

Building resilience

Unveiling the power of the built environment in fostering resilience for liveable and thriving neighbourhoods

Research proposal P2

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Abstract – In many Dutch neighbourhoods with a large social housing stock, a concerning development of nuisance and unsafety is emerging alongside an increasing concentration of vulnerable residents. These neighbourhoods often show little resilience, resulting in reduced overall liveability. Research indicates the important role of the built environment in shaping neighbourhood resilience. However, studies in the past decade have mostly overlooked the connection between social environments, such as neighbourhoods, and the specific elements that enhance resilience. This knowledge gap makes it difficult to understand how the built environment can contribute to neighbourhood resilience. Therefore, this study aims to explore how the built environment can enhance neighbourhood resilience to help prevent a decline in liveability when neighbourhoods face an influx of vulnerable residents by answering the following research question: “How can the built environment foster and enhance resilience within Dutch Neighbourhoods characterized by a large social housing stock and growing concentrations of vulnerable residents, thereby addressing the unfavourable developments of nuisance and unsafety in these areas?” To answer this research question, quantitative and qualitative data collection methods will be used. The approach involves selecting four cases using the resilience maps available on ‘Aedes’ and the ‘leefbaarometer’. Within these four neighbourhoods, in-depth interviews will be conducted with municipalities, housing associations and other institutes like welfare organisations, to gather insights into the usage and quality of the built environment. This research holds particular relevance for municipalities and housing associations operating in neighbourhoods where the amount of social housing and the number of vulnerable residents remains high. Determining which specific factors of the built environment enhance resilience can provide valuable insights to decision-makers, providing them with better tools to make well-informed investments. This research should, therefore, produce recommendations that are especially relevant to municipalities and housing associations, providing guidance on which elements of the built environment are worth addressing to enhance neighbourhood resilience.

Key words – Neighbourhood resilience, built environment, vulnerable residents, social housing, Dutch neighbourhoods, liveability

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Chapter 1



1. Introduction

1.1 Short problem statement

In numerous Dutch neighbourhoods characterized by a large social housing stock, an unfavourable development of nuisance and unsafety is emerging. This trend is frequently accompanied by a growing concentration of vulnerable residents. These neighbourhoods often show little resilience, which means that an increase of vulnerable residents coincides with reduced liveability. Resilience in this context is defined as the extent to which a neighbourhood can cope with an increasing concentration of vulnerable residents. In a resilient neighbourhood, an increase in vulnerable residents will not lead to reduced liveability (Leidelmeijer et al., 2020). Research suggests that the built environment plays a significant role in shaping neighbourhood resilience. By improving the built environment, neighbourhoods could potentially become more resilient and thus better cope with changes in population dynamics. However, even though this social approach of resilience has been frequently used during the last decade, a connection with social environments such as neighbourhoods is largely missing in these studies. Consequently, the specific elements that enhance a neighbourhood's resilience are not really known, making it difficult to determine how the built environment can contribute to the resilience of neighbourhoods (Parés et al., 2018; Platts-Fowler & Robinson, 2016). By understanding how the built environment can enhance neighbourhood resilience, it could help prevent a decline in liveability when neighbourhoods experience an influx of vulnerable resident.

1.2 Critical overview and main findings literature and market research

1.2.1 History and current policies of social mixing

Since resilience in this research is determined by increasing numbers of vulnerable residents in a neighbourhood, it is essential to have a good understanding of who these vulnerable residents are. Furthermore, it is important to comprehend how certain population groups have been historically perceived in the context of liveability. This understanding is very important, because if there is clarity about the context in which a specific policy has emerged, recommendations can be better aligned with it or intentionally deviate from it. The following paragraphs therefore briefly explain how liveability problems have been addressed in the past and how resilience has been introduced within Dutch neighbourhoods.

Developing strategies to improve deprived neighbourhoods is a timeless endeavour. One of these strategies involves the improvement of disadvantaged neighbourhoods through social-mixing. Naturally, this approach has a long history. The first ideas to mix neighbourhoods originated as early as the 19th century in England and have drawn interest in the Netherlands since the 20th century. This led to policies on urban renewal with a main focus on differentiating the housing stock and population in urban renewal districts (Musterd & Ostendorf, 2001; Platform 31, 2023).

To provide a concise history of these types of policies implemented in the Netherlands, we need to go back to 1997 when the note on urban renewal was introduced. This note primarily aimed at the large-scale transformation of post-war neighbourhoods. During that period, there was a significant emphasis on the negative effects of the concentration of what was then called 'ethnic minorities'. This housing and restructuring policy aimed to bring about change in this regard. In 2003, Minister Kamp introduced the 56-neighbourhood approach to stimulate progress, as urban renewal was not progressing successfully enough. This approach primarily aimed at fostering cooperation among local stakeholders (Ouweland, 2018; Musterd & Ostendorf, 2001).

Then, in 2006, the VROM-council issued the advice to emphasize the social uplift of residents in disadvantaged neighbourhoods and make the physical aspects subject to this social approach. This advice was followed: the social aspect was given a central place in national policy and the neighbourhood action plans for the 40 neighbourhoods designated by Minister Vogelaar. Many neighbourhoods within the 56-neighbourhood approach were also part of the 40-neighbourhood approach. The fundamental goal of the 40-neighbourhood approach was to address both social disadvantages and liveability issues in these areas, with the aim of revitalizing them into thriving living,

working and learning environments within a time-span of eight to ten years. However, the 2008 financial crisis and reports appearing from 2013 onwards highlighting the limited or absent effects of this neighbourhood approach, placed the policy within a different context. In 2015, the end of the neighbourhood approach became official when Minister Blok reinstated responsibility into the hands of the market, local parties and residents. The mixed neighbourhood was no longer part of the agenda, until a report about resilience in areas with a large amount of social housing was published in 2018 (Ouwehand, 2018; Platform 31, 2023).

Since 2018, three reports on resilience have already been published, with updates every few years. In these resilience reports published by Leidelmeijer et al. (2020), it is observed that the concentration of vulnerable residents in areas with large amounts of social housing continues to increase. Additionally, the development of nuisance and unsafety in these same areas is less favourable compared to neighbourhoods with less social housing. Therefore, differences between these neighbourhoods and the rest of the country continue to widen. In this context, the following groups are identified as vulnerable residents:

- People dependent on welfare benefits
- People with an origin from one of the refugee countries (Syria, Iraq, Iran, Ethiopia and Eritrea)
- People with mild intellectual disabilities
- People with psychiatric disorders
- People with multiple, chronic somatic conditions and mobility limitations

This definition of vulnerable residents clearly indicates a shift in emphasis compared to previous policies.

The reports further show that an increasing number of housing associations are directing their policies towards more differentiation of the housing stock in order to reduce the number of vulnerable residents in neighbourhoods where liveability is under pressure. A decrease in this concentration generally correlates with improved liveability. However, especially in the areas with more than 80% social housing, a decrease in the share of vulnerable residents often does not lead to an improvement in issues related to disturbance and safety (Leidelmeijer et al., 2020).

The reports by Leidelmeijer et al. (2020) are particularly important for this study as they focus specifically on resilience in Dutch neighbourhoods. In fact, these reports have served as the main starting point for this research proposal. They describe resilience as the extent to which a neighbourhood can cope with an increasing concentration of vulnerable residents. In a resilient neighbourhood, an increase in vulnerable residents does not lead to reduced liveability. More details on how their findings are used in this research are discussed later in this report. The following sections will first elaborate on how resilience has evolved in the social sciences and how other researchers have applied it.

1.2.2 Resilience

The concept of resilience can be traced back to its roots in the physical and natural sciences. At its fundamental core, it describes the ability to bend, bounce back and return to equilibrium in the presence of pressure and stress, as opposed to breaking. This was the foundation for the initial adaptations of resilience theory within societal contexts, which primarily focussed on preparedness for emergencies and disasters. It was therefore first used by organisations tasked with responding to challenges such as climate change, health crises, acts of terrorism and natural disasters. In the current context, resilience is more often used as a means of supporting vulnerable people and addressing inequalities (Platts-Fowler & Robinson, 2016; Norris et al., 2008).

When resilience concerns social actors (e.g., individuals, organisations or communities), it is referred to as social resilience. In contrast to the broader resilience discourse, social resilience takes on an actor-oriented perspective, emphasizing the capacities and practices of these social entities instead of the functioning of systems (Keck & Sakdapolrak, 2013). Social resilience can be conceptualised within communities, neighbourhoods and cities. Magis (2010: 401) defines community resilience as “the

existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise". Spaans & Waterhout (2017: 109) define urban resilience as "the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow regardless of the kinds of chronic stress and acute shocks they experience". Both definitions touch on the idea that resilience is not just about surviving challenges, but also about thriving and growing despite them. They recognize that resilience can lead to positive developments, not just mere survival. However, some studies limit resilience to the ability to cope with change, indicating varying levels of resilience. Although Magis (2010) and Waterhout (2017) probably describe the most advanced form of resilience, it's crucial to recognize that neighbourhoods effectively coping with change also demonstrate resilience. An important last note that remains to be made in this paragraph is that when the principles of resilience are translated from the natural to the social sciences, resilience should not be interpreted as self-reliance. It should not imply that residents are solely responsible for their own problems, allowing the state to retreat from its responsibilities (Davoudi et al., 2012).

This research focusses on social resilience within neighbourhoods, as the liveability problems outlined by Leidelmeijer et al. (2020) vary at the scale of the neighbourhood. Even among adjacent neighbourhoods, there can be significant differences in resilience levels. While social resilience has been largely studied during the last decade, its application in a geographical context has been limited in research. "The neighbourhood" is one of the possible geographical lenses through which social resilience can be conceptualised (Parés et al., 2018; Stevenson & Petrescu, 2016). Parés et al. (2018) also note the scarcity of research delving into the specific capacities that contribute to a neighbourhood's resilience. The following paragraphs elaborate on studies that did look at neighbourhood resilience. As previously mentioned, resilience is about a neighbourhood's ability to effectively navigate change. Each study therefore investigates a specific change. While not all studies address changes in population composition, as Leidelmeijer et al. (2020) did, their relevance lies in the exploration of issues related to liveability and the interplay between resilience and the built environment.

The research by Parés et al. (2018) offers valuable insights into resilience by examining two neighbourhoods with many characteristics in common that responded differently to the same stressor. Their study focusses on two neighbourhoods in Barcelona with similar historical contexts, yet their responses to the 2008 financial crisis were notably different. As mentioned above, Parés et al. (2018) emphasise that few studies have specifically delved into neighbourhood resilience. Furthermore, they highlight that, while multiple studies have demonstrated how to measure social resilience, too few have investigated the specific capacities that make a neighbourhood more resilient. According to their research findings, Parés et al. (2018) argue that both physical and social aspects play a role in influencing resilience. They imply that the built environment, social capital and civic capacity collectively determine a neighbourhood's resilience. Social capital refers to the social ties people have with each other, while civic capacity is about how governmental and non-governmental entities collaborate to achieve desired outcomes.

The explanation for the selection of the two investigated neighbourhoods, 'Ciutat Meridiana' and 'Bellvitge', lacks clarity. There is a reference to prior research that examined multiple cases. This research likely describes the characteristics of the different neighbourhoods, providing Parés et al. (2018) with sufficient information to arrive at these two neighbourhoods. To ensure consistent comparisons, they maintained several constant variables. For example, both neighbourhoods were constructed in 1960, primarily through the development of apartment blocks and a significant number of the initial residents originated from the southern parts of Spain. Additionally, both neighbourhoods are home to many low-income residents. The deliberate variation in other aspects between the two neighbourhoods aims to draw valuable conclusions. Bellvitge, for instance, is much more resilient than Ciutat Meridiana, as reflected in factors such as unemployment rate. Furthermore, the neighbourhoods differ in characteristics related to the built environment, social capital and civic capacity. Ciutat Meridiana's residents describe a lack of facilities and good public spaces. They commonly believe that they are victims of disinvestment from both public and private sectors. In contrast, Bellvitge shows that

the number and quality of facilities, amenities and public spaces have increased, while the number of residents has remained roughly the same. Thus, the facility density per person has actually increased. The favourable conditions in the physical environment contribute to a sense of community pride and belonging, promoting social connections. This is further encouraged by the belief that community involvement has a positive impact on the quality of the physical aspects of the neighbourhood. Parés et al. (2018) therefore conclude that resilience is determined by the context of a neighbourhood before changes take place. The built environment is one of the three elements that determine this pre-change context.

Platts-Fowler & Robinson (2016) have written a paper in which they developed a working definition for community resilience, a method for assessing resilience and an understanding of the factors that enhance community resilience. They employ the same definition for resilience as Magis (2010), but use a more comprehensive explanation of the concept of a community. Their analysis "focusses on communities of place and, in particular, the neighbourhood" (Platts-Fowler & Robinson, 2016: 769). Thus, both the research by Parés et al. (2018) and Platts-Fowler & Robinson (2016) concentrate on neighbourhood resilience.

In contrast to Parés et al. (2018), Platts-Fowler & Robinson (2016) clearly outline their method for selecting resilient neighbourhoods. They first emphasise that a neighbourhood's resilience can vary significantly depending on the specific change or stressor considered. Therefore, it is very important to provide a thorough explanation of the particular change or stressor under investigation. In their research, resilience is measured by using regression models, where the stressor is placed on the x-axis and the outcome on the y-axis, see figure 1. The study assesses three stressors: deprivation, unemployment and loss of income and eight outcomes, including crime rates and anti-social behaviour. The resulting regression models enable the identification of neighbourhoods that exhibit higher resilience levels. A total of 100 neighbourhoods in Sheffield were examined, of which four resilient neighbourhoods were further studied to determine which factors contribute to their resilience. Figure 2 visualises how resilience levels influence the performance of a neighbourhood.

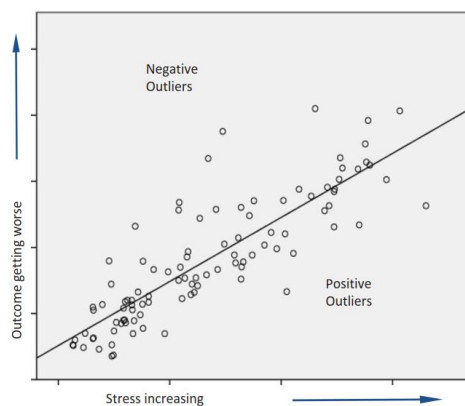


Figure 1: Identifying resilient neighbourhoods (Platts-Fowler & Robinson, 2016)

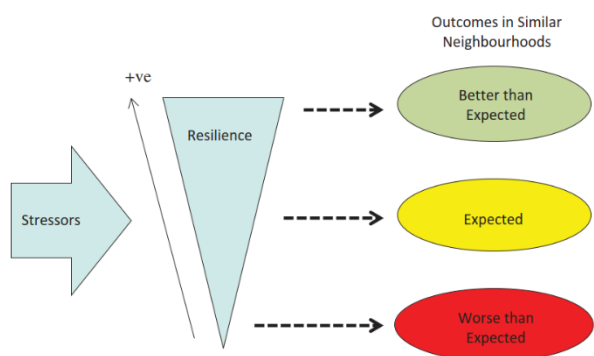


Figure 2: The effects of resilience (Platts-Fowler & Robinson, 2016)

Platts-Fowler & Robinson (2016) conducted multiple interviews within the four selected neighbourhoods. The interviews, which included residents, resident organisations and healthcare workers, aimed to explore factors contributing to the neighbourhood's better-than-expected outcomes. The interviews unveiled a recurring theme: clusters containing shops, services and various amenities played a crucial role in these neighbourhoods, alongside buildings designed for multiple activities. Furthermore, parks, particularly those designed for active use, were emphasised as very important. Within the specific case they studied in 2013, it was suggested that housing also played an important role, especially the affordability of housing. The relatively low cost of housing enabled residents to spend more time on community activities since they did not have to pay off a large mortgage (Platts-Fowler & Robinson, 2013). Another important finding was that neighbourhood resilience can easily fall apart

when important facilities and amenities close or when a rapid change in population is experienced. Therefore, the potential reduction of amenities, such as libraries and other community buildings, naturally raised significant concerns. Platts-Fowler & Robinson (2016) conclude that these factors are part of the social and physical context, one of the key explanations for resilience, see figure 3. Thus, both Parés et al. (2018) and Platts-Fowler & Robinson (2016) highlight the importance of the physical context. Both studies have also highlighted that the specific resident composition of the neighbourhood did not really matter, it was more important that the local population remained stable. As a negative consequence, this could also lead to exclusion of new residents (Parés et al., 2018; Platts-Fowler & Robinson, 2016).

Explanations for resilience	Elements identified by respondents
<i>Who lives there</i> The circumstances and situations of the population	<ul style="list-style-type: none"> ● Individual resources ● Age profile ● Capacity to engage ● Population stability ● Diversity and difference
<i>Social and physical context</i> The local context or setting, including resources, services, amenities and facilities	<ul style="list-style-type: none"> ● Physical environment ● Facilities and amenities ● Service provision ● Active citizenship ● Media and communications ● Links to power and influence ● Housing ● Crime and antisocial behaviour
<i>Nature of community</i> The sense of community, including shared notions of belonging	<ul style="list-style-type: none"> ● Shared notions of belonging and identity ● Inclusive communities

Figure 3: Key explanations for resilience (Platts-Fowler & Robinson, 2016)

While the study conducted by Moore et al. (2020) may not primarily focus on the built environment, it does demonstrate once again that certain neighbourhoods can exceed expectations due to their resilience. Their study focuses on a neighbourhood in Houston, Texas, which scores poorly on various aspects, with high unemployment rates and frequent incidents of violence. Additionally, the neighbourhood's structure is highly unfavourable, posing challenges for residents to engage in physical activity. The study investigates whether pro-social behaviour could still contribute to increased physical exercise. This relationship was indeed discovered. Therefore, a connection was established between resilience and pro-social behaviour, revealing that residents in resilient neighbourhoods participate in more social activities, offer mutual assistance and, as a result, engage in more physical activity.

Similar to the research conducted by Platts-Fowler and Robinson (2016), Breetzke & Pearson (2015) undertook a study across multiple neighbourhoods in New Zealand to identify those that overachieve in the face of adversity. By using regression models, they developed a crime resilience index based on various variables associated with high levels of crime, such as unemployment rates and income. Their research reveals that some communities respond better to criminal behaviour despite facing similar challenging circumstances, indicating a higher degree of resilience. These resilient neighbourhoods are characterized by more rural settings, higher population densities, and greater proportions of long-term residents. While one might expect higher crime rates in densely populated areas, the presence of more job opportunities and amenities ultimately leads to greater resilience and fewer crimes.

Pearson et al. (2014) also conducted a study in New Zealand, investigating the connection between resilience and the quality of the housing stock. In this research, a resilient neighbourhood is defined as one that may be deprived, yet residents still exhibit good health. This study utilises a resilience index similar to the one employed by Breetzke & Pearson (2015), along with data tracking the quality of properties throughout New Zealand. The resulting models consistently demonstrated that high-quality housing significantly contributes to fostering resilience. Therefore, the researchers suggest that investing in housing quality is advisable to enhance resilience and thereby promote overall health. Figure 4 illustrates the relationship between housing quality and resilience.



Figure 4: resilience and housing quality in Wellington, New Zealand (Pearson et al. 2014)

The final relevant study to be discussed in this section focuses on resilience in areas affected by hurricanes. Studies on disasters were intentionally avoided in this literature review, because dealing with their consequences and coping with social and economic difficulties in a neighbourhood are two very distinct aspects. However, Carpenter's (2015) research demonstrates how the built environment influences resilience in these areas through social bonds that people have developed. Resilience in this study was measured by examining the number of people who return after the disaster. The study identified intersection density, historic sites and amenities where people could easily gather like cafes and town halls as significant factors influencing resilience. Intersection density reflects connectedness, accessibility and walkability. Historic sites include monuments and cultural icons in the area.

Since this research could show that, similar to this last study, the built environment contributes to the formation of social bonds and thereby promotes neighbourhood resilience, section 1.2.4 will briefly discuss the role of social cohesion within vulnerable Dutch neighbourhoods. However, this research does not centrally address this social aspect, even though it's essential to recognise this potential relationship. This research does not primarily aim to determine whether the built environment always directly influences resilience or if its influence operates through intervening variables (intervening variables will be explained in section 1.2.5).

Now that studies examining neighbourhood-level resilience and investigating the relationship between resilience and the built environment have been extensively reviewed, the next section will provide a more detailed examination of how various studies have characterised the built environment. This is very important since the influence of the built environment is a central focus in this research. To precisely determine what constitutes the built environment and identify its most important elements, the following section offers an exploration of diverse perspectives from different researchers.

1.2.3 Built environment

When looking for literature on the description of the built environment, one frequently encounters very general descriptions. For instance, Moffatt & Kohler (2008) describe that the built environment is often referred to as Man-made environments that are used for human activity which can range from large-scale urban settings to private locations. However, such descriptions alone are insufficient for conducting thorough research on the influence of the built environment. Parés et al. (2018), Platts-Fowler & Robinson (2016) and Rashidfarokhi & Danivska (2023) provide tools for a more nuanced description of the built environment.

Parés et al. (2018) look at the built environment from two perspectives: morphology and geographical position. Morphology focusses on the quality of housing, amenities and public spaces and types of buildings and facilities. Geographical position explores the neighbourhood's interconnectedness with adjacent areas and its broader relationship with the city, using terms such as isolation, urban barriers and topography. It investigates the relationships between peripheral neighbourhoods and the challenges they face.

Platts-Fowler & Robinson (2016) refer to the built environment as the physical context, which, as illustrated in figure 3, includes the physical environment and green spaces, facilities, amenities and housing. In their research, green spaces, particularly parks, were consistently emphasized as highly important. Regarding facilities and amenities, the primary considerations were a good concentration of facilities and amenities (they should not be too spread out) and suitability for intended activities. For housing, the main concern was the attractiveness of the facades.

Rashidfarokhi & Danivska (2023) look at resilience from a community perspective. They highlight the impact of the built environment on the social resilience of communities. It shows that the built environment plays an important role in shaping a collective identity and meaning within these communities, which, in turn, contributes significantly to their resilience. Furthermore, the functionality and performance of the built environment determine whether people's needs are adequately met before, during and after crises. The research identifies specific attributes of the built environment that can either positively or negatively affect social resilience, such as Urban form, Movement & accessibility, architecture and style, Technical infrastructure and functionality and aesthetics. While their research provides valuable insights into the elements of the built environment that influence social resilience, the term "community" can be quite broad and ambiguous. A more practical approach is to examine resilience from a geographically specific perspective, such as the neighbourhood, as demonstrated by Parés et al. (2018) and Platts-Fowler & Robinson (2016).

As the 'leefbaarometer' serves as a criterion for selecting neighbourhoods, as explained later in this report and given the connection to the resilient reports by Leidelmeijer et al. (2020), it is important in this section to delve into how these studies interpret the built environment. By looking at the studies discussed above, three indicators from the 'leefbaarometer' appear to be relevant: housing stock, the physical environment and amenities. These indicators encompass various environmental characteristics that collectively contribute to the indicator's total score. Not all characteristics, however, are relevant to this study. For example, the characteristic 'air quality' categorised under the physical environment, is not pertinent (Mandemakers, et al., 2021). Table 1 outlines the relevant characteristics for each indicator. Since neighbourhoods will be selected using the 'leefbaarometer' it is crucial to use these characteristics as a basis for defining the built environment and to align other research with these criteria.

At first sight, it may appear that the ‘leefbaarometer’ lacks numerous features necessary for making truly insightful statements about the built environment. This limitation will also be addressed in the final limitations of this research. However, the availability of data allowing for statements about such characteristics at the neighbourhood level is quite limited. Consequently, the ‘leefbaarometer’ will still serve as the basis for selecting cases. Additionally, the characteristics that determine the quality of the housing stock, for instance, are associated with the attractiveness of buildings and housing maintenance. Thus, some characteristics provide more information than what might be expected at first glance.

Indicator	Environmental characteristics
Physical environment	<ul style="list-style-type: none"> - Function mixing (retail, industrial, offices) - Proximity green (amount of and distances to forests, open nature and green places) - Vacancy rate retail
Housing stock	<ul style="list-style-type: none"> - Living space* - Building height* - Vacancy rate housing** - Building period*** - Type of housing*
Amenities	<ul style="list-style-type: none"> - Distance to education, restaurants, cafés, culture (libraries, museums, theatres and cinema’s), supermarkets and healthcare - Density of amenities (restaurants, cafés, shops for daily groceries)

Table 1: Relevant indicators and characteristics (own work, derived from Mandemakers et al., 2021)

**Characteristics associated with the judgement of the attractiveness of buildings in the neighbourhood*

***Characteristics associated with the judgement of the maintenance of housing*

****Characteristics associated with the judgement of the attractiveness of buildings in the neighbourhood and of the maintenance of housing*

The resilience reports published by Leidelmeijer et al. (2020) and other publications from the research firm Circusvis provide insights into key focus areas for municipalities and housing associations to enhance resilience. In neighbourhoods facing significant challenges, initial efforts often involve reducing the concentration of vulnerable residents by offering housing to people with more favourable socio-economic positions and transforming the housing stock through demolition and new construction (the yellow and blue squares in figure 5). However, as problems become substantial, a combination of measures becomes necessary. In addition, differentiating is not always feasible. Therefore, two additional or alternative approaches are suggested: focussing on the social aspect (the green square in figure 5) or addressing the built environment (the red square in figure 5). The built environment encompasses facilities and amenities, public spaces, greenery conditions, the quality of buildings and the state of current housing. In an instructional video demonstrating the use of the resilience maps, Jeroen Frissen explains that they have visited the 10 most and 10 least resilient neighbourhoods. Even without knowing the location, the built environment immediately revealed whether they were in a resilient neighbourhood or not. This illustrates that the state of the built environment is very important and things like the condition of the facades of a school truly matter (Leidelmeijer et al., 2020; Frissen & Windhausen, 2021; Aedes, 2023)

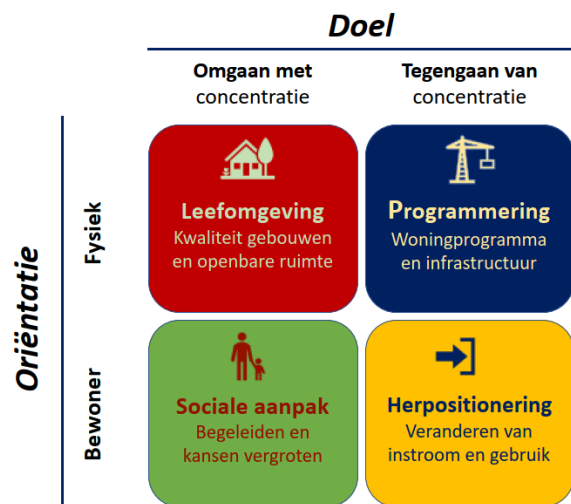


Figure 5: Making resilient neighbourhoods (Frissen & Windhausen, 2021)

The insights from this paragraph will be used to determine which specific elements within the built environment will be studied in this research. This will be further described in the sections on research methodology. As indicated in section 1.2.2, the next section will first provide a brief overview of social cohesion within vulnerable neighbourhoods. This section also shortly revisits section 1.2.1 by elaborating on the reports that evaluated regeneration policies.

1.2.4 Liveability and social cohesion

Numerous studies, including those that critically assess the effects of the 40-neighbourhood program, have examined whether the liveability within neighbourhoods that were subject to regeneration policies has indeed improved. As previously mentioned, the results often show mixed conclusions (Ouweland, 2018). These differences in findings partly have to do with the fact that there is no consensus about when improvements in liveability can be measured. Furthermore, measuring liveability is not always straightforward. In some studies, residents were asked to assess whether they perceived an improvement in liveability, making it a subjective evaluation. It often remains unclear in these studies how liveability was explained to the interviewees. In addition, other studies that do explain how they measure liveability differ in the indicators they use. For instance, some studies focus on safety indexes, while others consider factors like crime rates and cleanliness (Teernstra, 2015; Uitermark et al., 2007). Understanding how vulnerable neighbourhoods have been addressed in the past is very important. Similar to measuring liveability, diverse methods for assessing resilience could lead to varying results and the effects of interventions may only become apparent after a substantial period. Therefore, these lessons from past experiences should help to avoid prematurely halting interventions.

Within the urban restructuring programs, policy makers have often argued that these more diverse living environments would foster interaction between new and existing residents. However, multiple studies have demonstrated that these interactions almost never occur, the contacts tend to be superficial and residents coexist alongside each other at best (Meij et al., 2021; Musterd & Ostendorf, 2001; Uitermark et al., 2007). Contrary to these positive presumptions, multiple scholars have warned for the undermining of social networks that provide vulnerable residents with important contacts and resources (Uitermark, 2003). The study by Meij et al. (2021) further shows that long-term residents often feel alienated from their own neighbourhood and that increased liveability does not compensate for their lost contacts. Thus, social mixing could lead to reduced social cohesion. Nevertheless, some neighbourhoods show limited cohesion even before middle-classes enter the neighbourhood (Ouweland, 2018). This implies that social contacts may be limited both before and after neighbourhood restructuring.

As previously mentioned, this research does not specifically examine whether or not social connections are formed. It remains a possibility that the built environment plays a role in the formation

of social connections, or conversely, that pre-existing limited social cohesion remains unaffected by modifications to the built environment. Therefore, it is acknowledged in this research that these possibilities exist, otherwise, there is a risk of solely attributing observations to the built environment, as will also be explained in the next paragraph. However, at present, it is considered less important to precisely determine whether the built environment directly or indirectly influences resilience in neighbourhoods. The primary focus is on demonstrating that elements of the built environment can positively contribute to resilience, allowing for clear recommendations. The distinction between direct and indirect effects is, for now, deemed less crucial.

1.2.5 Physical determinism

For the credibility of this research, it is important to acknowledge a phenomenon known as physical determinism. Therefore, this final section of the literature review describes the meaning of the term and its implications in social studies that explore the relationship between the built environment and human behaviour.

When making deterministic assumptions in social research, it implies that human behaviour is solely attributed to one class of events or conditions. When research establishes this relationship between the built environment and human behaviour, terms like environmental determinism and geographical determinism are often used (Franck, 1984; Hiller et al., 1986; Marmot, 2002). In her research, Franck (1984) uses architectural determinism to outline this connection between the built environment and human behaviour. She describes that researchers labelled as determinists often suggest that the built environment is the sole influencer of human behaviour or consider it the most crucial factor. Deterministic research, therefore, often faces criticism for neglecting social, cultural and economic factors.

Franck (1984) highlights a second shortcoming of deterministic studies, pointing out that they often assume a direct influence of the built environment on human behaviour. Instead, she underscores the importance of considering indirect effects and interactions effects. An indirect effect occurs when the independent variable (the built environment) influences the dependent variable (human behaviour) through an intervening variable. She gives an example of a study demonstrating that the number of apartments grouped together (the independent variable) influences the level of community attachment (the dependent variable) through people's feelings of safety (the intervening variable). In case of interaction effects, the combination of two or more independent variables has a specific impact on the dependent variable. For instance, the built environment might affect behaviour differently in one type of society compared to another, see figure 6 for a visualisation of intervening variables and interaction effects. However, despite emphasizing the importance of acknowledging these indirect and interaction effects, Franck (1984) stresses that direct effects are still possible.

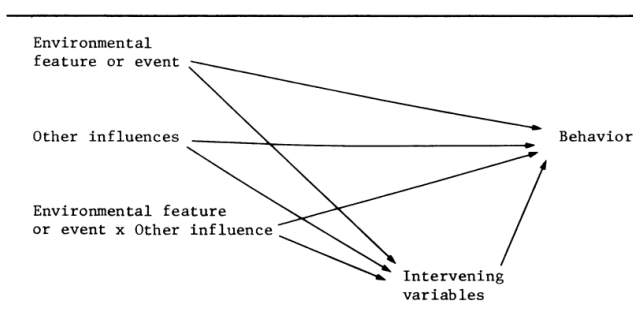


Figure 6: Intervening variables and interaction effects (Franck, 1984)

Despite the criticism of deterministic research, it is important to avoid a complete lack of research into the relationship between the built environment and human behaviour. Some researchers, fearing the determinist label, decide not to conduct any research in this field at all (Franck, 1984). Marmot (2002) further emphasises that architects often claim that their buildings influence various

aspects of human behaviour, while this is almost never verified when they are actually realised. Of course, there are often financial reasons for this, but the less research is conducted, the more challenging it becomes to design and build according to proven methods (Hillier, 2008). Al-Alwan et al. (2022) therefore propose to adopt the probabilistic approach. According to this model, individuals can choose how to behave. However, certain behaviours are more probable than others due to various, sometimes intangible factors and specific characteristics of the built environment. Similar to Marmot (2022) and Hiller (2008), they argue that research into the influences of the built environment remains vital to achieve optimal design outcomes. As long as other non-physical social, cultural and economic factors are considered or at least acknowledged and weaknesses in precisely defining these factors are addressed when explaining the effects of the built environment, studies in this field can provide significant value (Franck, 1984).

1.3 Problems that remain to be solved

Research indicates the important role of the built environment in shaping neighbourhood resilience. However, over the past decade, studies have predominantly overlooked the connection between social environments, like neighbourhoods, and the specific elements that foster resilience. This knowledge gap poses a challenge in comprehending how the built environment can contribute to neighbourhood resilience. As a result, the specific elements of the built environment that truly enhance a neighbourhood's resilience remain largely unknown. While it's acknowledged that numerous other factors influence resilience, some potentially more influential than the built environment, the decision to focus on this aspect was made due to the understudied nature of the relationship between the built environment and resilience.

1.4 Societal relevance

After the ending of the 40-neighbourhood approach, housing associations have encountered many challenges in their efforts to invest in liveability. The combination of stricter rules, the introduction of the landlord levy, the system changes with the introduction of the Housing Act 2015 and the economic crisis and the decentralisation and extramuralisation in social services, severely limited the abilities of housing associations to invest in liveability. As a result, several neighbourhoods that improved under the 40-neighbourhood initiative, experienced a decline in liveability after 2012. The introduction of the national liveability and safety program in 2022 shows renewed attention for liveability issues and highlights that housing association have once again more opportunities to invest in neighbourhoods, with a focus on differentiating the housing stock (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022; Uytendil & Van der Velden, 2017). However, the reports by Leidelmeijer et al. (2020) show that differentiating the housing stock in neighbourhoods with a large amount of social housing does not always lead to improvements in liveability. Furthermore, some neighbourhoods show greater adaptability to change than others, as was already shown in the literature review. It is therefore relevant to further research these differences in resilience, as improved resilience could potentially lead to better liveability, even though the share of vulnerable residents remains high.

1.5 Scientific relevance

The literature review indicates that many studies have already explored the concept of social resilience. However, it also highlights a lack of research into the relationship between the built environment and resilience. This study therefore aims to explore how various aspects of the built environment may impact neighbourhood resilience and it intends to identify which specific elements of the built environment play a more or less significant role. Additionally, scientific research on the influence of the built environment on resilience has not been conducted in the Netherlands and research has not specifically focussed on neighbourhoods with a large social housing stock. As a result, this study could provide many new insights and opportunities for cross-country comparisons.

Chapter 2



2. Research Output

2.1 Goals and objectives

This study aims to explore how the built environment can enhance neighbourhood resilience to help prevent a decline in liveability when neighbourhoods experience an influx of vulnerable residents. It seeks to determine whether, for example, the condition of current housing and specific aspects of public spaces have a significant impact on resilience. Resilience, in this context, refers to a neighbourhood's ability to function well despite undergoing changes. This research focuses on one specific change, namely an increase in vulnerable residents, for two reasons. Firstly, the research by Leidelmeijer et al. (2020) has shown that liveability is under pressure in many Dutch neighbourhoods and that an increase in vulnerable residents often coincides with reduced liveability. Secondly, this focus provides clear boundaries for this research, making it feasible within the time available. This research goal has led to the following research question:

“How can the built environment foster and enhance resilience within Dutch Neighbourhoods characterized by a large social housing stock and growing concentrations of vulnerable residents, thereby addressing the unfavourable developments of nuisance and unsafety in these areas?”

To be able to answer this main research question, the following sub-questions were formulated:

1. How is the built environment defined and what are its key elements?
2. What criteria and methodologies can be employed to assess whether neighbourhoods can be classified as resilient or less resilient?
3. What are the characteristics of the built environment of resilient neighbourhoods?”
4. Which elements of the built environment are highly valued in resilient neighbourhoods?
5. Which elements of the built environment are frequently emphasized as very important in resilient neighbourhoods?
6. What conclusions can be drawn regarding the influence of the built environment on neighbourhood resilience?

Following the literature review, the research aim and the main and sub-questions, an initial conceptual framework can be established, see figure 7. This framework may evolve during the field research, but it effectively illustrates how the different elements are interrelated. It provides a foundation for asking questions during the interviews that contribute to addressing the main research question.

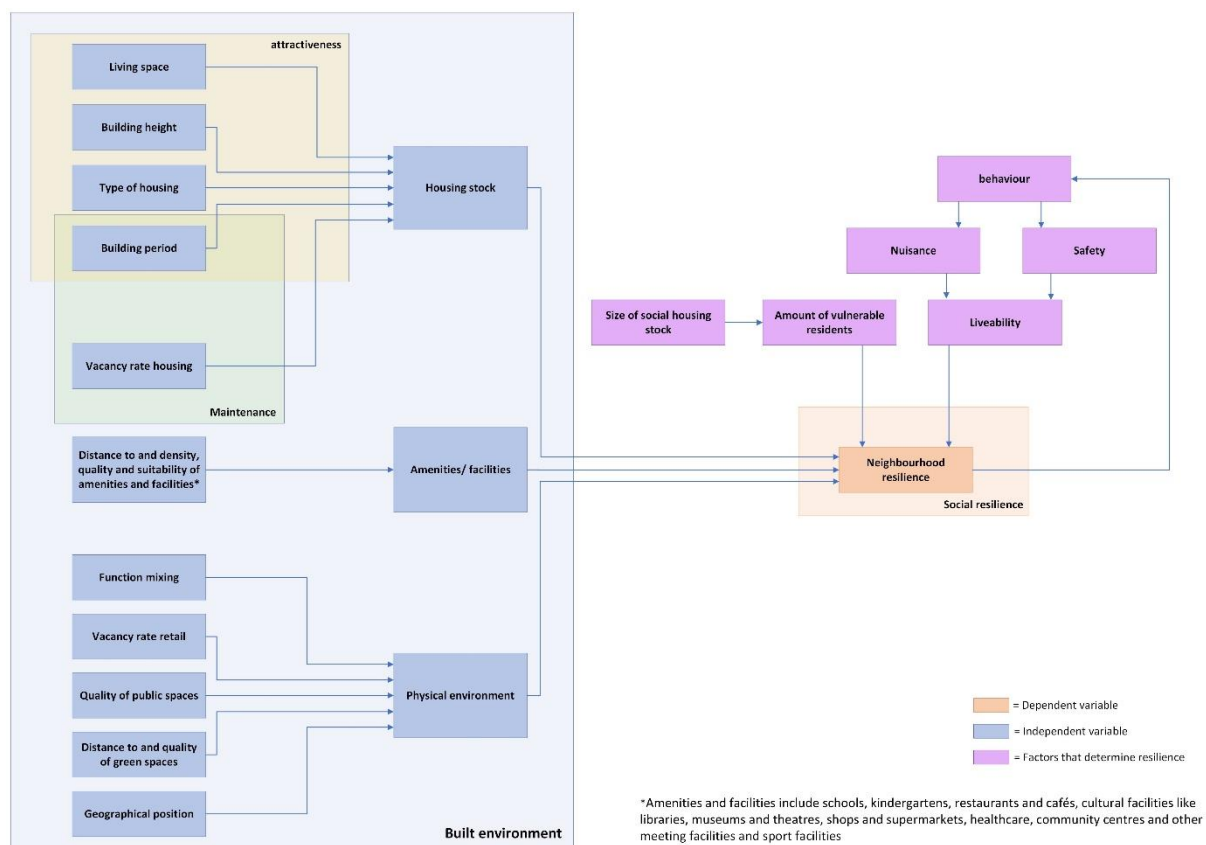


Figure 7: Initial conceptual framework (own work)

2.2 Deliverables (including data sets)

During the field research, data will primarily be generated through interviews. Each interview will be transcribed and coded. With these datasets, conclusions can be drawn regarding the relationship between the built environment and neighbourhood resilience. Based on these conclusions, recommendations will be formulated. Depending on the nature of the data, these recommendations could be specifically directed towards relevant stakeholders. For instance, some insights may guide municipalities on potential elements for investments and highlight areas where housing associations can exert more influence. When certain neighbourhoods face significant challenges, a proactive approach to changing current practices becomes inevitable. Therefore, this research aims to support these transformations through the provided recommendations. The outcomes may also serve as inspiration for the development of an initial practical framework, such as a step-by-step plan, which can be used as a tool in decision-making processes. The feasibility of creating such a tool needs to be determined as the research progresses.

2.3 Dissemination and audiences

This research holds particular relevance for municipalities and housing associations, especially those operating in neighbourhoods where the amount of social housing and the share of vulnerable residents is expected to remain high in the coming years. Of course, the study may also be relevant for other (smaller) organisations, such as welfare organisations and those collaborating with municipalities and housing associations. In principle, all organisations seeking to invest in the built environment of vulnerable neighbourhoods will benefit from the research findings. However, people working in housing associations and municipalities may be better equipped to translate the recommendations into concrete measures. The identification of specific factors within the built environment that contribute to resilience offers valuable insights to decision-makers in these organisations, providing them with better tools for making well-informed investments. Furthermore, a shift in focus toward enhancing resilience,

instead of solely differentiating the housing stock, could prove especially valuable in neighbourhoods where differentiating is challenging.

2.4 Personal study targets

From a practical point of view, I would like to learn how to conduct interviews in a well-structured manner. This includes effectively preparing for interviews, but also navigating the interview when the interviewee responds differently than expected. Furthermore, it can be quite challenging to draw accurate conclusions from numerous interviews, so I believe I can learn a lot in that respect. In addition, making connections between various studies and identifying relevant research gaps is already complex. Therefore, this process of formulating a relevant yet feasible research question is, in itself, quite a learning experience.

From a social perspective, I aim to emphasise the importance of paying continued attention to vulnerable neighbourhoods. Various studies focusing on the liveability of these areas have shown diverse results and opinions. It has also become evident that liveability has been a central concern for extended periods, while at other times, it received very limited attention. With my research, I primarily intend to, once again, shed light on the individuals directly affected by liveability issues. Everyone deserves a liveable environment. Therefore, I aim to investigate how we can contribute to the resilience of the people living there.

Chapter 3



3. Research method

3.1 Type of study, methods and data collection

To achieve comprehensive research results, various research methods are employed. First of all, it is necessary to conduct a literature review to gain an understanding of existing knowledge on the subject. Subsequently, cases are selected based on quantitative research methods. For these neighbourhoods, extensive data is collected to ensure thorough preparation for the qualitative part of the study. Within the selected neighbourhoods, interviews are conducted with municipalities, housing associations and, where feasible, other institutions, such as welfare organisations. These research methods are further explained in the following paragraphs. A visualisation of this process can be found at the end of this chapter in figure 12.

3.1.1 Literature study

Prior to conducting field research, it is necessary to understand certain concepts and resilience-related literature. This includes getting familiar with certain terms like liveability and the built environment. Additionally, it is essential to comprehend how resilience has evolved within the social sciences and what it means at the scale of the neighbourhood. It could also be very valuable to understand how vulnerable neighbourhoods have been addressed in the past and what current perspectives exist on the topic. This contextual understanding is necessary for aligning or deliberately not aligning recommendations with existing policies and viewpoints.

To find relevant literature, Google Scholar and Scopus were used. Both Dutch and English search terms were used, as literature on Dutch cases and practices is sometimes written in Dutch. Additionally, several theses were reviewed. If these were related to the topic of this research proposal, it was primarily assessed whether the references used could be relevant for this research. If a source seemed relevant, the abstract and main findings were read first. The selected sources for the literature review were thoroughly read and the references within these papers sometimes led to the discovery of additional relevant sources. Additionally, since the cases for this study are chosen through the resilience maps published on Aedes and the 'leefbaarometer', documents were accessed that further explain the functioning of these tools.

3.1.2 Selecting cases

Resilience can be assessed in several ways. As the literature has shown, it involves a neighbourhood undergoing change and coping with it effectively. Many studies use regression models for this purpose, allowing resilient neighbourhoods to be identified by revealing those that perform better than expected. For the change this research focusses on, such a model is not needed, as so-called resilience maps have already been created. These maps show how a neighbourhood copes with an increasing concentration of vulnerable residents, with resilient neighbourhoods appearing blue on the maps. In these areas, an increasing number of vulnerable residents is accompanied by a decrease in nuisance and unsafety. Dark blue areas experience many liveability problems, while light blue areas experience fewer liveability problems. Yellow areas are also considered resilient in this research. These neighbourhoods are still undergoing negative change (an increase in vulnerable residents), yet nuisance and unsafety are not increasing. Within the grey areas, no statements can be made about resilience, as there are no negative changes taking place. The number of vulnerable residents here remains the same or even decreases. As an example, the resilient map of Tilburg is shown in figure 8.

In the Netherlands, the terms 'neighbourhood' and 'district' are often used interchangeably. However, for this research, a conscious choice was made to focus on the neighbourhood level. This decision stems from the fact that a neighbourhood is an entity actually experienced by residents, whereas a district is more of an administrative demarcation (Wijkwijzer, 2023). Additionally, neighbourhood boundaries are frequently determined by building period or socio-economic composition (CBS, 2023). By looking at neighbourhood level, it is therefore easier to define

characteristics and keep them the same within different neighbourhoods. The neighbourhood boundaries are upheld in accordance with the 'leefbaarometer'.

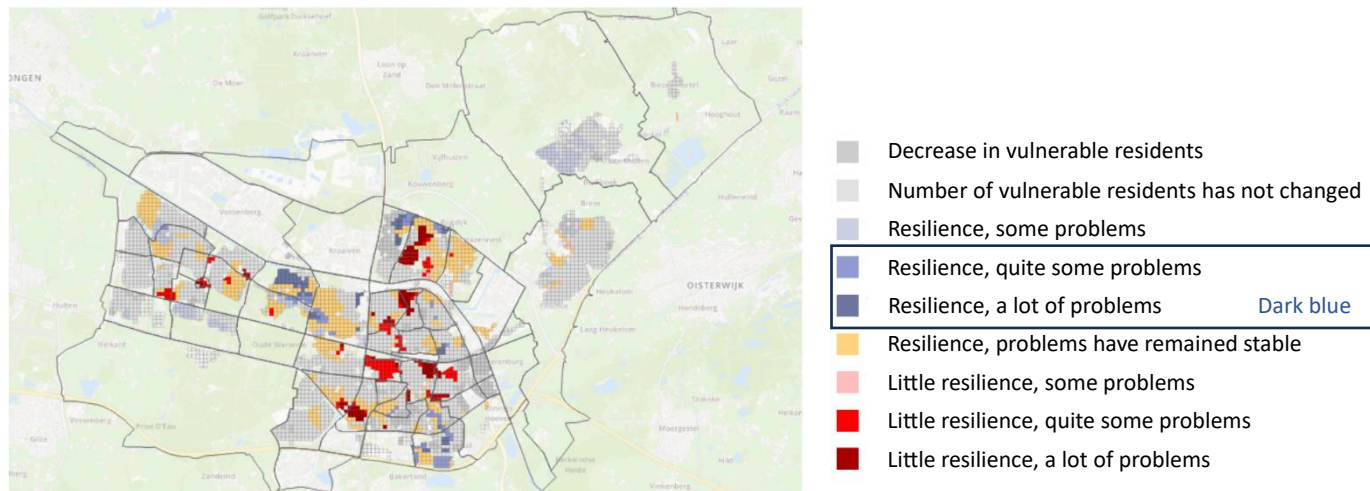


Figure 8: Resilient map Tilburg (Aedes, 2020)

For this study, neighbourhoods are selected that are largely coloured blue or yellow, with a focus on those that also exhibit more dark blue areas (as indicated in figure 8). A total of four resilient neighbourhoods will be selected. The presence of dark blue areas indicates a higher concentration of problems in a neighbourhood. It is precisely in these areas that valuable lessons can be learned: the greater the challenges a neighbourhood faces, the more remarkable it is that these problems decrease despite an increase in vulnerable residents.

Within these neighbourhoods, the influence of the built environment on resilience will be investigated. In order to demonstrate or at least make it plausible that it is indeed the built environment improving resilience, the 'leefbaarometer' is used. This tool assesses the extent to which amenities, the physical environment and the housing stock are valued within a neighbourhood in comparison to the national average. In the four selected neighbourhoods, the three indicators should be close to or preferably even higher than the national average. This implies that the neighbourhood should not significantly deviate from the average. As long as the bars are coloured green, the deviation from the average is considered negligible. An example of the indicators is provided in figure 9. This figure shows that the physical environment and amenities score well enough. However, the bar representing the housing stock is red and therefore this neighbourhood should not be selected. All bars should be green in the three available time periods of the 'leefbaarometer': 2014, 2018 and 2020. This is essential, because the resilience maps show how liveability has developed between 2014 and 2020. Therefore, if the built environment has indeed made a difference, it should receive consistently positive ratings over the entire period.

Two other criteria also play an important role in selecting neighbourhoods. City centres are excluded from consideration due to the different nature of nuisance and unsafety in these areas, which are typically connected with its nightlife. These areas differ significantly from other parts of the city and are therefore not considered representative. Furthermore, it is essential to select neighbourhoods that have a comparable proportion of social housing. The research by Leidelmeijer et al. (2020) shows that problems in a neighbourhood tend to increase when the percentage of social housing exceeds 45%. Therefore, the selected neighbourhoods should have a proportion of at least 45% social housing. All criteria are summarised in bullet points below.

- The selected neighbourhoods should be largely coloured blue or yellow
- The neighbourhoods should also have dark blue areas
- The three indicators of the 'leefbaarometer' should be close to the national average
- City centres are excluded from consideration

- At least 45% social housing

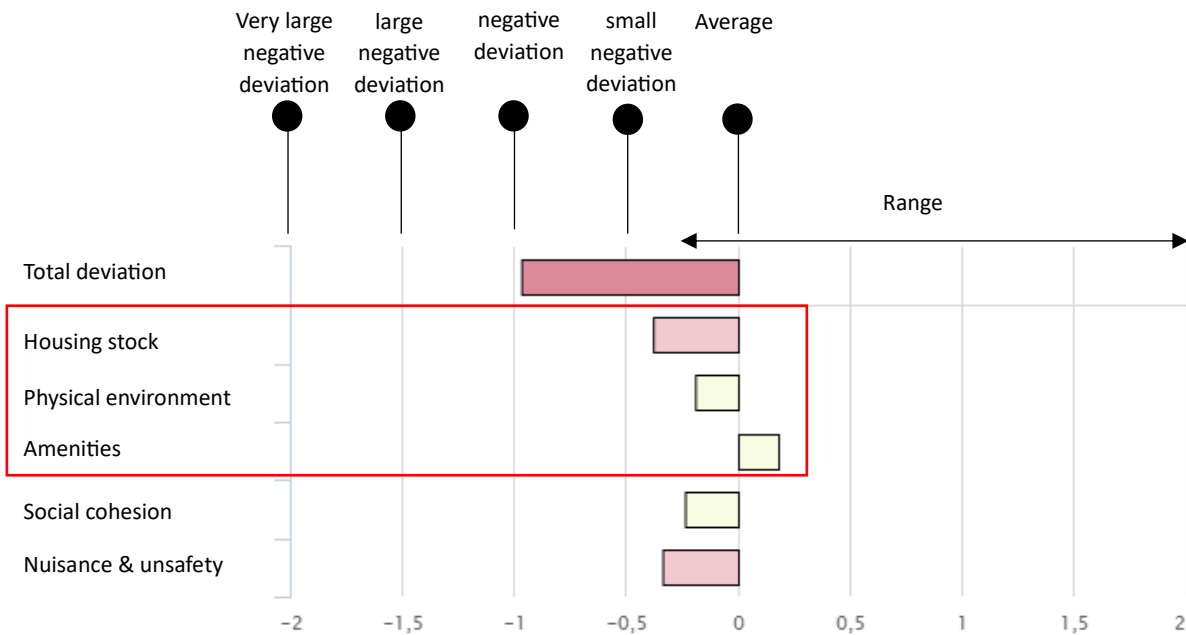


Figure 9: The three indicators and their range (leefbaarometer, 2020)

Using these criteria, a long list of approximately 25 neighbourhoods was compiled. Nealy 50 towns were assessed, taking into consideration the researcher's place of residence. Given the impracticality of, for instance, driving three hours multiple times for a single interview, only cities in relatively close proximity were considered. Subsequently, the construction periods of the selected neighbourhoods were considered. It is essential that the buildings date from similar construction periods, in order to keep the neighbourhoods comparable. Otherwise, it could become challenging to draw unambiguous conclusions if, for example, a pre-war neighbourhood is compared with a post-war neighbourhood. It was therefore examined during which time periods the selected neighbourhoods were constructed, revealing that many neighbourhoods were built between 1950 and 1970 and between 1970 and 1990.

Upon further analysis, neighbourhoods between 1970 and 1990 appeared to be more suitable. Generally, these neighbourhoods had undergone significant improvements in terms of liveability and the built environment received favourable scores. Consequently, a final selection was made of neighbourhoods within this period. Nevertheless, this construction period remains quite broad. Typically, a distinction is made between neighbourhoods built between 1970 and 1980 and those between 1980 and 1990. Ideally, neighbourhoods would be selected from a specific construction period, but given the chosen criteria, too few neighbourhoods remain that are predominantly from one construction period. In addition, many neighbourhoods feature dwellings from both periods. It was therefore decided to maintain this broad timeframe. The selected neighbourhoods are all characterised by many low-rise and terraced houses. Thus, they are similar in this regard.

Initially, two neighbourhoods were selected: one in Zoetermeer and one in The Hague, see figure 10 and 11. These neighbourhoods comply with all criteria and are reasonably close to the researcher's place of residence. Proximity was an important criterion in narrowing down the selection from six suitable neighbourhoods to two, as it can significantly save time. Both cities also encompass two neighbourhoods that do not meet all the criteria, but they may still be interesting for this research. Since employees from, for instance, municipalities might provide insights into both neighbourhoods, an attempt will be made to gather data from these two additional neighbourhoods. It needs to be further determined during the process if data for these neighbourhoods can indeed be collected efficiently. This will determine whether data will be collected from two of four neighbourhoods.

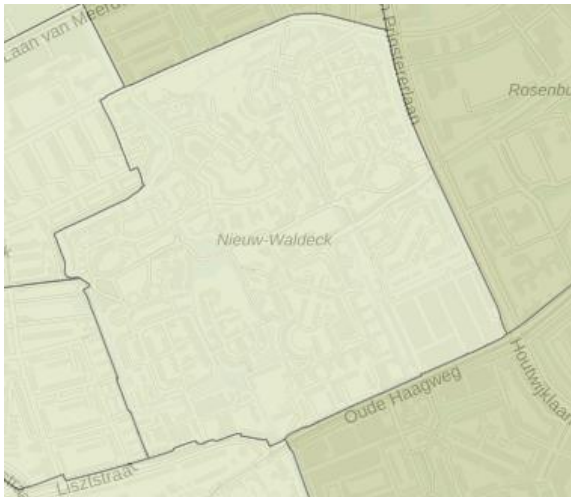


Figure 10: Nieuw-Waldeck, The Hague (leefbaarometer, 2020)



Figure 11: Buytenwegh, Zoetermeer (leefbaarometer, 2020)

3.1.3 Desk-research: study cases

As much information as possible is gathered for the four selected neighbourhoods. This information may include city-wide documents containing important information about the neighbourhood in question or documents written specifically for that neighbourhood, such as a neighbourhood plan. Both recent and older documents are valuable: recent ones are especially useful for understanding the current state of the built environment, while older documents can provide insights into the neighbourhoods' historical development. These older documents might describe the original distribution of low- and high-rise structures, the original layout of public spaces and other essential details about the architectural composition. Additionally, webinars or documentaries can offer further insights into the characteristics and dynamics of these neighbourhoods.

3.1.4 In depth interviews

The most important data for this research will be collected with semi-structured interviews. This technique ensures that questions align with the predetermined topics, while also allowing for tailored inquiries. It is essential to discuss which elements of the built environment are most influential according to the interviewees. Consequently, there is a need for follow-up questions that cannot be predetermined. However, an entirely unstructured approach would complicate the comparison of interview findings. Therefore, a semi-structured method seems most appropriate.

The interviews will take place at locations that are most convenient for the interviewees, with a preference for face-to-face interviews. Research indicates that phone calls or interviews via Teams are often shorter and of lower quality (Bryman, 2016). The interviews will be conducted with employees from housing associations, municipalities and, where possible, other institutions like welfare organisations. It is probably easier to get in contact with these people rather than, for example, residents' groups. Despite these potential challenges, efforts will still be made to engage with residents, as their perspective can offer valuable insights into their usage of the built environment. It is preferred to organise focus groups with residents if it turns out to be relatively straightforward. Otherwise, more creative alternatives, such as using a short questionnaire distributed at, for instance, a community centre, might provide a solution.

It is not precisely known in advance how many interviews will be conducted. The initial contacts that are established, might refer to other important stakeholders. It is also possible, for example, that within one municipality, one person possesses information about multiple neighbourhoods, while in the other municipality, several people need to be interviewed before the same amount of information is collected. Therefore, the aim is to conduct a minimum of six interviews per city (excluding resident

participation). This would result in a total of 12 interviews, but depending on the information each individual can provide, more or fewer interviews may be necessary.

3.1.5 Validate findings

After interpreting the results, describing the findings and formulating recommendations, they are validated with Jeroen Frissen. Given his expertise in the field, discussing the results with him could be very valuable. Furthermore, this process is less time consuming compared to, for example, organising a focus group.

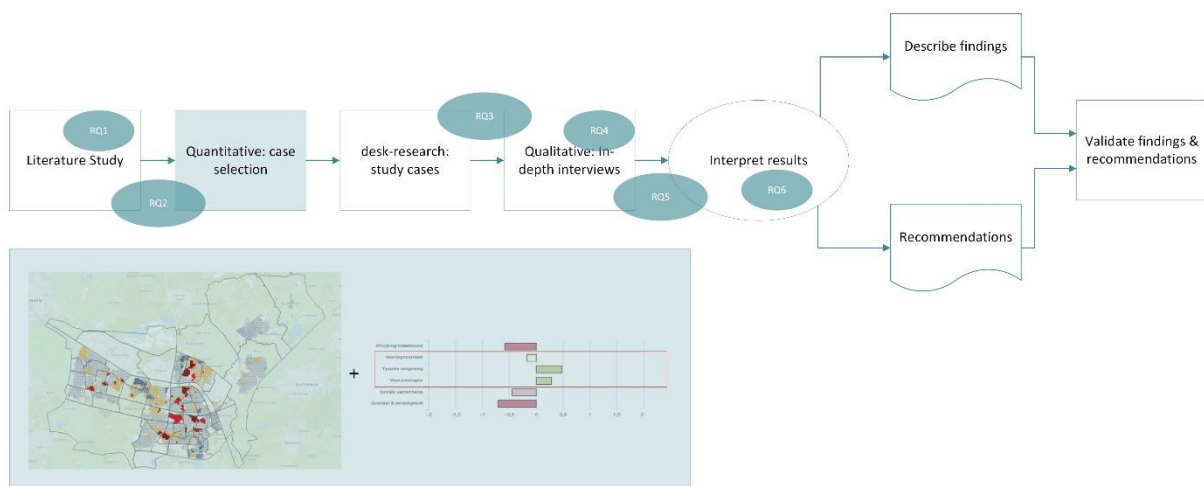


Figure 12: Research method (own work)

3.3 Research plan

Figure 13 illustrates the research plan. The schedule indicates that the interviews should be completed before P3 and they should, for the most part, be transcribed and coded. The initial findings should also be described to be able to discuss them during the P3 moment. The weeks between P3 and P4 will be used to further develop the findings and recommendations. Ideally, validation should take place before p4 and is therefore scheduled for week 14. The weeks between P4 and P5 will be used to finalise the report.

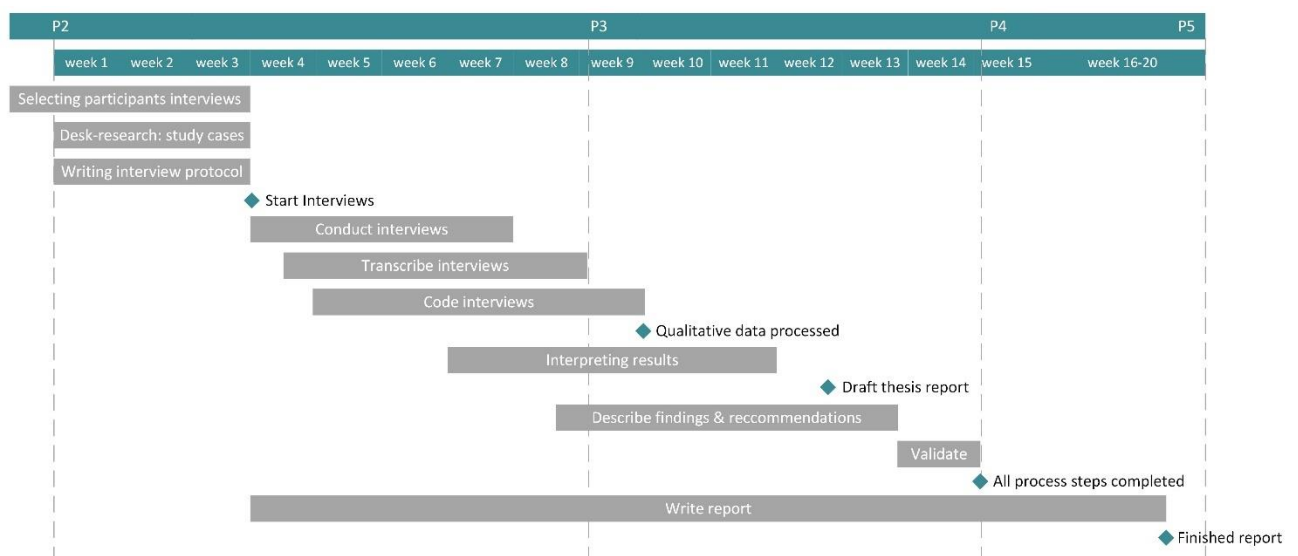


Figure 13: Research plan (own work)

3.2 Data analysis

The analysis of the quantitative data takes place prior to the field research. As outlined in the previous chapter, cases are selected with quantitative data from the 'leefbaarometer' and the resilience maps available on Aedes. The qualitative data will be generated with the interviews, which will be recorded and transcribed. These transcripts will be coded with Atlas.ti. Both deductive and inductive approaches will be employed for this coding process. The deductive approach involves closed coding. The predetermined themes by the literature review and the associated conceptual framework will be used to formulate interview questions and define codes. At the same time, themes that were not defined beforehand may emerge during the interviews. These could be themes that have not previously been addressed in the literature. New themes could then be derived from the data, which means that an inductive approach is followed. By employing both methods, this research will be complementary to prior research, while allowing interviewees to express what they consider important (Burnard et al., 2008). Efforts will be made to transcribe and code each interview before the next interview takes place. New themes identified in one interview can then be used for the next interview.

3.3 Data management plan & ethical considerations

For this research, a data management is prepared to justify methods of data collection, processing and sharing and to specify how data will be stored to prevent the loss of important documents. The data management plan forces the researcher to consider the protection of participants and ensures that data can be used as sufficient permission will be collected. The plan is included in appendix 1 and has received approval from the data steward.

In addition to the data management plan, an informed consent form to be signed by the participants prior to the interviews is also prepared and the ethics review checklist was completed. The data management plan, informed consent form and the completed checklist were approved by the Human Research Ethics Committee (HREC).

Chapter 4



4. Reflection

The first weeks of the graduation lab were more challenging than expected. I had already started looking for a topic during the summer holidays and I planned to do research on liveability in vulnerable Dutch neighbourhoods. However, defining a problem within this topic proved difficult. On Gerard's advice, I spoke to Jeroen Frissen, one of the authors on the resilience reports. After a brief telephone conversation, he suggested to research the influence of the built environment on resilience. This provided new hope and after another literature review, more possibilities within this topic emerged. Nevertheless, I remained somewhat sceptical, especially since the conversation with Jeroen was very brief and it felt like my only opportunity to continue in a similar direction. The first counselling sessions afterward were not always easy either. My supervisors and I were still figuring out how to precisely demonstrate the relationship between the built environment and resilience. I often wondered during this period whether it wouldn't be better to choose a completely different subject. Additionally, I also took two electives during this time, which sometimes left little time to work on the P1 report and increased stress. This stress increased further as I seemed to be falling behind, whereas this normally never happens to me.

Despite these uncertainties, I had decided to try to clearly write everything down and then just see whether the P1 report and presentation would give my mentors enough confidence to proceed. After the P1 moment, things actually went much smoother. I had managed to describe and present my ideas in a clear manner, which provided a solid foundation for the further development of the P2 report. Before some counselling sessions, I was apprehensive about having to present unresolved problems, but often the solutions were much simpler than I had anticipated. I progressed well during this second period and started to enjoy my research again. Thus, it has been a period with many different experiences, but I am glad that I started to view the process in a more positive way and I hope to continue this in the second phase of the research.

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Appendix 1: Data management plan