

**Perceived accessibility: a comparative study between
accessibility from a policy perspective and perceived
accessibility in the northern Netherlands**

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Abstract

Due to agglomeration benefits in urban areas, amenities located in rural areas often decide to concentrate in cities. This phenomenon in combination with a shrinking population could cause accessibility issues for remaining residents, possibly leading to social exclusion. Data has shown that in the Netherlands, average distances have increased the most in rural areas with a shrinking population last decade. Local governments are responsible to solve this issue but research has shown that accessibility policies often lack the implementation of the individual dimension, also known as perceived accessibility. Knowing how the accessibility issues from a policy perspective compare to the experience of residents contributes to the understanding of 'perceived accessibility' and could be insightful for other municipalities facing similar issues. By conducting interviews with policymakers in Groningen (Province), this research has shown the main challenges and proposed solutions for each municipality. Furthermore, these results are compared with an existing data set focusing on the experiences of residents, which reveals that a majority of municipalities are not in line with their residents. Het Hogeland and Eemsdelta, the northernmost municipalities, are overestimating the accessibility situation, and Midden-Groningen and Oldambt, the two central municipalities, are underestimating the situation. Only Pekela and Stadskanaal, the Southern ones, are in agreement with the residents. These findings argue that each municipality has and requires a unique accessibility vision, despite all being rural and located in the same area. Moreover, municipalities seem to struggle to determine the perceived accessibility and include it in policies, which tends to be a point of improvement for more governments.

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Chapter 1 - Introduction

1.1 Motivation

While current debates often focus on the pressing effect of overpopulation on climate change and the earth's resources, regions with a shrinking population, mostly in rural areas, are also a growing phenomenon. Accompanied by the decrease in fossil fuel energy, climate change, and globalization, demographic changes are one of the four main challenges which will affect almost all regions in Europe (Wísniowski et al., 2021). Faced by most European and other developed countries, two of these major demographic challenges are ageing and shrinking populations, which are often intertwined (Espon, 2010).

Figure 1 shows, on a municipality scale, where these shrinkage regions can be found in the Netherlands. On a scale from a shrinking population to an increasing population with a growth of over 10%, the shrinking municipalities are displayed in orange whereas the growing municipalities are colored blue, with a darker tone indicating a higher growth percentage. It can be observed that most of the shrinking municipalities are located in the rural areas at the borders of the country, while the growing municipalities mostly contain the more centralized urban areas (CBS, 2021a).

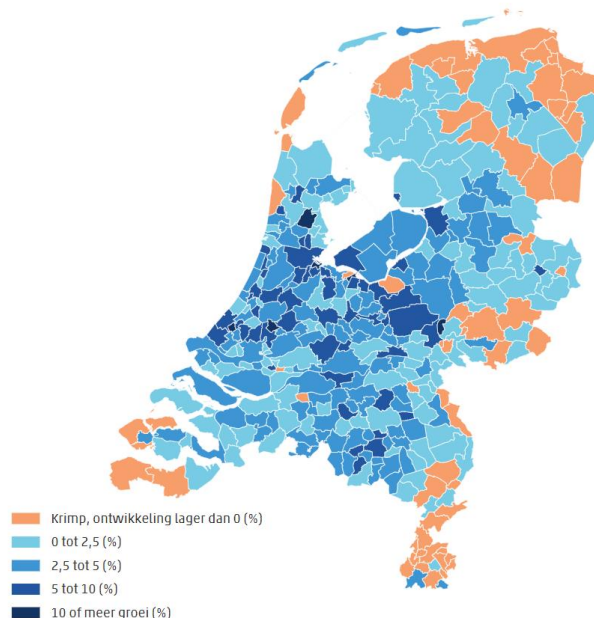


Figure 1: Population growth in the Netherlands, 2015-2020. Source: CBS, 2021a.

An ageing population, which is closely associated with a shrinking population, indicates that the average life expectancy has positively increased. On the other hand, a shrinking population could have a negative effect on the accessibility of amenities and social activities, possibly causing social exclusion and reduced livability (Pot et al., 2020; Mounce et al., 2020; Lieszkovszky, 2018; Wísniowski et al., 2021). A decline of amenities in rural areas is mainly driven by the absence of agglomeration benefits, leading to a concentration of amenities in urban areas, but a declining population adds additional pressure to the local amenities that are still located in rural areas, for example by increasing relative agglomeration benefits in cities (Yamu and Frankhauser, 2015). Currently, quantitative data shows a similar situation in the Netherlands. Research has shown that the average distance traveled to amenities is the largest in rural areas with a shrinking population, compared to rural areas with population growth or urban areas. In addition, this distance has been increasing in the period between 2008 and 2015, whereas a decrease in average distance has been observed in urban areas in the Netherlands (Tillema et al., 2015).

As a consequence of the amenities leaving rural areas and the resulting increased distances toward amenities, remaining residents in the rural areas could potentially suffer from accessibility issues (Tillema, 2015). Consequently, the average distances to supermarkets, daily shopping facilities, elementary schools, cafes, and healthcare facilities are increasing. In these rural areas, cars are generally the main mode of transportation due to longer distances and rather poorly developed public transport systems. For this reason, people with access to a private car can reach distant locations relatively easily. However, population groups with little or no access to a private car, like the elderly, children, low-income families, or disabled people, could have issues covering the increasing distances, making them vulnerable to social exclusion and decreased well-being (Delbosc and Currie, 2011; Mounce et al., 2020; Pot et al., 2020).

Ultimately, (local) governments are responsible for making sure that the livability of a certain rural area remains at an acceptable level by ensuring the accessibility of amenities and social inclusion (Mounce et al., 2020; Pot et al., 2020). Possible solutions for rural areas that are either currently dealing with accessibility issues, or are facing them, differ from improvements in the public transport services (e.g. Naude et al., 2005; Velaga et al., 2012), to improving the financial capabilities of rural governments (e.g. Mounce et al., 2020), to initiatives that try to attract and preserve existing amenities (e.g. Rijksoverheid, 2016). Solutions that are the most efficient and impactful in a certain region may not work in a different region as regions are unique when it comes to accessibility issues and possible solutions. Each individual experiences accessibility in a unique way and therefore, accessibility levels in a certain region consist of individual perceptions (Pot et al., 2020). Past and also current policy implementations have often been based on spatial statistics and aggregations of accessibility levels, proxying the individual dimension of

accessibility by assumptions on perceptions (Lätmann et al., 2018; Pot et al., 2015). The individual dimension is often lacking due to the difficulties that come with measuring perceived accessibility in a certain area. However, it is stated to be a vital part of successful and effective transport policies (Curl et al., 2015; Lätmann et al., 2018; van Wee, 2016).

Currently, research involving the opinion of policymakers regarding accessibility issues and solutions in their region remains rather limited for the Netherlands. Policymakers often base their decisions on measured indicators that may not match individual perceptions. Therefore, it is important to understand whether identified accessibility issues are based on these measured indicators and whether proposed solutions match the individual perception of the residents. In addition, the understanding of how accessibility-based planning currently works and to what extent this caters the needs of the residents is important knowledge for potential policy evaluations. Hence, a policy perspective will be used in this research to broaden the understanding of accessibility issues in Dutch shrinking municipalities via in-depth interviews with local policymakers. Furthermore, a comparison of these results will be made with an existing dataset containing the experience of residents living in these municipalities regarding accessibility issues, which could potentially reveal differences between the measured accessibility from policymakers and the perceived accessibility by residents. The results of this comparison could not only be insightful for other municipalities in the Netherlands, but also for similar shrinkage regions all over Europe.

Societal relevance

Shrinkage regions are a relatively new phenomenon that grew in importance during the last two decades. Between 2000-2010 population shrinkage started as an exemption still but became more common during the second half of the decade. Approximately 20% of the current municipalities experienced a shrinking population between 2000-2005, which increased to approximately 40% between 2005-2010 due to a relative decrease in immigration and an increase of younger generations moving to urban areas. During the second decade, the percentage of shrinking municipalities decreased to around 33%, which is partly due to an increase in immigration in this period. Thus, numbers between 2010-2020 already decreased slightly compared to the decade before but the shrinking municipalities are still highly present (CBS, 2021a; Tillema et al., 2015).

Accessibility issues in shrinking regions could cause or strengthen social exclusion for people who have difficulties dealing with longer distances, directly affecting the remaining residents (Lieszkovszky, 2018). Furthermore, the exclusion of social outdoor activities has a negative effect on the livability of a region or an individual's well-being (Cooper et al., 2006; Delbosc and Currie, 2011; Pot et al., 2020). Effective transport policies are necessary to prevent this from happening. For this reason, it appears to be relevant and insightful to find out what policymakers interpret as the biggest issues and solutions in their region, as the results could be used for future policies, potentially benefitting societies in shrinking regions.

Scientific relevance

As mentioned before, policymakers are to the utmost extent responsible for coming up with solutions that tackle these accessibility issues. However, apart from research suggesting policies that fit a certain situation or area (e.g. Naude et al., 2005; Velaga et al., 2012), studies focusing on actual policies from governments and the corroboration of this with the opinion of residents remains minimal, especially for Dutch shrinkage regions. Moreover, the use of accessibility metrics within the concept of accessibility by transportation and land use practitioners remains rather limited due to a lack of knowledge and data (Boisjoly & El-Geneidy, 2017). Therefore, the results of this research could contribute to the current literal discourse regarding accessibility and the understanding of measured indicators used by policymakers versus the individual perception of accessibility.

1.2 Research problem

Problem

The average distance to amenities, like supermarkets, daily shopping facilities, elementary schools, cafes, and healthcare facilities, has been increasing over the last two decades in rural areas with a shrinking population. Remaining residents face an increasing need for mobility which could be hard to manage for people who do not have access to a car, like children, the elderly, the poor, or disabled people. As a consequence, people could potentially be unable to attend certain amenities or activities, leading to social exclusion and decreased well-being. It is currently unknown what local governments in the Netherlands, where this issue is displayed on a large scale, identify as the major accessibility challenges and possible solutions for this issue, despite being the responsible institution for coming up with solutions. Furthermore, it is currently unclear how the policy perspective of accessibility issues and solutions relates to individual experiences, even though these proposed solutions are most effective when in line with the experienced accessibility difficulties.

Goal

The goal of this research is to gain insight in how the main challenges and solutions in shrinking municipalities regarding accessibility issues due to a decline of services, which are identified by local policymakers, compare to the experience of the residents.

Main question:

“To what extent do the main challenges and solutions regarding accessibility issues identified by local policymakers in municipalities in Groningen correspond with the experience of residents?”

Sub-questions:

- “Which accessibility issues are perceived to be most challenging by policymakers in Dutch shrinking municipalities”
- “Which solutions are currently perceived the most promising to deal with these issues?”
- “How does the policy perspective compare with the experience of residents?”

1.3 Reading Guide

In the next section, the theoretical framework, the concepts of shrinkage regions, accessibility, perceived accessibility, and social exclusion are explained. A conceptual framework with the main concepts concludes this part. Hereafter, the qualitative and quantitative research methods are clarified in the methodology and afterwards, the case study area with the participating municipalities is explored. In the results section, the main findings for both analyses are presented per municipality. The research closes with a discussion part, in which the most important results are related to existing literature, and a conclusion, which includes the answer to the main research question and future research recommendations.

Chapter 2 – Theoretical Framework

The theoretical framework will start with an explanation of shrinkage regions in the Netherlands and the causes of this phenomenon. Afterwards, the concepts of ‘accessibility’ and specifically ‘perceived accessibility’ are defined, which is then followed by the consequences of shrinkage regions on the accessibility of amenities and ultimately the possible social exclusion of individuals. The framework will conclude with an analysis of different types of solutions and a conceptual model based on the used literature.

2.1 Shrinkage regions

In the Dutch context, one can speak of a shrinkage region when multiple bordering municipalities have or are expected to have a decreasing population over a certain time period (Tillema et al., 2015). These regions are primarily located at the national borders of the country, away from the central and most urbanized regions.

Causes

As mentioned before, urbanization can be seen as the force that goes hand in hand with the phenomenon of shrinkage regions (Martinez-Fernandez et al., 2012; Pot et al., 2020). National Geographic Society (2019) defines urbanization as an ongoing process through which cities grow higher in the number of population, resulting from higher percentages of the population moving from rural to urban areas. More than half of the population currently lives in an urban area. Movements of residents in rural areas towards urban areas drastically change the population numbers in rural areas, since these are already relatively low compared to the more urbanized areas (Tillema et al., 2015; Wisniewski et al., 2021). In addition, a lower birth rate due to an ageing population and decreased immigration from outside of the Netherlands towards rural areas are two important causes of population decline as well (Ritsema van Eck et al., 2013).

The PBL (2010), which is a Dutch planning office for the living environment, divides the causes of shrinkage regions into three different categories: social-cultural outcomes, which cause a higher birth to death ratio in urban areas compared to rural areas due to individualization and different population structures. The second one is regional-economic outcomes, which focus on the higher rate of business activities and job opportunities in urban areas. And finally, outcomes simply based on planning, which states families moving to urban areas due to more options regarding housing.

2.2 Accessibility

Before continuing with the consequences of a shrinking population regarding accessibility to amenities, the concept of accessibility should be defined. The concept of accessibility is a broad one with several different definitions. Examples include economic and social accessibility, which focus on a facility for spatial interaction, and digital accessibility, like internet and mobile telephone connection (Gutierrez, 2009). For this research, accessibility in terms of possibilities supplied by (public) transport services for reaching amenities and activities will be used, which is also known as transport accessibility (Gutierrez, 2009). Moreover, accessibility includes four different dimensions (Geurs and Ritsema van Eck, 2001):

1. A transport dimension, which includes the transportation possibilities;
2. A land use dimension, which includes locations within the built environment;
3. A temporal dimension, like time of the day variations in travel time;
4. A personal dimension, referring to the needs, preferences, and abilities of an individual.

Perceived accessibility

Within accessibility, there are differences between measured accessibility and perceived accessibility. Measured accessibility, also known as objective accessibility, refers to a determined accessibility that is often based on statistics and results, like a reduction of travel time, travel costs, and travel distance (Lätmann et al., 2018; Ryan et al., 2016). Methods used for this type of approach range from simple A to B measurements that capture travel distance and travel time between two locations, to more complex GIS-based methods that also collect data about several other accessibility dimensions (Lätmann et al., 2018). On the other hand, perceived accessibility, or subjective accessibility, aim to measure individual perspectives directly (Pot et al., 2020). Due to differences in availability of and preference toward certain transport modes, different individuals perceive accessibility in different ways (Lätmann et al., 2018). Lätmann et al. (2016, p.36) define perceived accessibility as “how easy it is to live a satisfactory life with the help of the transport system”, which combines three different dimensions; accessibility towards the transport modes, accessibility while utilizing the transport modes, and finally the capability of reaching the amenities and social activities of choice by using the transport system.

Currently, politicians and planners are often lacking the implementation of perceived accessibility in transport policies, as it is relatively challenging to determine the perceived accessibility of a certain area (van Wee, 2016). However, it is argued that the perspective of perceived accessibility is as vital for transport policies as measured accessibility. According to Lätmann et al. (2018), perceived accessibility does not focus, unlike measured accessibility, on creating assumptions based on statistics and other indicators, but rather focusses on viewpoints of individuals or groups

of individuals towards the use of the transport system. Thus, perceived accessibility is not restricted by measurements of travel distance or travel time, but also considers what is relevant for individuals. Therefore, Lätmann et al. (2018) state that perceived accessibility should be seen as a complement to measured accessibility. Especially since many assessments of accessibility levels based on measurements do not even recognize the missing aspects of perceived accessibility. Similarly, Curl et al. (2015) indicate that accessibility based on measurements fails to achieve its intent, which is providing accessibility to people at risk of experiencing social exclusion resulting from mobility issues, since these measurements primarily focus on aggregate levels of accessibility, and fail to make a distinction between individuals. As a result, aggregate measurements in a certain area could indicate a good level of accessibility, while there are still groups of individuals experiencing accessibility issues who remain undetected by this method. In other words, it can be expected that perceived accessibility deviates from aggregate measures on levels of accessibility (van Wee, 2016). Finally, Scott et al. (2007) showed that perceived accessibility could predict the use of transport modes and physical activities, whereas measured accessibility was unable to do so. Therefore making perceived accessibility highly effective for possible transport policies.

Combining the perceptions of perceived accessibility with important statistics from measured accessibility will result in a better understanding of the concept of accessibility overall and create a more complete foundation for transport policy goals (Lätmann et al., 2018). This is in line with Curl et al. (2015), who state that both the accessibility methods are essential for transport policies, as differences have been observed between urban and rural areas. Measured accessibility levels have shown to be higher than perceived accessibility levels in rural areas, which was the other way around in urban areas, indicating a higher possibility of individuals experiencing inaccessibility issues in rural areas who remain unidentified. Perceived accessibility can in general be presumed as lower compared to measured accessibility in rural areas due to the relatively long journey times and lower number of amenities (Curl et al., 2015). Therefore, it is important to take the individual dimension of perceived accessibility into account, especially in rural areas due to the longer distances and the relatively low levels of current accessibility. As a result, this will increase the opportunities for socially excluded people and potentially contribute to a better quality of life (Mounce et al., 2020; Lätmann et al., 2018).

2.3 Consequences shrinkage region

Even in the absence of population decline in rural areas, the number of rural amenities has decreased over the past decades as a result of concentration in urban areas to profit from agglomeration benefits (Yamu and Frankhauser, 2015). However, a shrinking population adds to the pressure on rural amenities since it has a direct impact on the support base of amenities on a local and a regional scale and consequently affects locational choices of these amenities. Regarding accessibility to amenities, a chain reaction could take place (Wiśniewski et al., 2021). A flow of movements from people to an urban area changes the population and support base of private and public amenities in rural areas. As a result, these amenities could decide to follow these movements and also settle in urban areas. In turn, this affects the accessibility and ultimately the livability of people in the rural area and could cause more residents to move away (Tillema et al., 2015). The largest impact results from a decrease in population numbers compared to a decrease in households and this impact can happen in different ways (Ritsema van Eck et al., 2013; Tillema et al., 2015).

One scenario is a decrease in the number of children and young people, which has an effect on the demand for educational amenities and other amenities aimed at the youth like playgrounds, daycares, and sports clubs. Especially elementary schools in small villages are affected by this and are either forced to close down or merge with another school, which also has an effect on educational employment in the concerned area (Ritsema van Eck et al., 2013; Rijksoverheid et al., 2009). Another consequence of a decreasing youth population is the relative increase of the elderly (Mori, 2010). This could have a positive effect on the demand for healthcare amenities and other daily amenities, like stores and cultural activities, on a neighborhood scale due to the limited mobility of elderly people (Ritsema van Eck et al., 2013). Likewise, amenities that are relatively far away from a major part of the local population could see a decrease in customers.

A shrinking population also has a negative effect on the number of public transport users in an area. As a result, a chain reaction could also arise here; rural public transport supply often does not meet demand in the first place, which could lead to a declining demand due to increasing car usage, causing supply to downscale even more (Mounce et al., 2020). Rural residents who are not able to find an alternative for public transport are the dupe in this situation. This phenomenon, where accessibility issues arise due to limited transport possibilities, is often referred to as 'transport poverty' (Cooper et al., 2006; Pot et al., 2020). Lucas (2012) states that a combination of two types of disadvantages often causes this issue. The first one is disadvantages regarding transportation, like a poor supply of public transport systems and limited car access, while the second one focusses on social disadvantages, like low income, low social skills, or poor health. People finding themselves in this situation have a relatively high chance of suffering from social

exclusion, since transport poverty is associated with a lower participation in social activities, lower access to health care, and higher chances of unemployment as a result of fewer possibilities regarding higher education (Lucas, 2012; Kenyon, 2011; Pot et al., 2020).

Finally, the financial situation of local governments, like municipalities, could deteriorate as a result of a top-down budget cut. In addition, decentralization of government tasks to municipalities could result in a relative decrease in an accessibility budget. This leaves local governments with fewer means to deal with decreasing accessibility levels in a shrinking population (Elshof and Bailey, 2015).

2.4 Social exclusion and well-being

As mentioned before, social exclusion resulting from being unable to access amenities and participate in social activities may have a negative effect on people's well-being (Pot et al., 2020; Mounce et al., 2020; Lieszkovszky, 2018; Wśniewski et al., 2021). Furthermore, most of these social activities are located in different geographical locations away from home, which leads to a big impact of poor transportation possibilities on being able to participate in these activities (Delbosc and Currie, 2011).

The elderly portray one of the population groups that are especially affected by poor transportation options. According to Terraneo (2021), social exclusion has a negative effect on the health of elderly people due to a lack of emotional support. Furthermore, the active participation in social activities is correlated with a higher life expectancy and a longer healthy life. On the other hand, social exclusion causes higher stress levels and a decreased well-being overall (Diržytė et al., 2019; Terraneo, 2012).

Young people without access to a private car are another affected population group. Tomova et al. (2020), who studied the importance of belonging and social inclusion for adolescents, state that the avoidance of social exclusion is notably important during the adolescence period since it affects actual and long-term well-being. Moreover, adolescents are more prone to let their behavior be influenced by peer pressure when trying to avoid social exclusion, which could lead to behavior that involves risks regarding health and social state (Tomova et al., 2020).

People with disabilities are also easily affected by inaccessibility issues. Disabled people are already more likely to be less involved in a community and often find difficulties in making connections with other people, which increases the chance of experiencing lesser well-being (Emerson et al., 2009; Koller and Stoddart, 2020). In Australia, it was shown that a decreased well-being of disabled people was often not caused by the disability, but was a result of being socially excluded due to their immobility (Emerson et al., 2009). Therefore, it is important to avoid social

exclusion caused by accessibility issues for this population group, as they are already easily affected by a decreased well-being (Koller and Stoddart, 2020).

Finally, low-income families will be addressed. Smith et al. (2012) argued that low-income families who can afford a car are highly affected by the increasing costs of owning a car and fuel prices. Furthermore, other low-income families are not able to buy a car in the first place, making them reliant on public transport services. As a result, low-income families in rural areas without access to a private car show a lower participation in local social activities compared to families with a higher income and access to a car (Pot et al., 2020).

2.5 Solutions

In the current literature discourse, there is a wide range of possible solutions regarding accessibility issues in rural shrinkage regions. Most of these solutions focus on the improvement and optimization of existing public transport services or the implementation of new transport services for the residents. The shared logic behind these solutions is increasing the mobility of residents by making transport services as accessible and useful as possible. Finally, some solutions focus on the preservation of local amenities as well.

One frequently mentioned improvement focuses on the lack of technology in rural public transport (Mounce et al., 2020; Naude et al., 2005; Velaga et al., 2012). According to Velaga et al. (2012), the reason for this lack of technology follows from four different categories of challenges in rural areas:

1. Communication infrastructure: the lack of a proper communication infrastructure, like wireless communication and mobile connection, is a common issue in many rural areas. This is especially problematic for providing actual time information to travelers;
2. Service coordination: often, there is a limited amount of provided means and services regarding transport in rural areas, making it difficult to divide these between a certain amount of public amenities;
3. Service area: the amount of infrastructure is often limited in rural areas, whereas the public transport services also cover longer distances on average compared to urban areas. This causes issues when an alternative route is necessary due to road constructions or accidents for example;
4. Small scale: the relatively small scale of public transport in rural areas can make it difficult to acquire the funding and establishment of the technological infrastructure needed for improvements, like digital information provision.

Examples of technological implementation are digital and up-to-date information provision, like computerized arrival indicators at train and bus stops, and shared transport systems, like shared e-scooters or e-bikes (Elkosantini and Darmoul, 2013; Nelson et al., 2010; Velaga et al., 2012). For people living in urban areas, these initiatives might be perceived as common, since these have been highly implemented in cities, but their application in rural areas is still rather restricted. The relatively low demand for public transport in rural areas compared to urban areas partly clarifies this, as it is more challenging to design an efficient supply (Lieszkovszky, 2018; Mounce et al., 2020). Also taking into account the less optimal broadband internet connection and phone range, Velaga et al. (2012) speak of a 'digital divide' between people living in urban areas and people living in remote rural areas.

Overcoming these challenges and improving the technological state of public transport supply in rural areas would not only increase accessibility and efficiency (Naude et al., 2005; Velaga et al., 2012) but also open doors towards another possible solution, which focuses on a demand-responsive and flexible transport system (König and Grippenkov, 2020; Mounce et al., 2020; Velaga et al., 2012). According to Mounce et al. (2020), these demand-responsive systems fill some of the gaps in routine public transport services as they provide more flexibility and efficiency and are therefore one of the key solutions for rural mobility. Such demand-responsive systems are usually services that are provided for a certain group, like disabled people or the elderly. They are characterized by flexibility, door-to-door service, and shared transportation which are typically operationalized by small to medium-sized automobiles (Mulley et al., 2012). For the best results, the amenities, transport providers, and municipalities must work closely together since this increases the demand-responsive system to be economically feasible and based on local needs (Mounce et al., 2020).

Another possible solution is the implementation of shared transportation, which is usually characterized as shared systems and services that can be seen as an extension of the traditional public transport system, like car-pooling, shared taxis, and electric scooters (Mounce et al., 2020; Velaga et al., 2012). Like the demand-responsive systems, digital supporting services are also of high importance for an efficient online payment, reservation, and information system (Mounce et al., 2020). According to Mounce and Nelson (2019), there are two types of shared transportation methods; ride-sharing, which includes car-pooling, and shared taxis, allowing travelers to have a destination in the same direction to share the same vehicle, and asset-sharing, which allows travelers to share the mode of transport, like scooters or bicycles, but not simultaneously.

The next solution is one that is more intended for the long-term due to technological challenges; autonomous vehicles (Hinderer et al., 2018). Even though there are already a few examples of operating autonomous vehicles (e.g. the first self-driving shuttle bus on a public road in Salzburg, Austria (Rehrl and Zankl, 2018) and a similar shuttle bus in Brussels, Belgium (Feys et al., 2020)), these vehicles have only been operated for testing purposes and more testing will be necessary before it will be an implemented transport service on a big scale (Feys et al., 2020). However, according to Hinderer et al. (2018), autonomous vehicles offer great potential for rural areas regarding transport services since current services are often not in line with the needs of rural residents. Autonomous vehicles can be operated in a demand-responsive way and thereby potentially increase accessibility, which could in turn have an inhibitory effect on the shrinking populations in rural areas.

The previously mentioned solutions will not be free of charge, which is closely correlated with the next possible solution; subsidizing rural transport services in countries where this is not happening yet or an increase of subsidies in countries or areas where this is already existing (Emele et al., 2016; Mounce et al., 2018; Velaga et al., 2012). In most countries in Europe, this is also the case. However, governments in many of these countries have decided to reduce the subsidies for rural transport services in an attempt to reduce public spending. As a consequence, rural transport services are less capable of running effectively or are even forced to quit their service (Mounce et al., 2020). On the other hand, government spending on public transport in urban areas has been increasing over the years in these countries, as this stimulates economic activities and high well-being. In this situation, people in rural areas become more and more dependent on private car use, which affects population groups with limited access to a car (Mounce et al., 2020). It is frequently stated that subsidies for transport should be better allocated.

The formerly mentioned solutions all focused on the transport dimension and the temporal dimension explained by Geurs and Ritsema van Eck (2001), namely improving the supply and efficiency of transport services and decreasing travel times for users. However, the attention could also be aimed at the land-use dimension by trying to preserve existing amenities in a certain area. According to the OECD (2020), this has become more challenging for governments as a result of the demographic changes in rural areas. Therefore, many residents in Dutch rural areas started initiatives to preserve or effectuate certain facilities that they identify as vital for their livability. This has been the case in many small villages in the Northern Netherlands regarding supermarkets and transport services for the elderly. Governments currently play a facilitating role in these initiatives and are constantly evaluating how they could keep contributing to this solution. Nevertheless, the residents are indispensable regarding the preservation of amenities (Rijksoverheid, 2016).

2.6 Conceptual model

A conceptual model has been created, which is based on the theoretical framework. The model can be seen in figure 3.

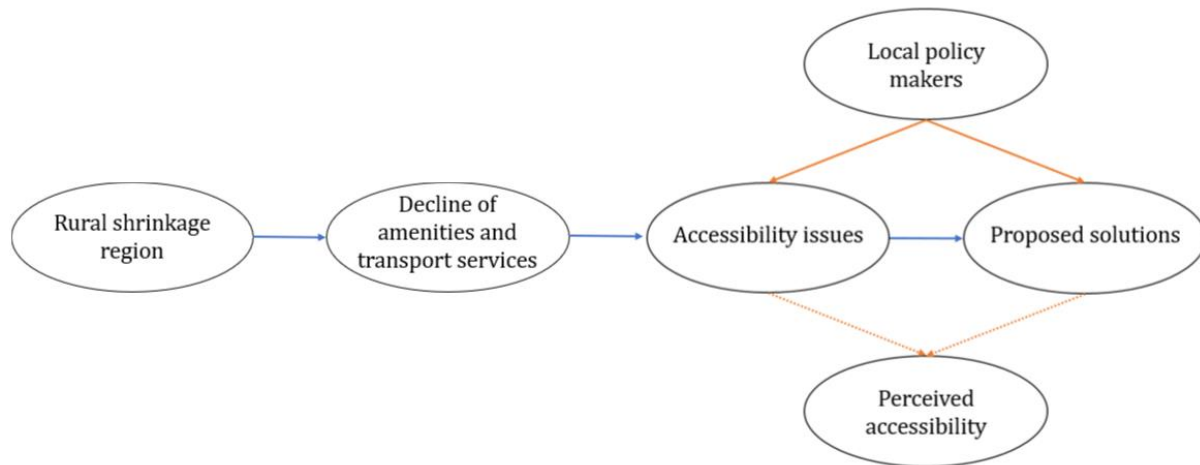


Figure 3: Conceptual model . *Source: Author*

The model starts with the concept of ‘shrinkage regions’ on the left side, which serves as the geographical base of the research. The current literature discourse has shown that accessibility issues arise in many rural areas with a shrinking population due to a decline in amenities and transport services. In the Netherlands, the average distance traveled to amenities is the largest in rural areas with a shrinking population, compared to rural areas with population growth or urban areas (Tillema et al., 2015), which serves as the second concept of the model. ‘Accessibility issues’ are the third concept in line since these often result from the decline of amenities and transport services. Consequently, solutions are necessary to deal with this issue and avoid a decreased well-being for people at risk of social exclusion. For this reason, ‘solutions’ have been placed in the most right section. All of these arrows are highlighted in blue because previous research has profoundly shown these connections.

‘Local policymakers’ are at the top of the model, as this research has a policymakers’ perspective. Interviews will be conducted with policymakers from municipalities in the province of Groningen to find out what they identify as the main accessibility issues and possible solutions for their municipality. Both of these arrows are highlighted in orange since the policy perspective is currently unknown. Finally, the concept ‘perceived accessibility’ can be seen at the bottom. The results from the interviews will be compared with an existing dataset regarding perceived accessibility of residents in the North of the Netherlands. The line is dotted since both datasets cannot be compared perfectly, as the policymaker data will be qualitative and the perceived accessibility is quantitative. This will be further explained in the next section, the methodology.

Chapter 3 – Methodology

This research is about gaining new insights from a policy perspective regarding accessibility issues and solutions in Dutch shrinkage regions. Each municipality has a unique policy implementation regarding accessibility issues, so the results cannot be generalized. Therefore, the main nature of this research will be qualitative. In addition, the results will be briefly compared with a dataset regarding ‘perceived accessibility’ in the Northern Netherlands, which consists of quantitative data.

3.1 Case study area

Groningen

A municipality scale has been chosen for this research with a time period of 2015-2020, meaning that municipalities in the province of Groningen with a decreasing population in this period are included in the analysis. Relatively speaking, most of these shrinking municipalities can be found in the province of Groningen. In this province, which is the area of land outlined by a grey line at the top right of the map in figure 2, 9 out of 12 municipalities (75%) had a shrinking population between 2015 and 2020. The island of Schiermonnikoog will be disregarded in this research since the dynamics of accessibility and mobility issues caused by population decline are different compared to the mainland (Walsh et al., 2020). In comparison, Limburg, which can be found at the right bottom, is the province with the second highest share of shrinking municipalities, namely 18 out of 29 (62%), of which some are also urban areas, like Heerlen (CBS, 2021a). This is the reason this research will be focused on accessibility issues in shrinking municipalities in Groningen, since statistics have indicated this issue to be present especially in this province.

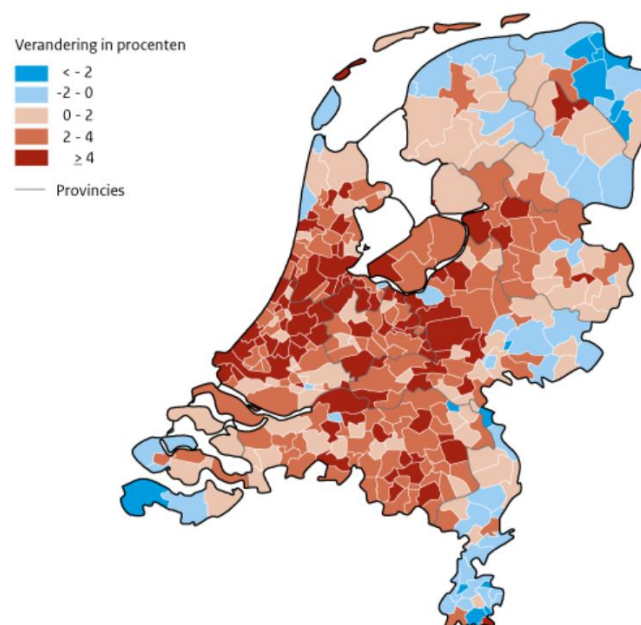


Figure 2: Population growth in Dutch municipalities, 2015-2020. Source: Volksgezondheidszorg, 2021.

As mentioned before, 9 out of 12 municipalities had a shrinking population between 2015 and 2020. From north to south these municipalities are: Het Hogeland, Delfzijl, Loppersum, Appingedam, Midden-Groningen, Oldambt, Veendam, Pekela, en Stadskanaal (CBS, 2021a). It should however be noted that since the 1st of January, 2021, the municipalities Delfzijl, Loppersum, and Appingedam have been fused into one municipality: Eemsdelta. This brings the total of shrinking municipalities in Groningen to 7. However, since Eemsdelta currently does not exist for a whole year, Delfzijl, Loppersum, and Appingedam will be described separately in the next section. This also applies to Het Hogeland, as this municipality exists since the 1st of January 2019. Therefore, the four former municipalities which fused into Het Hogeland, which are Bedum, Eemmond, De Marne, and Winsum, will also be described.

3.2 Municipalities

Het Hogeland

This municipality has a total population of 47.834 and an average population density of 99 per km² in 2021. The largest share of the population is 50-60 years old, followed by 60-70 years old and 10-20 years old. The largest places in Het Hogeland are Bedum, Winsum, and Uithuizen. Het Hogeland exists since the 1st of January 2019 after a fuse of Bedum, Eemmond, de Marne, and Winsum, which is why table 1 displays a comparison between 2019 and 2020, instead of 2015 and 2020. This could explain why there are barely any differences notable, only distances to daily shopping facilities, cafes and restaurants, and pharmacies increased slightly (CBS, 2021b).

	2019	2020
Supermarket	1,4	1,4
Daily shopping facility	1,4	1,5
Elementary school	0,9	0,9
Cafes and restaurants	2,3	2,7
General practitioner	1,3	1,3
Pharmacy	2,1	2,4

Table 1: Average distance in kilometers to amenities in Het Hogeland, 2019 and 2020. Source: CBS, 2021c.

Bedum

This former municipality had a total population of 10.475 in 2018. The largest share of the population was between 50-60 years old, followed by 60-70 years old and 40-50 years old. The only relatively large place in this former municipality was Bedum. Table 2 shows the differences in average distance to amenities between 2015 and 2018. It can be seen that the average distance to an elementary school is the only one that slightly increased in this period.

	2015	2018
Supermarket	1,1	1,1
Daily shopping facility	0,9	0,9
Elementary school	0,7	0,9
Cafes and restaurants	0,7	0,7
General practitioner	1,1	1,1
Pharmacy	1,3	1,3

Table 2: Average distance in kilometers to amenities in Bedum, 2015 and 2018. *Source: CBS, 2021c.*

Eemsmond

This former municipality had a total population of 15.553 in 2018. The largest share of the population was between 50-60 years old, followed by 60-70 years old and 40-50 years old. The largest places in this former municipality were Uithuizen, Uithuizermeeden, and Warffum. In table 3, the average distances to amenities are shown in 2015 and 2018. Despite the average distances being relatively large compared to other (former) municipalities, only minimal increases have been observed for elementary schools and cafes and restaurants.

	2015	2018
Supermarket	1,7	1,7
Daily shopping facility	1,4	1,3
Elementary school	0,8	0,9
Cafes and restaurants	2,3	2,4
General practitioner	1,2	1,1
Pharmacy	2,5	2,4

Table 3: Average distance in kilometers to amenities in Eemsmond, 2015 and 2018. *Source: CBS, 2021c.*

De Marne

This former municipality had a total population of 10.058 in 2018. The largest share of the population is between 50-60 years old, followed by 60-70 years old and 40-50 years old. The largest places were Leens, Ulrum, and Kloosterburen. Table 4 shows the differences in average distance to amenities between 2015 and 2018. It shows that there was a minimal increase of average distance to daily shopping facilities and even a doubling of the average distance to cafes and restaurants.

	2015	2018
Supermarket	1,9	1,9
Daily shopping facility	1,7	1,8
Elementary school	1,1	1,1
Cafes and restaurants	1,8	3,7
General practitioner	2,0	2,0
Pharmacy	2,7	2,7

Table 4: Average distance in kilometers to amenities in De Marne, 2015 and 2018. *Source: CBS, 2021c.*

Winsum

Finally, this former municipality of Het Hogeland had a total population of 13.560 in 2018. . The largest share of the population is 50-60 years old, followed by 60-70 years old and 10-20 years old. The largest places were Winsum, Baflo, and Sauwerd. In table 5, the average distances to amenities are shown in 2015 and 2018. An average increase of 600 meters can be seen for supermarkets and cafes and restaurants. On the other hand, the average distance towards pharmacies has decreased with 600 meters.

	2015	2018
Supermarket	1,1	1,7
Daily shopping facility	1,8	1,8
Elementary school	0,8	0,8
Cafes and restaurants	1,3	1,9
General practitioner	1,3	1,3
Pharmacy	2,5	1,9

Table 5: Average distance in kilometers to amenities in Winsum, 2015 and 2018. *Source: CBS, 2021c.*

Delfzijl

This former municipality had a total population of 24.678 and an average population density of 185 per km² in 2020. The largest share of the population is between 50-60 years old, followed by 60-70 years old and 40-50 years old. The only large city in this municipality was the city of Delfzijl. Moreover, Delfzijl is known for its harbor, which is considered the most important one in the Northern Netherlands. Table 6 shows the differences in average distances to amenities between 2015 and 2020. It can be seen that only the distances to elementary schools and cafes and restaurants increased. What stands out for Delfzijl is the average increase of 16,1 km to a hospital (CBS, 2021b).

	2015	2020
Supermarket	1,3	1,3
Daily shopping facility	1,9	1,9
Elementary school	0,7	0,9
Cafes and restaurants	1,3	1,4
General practitioner	1,4	1,4
Pharmacy	1,4	1,4

Table 6: Average distance in kilometers to amenities in Delfzijl, 2015 and 2020. Source: CBS, 2021c.

Loppersum

This former municipality had a total population of 9.537 and an average population density of 86 per km² in 2020. The largest share of the population is 50-60 years old, followed by 60-70 years old and 10-20 years old. The largest places in Loppersum are Loppersum, Middelstum, and Stedum. Moreover, Loppersum is known as the area where the epicenter of (small) earthquakes is often located due to the gas extraction. In table 7, the average distances to amenities are shown in 2015 and 2020. Considerable differences can be observed here. While the average distance to supermarkets and other daily shopping facilities stayed equal or even decreased, the distances to the other four types of amenities increased greatly. Standing out is the average increase of 5,7 km to a hospital (CBS, 2021b).

	2015	2020
Supermarket	2,6	2,6
Daily shopping facility	2,4	2,2
Elementary school	0,9	1,4
Cafes and restaurants	1,4	2,7
General practitioner	1,6	2,4
Pharmacy	2,0	2,5

Table 7: Average distance in kilometers to amenities in Loppersum, 2015 and 2020. Source: CBS, 2021c.

Appingedam

This former municipality had a total population of 11.642 and an average population density of 490 per km² in 2020. The largest share of the population is also 50-60 years old, followed by 60-70 years old and 10-20 years old. The only large place in this area is Appingedam. Table 8 shows the differences in average distances to amenities between 2015 and 2020. It is shown that there has only been a minimal increase to general practitioners in this period. What stands out for Appingedam is the average increase of 17,8 km to a cinema (CBS, 2021b).

	2015	2020
Supermarket	0,9	0,9
Daily shopping facility	0,7	0,7
Elementary school	0,9	0,9
Cafes and restaurants	1,0	1,0
General practitioner	1,3	1,4
Pharmacy	1,3	1,3

Table 8: Average distance in kilometers to amenities in Appingedam, 2015 and 2020. Source: CBS, 2021c.

Midden-Groningen

This municipality currently has a total population of 60.726 and an average population density of 217 per km² in 2021, making it the most populated shrinking municipality. The largest share of the population is between 50-60 years old, followed by 60-70 years old and 40-50 years old. The largest places are Hoogezand, Sappemeer, and Muntendam. In table 9, the average distances to amenities are shown in 2018 and 2020, because this municipality exists since 2018. Despite the short time period, small distance increases can still be observed for cafes and restaurants, general practitioners, and pharmacies. Furthermore, there is nothing standing out for Midden-Groningen (CBS, 2021b).

	2018	2020
Supermarket	1,2	1,2
Daily shopping facility	1,1	1,1
Elementary school	0,9	0,9
Cafes and restaurants	1,3	1,6
General practitioner	1,3	1,4
Pharmacy	1,5	1,6

Table 9: Average distance in kilometers to amenities in Midden-Groningen, 2018 and 2020. Source: CBS, 2021c.

Oldambt

This municipality has a total population of 38.277 and an average population density of 169 per km² in 2021. The largest share of the population is between 50-60 years old, followed by 60-70 years old and 70-80 years old. The largest places are Wainscoted, Scheemda, and Finsterwolde. Table 10 shows the differences in average distances to amenities between 2015 and 2020. In Oldambt, increases of distances can be observed to daily shopping facilities, cafes and restaurants, and general practitioners. What stands out for Oldambt is the average increase of 17,7 km to a cinema (CBS, 2021b).

	2015	2020
Supermarket	1,2	1,2
Daily shopping facility	0,9	1,0
Elementary school	0,9	0,9
Cafes and restaurants	1,2	1,7
General practitioner	1,6	1,9
Pharmacy	1,6	1,6

Table 10: Average distance in kilometers to amenities in Oldambt, 2015 and 2020. *Source: CBS, 2021c.*

Pekela

This municipality has a total population of 12.176 and an average population density of 248 per km² in 2021. The largest share of the population is between 50-60 years old, followed by 60-70 years old and 40-50 years old. The largest places are Oude Pekela, Nieuwe Pekela, and Alteveer. Table 12 shows the differences in average distances to amenities between 2015 and 2020. In Pekela, the least amount of increase between 2015 and 2020 can be observed regarding distance to amenities. Standing out is the average increase of 3,6 km to a hospital (CBS, 2021b).

	2015	2020
Supermarket	1,2	1,2
Daily shopping facility	0,8	0,8
Elementary school	0,8	0,8
Catering industry	2,0	2,0
General practitioner	1,1	1,2
Pharmacy	1,2	1,2

Table 11: Average distance in kilometers to amenities in Pekela, 2015 and 2020. *Source: CBS, 2021c.*

Stadskanaal

This municipality has a total population of 31.754 and an average population density of 270 per km² in 2021. The largest share of the population is between 50-60 years old, followed by 60-70 years old and 70-80 years old. The largest places are Stadskanaal, Musselkanaal, and Ceresdorp. In table 13, the average distances to amenities are shown in 2015 and 2020. Only for elementary schools and cafes and restaurants, average distances have increased. What stands out for Stadskanaal is the average increase of 1,2 km to a school of higher general secondary education (CBS 2021b).

	2015	2020
Supermarket	1,3	1,2
Daily shopping facility	1,2	1,2
Elementary school	0,8	1,0
Cafes and restaurants	1,4	2,0
General practitioner	1,6	1,6
Pharmacy	1,4	1,4

Table 12: Average distance in kilometers to amenities in Stadskanaal, 2015 and 2020. Source: CBS, 2021c.

Previous tables already show a few differences between the municipalities when it comes to the increase in average distances to amenities. Where Loppersum, Het Hogeland, and Oldambt show relatively large increases, Pekela, Appingedam, and Delfzijl only display minimal increases. In figure 3, the geographical locations of each municipality are displayed to improve the understanding of the case study area. The municipalities with a shrinking population between 2015-2020, which are therefore included in the analysis, are circled white.



Figure 3: Map of the municipalities in Groningen as of 01-01-2021. *Source: Provincie Groningen, 2020.*

Despite the different distance increases, these numbers only show a small fraction of the potential accessibility issues in the municipalities. Within accessibility levels based on measurements, travel times and modes of transport are currently missing, which are equally important as travel distance. Additionally, the perceived accessibility is completely missing as well.

3.3 Empirical approach

For this research, both a qualitative method and a quantitative method have been used to answer the research questions. To identify the main accessibility issues and possible solutions in the eyes of local policymakers, a qualitative method has been conducted. Moreover, the comparison between the opinion of the policymakers and the experience of residents has been analyzed through a quantitative method. Both approaches will be explained in more detail hereafter.

3.4 Qualitative research

Interviews

To get a more complete identification of the potential accessibility issues in each municipality, policymakers have been interviewed to broaden the current understanding of accessibility issues by taking a policy perspective. The necessary data for the first two sub-questions had to be qualitative, since the opinions of local policymakers were asked. As a result, this data allowed the sub-questions “Which accessibility issues are perceived to be most challenging by policymakers in Dutch shrinking municipalities” and “Which solutions are currently the most promising to deal with this issue?” to be answered. The policymakers have been approached through the mail address or phone number of the municipal government they work for. This way, appointments have been made and the interviews either took place face-to-face, which is the preferred method because of communicational advantages, or online, due to the current national Covid-19 restrictions. Municipalities were given the option to select the policymakers most suitable for the research. As a result, interviews have been conducted with policy officers for traffic and transport, an alderman, a housing policy advisor, an area director, an advisor for public space, and a policy officer for the Social Support Act. In two cases, Midden-Groningen and Oldambt, an interview took place with two interviewees simultaneously, to maximize the amount of relevant information. In total, there has been contact with eight different policymakers divided over six municipalities. Finally, each interview has been (partly) transcribed and analyzed through a coding scheme. In appendix 1, a list of the interview questions can be found.

Coding scheme

The program "Atlas.ti" has been used to analyze the transcribed interviews with codes that are based on the theoretical framework. This method gives structure to large pieces of texts, like transcripts, and allows the researcher to label parts about a certain topic (Clifford et al., 2010). A list of the codes based on the theoretical framework can be found below.

Accessibility issues:

- 1 – Cause shrinking population
- 2 – Decrease of amenities
- 3 – Decrease of public transport
- 4 – Social exclusion
- 5 – Other accessibility issues

Solutions:

- 1 – Expansion public transport
- 2 – Technological improvements public transport
- 3 – Demand responsive services
- 4 – Shared transportation
- 5 – Autonomous vehicles
- 6 – Increasing subsidies/spending
- 7 – Preserve amenities
- 8 – Other solutions

Ethical considerations

Ethical research is conducted by thoughtful and informed researchers, who stand by moral and social values, such as doing no harm to other parties, and important values for cooperative work, like fairness and mutual respect (Clifford et al., 2010). Ethical considerations will be described since these are highly important while conducting qualitative research through interviews.

Firstly, each interviewee has been given the option to stay anonymous in the report and to stop the interview whenever they feel like doing so, whether temporarily or permanently. Also, to allow for listening back and transcribing, interviewees have been asked for their permission to record the interview. During the research, the recordings will be stored safely and secured on a personal laptop and deleted afterwards. Interviewees will be informed about the purpose of the interviews for the research and how these will be analyzed as well. Finally, interviewees have been given the option to receive the final version of the research, as their input has been of vital importance.

3.5 Comparative research

Comparative research has been conducted to answer the final sub-question “How does the policy perspective compare with the experience of residents?”. The results of the interviews with local policymakers from the municipality, mainly the results that focus on the accessibility issues in their area, have been compared with an existing data set covering perceived accessibility of residents in the Northern Netherlands, which is provided by F. J. Pot. Due to the survey format of this data set, the results are quantitative, while the results of the interviews are qualitative. For this reason, a perfect comparison between these data sets is not possible. Nevertheless, the interview questions have been formulated in such a way that they cover the same topics as the existing survey, which made it possible to determine to what extent the interview results are in line with the perceived accessibility of residents. A part of the survey can be found in appendix 2.

The analysis of the interview questions that are directly linked with the survey question has been operated in a different way compared to the qualitative research. While the questions aimed at answering the first two sub-questions are formulated in an open way, and have been analyzed using codes, the questions aimed at answering the third sub-question are directly linked to one or multiple questions in the survey. Appendix 2 shows which interview questions have been directly linked with questions from the survey. Furthermore, these interview questions are divided into two separate categories, the living environment and residential mobility, considering that the survey questions are divided by these categories as well. The results of the relevant questions in the survey have been sorted into zip codes, so the opinions can be identified per municipality. Afterwards, descriptive statistics have been applied using the program “STATA” for the opinions and finally, the results of the interviews with the policymakers have been compared with these descriptive statistics to find out to what extent this is in line with perceived accessibility. The syntaxes of the quantitative analysis

Data reflection

Out of the 7 municipalities in the province of Groningen with a shrinking population between 2015 and 2020, interviews took place with (a) representative(s) of Het Hogeland, Eemsdelta, Midden-Groningen, Oldambt, Pekela, and Stadskanaal. Only with the municipality of Veendam it has not worked out to schedule a meeting, which causes Veendam to be excluded from the analysis. Regarding the data set of the residential accessibility experiences, there were two municipalities, Pekela and Stadskanaal, with an insufficient number of cases for a meaningful comparison. Therefore, the decision has been made to combine municipalities for this part of the analysis. Although the data is not flawless, it is certainly sufficient for the purposes of this research.

Chapter 4 - Results

In this section, the main findings from the qualitative research, which are the interviews with representatives of the municipalities, and the comparative research, which is the comparison of the results with the experience of local residents, will be summarized per municipality

4.1 Main accessibility issues and possible solutions

Het Hogeland

The first and northernmost municipality is Het Hogeland. Here, an interview with a policy officer for traffic and transport helped to identify the main issues and possible solutions for the upcoming years.

Main accessibility challenges

According to the interviewee, the municipality faces two big challenges regarding the accessibility of amenities. The first one is increasing the accessibility of amenities that have become relatively inaccessible the last decade, which are mainly supermarkets, healthcare amenities and elementary schools. Some local supermarkets have become relatively inaccessible due to a decrease of bus services in the municipality, causing increased travel times and distances for residents who rely on these public transport services for their daily groceries. The municipality received multiple complaints from its inhabitants as a result. Regarding the healthcare amenities, these have been relatively inaccessible for a longer period, especially for residents living in the smaller villages, since these amenities are only located in the bigger villages. Finally, the decreased accessibility of elementary schools can directly be linked to the population decline in the area, as multiple schools were forced to close down or merge with another school due to a declining number of pupils. This is also in line with the possible consequences of a declining population explained earlier by Ritsema van Eck et al. (2013).

The second accessibility challenge focuses on the public transport services in the area. Specifically, the municipality wants to prevent that public transport services are scaling down even more since a portion of the residents rely on these services to reach certain amenities. The situation was explained as follows:

“The decreasing number of bus services is almost always a result of reduced revenues. Not enough people are making use anymore of these services so it is not financially feasible to keep certain bus lines. The public transport agency then decides to get rid of them, which unfortunately has consequences for the people who did still use the busses” (Policy Officer for Traffic and Transport Het Hogeland, personal communication, December 7, 2021).

Furthermore, 72% of the residents in Het Hogeland currently have a bus stop within walking distance, which corresponds to 1 kilometer, from their home. According to the interviewee, full coverage in a vast and rural municipality like Het Hogeland is utopian, but the challenge is to prevent this number from decreasing and find out where improvements can still be made.

Solutions

To address these issues, the municipality is currently working on a ‘mobility vision’, of which one of the most important goals is to make the public space more accessible for everyone, despite age or possible disability. The municipality has asked a third party to calculate the average travel distances to all sorts of amenities for its residents. The results revealed that the distances are much larger compared to the national average distances and it helped identify certain areas within the municipality that might need extra interference. This type of measurement for determining accessibility is a solid example of objective accessibility which, as previously mentioned, is often used by politicians and planners (van Wee, 2016).

Within the mobility vision, the municipality wants to increase the share of people that make use of public transport services to reach amenities. As mentioned earlier, around a quarter of the population does not have a bus stop within walking distance from their home. Therefore, the municipality is currently evaluating if it is possible to arrange extra transport services or support transportation initiatives from the residents themselves that bring people to bus stops, after which they can continue their trip to an amenity. As a result, public transport would be more accessible for some people, which in turn has a positive effect on the accessibility of amenities. Moreover, this initiative could serve as a more affordable alternative for the services of the WMO, which is a Dutch Social Support Act that provides demand-responsive transport for citizens with low mobility, like disabled people and the elderly. An increase in usage of bus services also generates more revenue for the agency of public transport, which lowers the chance that bus services will be scaled down even more in the future. In short, this solution would help against both of the main accessibility issues.

Apart from the measured accessibility methods, the municipality also took the individual perspective in mind. Over the last few years, bus stops have already been improved to be more accessible and usable specifically for disabled people and the elderly, since the average age has been increasing and the elderly continue to live independently for a longer time. Among other things, these improvements include ramps for wheelchairs, raised bus stops that align with the entrance of busses, and flat sidewalks.

The final idea that should increase accessibility levels, is the construction of new bike paths between smaller villages that recently saw a bus line close down due to decreasing revenues. According to the municipality, this alternative should increase the accessibility of residents that were negatively affected by the disappearance of public transport (Policy Officer for Traffic and Transport Het Hogeland, personal communication, December 7th, 2021).

Eemsdelta

The municipality of Eemsdelta is located at the southern border of Het Hogeland. Both municipalities show similarities concerning the main accessibility issues. An interview with the Alderman of Eemsdelta shed light on the most important challenges and possible solutions for the municipality.

Main accessibility challenges

According to the interviewee, the main challenge of Eemsdelta is similar to the situation of Het Hogeland, namely increasing the accessibility of amenities that have displayed a general decrease in accessibility over the last couple of years. Within this challenge, Eemsdelta has a special focus on the accessibility of elementary schools, pubs and bars, and daily shopping facilities. Furthermore, there is a stronger focus on the smaller villages as the municipality has a few bigger places, which are Loppersum, Appingedam, and Delfzijl, that have a sufficient number of amenities and a useful railway connection with the city of Groningen.

As for the smaller villages, the municipality is concerned for its residents because of how accessibility levels have developed recently. According to the interviewee, elementary schools are the most impactful amenity for a smaller village as these are often the number one criterion for outsiders with children to move to a rural area. The Alderman described this as follows:

“People often say that when an elementary school closes down, the village is done for regarding the attraction of outsiders. For families who move from an urban area to our municipality, an elementary school is the type of amenity that they want to have close by. They are not in the mood to travel a couple of kilometers every morning with young children. In other words, an elementary school is a major pull factor for outsiders, while not having an elementary school leads to a low number of families with children settling down. As a consequence, population demographics within an area change and the livability decreases, which could strengthen the population decline” (Alderman, Eemsdelta, personal communication, December 9th, 2021).

This matches an earlier scenario explained by Ritsema van Eck et al. (2013), who stated that the decrease of (young) children decreases the demand and chance of survival for certain amenities, like schools, daycares, and playgrounds. When these types of amenities have to close doors, the whole region is affected due to a decrease in young people and employment possibilities.

Besides the importance of elementary schools, the number of pubs and bars and daily shopping facilities has also decreased recently. The youth that is affected by the decrease of pubs mainly rely on the night bus that brings them home from the city of Groningen or they organize house and barn parties themselves. For adults and the elderly who are less mobile, this decrease could have a negative effect that leads to social exclusion.

Solutions

Despite having a similar accessibility challenge compared to Het Hogeland, the municipality of Eemsdelta has a different point of view when it comes to the most promising solution. Here, the focus point is not improving the infrastructure of public transport services, but housing. According to the interviewee, the municipality wants to focus on two specific population groups. The first group is outsider families with (young) children, as mentioned before. The interviewee predicts that rural villages will become more attractive living areas for families due to the exorbitant housing prices in especially the Randstad and cities like Groningen. Even though the prices are also rising in rural areas, housing here has become and will be relatively more affordable compared to urban areas. The second group is young adults born in Eemsdelta who were often forced to move away due to the limited number of houses available within the municipality, despite the desire to stay.

The motive for the focus on housing for these two population groups is the possible benefits for accessibility towards amenities they bring along. According to the interviewee, an increase in these groups of people changes dynamics within a village and has a positive effect on the demand for amenities. Local populations have aged over the last decade and these households often have a less diversified demand and fewer means to spend on amenities.

Therefore, the attraction of families with children and the retainment of young adults in the municipality, and the increase in demand and spending they bring with them, increase the chance of survival for certain amenities and could even lead to amenities coming back. As a result, distances towards amenities decrease overall and the accessibility levels increase for all residents.

It is currently unsure how the municipality wants to achieve this in detail, but it was mentioned that there is also a certain responsibility expected from the residents themselves to make this work. Currently, residents are used to travelling to a larger nearby place for supermarkets or daily shopping facilities, but they also have a direct impact on the survivability of local supermarkets. So, one requirement for this to work is that the local people also make use of the local amenities instead of driving to a nearby place (Alderman, Eemsdelta, personal communication, December 9th, 2021).

Finally, the municipality has already been working on a solution for the declining number of pubs and bars. For a couple of years, Eemsdelta has been making sure that every village at least has one community center where local residents can come together. This solution is especially aimed at adults and the elderly, as they are more vulnerable to social exclusion compared to the youth, which was earlier explained by Terraneo (2021) as well.

Midden-Groningen

At the Southern border of Eemsdelta, the municipality of Midden-Groningen is located. Here, a group interview with a policy officer for traffic and transport and a housing policy advisor helped identify the main accessibility challenges and possible solutions for the municipality.

Main accessibility challenges

Unlike the situation in Het Hogeland and Eemsdelta, there is not one main accessibility for the upcoming years. Instead, there are several smaller issues that need to be addressed. The first one is accessibility worries for a small portion of the population that lives in one of the smaller and remote villages with poor access to public transport services, and where a few amenities have closed down recently. These are mainly daily shopping facilities and pubs and bars. The municipality has received some complaints about disappearing bus lines or amenities but according to the interviewees, most residents in the remote villages possess at least one private car or were familiar with the accessibility situation beforehand.

Secondly, the municipality stressed the issue of affordability regarding transportation, especially if current inflation rates continue over a longer time period. According to the interviewees, owning, insuring, and driving a private car has recently become increasingly expensive. This could have a life-changing effect on low-income households in rural areas, if it would result in families being forced to sell their cars. Moreover, new initiatives which could act as an alternative for a private car, like shared cars or e-scooters, are often relatively expensive in the initial start-up period and therefore unaffordable for low-income families. As a result, these families would have to rely on the public transport system, which is often impractical in smaller villages.

The third and final challenge focuses on the accessibility of bus stops for the elderly and disabled people. Currently, some bus stops are hard to access for people in need of a walker or a wheelchair, which limits them from using public transport services. Over the past years, some bus stops have already been upgraded but there is still room for improvement (Policy officer for traffic and transport and a housing policy advisor, Midden-Groningen, personal communication, January 24th, 2022).

Solutions

To deal with these challenges, the municipality of Midden-Groningen has several ideas in mind. Considering the first two issues, the municipality wants to invest in more and better bike paths that connect the relatively remote northern area with the eastern part of the city of Groningen, where the neighborhood 'Meerstad' is currently being developed. The idea was explained as follows:

“Besides the fact that we want people to use the bike more often in general because of health and sustainability benefits, which is now increasingly possible because of e-bikes, extra bike paths in the North connected to Meerstad for example could also increase accessibility levels for residents unable to afford a private car (anymore) or other expensive transportation options” (Policy officer for traffic and transport, Midden-Groningen, personal communication, January 24th, 2022).

Moreover, the municipality wants to keep supporting initiatives from its residents when it comes to transportation. In 2015, a bus line in Hoogezand, the main town in Midden-Groningen, was in danger of disappearing due to decreased revenues. The municipality came up with the idea to take over the bus from the public transport agency and keep it running by the residents themselves. A similar situation happened in 2018 with a bus line between Harkstede and Tynaarlo. Up until this day, both bus lines are still running with help from the municipality and volunteers.

The third solution focuses on the issue of affordability and knowledge in the municipality. A quarter of the population in Midden-Groningen stated to the municipality that they want to make use of the public transport system, but are unable to due to a lack of knowledge or financial means.

The municipality wants to decrease this group of people by providing clearer information at bus stops for current transport services, as well as making new initiatives like shared e-scooters more understandable and affordable. According to the interviewees, shared transportation is only going to grow from this point on, as 'using' has become more important than 'owning' over the last years. For this reason, shared transportation is a serious focus point for Midden-Groningen.

Finally, the issue of inaccessible bus stops for the elderly and disabled people will be tackled by improving the accessibility of these bus stops the upcoming years. The operation of the improvements will be similar to what has already been done in Het Hogeland, which are ramps for wheelchairs, raised bus stops that align with the entrance of busses, and flat sidewalks (Policy officer for traffic and transport and a housing policy advisor, Midden-Groningen, personal communication, January 24th, 2022).

Oldambt

This municipality is based in the Eastern part of the province of Groningen, bordering Midden-Groningen in the west and Niedersachsen, Germany, in the east. An interview with an area director and project manager helped discover the main accessibility challenges and possible solutions for the next years.

Main accessibility challenges

Regarding the type of accessibility challenges, the situation in the municipality of Oldambt is quite similar to the situation in Midden-Groningen, as there is not one main challenge, but rather multiple smaller ones. The first challenge that was mentioned was a modest decrease in supermarkets, daily shopping facilities, and spare time facilities, specifically sports clubs and village houses. Similar to other municipalities, Oldambt has received multiple complaints from residents about the disappearance of an amenity in the area. According to the interviewee, the municipality has very little influence on the relocations or closures of daily stores and supermarkets for example. However, the disappearance of amenities like sports clubs and village houses is affected by decisions conducted by the municipality. This is strongly connected with the second challenge, which is the relative decrease of municipal financial means meant for the management and maintenance of buildings and structures used for amenities. The interviewee explained this as follows: "Village houses have also closed down recently. The buildings were managed and exploited by the municipality, but over the last years, more and more tasks of the national and provincial government have been decentralized to municipalities. These tasks take up an increasing part of our budget and as a result, it is not financially feasible any longer to keep all the village houses, despite the great need for these houses" (Area director and project manager, Oldambt, personal communication, January 11th, 2022).

The third accessibility challenge is contrary compared to all of the other challenges mentioned in this research. Where most of the challenges could be related to rural characteristics, like a declining population, Oldambt currently has a traffic flow-related challenge caused by population growth in the area of Winschoten and Blauwestad. In the last 5 years, the pressure on a particular infrastructure piece called 'Blauwe Roos' has increased significantly, which consists of roads, bridges, and roundabouts. The long traffic jams resulting from this cause low accessibility levels of many amenities in Winschoten, especially during peak rush hours.

Solutions

As a response to the several challenges, the municipality of Oldambt has multiple solutions as well. Considering the first two challenges, the modest decrease in amenities in the area and a relative decrease in financial means to manage buildings, the municipality wants to facilitate the possibility for similar amenities to locate in the same building. Examples are healthcare centers with a pharmacy and a general practitioner, or a youth center with daycare and a library. According to the interviewee, it is not profitable any longer to have a separate building for every amenity. Therefore, the implementation of these centers decreases the chance of amenities having to close down. To ensure good accessibility levels of these locations for all its residents, the municipality plans to connect the centers to hubs, which are places where multiple transport services come together. Currently, a hub is being constructed in Scheemda, which is one of the bigger villages.

Additionally, teaming up and cooperating with the residents in Oldambt is also important for the upcoming years. According to the interviewee, by doing this more accessibility goals can be achieved compared to a top-down approach from the municipality. At present, the village of Westerlee is at risk of losing its neighborhood supermarket since the owners are becoming of age. There are ongoing talks between residents and the supermarket chain Jumbo about the possibility to open a franchise to solve the accessibility issue. The municipality acts as a facilitating and supporting party in the process, hoping to increase the chance of success.

Finally, to deal with the traffic flow issue in the Blauwe Roos area, the municipality is currently working together with the province of Groningen and Rijkswaterstaat, which is the executive agency of the Ministry of Infrastructure and Water Management in the Netherlands. An extra turbo roundabout and bypasses are already being developed at the moment. Furthermore, there are debates about increasing the height of the Beersterbrug, so it does not have to open any longer for recreational boats. All in all, these improvements should have a positive effect on the traffic flow and the accessibility of amenities in the Winschoten area (Area director and project manager, Oldambt, personal communication, January 11th, 2022).

Pekela

The municipality of Pekela is located in the Southern part of the Province of Groningen, bordering the South of Oldambt. An interview with an Advisor for Public Space helped with identifying the most important accessibility challenges and possible solutions.

Main accessibility challenges

Considering the main issue for the upcoming years, Pekela finds itself in a less worrying situation than for example Het Hogeland and Eemsdelta. According to the interviewee, the main challenge for the municipality is ensuring the current solid accessibility levels for its residents. Over the past years, a handful of bus lines have reduced their travel frequencies due to a decrease in travelers, but this mostly did not lead to accessibility issues for residents as there were still sufficient alternative transport methods available. Besides, Pekela hosts a variety of all sorts of amenities, of which most are accessible via public transport for people who are not able to use a private car. This amount of amenities has also not declined over the last few years and the municipality has a strong public transport connection with the surrounding municipalities Stadskanaal and Veendam for amenities not located in Pekela, like a cinema or a swimming pool.

Solutions

To ensure the solid accessibility levels of today, the municipality deems it necessary to scale down the current usage of the demand-responsive transport services provided via the WMO. As mentioned before, these services are mainly meant for disabled people and the elderly because their mobility limits them from using regular public transport services. These demand-responsive services are allocated and financed by the government. According to the interviewee, a reevaluation of the people currently using these services is advisable as these services are costly and overuse of the services endangers the economic feasibility of the system. This is in line with Mounce et al. (2020), who also acknowledged the price tag of these services and stressed the importance of cooperation between municipalities, amenities, and transport providers regarding the financial feasibility.

In case the municipality succeeds in changing the travel habits of residents who do not necessarily need to rely on the demand-responsive services, Pekela does not only contribute to the financial feasibility of these WMO services, but also decreases the chance of bus lines scaling down in travel frequencies in the future since more people will make use of them (Advisor for Public Space, Pekela, personal communication, December 6th, 2021)

Stadskanaal

The municipality of Stadskanaal is located at the Southern border of Pekela. Here, an interview with a Policy Officer for the Social Support Act (WMO) helped identify the main accessibility challenges and possible solutions for the municipality.

Main Accessibility challenges

Regarding the severity of the main accessibility issue, the situation in Stadskanaal is reasonably similar to the situation in Pekela. According to the interviewee, current accessibility levels to amenities are good in the municipality as every household has a bus stop within 800 meters of their home. By using the bus services, nearly all types of amenities can be reached within a short time period. A few daily shopping facilities have closed down in the city center of Stadskanaal but there are still enough alternative stores present. Therefore, this did not cause any accessibility issues. There have, however, been troubles recently when it comes to the category of healthcare amenities. More specifically, over the last few years, multiple departments have closed in the Refaja Hospital in Stadskanaal. Drastically increased travel times from a few minutes to 35 minutes were the result of this. Residents filed complaints about this and the municipality is currently evaluating how to act on the matter.

Nevertheless, there is an issue that is currently more pressing than the hospital situation. The municipality is currently dealing with a driver shortage for public transport services. This issue was explained as follows:

“Transporters have issues at the moment with finding enough drivers, especially for morning and night shifts. We, the municipality, are doing whatever we can but it feels like we are mopping with the tap wide open. This shortage could potentially cause for accessibility issues when transporters decide to remove a bus line because there are simply no drivers for the bus” (Policy Officer for the WMO, Stadskanaal, personal communication, December 10th, 2021).

Solution

As for the main challenge for the upcoming years, the municipality currently has several angles to deal with the driver shortage. The first one is to educate more people as drivers and possibly ask if retired drivers are willing to take on their previous job again for a limited amount of time. Stadskanaal is currently assessing which role it can play as a municipality in this process. Secondly, the municipality is already stimulating and sponsoring an initiative called 'AutoMaatje' (Car Buddy) from the ANWB, which is a Dutch federation for all kinds of traffic-related activities. This initiative connects immobile people who rely on others for transportation as they do not have a car, with volunteers willing to drive these people to different types of amenities. Mainly, this project is meant for people who on the one hand suffer from mobility issues, but are on the other hand not eligible yet for the demand-responsive service of the WMO. According to the interviewee, AutoMaatje fills the resulting gap and helps relieve the pressure on regular public transport services. Finally, the municipality wants to stimulate people to plan activities outside rush hours to keep public transport as accessible as possible for all its residents.

In addition, there are already a few improvements the municipality has made in the last few years to increase the overall accessibility levels for people. Similar to the municipality of Het Hogeland, Stadskanaal has adjusted its bus stops and stations for people who have trouble walking or people who are in need of a wheelchair. Before these improvements, public transport was barely accessible for people in this category. The importance of such improvements regarding public transport has also been stressed by Naude et al. (2005) and Velaga et al. (2012).

4.2: Comparison of accessibility issues with experiences of residents

As opposed to the structure of the first part of the results, where the main findings were described per municipality, in this second part municipalities that show similarities regarding accessibility issues have been combined. The reason for this is the low sample size for some municipalities in the province of Groningen, making it impractical for a comparison with the qualitative data.

The findings are divided into two different sections, living environment and residential mobility, since the survey containing the perceived accessibility follows the same structure. The living environment includes the following topics:

- Distance to amenities
- Disappearance of amenities
- Ranking of amenities best accessible
- The ability to reach daily amenities
- Being able to participate in desired activities

Moreover, the residential mobility focusses on the next topics:

- Necessity of the car
- Necessity of public transport
- Usefulness of public transport services
- The comprehensibility of the digital aspect of public transport

In tables 13 and 14, an overview of the scores per municipality duo is displayed. Table 13 includes the living environment category and table 14 the residential mobility category. Afterwards these scores and their comparison with the policymakers' perspective will be explained.

	Northern Netherlands	Het Hogeland & Eemsdelta	Midden-Gro. & Oldambt	Pekela & Stadskanaal
Distance large to most amenities	24%	25%	37%	23%
Amenities have disappeared	16%	35%	22%	15%
Not enough schools	8%	8%	11%	9%
Not enough shops	18%	24%	28%	27%
Not enough healthcare	12%	25%	20%	18%
Not enough pubs and bars	38%	47%	53%	53%
Not enough sports amenities	11%	11%	21%	22%
Not enough supermarkets	10%	10%	21%	9%
Easy to do daily activities	92%	92%	87%	94%
Easy to do valued activities	85%	83%	82%	84%
Accessibility score average	7,4	7,1	7,0	6,9

Table 13: Overview of living environment scores per region used in comparison analysis. *Source: Author*

	Northern Netherlands	Het Hogeland & Eemsdelta	Midden-Gro. & Oldambt	Pekela & Stadskanaal
Private car indispensable	61%	69%	70%	74%
Private car always available	80%	80%	80%	86%
Automatically use car for trips	49%	49%	56%	48%
Unsatisfied with PT provision	32%	44%	37%	52%
Use PT services weekly	6%	6%	7%	8%
PT-information provision bad	16%	21%	23%	18%
Planning PT-trip difficult	21%	21%	23%	28%

Table 14: Overview of residential mobility scores per region used in comparison analysis. *Source: Author*

Het Hogeland and Eemsdelta

The municipalities of Het Hogeland and Eemsdelta have been combined for this section since both showed great similarities considering the severity of accessibility issues. Het Hogeland as well as Eemsdelta stated that these issues are highly present at the moment and stressed the importance of different solutions and initiatives to increase accessibility levels in the near future.

Living environment

Both representatives of the municipalities stated that the average distances to amenities are relatively long in Het Hogeland in Eemsdelta due to the rural setting, the shrinking population, and the declining number of amenities. This is especially the case in Het Hogeland, since this municipality does not have a few larger places with good transport connections to the city of Groningen, like Eemsdelta has in Loppersum, Appingedam, and Delfzijl. According to the data covering the experience of residents, 25% agreed with that statement. This indicates that for the majority of the residents the large distances to amenities are not experienced as severe as the policymakers pictured.

Similar results are discovered when comparing the experienced distances to schools for residents. Both representatives stated that the average distance to schools has been increasing over the last decade as a consequence of schools closing down or merging. However, 65% of the respondents stated that there are enough schools in their living environment, which is a large majority.

When looking at the results of amenities that were mentioned by either the representative of one municipality, which are healthcare facilities and supermarkets for Het Hogeland and daily shopping facilities and pubs and bars for Eemsdelta, some differences can be observed as this was mainly based on measured accessibility. Namely, 25% of the respondents expressed that the accessibility of healthcare facilities in their living environment is low, 24% stated this for daily shopping facilities and 47% stated this for pubs and bars, suggesting that a relatively large share of the population agrees with the municipalities. On the other hand, only 10% said that there are not enough supermarkets in their area, so there seems to be less concern for accessibility issues regarding supermarkets. Also, both municipalities were not worried about the accessibility of sports clubs as most smaller villages still had a football club and/or a sports hall. Residents appear to agree with this since only 11% chose to disagree with this.

Finally, both representatives of the municipalities expressed their concern for large parts of the population that live in the remote villages because of the decreasing accessibility levels. However, the assessments covering the overall accessibility scores perceived by the residents show a different situation. Of the respondents, 92% agreed with the statement that it is easy to do daily activities, considering how they travel at the moment. Furthermore, 83% stated it is easy for them to do activities that they value, considering their current travel behavior. This implies that only a very small portion of the population struggles with reaching daily amenities like supermarkets and other shops and spare-time amenities like sports clubs and pubs and bars. Finally, residents in Het Hogeland and Eemsdelta rated their overall accessibility score as 7.1 out of 10 on average, which is only slightly lower than the average score from all the respondents in the Northern Netherlands of 7.4 out of 10.

Residential mobility

First, the representatives of Het Hogeland and Eemsdelta both agreed on the high necessity of a private car resulting from relatively large distances, a poor public transport system, and an ageing population. According to 69% of the residents, a private car is indeed indispensable where they are currently living. Moreover, 80% stated that they always have a car available for a trip to an amenity and 49% stated they automatically use the car for a trip, regardless of the travel distance. This indicates that the experience of the residents is in line with the visions of the municipalities. A comparison between the average number of cars per household points this out as well, namely 1.28 on average in Het Hogeland and Eemsdelta compared to 0.96 on average in the Netherlands.

Regarding the practical state and necessity of public transport services in the municipalities, it became clear in the interviews that for a decent share of the population, it is difficult or impossible to rely on public transport when traveling to amenities. Nonetheless, both municipalities also agreed on the fact that a small part of the residents still depends on these services since they do not own a private car or are not eligible yet for the demand responsive services provided by the WMO. The residents somewhat agreed with the municipalities, as 44% expressed their dissatisfaction with the public transport provision where they live. Also in line with the policymakers is the small part that depends on public transport, as respectively 4% and 7% stated they use the bus and the train multiple days per week.

The comparison also suggests, however, that there is room for improvement regarding public transport services. Both municipalities made it clear that there is very limited use of digital information provision at bus stops and that in some areas a lack of decent internet connection hinders people from using online trip planners. The experience from residents implies that consequences are caused by this. In Het Hogeland and Eemsdelta, 21% of the respondents stated they have problems with planning a public transport trip online and that the public transport information provision is poor. This is a fair increase compared to the 16% of all respondents in the Northern Netherlands, which includes many municipalities where digital information provision and solid internet connections are implemented on a wide scale.

Midden-Groningen and Oldambt

Comparable to the combination of Het Hogeland and Eemsdelta, Midden-Groningen and Oldambt are two municipalities that showed similarities regarding the severity of accessibility issues as well. Both policymakers explained there are several accessibility challenges ahead for the upcoming years that need to be dealt with, but there are no pressing accessibility issues at the moment.

Living environment

According to the interviewees of both municipalities, distances to amenities are not long for the majority of the population. Mainly, residents living in the smaller and remote villages could experience the distances as long. However, 37% of the respondents in Midden-Groningen and Oldambt stated that the distances to amenities in their living environment are large. This could be deemed as an unexpected result since this share is 12% higher than the results in Het Hogeland and Eemsdelta, where the representatives were rather certain that the distances are large for their residents. Similar results are found with the comparison of amenities disappearing. The representatives of Midden-Groningen disclosed that the disappearance level of amenities is very little to none recently. In Oldambt, a small decrease in the number of supermarkets, sports clubs, and pubs and bars has been noticed. Nonetheless, 22% of the respondents expressed that important facilities have disappeared recently, which is 6% higher than the numbers in Het Hogeland and Eemsdelta.

For the other amenities, the scores are mostly according to the policymakers' perspective. Regarding the pubs and bars, which decreased in number in the municipality of Oldambt, residents seem to agree with this as 53% said that there are not enough pubs and bars in their living area. In addition, 21% chose to disagree with the statement that there are enough supermarkets in the area, which was also explained by the representative of Oldambt. The same goes for the decline in sports clubs, which is backed by the 21% of the respondents that think there are not enough sports clubs. Finally, only 11% stated that there are not enough schools around, which is in line with the good accessibility levels mentioned by the municipalities. However, there are also differences concerning the accessibility of healthcare facilities and daily shopping facilities, which were both accessible according to the municipalities. 20% stated that there are not enough healthcare facilities in the area and 28% said this about daily shopping facilities, which is again more than in Het Hogeland and Eemsdelta.

Overall, 87% of the respondents said that it is easy for them to reach daily amenities and activities and 82% stated it is easy for them to do activities that they value, considering how they travel today. While these numbers seem in line with the results of the qualitative research since they display a big majority, both scores are in fact lower than the scores of the residents in Het Hogeland and Eemdelta. Moreover, residents in Midden-Groningen and Oldambt rate their accessibility score as a 7.0, which is lower than both the score of all respondents in the Northern Netherlands and the score in Het Hogeland and Eemdelta. This could possibly suggest that governments in Midden-Groningen and Oldambt are currently underestimating the accessibility issues towards amenities in their municipalities.

Residential mobility

A private car was explained to be a necessity in Midden-Groningen, due to the fact it is not possible to travel to every location in the municipality by using public transport. According to the representative in Oldambt, a private car might not be necessary for a part of the population but it is still by far the most important transportation method. This is in line with the experience of the residents, as 70% stated a private car is essential where they live. Furthermore, 80% of the respondents, which is equal to Het Hogeland and Eemdelta, said they always have a car available for amenities and 56% use the car routinely, regardless of the distance or time. This is higher than the respondents in Het Hogeland and Eemdelta, which could partly be explained by the large difference in the number of cars per household; 1.51 in Midden-Groningen and Oldambt compared to 1.28.

Regarding the public transport services in Midden-Groningen and Oldambt, both municipalities were quite positive about the current provision and the state of the services. Because of the three train stops that facilitate a train four times per hour and the solid bus connections to the city of Groningen, there is not much that can be improved realistically according to the interviewees of Midden-Groningen. Still, there are locations where public transport services are highly inaccessible but residents are aware of this when deciding to move there. The policymaker in Oldambt was positive as well since the solid public transport system has not been confronted with a budget cut in the last couple of years. The residents give the impression to have a somewhat similar opinion about the public transport as 37% expressed their dissatisfaction with the current provision of services in their living environment, which is lower compared to the 44% in Het Hogeland and Eemdelta but still 4% higher than the share of all the respondents. Also, 7% stated to make use of the bus or the train on a weekly basis, which corresponds with the perspective of the municipalities.

Similar to the comparison for Het Hogeland and Eemsdelta, it seems that there is room for improvement in Midden-Groningen and Oldambt as well regarding public transport provision. Both municipalities explained that only in the bigger places and at train stations there is digital information provision. This could have led to the share of 23% of the residents feeling that the provision of public transport information is poor, which is relatively high compared to the 16% in the Northern Netherlands. Finally, the share of residents who find it difficult to plan a public transport trip only is 23% as well, slightly outscoring the Northern Netherlands by 2%. As mentioned before, increasing the understandability and affordability of public transport for the residents is one of the main focus points for Midden-Groningen in the upcoming years, indicating that the municipality is aware of this issue.

Pekela and Stadskanaal

Both of these municipalities have been combined due to the fact that both representatives of Pekela and Stadskanaal stated that there are currently very few accessibility issues in their area. There are some challenges ahead for the upcoming years but these are mostly aimed at ensuring the good accessibility levels of today for a long time, instead of improving the current situation like in most other municipalities.

Living environment

In the first part of this section, there seems to be an agreement between the policy perspective and the residential experiences. Both interviewees stated that distances toward amenities are not long in their municipalities. 23% of the respondents expressed that these distances are long where they live, which is the lowest number compared to previous comparisons. Moreover, only 15% said that important amenities have disappeared recently, which is in line with the opinion of the interviewees and again lower compared to the results in the other municipalities.

Considering the results of the separate categories of amenities, there are some differences in experience as well. According to the representatives of the municipalities, schools, bars and restaurants, supermarkets, and sports accommodations all have high accessibility. On the other hand, daily shopping facilities and healthcare amenities are slightly worse accessible due to a small decrease in stores and hospital departments. Residents appear to agree with schools and supermarkets since only 9% stated that the provision of these amenities is not sufficient enough. In addition, local experiences are somewhat in line with the municipality in regards to sports accommodations as 22% stated there are not enough in their living environment.

However, the largest dissimilarity is shown in the pubs and bars comparison. 53% expressed there are not enough amenities in the area and therefore disagree with the interviewees. On the other hand, only 18% indicated that healthcare amenities are relatively inaccessible, so the residential experience is not as bad as assumed by the policymakers.

Overall, 94% of the respondents stated that it is easy for them to reach daily amenities and activities and 84% said this for activities that they value. Both of these numbers are in line with the opinion of the interviewees since 94% is even the highest number compared to the other municipalities. Contrastingly, there are also some inconsistencies displayed. The respondents in Pekela and Stadskanaal rated their overall accessibility score a 6,9 out of 10, which is actually the lowest score compared to the other municipalities. Generally speaking, however, the view of the policymakers seems to be in line with the experience of the local residents.

Residential mobility

Around 74% of the respondents stated that owning a private car is necessary where they live. Also, 86% always have a car available and 48% use a car routinely regardless of the travel time or distance. Most of these numbers are higher than the results of the other municipalities. According to the interviewees, a private car is by definition not necessary in Pekela or Stadskanaal due to the relatively short distances, possibly indicating that the policymakers are underestimating the degree of car necessity in their municipality. However, while there seems to be a misunderstanding, both interviewees acknowledged the high number of cars and car trips due to the rural nature of the municipalities.

Similar results are found for the public transport services. Both municipalities were quite positive about the current provision of public transport because of the good connection to bigger cities, the increased accessibility to all important amenities, and the minimum decrease in services over the years. Nonetheless, 52% of the respondents expressed their dissatisfaction with the current public transport provision, which is approximately 10% higher than the other municipalities, indicating that residents feel rather contrary about public transport services compared to the municipalities. In line with these findings are the results of public transport planning. Both interviewees explained that digital information provision is poor in their municipalities due to the high costs and relatively low rewards. This could have contributed to the share of 28% of respondents that find it difficult to plan a public transport trip online, which is again higher than the other areas. These results give the impression that improvements regarding the provision and understanding of public transport are desired by residents.

Chapter 5 – Discussion

In existing literature covering transport accessibility topics, it was unclear how accessibility issues and possible solutions based on a policy perspective relate to the experience of the local residents in the Northern Netherlands. Policy implications regarding accessibility issues are often a result of assumptions based on statistics and measurements, disregarding the individual dimension of accessibility, also known as perceived or subjective accessibility. Understanding how both of these components relate to one another in the Northern Netherlands, where shrinkage areas are displayed on a large scale, does not only add to the understanding of the implementation of the individual dimension in accessibility policies, but could also be insightful for other governments in rural shrinkage regions who face similar accessibility issues as policies meant to deal with these issues are most effective when in line with the experience of local residents.

Key findings

In-depth interviews with representatives of six different municipalities in the province of Groningen helped identify the main accessibility issues and possible solutions. The results indicate that, according to the policy perspective, the severance of the issues decreases moderately from North to South. In the northernmost municipalities, Het Hogeland and Eemsdelta, both representatives explained that several issues are currently present and that there are worries about the future. The two middle municipalities, Midden-Groningen and Oldambt, had some challenges for the upcoming years but nothing pressing yet. Finally, Pekela and Stadskanaal, the most Southern municipalities, are mostly striving to maintain the current accessibility levels.

In addition, despite each focus area being a rural municipality in Groningen with a decreasing population between 2015 and 2020, each municipality has a unique main challenge and subsequent solutions. Issues range from preventing bus services to scale down even more in Het Hogeland, to increasing the accessibility of some specific amenities in Eemsdelta, to affordability issues regarding transportation in Midden-Groningen, to traffic congestions in Oldambt, to a staff shortage of bus drivers in Stadskanaal, and finally just ensuring the solid accessibility levels of today in Pekela.

The analysis of these results might suggest that the issues and solutions identified by the policymakers are in line with the experience of the residents, since each municipality has a unique situation that could be based on the individual perceptions of the residents. However, the comparison of the components that the issues and solutions consist of with the experience of the residents shows a different association. A summary of this comparison is shown in tables 14 and 15, where the best scores considering accessibility are marked in green and the worst in red.

	Northern Netherlands	Het Hogeland & Eemsdelta	Midden-Gro. & Oldambt	Pekela & Stadskanaal
Distance large to most amenities	24%	25%	37%	23%
Amenities have disappeared	16%	35%	22%	15%
Not enough schools	8%	8%	11%	9%
Not enough shops	18%	24%	28%	27%
Not enough healthcare	12%	25%	20%	18%
Not enough pubs and bars	38%	47%	53%	53%
Not enough sports amenities	11%	11%	21%	22%
Not enough supermarkets	10%	10%	21%	9%
Easy to do daily activities	92%	92%	87%	94%
Easy to do valued activities	85%	83%	82%	84%
Accessibility score average	7,4	7,1	7,0	6,9

Table 13: Overview of living environment scores per region including best and worst scores. *Source: Author*

	Northern Netherlands	Het Hogeland & Eemsdelta	Midden-Gro. & Oldambt	Pekela & Stadskanaal
Private car indispensable	61%	69%	70%	74%
Private car always available	80%	80%	80%	86%
Automatically use car for trips	49%	49%	56%	48%
Unsatisfied with PT provision	32%	44%	37%	52%
Use PT services weekly	6%	6%	7%	8%
PT-information provision bad	16%	21%	23%	18%
Planning PT-trip difficult	21%	21%	23%	28%

Table 14: Overview of residential mobility scores per region including best and worst scores. *Source: Author*

Here, it can be observed that the situation described by the representatives of Het Hogeland and Eemsdelta may not be experienced that way by the residents. On several occasions, like the satisfaction with the number of schools and sports clubs, the municipalities score better than the other municipalities included in the research and even all respondents in the Northern Netherlands, which includes multiple urban municipalities like Leeuwarden, Groningen, and Assen, with great accessibility levels overall. This indicates that the municipalities of Het Hogeland and Eemsdelta could be overestimating the severity of the accessibility issues since residents seem to be relatively positive about their accessibility compared to the other municipalities in the region.

The opposite comes to pass when assessing the results of the municipalities of Midden-Groningen and Oldambt. The representatives of both municipalities were relatively optimistic about the accessibility of municipalities in their areas. The experience of the local residents, however, shows a different situation. In table 14 it is shown that for many criteria, especially in the 'living environment' category, Midden-Groningen and Oldambt have the worst score compared to the other municipalities and the averages of all respondents in the Northern Netherlands. This difference implies that the accessibility situation could be underestimated by the local governments in these municipalities. Further research that dives deeper into the comparison

between the policy perspective and local experience is necessary to determine if policy adjustments are required.

Finally, the municipalities of Pekela and Stadskanaal and the local residents seem to be mostly in line with one another since both parties were reasonably positive about the accessibility of amenities. Nonetheless, car use seems to be relatively high in these municipalities which could be a consequence of the low scores for public transport satisfaction and planning.

Implications

With respect to current literature, the results of this research build on the existing claims of perceived accessibility and how this phenomenon should be an important factor for policy implementations. Curl et al. (2015) and Lätmann et al. (2018) stressed the importance of the individual dimension of accessibility since assessments solely based on assumptions and measurements often fail to identify the people who are actually experiencing accessibility issues. While average travel distances and travel times could indicate a positive situation, certain households with mobility or accessibility issues who require help could remain under the radar. The comparison between accessibility issues and solutions identified by policymakers and the experience of local residents in the province of Groningen adds to this point, especially in Midden-Groningen and Oldambt. The disagreement between the representatives and the residents could potentially be a consequence of the municipalities disregarding the individual dimension in their determination of accessibility levels. The same counts for Het Hogeland and Eemsdelta. Here, it also appears that the municipalities and the local residents are not agreeing on the severity of accessibility issues at the moment, which could be caused by assessments based on measured accessibility techniques from the municipalities. The situation here has a lesser negative impact on the residents as the municipalities overestimated the seriousness of the issues, but resources spent on this issue could potentially serve a better purpose since the residents are relatively optimistic about their accessibility.

The data also contributes to the understanding of the consequences of shrinkage regions. The point made by the representative of Eemsdelta regarding the decrease of local house prices in shrinkage regions, which results in a pull factor for outside families and starters who are looking for affordable housing, could in the long run solve some of the accessibility issues that are currently present. Population developments in the Northern Netherlands in 2021 also prove this point. Out of the 7 municipalities in Groningen that had a shrinking population between 2015 and 2020, only one municipality had a shrinking population in 2021, which is, slightly ironically, Eemsdelta. In the current literature, this dynamic has not been touched upon yet.

In addition, findings are in line with current literature regarding social exclusion for specific population groups, like the elderly, disabled people, children, and low-income households. Koller and Stodart (2020) and Terraneo (2021) explained the impacting consequences for the elderly and disabled people specifically that were unable to reach amenities or attend social activities due to accessibility issues. Local governments in the Northern Netherlands seem to agree with this point of view as essentially all representatives explained that there are specific policies or initiatives that increase accessibility for these people. This confirms the importance of attention to population groups vulnerable to accessibility issues.

Finally, the analysis of the accessibility issues and solutions from the policy perspective builds on the statement from Mounce et al. (2020) that in the end, all rural regions with accessibility issues are unique as they originate from all the individual experiences in that region. The rural municipalities in Groningen also displayed this, since all municipalities had a unique vision of the most important accessibility challenges for the upcoming years and possible solutions. Regions can learn from one another regarding policies but they may not have the same outcome as in other regions.

Limitations

Despite the findings and contributions, there are also a few limitations that impact the credibility. The first one derives from methodological choices, namely the comparison between qualitative data, the interviews with policymakers, and quantitative data, the data set covering the experience of residents. An analysis including interviews with policymakers and interviews with local residents would have been the most suitable method to conduct the research but this was out of reach. As a consequence, the comparison between two different types of data slightly decreases the credibility of the research. However, the interview questions have been constructed in such a way that a comparison with statistics was possible and logical, making the findings and results valid.

Secondly, the generalizability of the results is limited by a few small sample sizes in the data set containing the residential experiences. The study groups for the municipalities Pekela and Stadskanaal, which are also the smallest municipalities in the study area, were too small for separate results so these municipalities had to be combined. For the sake of continuity, Het Hogeland and Eemdelta and Midden-Groningen and Oldambt were combined too. This was possible due to the similarities in type and severity of accessibility issues. This caused the results to not be interpreted per singular municipality and the generalizability to decrease slightly. Nonetheless, the comparison with the policymakers still provided great insight into the relationship between the two different perspectives in the province of Groningen.

Chapter 6 – Conclusion

This research aimed to identify the main accessibility issues and possible solutions towards amenities in municipalities in the province of Groningen from a policy perspective, and to discover how these issues and solutions compare to the experiences of residents. This was formulated in the following main research question:

- “To what extent do the main challenges and solutions regarding accessibility issues identified by local policymakers in municipalities in Groningen correspond with the experience of residents?”

Based on a combination of qualitative and quantitative research methods through interviews and descriptive statistics, it can be concluded that each municipality has a unique (set of) challenge(s) and possible solutions for the upcoming years according to the policymakers, despite that all municipalities are located in the same region and are sharing demographical and geographical similarities. In addition, the severity of current and future accessibility issues seems to graduate rather evenly from the Northern municipalities to the Southern municipalities, where the Northern ones are facing the most serious issues and the Southern ones are currently not worried about any major issues. However, residents appeared to have different feelings about the accessibility situation in their municipalities. Residents in the Northern municipalities were relatively positive about their mobility and living environment in regards to amenities accessibility, indicating that the governments could be overestimating the gravity of the identified issues. In the two middle municipalities, the governments were in fact underestimating the situation as the residents were clearly the most negative about their mobility and living environment compared to the other municipalities and even the Northern Netherlands as a whole. This is an undesirable situation since policy implementations based on the policy’s perspective may not meet the needs of its residents. The importance of the individual dimension of perceived accessibility, which is advocated in numerous studies, is also clearly displayed in the comparison part of this research, since most of the municipalities’ visions are not in line with the residential experiences. Only the two Southern municipalities succeeded. These findings are not only relevant to participating municipalities, but to other municipalities or regions that face accessibility challenges as well.

Future research

This research has shown that there is a difference between the accessibility issues identified by policymakers and the perceived accessibility of local residents in the province of Groningen. Nonetheless, further research is needed to determine the cause of this disagreement. Qualitative research with policymakers that focuses on the used methods for determining the accessibility situation in their area could clarify to what extent the individual dimension of perceived accessibility is implemented in accessibility policies. Identifying the opinion of local residents by conducting interviews, instead of the quantitative data set, would also be a relevant method for a comparison with the policymakers.

In addition, to better understand the implications of the results from this research, future studies could approach this topic with a quantitative method. Contrary to focusing on opinions from policymakers and residents, quantitative research could explain if there is a significant relation or distinction between accessibility situations determined by governments and the perceived accessibility of residents.

Among these suggestions, there are many more approaches and future studies that could contribute to this topic. This research has already shown the importance of the individual dimension when it comes to accessibility policies in rural regions. For a greater part of the participating municipalities, the policymakers' perspective was not in line with the experience of residents. Future research could add to these findings by focusing on other important factors.

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Appendix 1: Interview Guide

Mobiliteit en activiteit bewoners:

1. Hoe kijkt u/de gemeente naar het gebruik van de auto onder de bewoners? Is deze voor veel bewoners noodzakelijk om voorzieningen te bereiken? **1, 2, 3, 6**
Zo ja/nee: is dit iets wat meegenomen kan of gaat worden in toekomstig beleid om bereikbaar van voorzieningen te verbeteren?
Zo ja/nee: wat zijn de voornaamste alternatieven voor bewoners zonder auto?

2. Hoe kijkt u/de gemeente naar het gebruik van het openbaar vervoer onder de bewoners? Is het openbaar vervoer voor veel bewoners noodzakelijk om voorzieningen te bereiken? **2, 3, 6,**
Zo ja/nee: hoe heeft het aanbod van openbaarvoer zich ontwikkeld de afgelopen 5 jaar? Gedaald, gestagneerd, of uitgebreid?
Zo ja/nee: wat vindt u/de gemeente van het huidige aanbod qua openbaar vervoer?
Zo ja/nee: zijn er plannen om het openbaarvoer te verbeteren en/of uit te breiden om de bereikbaarheid van voorzieningen te verbeteren?

3. In huidige literatuur over bereikbaarheidsproblemen wordt vaak gesproken over een digitale kloof tussen stedelijke gebieden en rurale gebieden wat betreft openbaar vervoer. Voorbeelden zijn digitale informatievoorzieningen en het online kunnen kopen van een kaartje. Wat vindt u/de gemeente van de huidige staat van het openbaar vervoer wat betreft efficiëntie en digitalisering? **3, 6**
Waar ligt nog ruimte voor verbetering?

4. Daarnaast wordt er ook vaak gesproken over groepen mensen die gevoelig zijn voor bereikbaarheidsproblemen omdat zij niet over een auto beschikken. Voorbeelden zijn jongeren, invaliden, laag-inkomen huishoudens, en ouderen. Wordt hier binnen de gemeente ook rekening gehouden wat betreft beleid en initiatieven? **(29, 30, 33) + 36, 39, of 40**

5. Krimpende bevolkingen gaan vaak gepaard met vergrijzing, waardoor de vraag naar zorgvoorzieningen toe kan nemen. In hoeverre bent u/de gemeente van mening dat deze voorzieningen goed bereikbaar zijn voor mensen die niet beschikken over een auto? **23, 24**

6. En hoe zit dit met vrijetijdsvoorzieningen? Zijn deze goed bereikbaar voor ouderen en ook jongeren die geen auto hebben? **20, 21**

Woonomgeving bewoners:

1. Bent u/de gemeente van mening dat de gemiddelde afstand naar voorzieningen voor bewoners groot is vergeleken met bijvoorbeeld omliggende gemeenten? **29**
Zo ja, wat voor soort voorzieningen voornamelijk?
Zo ja, weet u wat hier de belangrijkste rede(nen) voor is/zijn?
3. Van de volgende categorieën voorzieningen: scholen, winkelaanbod, zorgvoorzieningen, horeca, en supermarkten, bent u/de gemeente van mening welke het beste bereikbaar is voor bewoners en welke het slechts? **29**
Wat zijn de redenen van uw keuzes?
4. Denkt u/de gemeente of krijgt u signalen van bewoners dat zij bepaalde voorzieningen en activiteiten niet (meer) kunnen bereiken door bijvoorbeeld een verslechterde mobiliteit of het verdwijnen van een voorziening? **30, 32**
Zo ja, wordt hiervoor ook gewerkt aan een oplossing?

Samenvattende open vragen:

1. In hoeverre zijn er op dit moment bereikbaarheids- en mobiliteitsproblemen onder bewoners in uw gemeente? En wat zijn voor nu en de komende jaren de grootste uitdagingen?
Sinds wanneer spelen deze problemen?
Hoe heeft dit zich ontwikkeld de afgelopen 5 jaar?
2. Wat zijn volgende de gemeente de veelbelovendste oplossingen om dit probleem/deze problemen aan te pakken?
Waarom deze oplossingen?

Appendix 2: Survey questions

Overview of the survey questions linked to the interview questions, which are shown in appendix 1 in bold:

1. Hoeveel van de onderstaande vervoermiddelen zijn er in uw huishouden aanwezig?							
	Geen	Eén	Twee	Drie	Vier of meer		
<i>Auto</i>	0	0	0	0	0		
<i>Fiets (inclusief racefiets/vouwfiets)</i>	0	0	0	0	0		
<i>Elektrische fiets (inclusief speed pedelec)</i>	0	0	0	0	0		
<i>Motor</i>	0	0	0	0	0		
<i>Brommer, scooter, snorfiets</i>	0	0	0	0	0		
<i>Scootmobiel, brommobiel</i>	0	0	0	0	0		

2. Ik ben in het bezit van een...	
<i>Meerdere antwoorden mogelijk.</i>	
<input type="checkbox"/> Autorijbewijs	<input type="checkbox"/> Abonnement of kortingskaart voor het openbaar vervoer
<input type="checkbox"/> Geen van deze	

3. Hoe vaak maakt u gebruik van onderstaande vervoerwijzen om activiteiten buitenshuis te bereiken?							
	Nooit	Op minder dan 1 dag per jaar	Op 1 tot 5 dagen per jaar	Op 6 tot 11 dagen per jaar	Op 1 tot 3 dagen per maand	Op 1 tot 3 dagen per week	Op 4 of meer dagen per week
<i>Auto (als bestuurder)</i>	0	0	0	0	0	0	0
<i>Auto (als passagier)</i>	0	0	0	0	0	0	0
<i>Fiets</i>	0	0	0	0	0	0	0
<i>Elektrische fiets (inclusief speed pedelec)</i>	0	0	0	0	0	0	0
<i>Brommer, scooter, snorfiets</i>	0	0	0	0	0	0	0
<i>Trein</i>	0	0	0	0	0	0	0
<i>Bus, tram, metro</i>	0	0	0	0	0	0	0
<i>Aanvullend openbaar vervoer op aanvraag (belbus, WMO etc.)</i>	0	0	0	0	0	0	0
<i>Scootmobiel, brommobiel</i>	0	0	0	0	0	0	0
<i>Lopen</i>	0	0	0	0	0	0	0
<i>Taxi</i>	0	0	0	0	0	0	0

6. In hoeverre bent u het met volgende stellingen eens of oneens?							
De OV-chipkaart is voor mij makkelijk te begrijpen	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Ik weet goed om te gaan met online OV-reisplanners	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
De informatievoorziening van het OV is goed	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Ik kan altijd wel bij iemand een lift met de auto regelen	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Als ik ergens naartoe moet, gebruik ik automatisch de auto	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Ik kan altijd beschikken over een auto	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Ik heb een goede internetverbinding	helemaal mee oneens	1	2	3	4	5	helemaal mee eens

20. Met welke vervoerwijze bent u naar deze locatie gekomen?

Als u meerdere vervoerwijzen heeft gebruikt, kies dan de vervoerwijze waar u de grootste afstand mee hebt afgelegd.

- | | |
|--|--|
| <input type="radio"/> Auto (als bestuurder) | <input type="radio"/> Bus, tram, metro |
| <input type="radio"/> Auto (als passagier) | <input type="radio"/> Aanvullend openbaar vervoer (belbus, WMO etc.) |
| <input type="radio"/> Fiets | <input type="radio"/> Lopend |
| <input type="radio"/> Elektrische fiets (of speed pedelec) | <input type="radio"/> Taxi |
| <input type="radio"/> Brommer, scooter, snorfiets | <input type="radio"/> Scootmobiel, brommobiel |
| <input type="radio"/> Trein | <input type="radio"/> Anders, namelijk: |

21. Deze activiteit is **vanuit mijn huis** goed te bereiken met de volgende vervoerwijzen:

De auto	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Het openbaar vervoer	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
De fiets	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
De elektrische fiets	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Lopend	helemaal mee oneens	1	2	3	4	5	helemaal mee eens

23. Met welke vervoerwijze bent u naar deze afspraak gekomen?

Als u meerdere vervoerwijzen hebt gebruikt, kies dan de vervoerwijze waar u de grootste afstand mee hebt afgelegd.

- | | |
|--|--|
| <input type="radio"/> Auto (als bestuurder) | <input type="radio"/> Bus, tram, metro |
| <input type="radio"/> Auto (als passagier) | <input type="radio"/> Aanvullend openbaar vervoer (belbus, WMO etc.) |
| <input type="radio"/> Fiets | <input type="radio"/> Lopend |
| <input type="radio"/> Elektrische fiets (of speed pedelec) | <input type="radio"/> Taxi |
| <input type="radio"/> Brommer, scooter, snorfiets | <input type="radio"/> Scootmobiel, brommobiel |
| <input type="radio"/> Trein | <input type="radio"/> Anders, namelijk: |

24. Deze locatie is **vanuit mijn huis** makkelijk te bereiken met de volgende vervoerwijzen:

De auto	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Het openbaar vervoer	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
De fiets	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
De elektrische fiets	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Lopend	helemaal mee oneens	1	2	3	4	5	helemaal mee eens

29. In hoeverre bent u het met de volgende stellingen eens of oneens?

De afstanden tot de meeste voorzieningen in mijn woonomgeving zijn groot	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Recentelijk zijn voor mij belangrijke voorzieningen verdwenen uit mijn woonomgeving	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Er zijn genoeg scholen in mijn woonomgeving	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Het winkelaanbod in mijn woonomgeving is goed	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Het aanbod van zorgvoorzieningen in mijn woonomgeving is goed	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Het aanbod van uitgaansgelegenheden in mijn woonomgeving is goed	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Het aantal sportvoorzieningen in mijn woonomgeving is goed	helemaal mee oneens	1	2	3	4	5	helemaal mee eens
Er zijn genoeg supermarkten in mijn woonomgeving	helemaal mee oneens	1	2	3	4	5	helemaal mee eens

30. Rekening houdend met **uw huidige reismogelijkheden**, in hoeverre bent u het met de volgende stellingen eens of oneens?

Ik kan mijn gewenste dagelijkse activiteiten makkelijk uitvoeren	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens
Ik kan mijn leven leiden zoals ik dat wil	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens
Ik kan alle activiteiten uitvoeren die ik wil	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens
De bereikbaarheid van mijn gewenste activiteiten is goed	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens

32. Welk rapportcijfer tussen de 1 en 10 geeft u aan de bereikbaarheid van voorzieningen in uw woonomgeving?

Cijfer:

33. In hoeverre bent u het met volgende stellingen eens of oneens?									
Alles bij elkaar genomen, ben ik tevreden met hoe ik me kan verplaatsen	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens
Ik ben tevreden met mijn huidige woning	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens
Ik ben tevreden met mijn huidige woonomgeving	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens
Ik zou graag meer (sociale) activiteiten buitenshuis willen ondernemen	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens
Ik ben tevreden over het aanbod van openbaar vervoer in mijn woonomgeving	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens
Waar ik woon is een auto onmisbaar	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens
De regio waarin ik woon wordt achtergesteld door de politiek	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens
Ik zou graag binnen twee jaar gaan verhuizen	helemaal mee oneens	1	2	3	4	5	6	7	helemaal mee eens

Appendix 3: Syntaxes quantitative analysis

```
DO file eemshogeland - Printed on 15-8-2022 12:26:55
1 gen postcode = substr(homeadress_postalcode,1,4)
2
3 gen npostcode = real(postcode)
4
5 codebook npostcode
6
7 egen eemshogeland = anymatch (npostcode), values(9987 9915 9937 9901 9902 9903 9904 9947 9906
9931 9949 9947 9909 9931 9932 9933 9934 9917 9913 9918 9936 9947 9991 9918 9923 9937 9908 9918
9905 9987 9992 9946 9987 9937 9908 9905 9987 9912 9919 9907 9921 9991 9909 9911 9924 9948 9994
9945 9922 9993 9917 9914 9981 9965 9951 9953 9954 9774 9781 9998 9989 9968 9966 9967 9969 9970
9971 9988 9956 9997 9979 9961 9773 9955 9982 9981 9978 9995 9977 9984 9976 9965 9957 9951 9972
9986 9784 9959 9983 9968 9963 9962 9781 9925 9924 9999 9975 9989 9785 9966)
8
9 keep if eemshogeland
10
11 sum eemshogeland
12
13 tab importantfacilitiesgonerecently
14
15 tab largedistances
16
17 tab npostcode if largedistances == 4
18
19 tab enoughschools
20
21 tab goodshopping
22
23 tab goodhealth
24
25 tab goodgoingout
26
27 tab goodsports
28
29 tab goodsupermarkets
30
31 tab pac_easytodomydailyactivities
32
33 tab pac_livelifewaswant
34
35 tab pac_doallactivitiesiwant
36
37 tab pac_accessibilityvissatisfying
38
39 tab accessibilityscore
40
41 sum accessibilityscore
42
43 tab pac_doallactivitiesiwant if disability_walk == 1
44
45 sum accessibilityscore if disability_walk == 1
46
47 tab pac_doallactivitiesiwant if disability_drive_day == 1
48
49 sum accessibilityscore if disability_drive_day == 1
50
51 tab cardependence
52
53 tab carhabit
54
55 tab caravailability
56
57 sum ncars
58
59 tab ptsatisfying
60
61 tab fbus
```

Page 1

```
1 gen postcode = substr(homeadress_postalcode,1,4)
2
3 gen npostcode = real(postcode)
4
5 codebook npostcode
6
7 egen middenoldambt = anymatch (npostcode), values (9600 9601 9602 9603 9604 9605 9606 9607 9608
9609 9610 9611 9613 9615 9616 9617 9618 9619 9620 9621 9623 9624 9625 9626 9627 9628 9629 9632
9633 9635 9636 9649 9651 9939 9670 9671 9672 9673 9674 9675 9677 9678 9679 9681 9682 9684 9685
9686 9687 9688 9691 9693 9942 9943 9944)
8
9 keep if middenoldambt
10
11 sum middenoldambt
12
13 tab largedistances
14
15 tab importantfacilitiesgonerecently
16
17 tab enoughschools
18
19 tab goodshopping
20
21 tab goodhealth
22
23 tab goodgoingout
24
25 tab goodsports
26
27 tab goodsupermarkets
28
29 tab pac_easytodomydailyactivities
30
31 tab pac_livellifeasiwant
32
33 tab pac_doallactivitiesiwant
34
35 tab pac_accessibilityissatisfying
36
37 tab accessibilityscore
38
39 sum accessibilityscore
40
41 tab pac_doallactivitiesiwant if disability_walk == 1
42
43 sum accessibilityscore if disability_walk == 1
44
45 tab pac_doallactivitiesiwant if disability_drive_day == 1
46
47 sum accessibilityscore if disability_drive_day == 1
48
49 tab cardependence
50
51 tab carhabit
52
53 tab caravailability
54
55 sum ncars
56
57 tab ptsatisfying
58
59 tab fbus
60
61 tab ftrain
62
63 tab fdrt
```

```
1 gen postcode = substr(homeaddress_postalcode,1,4)
2
3 gen npostcode = real(postcode)
4
5 codebook npostcode
6
7 egen pekelaastads = anmatch(npostcode), values(9663 9665 9588 9581 8583 9583 9588 9581 9584
8 9585 9591 9661)
9
10 keep if pekelaastads
11
12 tab largedistances
13 tab importantfacilitiesgonerecently
14
15 tab enoughschools
16
17 tab goodshopping
18
19 tab goodhealth
20
21 tab goodgoingout
22
23 tab goodsports
24
25 tab goodsupermarkets
26
27 tab pac_easytodomydailyactivities
28
29 tab pac_livelifewaswant
30
31 tab pac_doallactivitiesiwant
32
33 tab pac_accessibilityissatisfying
34
35 tab accessibilityscore
36
37 sum accessibilityscore
38
39 tab pac_doallactivitiesiwant if disability_walk == 1
40
41 sum accessibilityscore if disability_walk == 1
42
43 tab pac_doallactivitiesiwant if disability_drive_day == 1
44
45 sum accessibilityscore if disability_drive_day == 1
46
47 tab cardependence
48
49 tab carhabit
50
51 tab caravailability
52
53 sum ncars
54
55 tab ptsatisfying
56
57 tab fbus
58
59 tab ftrain
60
61 tab fdrt
62
63 tab ovchipeasy
64
65 tab ptonlineplanningeasy
```