due to a too low number of observations).

Furthermore, there were limitations to the option to choose multiple answers for the questions on location preference. This data turned out not to be suitable for regression analysis. In particular, it is unfortunate that no statements have been made about the relationship between mobility and location preferences as done by Shearer and Burton (2019). Finally, the answer categories have stopped at five years for the questions about the desired duration of stay with a tiny house in Rotterdam. In view of the fact that it is possible to deviate from a land-use plan for a maximum of ten years, a different distribution should be made (over ten years). This could say more about match between the preference and the possibilities.

In terms of content, this research has yielded new questions that can be answered in future research. Examples of this are:

- How can tiny houses be incorporated into procedures of Dutch municipalities?
- What are the opportunities and obstacles for tiny houses on private land?
- What are the opportunities and obstacles for tiny houses on water and / or roofs?
- What can flexible zoning plans contribute to the construction of tiny houses?

A final remark is that this research and the data collection of the questionnaire are still ongoing.

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