

# Hubs as Destination

How to integrate amenities with hubs for rural  
liveability



Master Thesis Society, Sustainability and Planning

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## Colophon

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## Preface

Dear reader,

I am pleased to present to you my master thesis for the master programme Society, Sustainability and Planning, which marks the end of my enjoyable time as a student at the Faculty of Spatial Sciences at the University of Groningen.

Writing this thesis would not have been possible without the help and support of others. First of all, I would like to thank my supervisor Jos Arts for all his enthusiasm and detailed feedback. This has encouraged me to find out more about topics I first knew only little about. I also like to thank Martin Courtz, my internship supervisor from the Hub Programme Groningen-Drenthe for passionately sharing all his knowledge about hubs and providing me with the opportunities to explore the topic in practice. Besides, I want to thank everyone who participated in the interviews for making time in their agendas and for sharing their valuable insights. Finally, I would like to thank my dear family and friends for their encouragement and support during the research process.

Mariëlle Lunshof

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## Abstract

Rural areas have to deal with accessibility challenges as both amenities and public transport are disappearing, which pressures also rural liveability. Hubs can potentially help to tackle this issue as they are multimodal mobility nodes on central locations. The purpose of this research is to explore how amenities can be integrated with hubs to improve rural liveability and answers the research question: *How can amenities be integrated with hubs in order to increase liveability in rural areas?* This is done through a case study on North-West Drenthe using secondary data, policy analysis and interviews. The villages of Roden, Peize, Roderwolde and Nieuw-Roden are used as exemplar villages. The theories used are embedded in research on liveability, accessibility, LUTI and hubs. The results show that the accessibility of amenities impacts liveability. Proximity and LUTI contribute to accessibility, and they can be applied through integrating hubs with amenities. Needs and desires regarding amenities differ per community and therefore customization is important. Clustering of amenities at hubs leads to several potential effects including reduced mobility, increased social interaction, generating new users and amenities reinforcing each other. Based on the outcomes of this research, recommendations for the planning practice include using an integrated approach to connect different policy domains as well as customizing every hub in order to match with the needs and desires of its future users. Further research is needed on parcel and parcel-passenger combination hubs, integrated approaches which connect different policy domains for hub developments and on more isolated rural areas as well as rural areas with railway connections as this would help to get a further understanding of how integrating hubs with amenities can improve liveability for rural areas.

**Keywords:** Mobility hubs, accessibility, rural liveability, amenities, land-use transport interaction

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## List of Abbreviations

CBS	Centraal Bureau voor de Statistiek (Statistics Netherlands)
CO2	Carbon dioxide
CROW	Centrum voor Regelgeving en Onderzoek in de Grond- Water- en Wegenbouw en de Verkeerstechniek (Center for Regulation and Research in Civil Engineering and Traffic Engineering.)
e.g.	Example given
GIS	Geographic Information Systems
GP	General Practitioner
HOV	Hoogwaardig Openbaar Vervoer (bus rapid transit)
K6	Kleine Zes (Small Six)
LUTI	Land Use Transport Interaction
MFA	Multi-Functional Accommodation
NOVI	Nationale Omgevingsvisie (National Strategy on Spatial Planning and the Environment)
OECD	Organisation for Economic Co-operation and Development
OV	Openbaar Vervoer (public transport)
P+R	Park and Ride
PBL	Planbureau voor de Leefomgeving (Netherlands Environmental Assesment Agency)
SMiLES	Shared connectivity in Mobility and Logistics Enable Sustainability
TOD	Transit-Oriented Development
UK	United Kingdom
WiFi	Wireless Fidelity
WMO	Wet Maatschappelijke Ondersteuning (Social Support Act)



# 1. Introduction

## 1.1 Background

Every year in mid-December comes a painful day for some rural villages in the Netherlands; public transport schedules change and for some places this means that their bus line becomes cancelled. This can lead to the challenge of transportation poverty. Bastiaanssen and Breedijk (2022) have concluded that in many rural areas, amenities such as schools, shops, recreational facilities and jobs are more and more difficult to reach with public transport, up to the point it becomes impossible. Transport poverty occurs in the situation where transport disadvantage and social disadvantage meet (Lucas, 2012); meaning that people who for instance live in an area that is poorly served by public transport and do not have a car and at the same time are socially disadvantaged due to for example a low income and low skills, suffer from transport poverty and thus an inaccessibility to daily life activities.

Accessibility is important because it has a positive impact on liveability as it eases commuting and encourages social inclusion (Currie and Stanley, 2008). Accessible areas are defined by Nassir et al. (2016) as places that can be reached with little or no barriers to get there. This means that accessibility depends on the spatial structure of an area and that every individual can experience it in a different way because one's personal mobility situation (Farber et al., 2014). As rural areas are often dispersed in terms of spatial structure and mobility flows, the provision of public transport is challenging as demands are low and therefore costly (Kask et al., 2022). As a result of unattractive public transport, the car is getting a more prominent role outside the city: 46% of people in rural areas feel like they depend on having a car (Zeilstra et al., 2022). This means that people who cannot afford or drive a car are disadvantaged in those places, often teenagers, elderly and people with an impairment. Martens (2017) argued that governments have the obligation to provide sufficient accessibility to everyone, as every individual has the right to accessibility. This means that a focus on those who have the least accessibility is needed. People who do not have access to a car and are thus dependent on public transport, active mobility and shared mobility.

## 1.2 Societal relevance

As discussed above, accessibility is one of the factors that has an impact on liveability. Liveability can be defined as the extent to which the living environment meets the desires of its residents (Gielsing and Haartsen, 2016). Liveability is closely related to sustainability at which two aspects can be distinguished that impact liveability: environmental sustainability and socio-economic sustainability (Bertolini, 1999). In the context of public transport, environmental sustainability is about environmental footprint and emissions, while socio-economic sustainability is more about accessibility and being able to participate

in society. In the scope of this research, there is a focus on the socio-economic sustainability – on society and accessibility – and what hubs can bring residents of rural areas in terms of liveability.

In rural areas, the decline of local amenities has an impact on liveability. Due to urbanisation, economies of scale and increased mobility, more and more amenities such as shops, libraries, health care and schools are disappearing (Christiaanse and Haartsen, 2017). This decline in amenities becomes problematic as soon as they lead to an inaccessibility to the type of amenity. Especially the combination of declining amenities and declining public transport is problematic, because this erodes accessibility as well as liveability for rural communities.

An area where this phenomenon of declining amenities arises, is the North-West of the Province of Drenthe. Due to its proximity to the city of Groningen, economies of scale and increased mobility, residents become dependent on the city for certain types of amenities. Especially for people with cars, this does not have to be a problem. However, for vulnerable groups like elderly, teenagers, families with children and people with an impairment it is a huge disadvantage. The Province of Drenthe wants to work towards an inclusive society and sees amenities and mobility as means to achieve this goal; they want to combine them at hubs (Provincie Drenthe, 2022). In this context, hubs are considered as central places in a network in which different mobility modes come together – such as busses, trains and shared mobility. In policy documents and visions of Drenthe (Provincie Drenthe, 2022) is discussed how hubs should become more than a mobility node by adding services and amenities. This change in function might also mean that the current locations of hubs should be reconsidered, as they were once selected based on linking public transport and target group transport.

### 1.3 Academic relevance

Early research on the link between accessibility of amenities in rural areas and liveability was conducted by Moseley (1979), who concluded that poor accessibility is problematic for various groups in society and thus effective policy is important. As this research took place over 40 years ago, and both the environment and society have changed, revisiting the topic is warranted. Haartsen and Venhorst (2010) concluded that accessibility is challenged in rural areas as a result of declining public transport, which pressures liveability. Although there is some research that underline the existing problems, fewer focus on the possible solutions. One of them is by Frank et al. (2021), who did a study on how rural accessibility can be improved by strengthening public transport connections and speed by the implementation of mobility hubs. This study focussed especially on getting people from A to B and the need of bundling mobility flows, but did not look at the needs of people in terms of communities and if it is possible to provide them closer by. Shove (2002), however, argued that mobility and accessibility

are about integrating daily life and ‘normal’ activities rather than simply going from point A to point B, but this study did not look at the opportunities which mobility hubs can offer.

Research on mobility hubs is relatively new, with most papers being published over the past five years (e.g., Bell, 2019; Frank et al., 2021; Rongen et al., 2022). The focus of these papers is often on urban areas, however there are some focussing on rural areas as well – for instance, a series of research-reports prepared as part of the SMiLES research programme that were also focussing specifically on the Groningen and Drenthe case. Kask et al. (2021) argued that the focus of hubs is going to shift from mobility to services, so hubs are becoming more of a community centre and a destination. This can be considered as the starting point for this thesis. However, as Kask et al. (2021) did not indicate, how this can be achieved and what factors determine the success of such amenities, this can be considered a knowledge gap that warrants further study.

Research on mobility hubs rests on a strong foundation of research in land-use transport interaction (LUTI), transit-oriented development (TOD), and node-place models (Weustenk & Mingardo, 2023; Bertolini 2005; Nigro et al., 2019). These models and theories are however mainly researched in the urban context, while they might be relevant for the rural context as well.

The OECD already indicated in 2008 that rural areas in a country such as the Netherlands face and will face even more in the future the problem of declining services. This is a result of changing population patterns, and this process is a vicious circle (Poelenjee, 2008). This has led to various studies in the Netherlands on the topics of declining services as well as liveability – for instance by: Christiaanse and Haartsen (2017), Venhorst and Haartsen (2010), and Bastiaanssen and Breedij (2022). Liveability in rural areas is a topic that has been researched in the fields of planning and of geography, while studies on accessibility mainly focus on urban areas (Gielsing and Haartsen, 2016).

This thesis elaborates on these identified research gaps, in order to gain a better understanding about how to maintain and create accessible amenities in rural areas in order to upkeep liveability.

#### 1.4 Research aim and research questions

The aim of this research is to explore how amenities can be integrated with hubs in rural areas in order to maintain and create liveability, and what the barriers, success factors and conditions are for the implementation of amenities at hubs. It is expected that the integration of hubs with amenities can improve liveability in rural areas as a result of clustering and improved accessibility of amenities.

Based on this research aim, the following overall research question can be formulated:

***How can amenities be integrated with hubs in order to increase liveability in rural areas?***

The following sub-questions are posed to find an answer to the main research question:

1. Which amenities are, according to literature, necessary for liveability in rural areas?
2. What is the relationship between amenities and different types of hubs?
3. What are the needs and desires regarding liveability in communities in North-West Drenthe?
4. Which stakeholders play a role in the development of hubs at amenities and how does the related planning process unfold?
5. What are barriers, success factors and conditions for implementing hubs with amenities in order to contribute to liveability?

Question 1 is a theoretical question that provides input for question 2 on the topic of amenities. Besides, question 2 is also theoretically related and defines the various concepts that are used in this thesis. Those first two questions are being answered by making use of a literature search into existing theories and literature. The relationship between hubs and amenities is traditionally looked upon from the perspective of transit-oriented development, so getting amenities to hubs (Frank et al., 2021; Witte et al., 2021). This research will however look also from the perspective of getting hubs to amenities. Question 3 and 4 are empirical questions that build on knowledge generated by the previous questions and produce case-study specific answers. These questions make use of policy analysis and interviews with experts in order to come to answers. Question 4 specifically zooms in into how hubs can be established at amenities, instead of the other way around as is more commonly done. Question 5 builds on the theoretical and empirical answers from the previous questions and provides relevant input for planning practice, this is done by making use of the interviews in combination with a reflective interview with an expert. This question looks at the integration of amenities and hubs in both directions: bringing amenities to hubs and bringing hubs to amenities. A visual overview of the relationship between the different sub-questions is presented in figure 1.

# Relationship between research questions

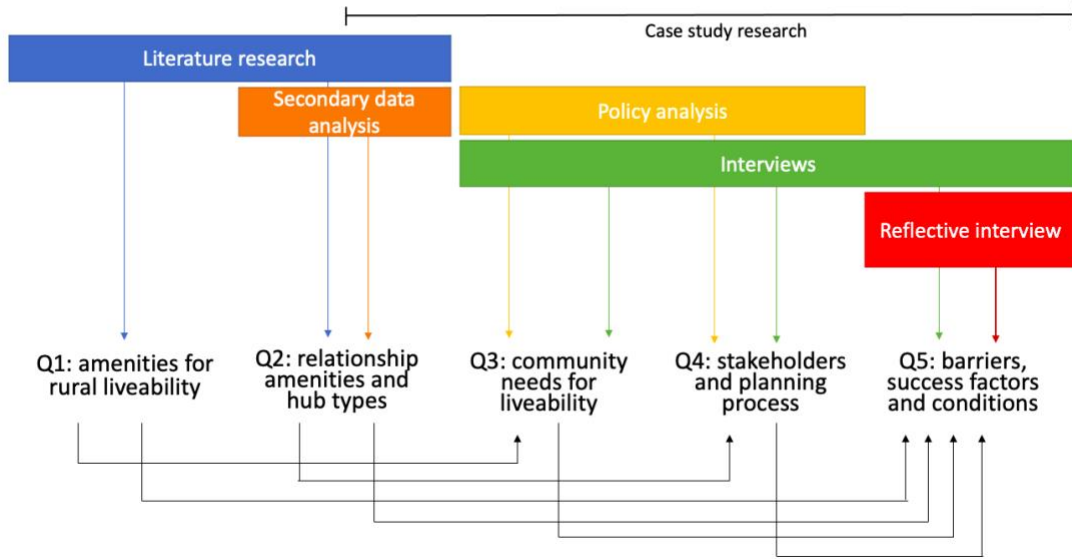


Figure 1: Relationship between sub-questions

## 1.5 Reading guide

This first chapter provided an introduction into the topic of this thesis, by presenting the background and stating the research aim and research question. The next chapter elaborates on the theoretical concepts and conceptualises relevant theories in order to come to a conceptual framework. The third chapter discusses the methodology by presenting the research design. In the fourth chapter the case study is presented and in chapter five findings of the general case study are discussed. Chapter six follows by presenting the findings of the exemplar communities. Chapter seven presents an analysis and discussion by connecting the findings from chapter five and six to literature from chapter two. In the concluding chapter eight, the research questions are answered, limitations of this research and suggestions for further research are given and recommendations for the planning practice and a reflection on the research process are presented.

## 2. Theoretical perspectives

The objective of this chapter is to develop a theoretical framework that helps to analyse the case and in order to be able to provide answers to the research questions posed. This chapter starts by providing theories on liveability and amenities in rural areas in section 2.1. Accessibility has a large share in liveability, which will be discussed in 2.2. Accessibility is also one of the aspects of 'land-use transport interaction', which is discussed in 2.3. The concept of mobility hubs builds on notions of both accessibility as well as LUTI and these notions are explored in section 2.4. Mobility hubs are the result of certain governance dynamics, which is discussed in section 2.5. Finally, links between the topics are drawn and a conceptual model is presented in 2.6.

### 2.1 Amenities and liveability in rural areas

Even though there are various definitions for liveability, it is commonly agreed upon that liveability is about the extent to which someone's physical and social environment are in line with his individual needs and desires (Pacione, 1990; Newman, 1999; Leidelmeijer et al., 2008). 'Liveability' differs from the concept 'quality of life' as it does not just deal with wellbeing; it deals with someone's opinion about aspects of his living environment (Gieling and Haartsen, 2016). According to Gieling and Haartsen (2016) it was assumed for a long time that the availability of rural amenities is in direct relationship with village liveability. More recent research however shows that accessibility of amenities and its social functions are far more important (Langford and Higgs, 2010; Haartsen and Wissen, 2003; Elshof et al., 2015). For residents with reduced mobility these aspects are especially important. Residents who have difficulties with access to amenities are prone to lower levels of health, reduced happiness and loneliness (Kennis voor Krimp, 2017).

The specific type of amenities that are valued most, differ across different countries and cultures. For instance, public libraries are valued in Denmark and pubs in the United Kingdom (Svendson, 2013; Cabras and Bosworth, 2014). Both amenities do not just serve their primary function, they have a strong social function as well. Noble et al. (2006) did a UK based study on amenities in rural areas and found that post offices, food stores, general practitioners and primary schools were considered most important. Bastiaanssen and Breedijk (2022) from the Netherlands Environmental Assessment Agency (*Planbureau voor de Leefomgeving*, PBL) mentioned that access to healthcare (hospitals, general practitioners and pharmacies), education (primary, secondary and tertiary) and stores for daily groceries such as supermarkets are important. This does however not mean that all these amenities should be available within a village itself, it means that they should be accessible from the village. Kennis voor Krimp (2017) argued that the liveability of a village does not just depend on the general availability of amenities. They argue that amenities serve a strong social function in villages,

therefore it is important that a village has an amenity where people can meet each other. This is in line with Svendsen (2013), who argued that amenities where people can interact and meet each other are considered most important of all. This social function is just like its accessibility especially important for residents who suffer from reduced mobility or transport poverty (Gardner, 2011; Rosenbaum, 2006).

All in all, this all means that for liveability in rural areas, the accessibility of amenities is crucial, as well as the social function of amenities. This means that daily amenities may be outside of the village, as long as they are accessible and there is at least one place within the village where residents can meet and interact with each other.

## 2.2 Accessibility in rural areas

Traditionally many transportation research has focused on urban areas, only more recently more attention can be seen for transportation in rural areas (Pot et al., 2020; Tillema, 2019). Accessibility has gained a prominent role in recent transportation research and policy papers, as a shift from mobility to accessibility has taken place (Levine et al., 2019). In close relation with accessibility, an increasing importance of the concepts of proximity as well as LUTI can be recognized (Haugen, 2012).

There are many different notions of accessibility. In a classic paper by Hansen (1959), it is described as relative proximity of one person or place to another person or place. Batty (2009) defined accessibility as a trade-off between costs of getting to a place and the benefit one gains from going to that place. He also noted that different measures can be used; such as time, distance and travel costs. According to Moseley (1979), accessibility refers to how easily something or someone may be reached. In contrast to mobility, which deals with 'ease of moving', accessibility is about 'ease of reaching' (Preston and Raje, 2006). Poor mobility but high accessibility may be the case for low-income households without access to a car if nearby businesses, jobs, and services are reachable on foot. Bertolini (1999) argued that an accessible area is an area where many different activities can be practiced by many different people, therefore it should be both an accessible place and an accessible node. According to Geurs and Wee (2004) accessibility, with a focus on passenger transportation, is the degree to which land use and transportation systems let people to reach activities or destinations through modes of transport. Characteristics, that these various definitions of accessibility have in common, are that they are all about the ease or difficulties an individual encounters in order to reach a desired destination.

The study on accessibility measures by Geurs and Van Wee (2004) points out that the incorporation of individual spatial-temporal limitations and feedback mechanisms between accessibility, land-use, and travel behaviour are important to consider. This means that in order to enable individuals or communities to engage in activities in various settings, the land-use and transportation systems must

be considered in discussions about accessibility (Geurs and Wee, 2004). Four components of accessibility are highlighted by Geurs and Wee (2004):

1. *The land-use component*: which takes into account the quantity, quality, and spatial distribution of origin (housing) and destination (amenities, jobs, education, etc.) locations.
2. *The transportation component*: The transport system and distance from origin to destination an individual needs to cover with a certain mode of transport, involved costs and total time it takes.
3. *The temporal component*: The possibilities of going to destination and origin locations during different times of the day and throughout the week.
4. *The individual component*: The individual needs, capacities and opportunities to access transportation.

In sum, accessibility is about the ease or difficulties an individual encounters in order to reach a desired destination and can be measured through four components: the land-use-, transportation-, temporal- and individual component.

### 2.3 Land use transport interaction

The notion of land-use transport interaction (LUTI) came from the view that transportation networks serve people to access daily life activities, meaning both the transport system and locations of daily activities are important (Straatemeier, 2008), opposed to more traditional views which view that transport networks should be as efficient as possible (Martens, 2017). The link between transport and land-use was first mentioned by Mitchell and Rapkin (1954), after which various scholars contributed to the development of theories. The land-use transport feedback cycle (LUTI-cycle) was first designed by Wegener and Fürst (1999). Bertolini (2012) has further developed this land-use transport feedback cycle which shows the processes of interaction between transport, land use, activities and accessibility. The cycle is shown in figure 2 and the four aspects are defined as followed (Bertolini, 2012):

1. *Land use*: is the distribution of land uses, such as residential, industrial, and commercial, that allow for activities, such as living, working, and shopping, is known as land use.
2. *Activities*: are the distribution of activities that call for the usage of a transportation system to get from one area to another.
3. *Transport system*: is the distribution of infrastructure that is necessary to establish spatial interactions that may be quantified by accessibility.
4. *Accessibility*: is a direct result of the transport system and is a factor which affects where certain land-uses take place.



All aspects impact each other and if one factor changes, the others will change as well, the pace can however differ, as noted in figure 2. The aspects in itself are impacted by some more independent factors as well, like mobility policy for transport system and spatial policy for land use. This cycle is however a simplified representation of reality, as there are other factors beyond the cycle that also impact the different aspects.

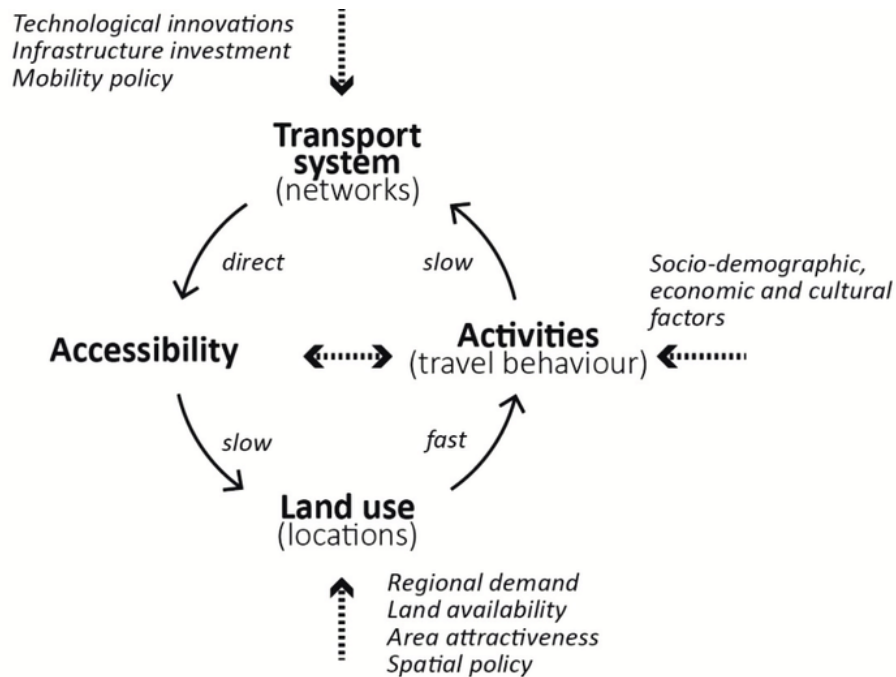


Figure 2: Transport land-use feedback cycle (based on Wegener & Fürst, 1999; adapted by Bertolini, 2012)

The node-place model by Bertolini (1999, 2005) is based on the interdependencies between transport and land-use – ‘node’ and ‘place’. ‘Node’ includes the public transport service, to how many places there are connections and how long it takes to reach them. ‘Place’ is about the activities of an area and its users; they impact each other as the people and functions of the area impact demand of transport services and the accessibility of transport towards the place impacts the attractiveness of the area. Node and place should be in balance and thus equally strong in order for an area to realise its potential. The node-place model is very suitable to apply on hubs in order to measure whether the hub is in balance and thus accessible (Kask, 2021). Figure 3 gives a visualised representation of this node-place model.

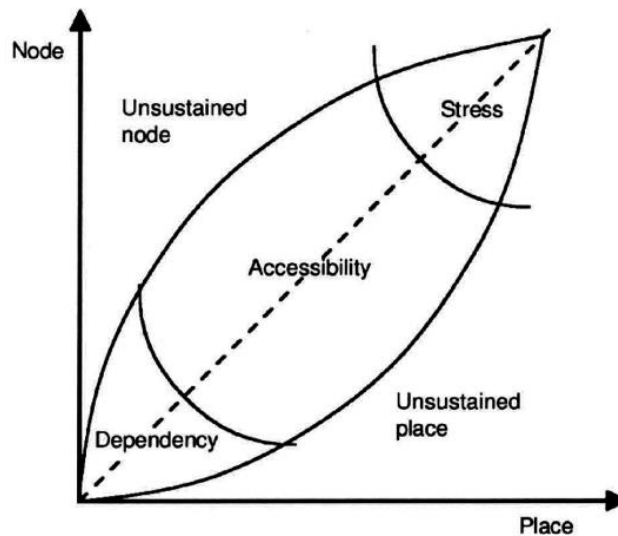


Figure 3: Node place model (Bertolini, 2005)

In the situation of low place and low node values, one would speak of a situation of dependency, meaning demand for both activities and transportation services is low, making it hard to keep supplying them (Zweedijk, 1997; Serlie, 1998). This situation typically occurs in lower density areas, such as rural areas.

The extent of node and extent of place values present in an area are based on the node index and the place index. The node index includes types of public transport modes available and for each of them; number of directions served and frequency per day. For car and bike, it includes parking capacity, distance to closest highway access and the number of freestanding bike paths. The place index includes intensity and diversity of activities within the area. These variables are based on number of residents in area, number of workers and the degree of functional mix. The surrounding area is defined by Bertolini (1999) defined as a walkable radius of ca. 700 meters.

In close relationship with LUTI and node-place theories is the concept of transit-oriented development (TOD) (Rongen et al., 2022). All these theories are about the interrelationship between land-use or developments and transport. Traditionally TOD is mainly focussed on cities, but Nigro et al. (2019) did a study on TOD strategies in the context of sub-urban areas and small towns. They build on theories of the node-place model and feeder networks of different mobility modes leading to the node. Contrary to studies that focus on cities and metropolitan areas, they focussed on areas with low and medium densities of population and activities and public transport networks with lower capacities. Their conclusions showed that in lower density areas it is important to consider the multiple types of feeder transport in TOD strategies because the catchment area of a node is higher. Even though TOD is designed to increase transit use, it can also reduce the need for travel in the meantime (Currie and Stanley, 2008).

To sum up, land-use transport interaction focusses on feedback mechanisms between transport, land use, activities and accessibility, which is a result of among others spatial and mobility policies. It is in close relation with the node-place model which looks at the balance between node and place which should be achieved at hubs in order to optimize accessibility. Besides the walkable radius of 700 meters as defined by Bertolini (1999), it is important to consider the presence of various types of feeder transport in rural areas as a result of a wider catchment area of the node.

## 2.4 Mobility hubs

Mobility hubs are defined in recent literature as places where various mobility streams and modes come together in certain strategic locations with significant travel demand (Andersons et al., 2017; Bell, 2019). They arise on various locations and Witte et al. (2021) defined hubs as physical linkages between different modes of transport and spatial developments; drawing a link with TOD strategies.

The mobility hub is considered as the solution to pressing policy problems in transportation, including congestion, poor liveability, and constrained urban space (Rongen et al., 2022). In the Netherlands, Witte et al. (2021) distinguished between parcel hubs, passenger hubs and combination hubs. As this study is about liveability and accessibility of amenities for people, the focus is on passenger hubs.

Passenger hubs can be categorised into different typologies. Weustenenk and Mingardo (2023) established a typology of mobility hubs, but they focus solely on the urban context. Rongen et al. (2022) however, made a typology that goes beyond the urban context and also includes the rural context. Regarding the spatial context of hubs, several typologies of hubs can be distinguished according to Rongen et al. (2022), they are visualised in figure 4:

1. *TOD hubs*: located on a central location at the heart of a built-up area and is centred around a main bus or train station; they form a linkage between public transport and the mixed-functions around it and aim to stimulate use of public transport.
2. *P+R hubs*: are located along a main road and often at the side of built-up areas; they aim to link private cars with public transport in order to bundle vehicle flows into built-up areas and thus stimulate multimodal trips.
3. *Neighbourhood hubs*: are located in high-density and mixed-use urban neighbourhoods, these hubs do not necessarily have public transport, but at least have some shared modes available to connect to other hubs.

4. *Rural hub*: aims to bundle travel flows in dispersed areas, in order to establish a connection to the rest of the network and being able to provide faster and more frequent connections as compared to the situation without hubs.

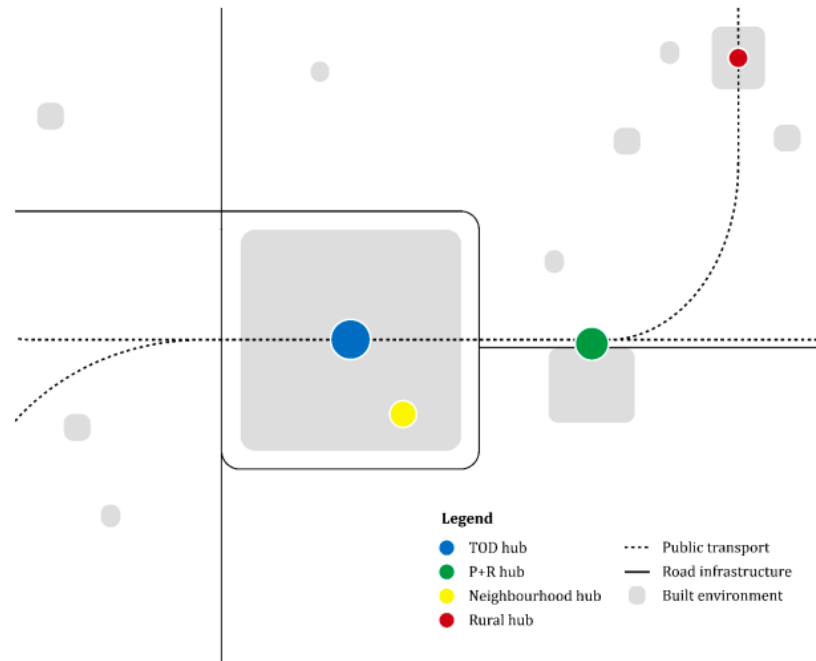


Figure 4: Hub typologies (Rongen et al., 2022)

According to Rongen et al. (2022), the rural hub can increase liveability due to mobility that is generated as a result of the hub, which leads to more people making use of amenities close to the hub.

Even though all hubs in this research are located in a rural region and would thus all be categorised as ‘rural hubs’ in line with Rongen et al. (2022), it is possible to zoom in to the rural context and to distinguish a similar hierarchy. For instance, hubs in attractive destination areas in bigger villages, can have similarities with TOD hubs; especially in case there is a railway station present. Even though those hubs are often not based on TOD models, they have in common that they are often set in an attractive destination location where people travel to from other surrounding hubs or other points of departure. On the other hand, hubs that are functional transfer nodes along main roads (often) on the edge of a village can be considered as P+R hubs as they are points of departure towards final destinations. Hubs in rural areas that do not necessarily have public transport connections but for instance shared mobility to connect to bigger hubs, can be categorised as ‘neighbourhood hubs’, as they have the same characteristics.

All in all, mobility hubs can be seen as places where mobility flows and modes come together with spatial developments. Several hub typologies can be distinguished based on location characteristics, position in the network and surrounding density. Rural hubs can serve to increase

liveability as a result of more people making use of amenities due to presence of the hub, which generates mobility.

## 2.5 Governance of hubs

'Governance' is not to be confused with 'government', so it is useful to highlight the differences between the two terms. Government refers to the entity of power in a nation state; they have the ability to make decisions and enforce those decisions (Stoker, 1998). This means a government is a traditional way of governing through a top-down approach with limited stakeholders (Hajer & Wagenaar, 2003).

Governance is about the processes of decision-making and the implementation of those decisions (Kharisma, 2014). This process does not just take place within governmental institutions, but in a more open and market-oriented system (Hajer & Wagenaar, 2003). This means that governance decreases the role of state and boundaries between public and private sectors become blurred (Stoker, 1998). This means that the power of governing is shared in triangulation between market, citizens and government (Innes & Booher, 2003).

Interaction between stakeholders can take place in the shape of formal as well as informal relations across governance networks. Morand (1995) as well as Innes et al. (2007) described these contrasting forms of interaction as follows: formal interactions follow hierarchical structures and act in a procedural and rational nature. Informal interactions on the other hand, there is more of a free flow of interactions and actions as well as status levelling. These two forms are however extremes, so should not be seen as two categories, but rather as a spectrum. They are however very relevant in order to grasp and understand governance relation between different stakeholders in the network. This is important because the type of interaction might lead to complete different outcomes; from an official contract to an outburst of creative and spontaneous ideas.

When these interactions occur in governance networks including multiple levels of government, a distinction between two types of approaches can be made: bottom-up and top-down (Hooghe & Marks, 2003). It is however often the case that when one approach is carried out, there are aspects of the other present as well; it hardly happens that solely one approach is taken. The top-down approach lies close to the traditional way government (Hooghe & Marks, 2003). There is a small number of jurisdictional levels involved and similar systems and structures across all levels, as well as clear distinguishments which policy is who's responsibility. Bottom-up approaches occur in a more governance-based system there are various jurisdictional levels and it is more collaborative, flexible and pragmatic in its nature (Hooghe & Marks, 2003).

In the context of mobility hubs specifically, various stakeholders are involved as a result of the hub often being on public ground. This leads to the involvement of different levels of government; in forms such as financier, regulator and developer (Witte et al., 2021). According to Storme et al. (2021), there are various governance approaches that can influence the development of hubs. For instance, both private and public stakeholders have an important role in the implementation process. The involvement of various stakeholders asks for coordination and planning among the stakeholders involved as well as integration with other policy instrument (Kask et al., 2022).

In sum, governance is about the process of decision making in a system with government, market parties and citizens involved. The dynamics across governance networks may vary from formal to informal relations and top-down to bottom-up approaches.

## 2.6 Conceptual model

Building on theories about liveability and amenities in rural areas, accessibility, land-use transport interaction, mobility hubs and governance of those hubs, a conceptual model can be built. This conceptual model helps to find an answer to the research question: *How can amenities be integrated with hubs in order to increase liveability in rural areas?*

As mentioned by Rongen et al. (2022), hubs in rural areas have the potential to increase liveability as a result of more people making use of thereby upkeeping amenities as a result of mobility generated due to presence of the hub. In order for amenities to have a positive impact on liveability, they have to be accessible and have a social function. This accessibility is impacted by four aspects: the transport aspect, the land-use aspect, the temporal aspect and the individual aspect. Accessibility, as well as the first two aforementioned aspects also occur in the LUTI- cycle, together with activities. Amenities can be classified as a place where those activities occur; like shopping in supermarkets or learning at schools. Governance in the form of bottom-up and top-down approaches and formal and informal relations, as well as policies in various fields have an effect on transport, land-use and amenities, which in its turn also affect the hub in a direct or indirect manner. All aforementioned concepts, relations and linkages are visualised in the conceptual model in figure 5.

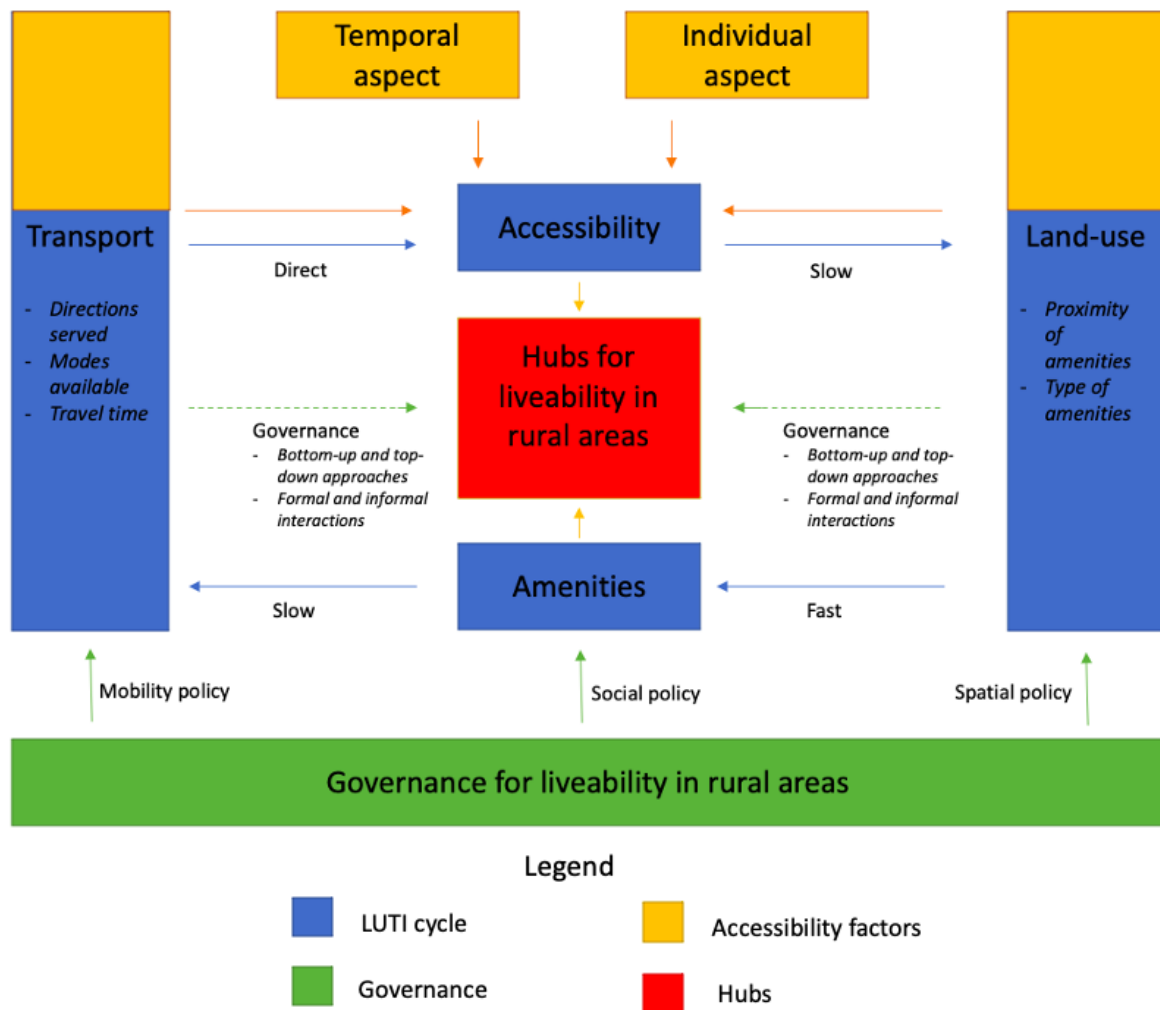


Figure 5: Conceptual model

In this conceptual model, liveability is the dependent variable that gets directly impacted by hubs. Hubs are impacted by accessibility, amenities, land-use and transport. Therefore, hubs can be considered the centre point in a LUTI-cycle. Independent variables are governance, the transport aspect, the temporal aspect, the individual aspect and the land-use aspect. Those last four aspects impact accessibility. Governance has an effect of transport, amenities and land-use. This is the way in which the general concepts are intertwined and impact hubs for liveability in rural areas. Some of the concepts also have sub-elements; transport includes modes available, directions served and travel time. Land-use includes type of and proximity of amenities. Governance distinguishes between bottom-up and top-down and formal and informal relations. And within hubs four different hub types can be distinguished: TOD, P+R, rural and neighbourhood hubs. The latter three are the most common in rural areas.

### 3. Methodology

The objective of this chapter is to present the different methods used in this study and to operationalize the conceptual model, in order to form a basis for the empirical research.

#### 3.1 Research design

This thesis makes use of a case study approach in order to get a better understanding of which amenities can be integrated with hubs in rural areas in order for them to empower each other. Making use of a case study means that deliberate choices need to be made in terms of methods of qualitative and quantitative data collection and analysis (Yin, 2003). This research makes use of both qualitative and quantitative data: literature research; an analysis of policy documents; interviews with experts and a reflective interview. In addition to these qualitative methods, also quantitative methods have been used by making use of secondary data from the Province of Drenthe in order to conduct a GIS analysis. Figure 1 in presents a schematic overview of which methods are used in order to answer each of the sub-questions.

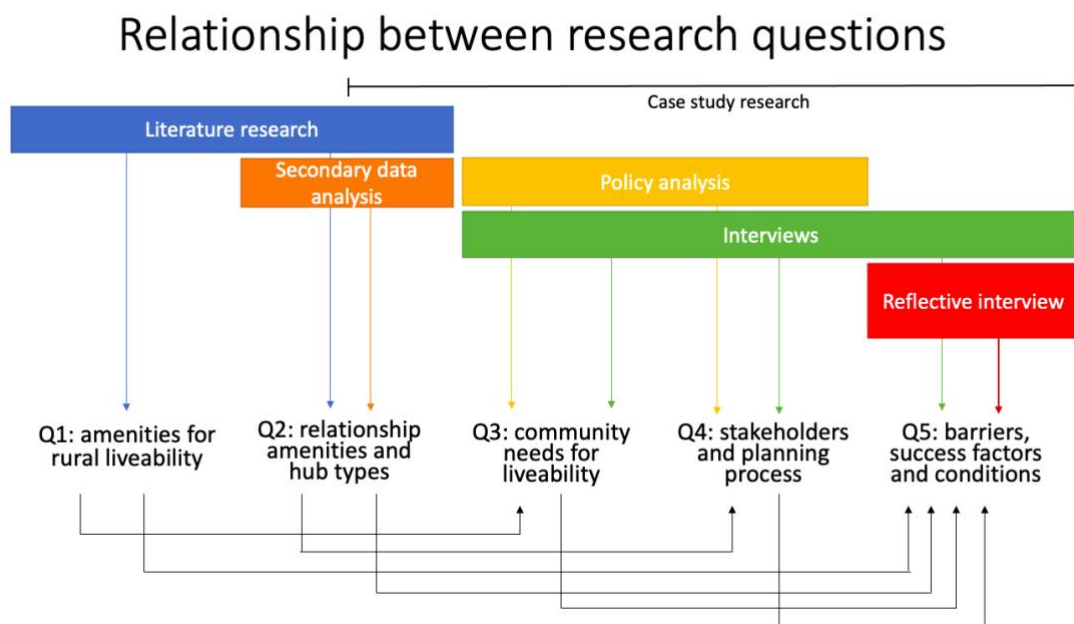


Figure 3: Relationship between sub-questions

#### 3.2 Literature study

A literature study was conducted – see chapter 2 – in order to gain an understanding of central concepts and theories for this study and in order to come to conceptual model. The literature study also provides direct input for sub-question 1 and 2.



Most research originates from the 2020s and 2010s, as recent literature was preferred. For mobility related topics this could be achieved, but for liveability also sources from the 2000's were used due to fewer studies on this topic. In some cases, older sources were used; especially in case of fundamental theories. In order to find scientific articles, the search engines 'Worldcat', 'Google Scholar' and 'Scopus' were used. Search terms used include: 'rural liveability', 'mobility hubs', 'accessibility', 'rural accessibility' 'transport poverty', 'transport inequalities', 'rural amenities', 'rural facilities', 'land-use transport interaction' and 'transit-oriented development'. The Dutch synonyms were used as well as the research takes place in a Dutch context, the researcher is Dutch, and this led to more suitable articles. In order to find more relevant sources, 'snowballing' techniques in both directions were used; using references and citations from the found articles. Backward snowballing is looking at references in the article (previous research) and forward snowballing is looking at sources that have cited the article (follow-up research). This led to the usage of over 50 different sources, mainly articles from 27 different academic journals, such as: 'Rural Sociology', 'Journal of Transport Geography', 'Transport Policy' and 'Tijdschrift voor Economische en Sociale Geografie'.

### 3.3 Nested case study research

A nested case study approach has been used for this research. This means there are multiple sub-cases on a smaller level within the wider case (Hutjes en van Buuren, 1992). This same concept is what Yin (2003) mentions as 'embedded units of analysis'. A nested case study approach allows for a detailed level of inquiry by investigating the features, context and processes of the multiple sub-cases. The wider case of this research is the region of North-West Drenthe, within which lay the sub-cases of Roden, Peize, Roderwolde and Nieuw-Roden. These sub-cases serve as exemplars for different hub and village types in rural areas. Flyvbjerg (2003) argues that the production of exemplars is crucial for a social science discipline to be an effective one.

### 3.4 Secondary data analysis

The secondary data analysis serves to conduct an analysis on 3 of the aspects of accessibility as mentioned by Geurs and Wee (2004). The individual aspects are difficult to measure with existing data, which is why it is left out this analysis, it was however part of the interviews. This secondary data analysis helps to get a better understanding of the case study area, which is useful for the interviews. Besides, the secondary analysis provides answers for sub-question 2. For each of the selected hubs, secondary data has been collected and processed in the following way:

- *Transport*: an inventory of which directions are served is done by making use of a bus line map from Qbuzz, which is the public transport provider. Additional available modes are included as well.

- *Land-use*: based on spatial Open Street Map data, bus stops and amenities are mapped in ArcGIS. Next, hubs are selected and a 700-meter radius is drawn around them to determine the amenities within the walkable radius (Bertollini, 1999).
- *Temporal*: frequency and availability of the busses and other modes of transport are listed by making use of the Qbuzz ‘busboekje’ which presents an overview which bus line drives when.

### 3.5 Policy analysis

In order to understand the views on liveability, accessibility and hubs in the cases of the study area, an analysis of documents was conducted. This was useful in preparation for semi-structured interviews as it helped to build background knowledge.

Documents were first selected based on the areas of authority of which the case study area is part of; on a municipal, provincial and national level. Then, the documents had to include the themes ‘liveability’, ‘amenities’, ‘hubs’, ‘public transport’ or ‘accessibility’, or the corresponding translations and synonyms of those words in order to be selected. In order to find the documents, the search engine Google as well as the websites from the areas of authority were used. Some documents were selected by input from experts. After selecting documents, the documents were analysed and coded using a code book (appendix 4). This code book was based on the concepts from the conceptual model. However, during the coding process also new codes were added to this code book. An overview of the policy and other documents used for this research can be found in appendix 1. Further descriptions of the documents used can be found in chapter 4.

### 3.6 Semi-structured interviews

As part of the empirical data collection, semi-structured interviews were conducted. These interviews mainly serve to provide an answer to sub-question 3 and 4 and as a foundation for sub-question 5.

Semi-structured are interviews in a conversational manner, which allows for freedom among both the interviewer and interviewee (Longhurst, 2016). This means there is the possibility to go deeper on some topics and to naturally switch back and forth between questions instead of strictly following the list. This is suitable because for this research because experts from different fields were interviewed, so it is valuable to delve deeper into the subjects the interviewee has his expertise in. The interviewees consist of experts from different levels of government, as well as other private and public organisations. As all respondents were Dutch, the interviews were held in Dutch. The full list of interviewees is available in appendix 2. The interviewees were selected in a similar way to the documents; based on areas of authority and an expertise in ‘liveability’, ‘amenities’, ‘hubs’, ‘public transport’ or ‘accessibility’. Besides, interviewees were asked in the interviews if they knew other

experts relevant for this research. During the interviews questions are asked about the needs of the community, policies in place, stakeholders and the integration of hubs and amenities. The interview guide can be found in appendix 3. The interviews were recorded and transcribed afterwards. A codebook based on the conceptual model was used to process the information, the same strategy has been used as described in chapter 3.5.

### 3.7 Focus group discussion

The initial idea was to organise a focus-group discussion with professionals and people active in regional/local practice. Due to limited availability of potential participants and time constraints, the focus group discussion could not take place in the end. The focus group discussion would build on the input from the semi-structured interviews and would help to answer sub-question 5. The aim of the focus-group discussion was to validate the results and to provide relevant output and recommendations for the planning practice.

According to Longhurst (2016), a focus group is a group of people who discuss the topic set by the researcher in an informal setting. As they are given the opportunity to explore the subject from all angles they wish, it can lead to surprising and creative outcomes. The potential participants of the focus-group would have been former interviewees. The focus group could not take place due to limited time available as well as busy and clashing schedules of potential participants. Therefore, the researcher discussed the outcomes of the interviews with her daily supervisor at the Hub-programme as a 'second-best' management measure. This meant that the multi-sided perspective was missing, but a moment of reflection with someone from practice could still take place. This was useful to discuss, validate and refine the findings of the interviews.

### 3.8 Ethical considerations

During the course of this research, some ethical considerations arose as in every study. This was especially the case for the part that involved participants: the semi-structured interviews and the focus group discussion.

As this research was part of an internship at the Hub-Programme Groningen-Drenthe, attention should be paid to the positionality of the researcher. She had more knowledge about the perspective of the Hub-Programme opposed to other perspectives and this could have caused a bias. However, this also meant that she was properly informed and knowledgeable about the programme, and this helped with posing the right questions at the interviews and with interpreting the results. For the case of the interviews, the researcher already introduced herself and her research to some of the interviewees

before the interviews took place. This means that those interviewees had an advantage in information as there was already some familiarity with the topic. Because of this positionality, the reflective interview took place, so the researcher could discuss her findings to check whether they were a representation of reality. Before each interview took place, consent for recording, transcription and data storage was asked from every participant. The standard consent and information form from the University has been used for this. Besides, it was highlighted that the information was treated confidential and would be anonymised in the research, as well as the possibility to withdraw at any moment without explanation. It was important to carefully select the location in order to make sure both the participants and the researcher felt safe. For the case of the interviews, different options were posed: own office, office of the Province of Drenthe or online. Those different options were posed so the interviewee could choose the situation in which he feels most comfortable. All aforementioned aspects have contributed to creating a safe environment during the interviews and reflective interview.

## 4. Characteristics and policy context of North-West Drenthe

This chapter provides an overview of the case study area: the North-West of Drenthe. Some background information about characteristics of the area is provided, information about the hub programme Groningen-Drenthe is given and relevant policies and other documents are presented.

### 4.1 Characteristics of North-West Drenthe

This study zooms in into 4 villages and hubs in: Roden, Peize, Nieuw-Roden and Roderwolde. All selected hubs for this case study are located in the region of North-West Drenthe, in the north of the municipality of Noordenveld. This research thus focusses on the Northern part of the Noordenveld municipality. This area is situated between the cities of Groningen and Assen. The city centre of Groningen is north-east of the region and lies 10 to 20 kilometres away from the villages. Assen can be found 20 to 25 kilometres to the south, as presented in figure 6 below.

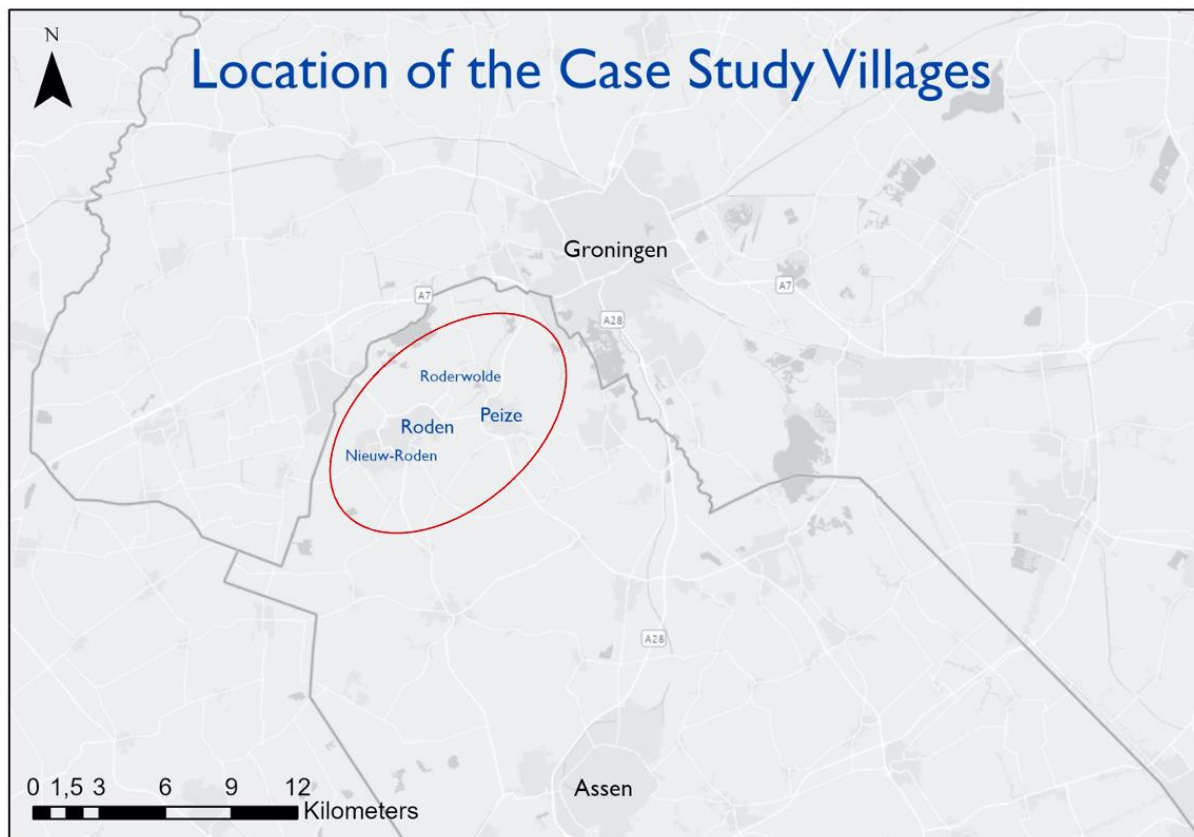


Figure 6: Location of the case study area

Regarding liveability, the entire municipality scores high above average compared to the Dutch average (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020). There is however one aspect on which the area scores far below average: amenities.

Table 1 provides an overview of relevant characteristics of the villages; the total number of inhabitants is shown as well as data about the size of the groups that can be prone to transport poverty: children and teenagers they can often too young to drive or own a car; elderly people, disabled people and people who make use of the social support act (WMO) as they are often less mobile. It must be noted that WMO transport can relate all ages and thus are also part of the mentioned age groups. This is something to pay attention to when interpreting the table. Percentage of social housing and average income are shown to give an idea about the presence of lower income groups who can also be victim of transportation poverty.

*Table 1: Characteristics of Noordenveld and selected villages (Based on CBS, 2021)*

	Noordenveld	Roden	Peize	Nieuw-Roden	Roderwolde
Number of inhabitants	31.238	14.573	5.485	1.285	290
Children 0-15	14%	14%	16%	18%	12%
Youth 15-25	9%	10%	10%	10%	9%
Adults 25-65	49%	46%	49%	52%	57%
Elderly 65+	28%	30%	25%	20%	22%
WMO	6%	7%	4%	5%	3%
Social housing	19%	27%	13%	22%	15%
Average income	28.400	26.623	30.400	24.800	32.800

Regarding public transport, figure 7 below provides a spatial overview of the hubs and public transport connections in the area.



Figure 7: Bus line and hub network around case study area (Qbuzz, 2023)

In the context of the hub and public transport network of North-West Drenthe, it is noteworthy that there is no rail transport; meaning this by mobility experts considered backbone is missing (Courtz, 2023). However, the BRT-lines 3 and 4 function as a backbone in this area as they are set for 20 years and thus also provide security for residents (Courtz, 2023). The absence of rail however also means that routes are (potentially) more flexible and can be more easily adjusted to changing needs over time.

#### 4.2 Hub programme Groningen-Drenthe

The hub programme Groningen-Drenthe is a collaboration between the Province of Drenthe, the Province of Groningen, OV-Bureau Groningen-Drenthe (transportation authority) and Publiek Vervoer Groningen-Drenthe. The programme was originally established in order to allow for better public transport connections; better integration between busses and 'publiek vervoer' (Kask et al., 2021). Later on, this shifted to the ambition of catering for intermodal travel, making the role of bike and car parking and shared mobility more prominent. To make the journey more pleasant, various facilities were added to the hubs e.g., upgraded bicycle sheds, water taps and free WIFI. More recent ambitions of the hub programme aim towards an inclusive society where everyone can participate. As there is a covering hub network in Groningen and Drenthe, with a hub within 15 kilometres from every address, the hub programme wants to integrate amenities on hubs to bring them closer to people and make them more accessible with public transport (Courtz, 2023). This is based on the idea that people use mobility to get to the places they want or need to be in order to participate in society (Courtz, 2023).



However, the established hub locations are a result of stretching bus lines from the perspective of transport efficiency, which meant that many bus lines were moved out of the neighbourhoods and villages towards the larger roads (Kask et al., 2021). As a result, many hubs are currently located on the edge of villages rather than in the village centre and thus further away from amenities as well. This physical distance between current hubs and village centres with amenities can bring possible challenges for the integration between hubs and amenities (Interviewee #5).

### 4.3 Policy documents regarding hubs and liveability

There are three jurisdictional levels and organisations from which policies are used: the country, province and municipality.

On the national level, there are three recent documents from the Ministry of Infrastructure and Water Management that have been analysed. First of all, the overarching policy document 'Hoofdlijnennotitie Mobiliteitsvisie 2050' (Ministerie van Infrastructuur en Waterstaat, 2023a) especially pays attention to accessibility and draws links with TOD strategies and the 'Nationale Omgevingsvisie' (NOVI), the main focus is however on the more densely populated and urban areas. Second, the research report 'De Ontwikkeling van de mobiliteit en de bereikbaarheid in stedelijk en ruraal Nederland' (Ministerie van Infrastructuur en Waterstaat, 2023b) looks at accessibility of amenities and public transport and compares rural and urban areas. Third, the overview report 'Inventarisatie bereikbaarheidsfilosofie in andere sectoren dan mobiliteit' (Ministerie van Infrastructuur en Waterstaat, 2023c) analyses the existing policies on accessibility outside of the mobility sector. Among these policies are the NOVI and policies from different levels of government on various themes such as education, health care, and social policy. The document 'Nationale Omgevingsvisie' (Ministerie van Binnenlandse Zaken en Koningsrelaties, 2020) provides a framework for the provincial and municipal spatial visions. Two documents from the Netherlands Environmental Assessment Agency have been used in this study. The research report 'Toegang voor iedereen?' (Planbureau voor de Leefomgeving, 2022a) presents an analysis on the accessibility of different types of amenities throughout the Netherlands and makes recommendations for future mobility plans and spatial policies and visions. The mid-term evaluation report 'Monitor Nationale Omgevingsvisie 2022' (Planbureau voor de Leefomgeving, 2022b) reflects on the current status of themes discussed in the NOVI. The research report 'Vitaal Platteland!' (CROW, 2018) from the technology platform for transport, infrastructure and public space, provides guidelines for which rural mobility and accessibility challenges should be tackled by which parties and how, in order to make rural areas in the Netherlands more accessible and liveable.

On the Provincial level, also a spatial vision 'Omgevingsvisie Drenthe 2022' (Provincie Drenthe, 2022a) has been analysed. This document describes itself as the bridge between the national and



municipal spatial vision and has a strong focus on liveability and accessibility. The Provincial mobility plan 'Mobiliteitsprogramma mobiliteit op maat' (Provincie Drenthe, 2022b) links to this provincial spatial vision and is focussed on mobility, with a strong focus on accessible amenities and the role of hubs. The document 'Visie op Krimp en Leefbaarheid' (Provincie Drenthe, 2016) discusses population decline in the more rural areas of Drenthe and zooms in towards accessibility as well as amenities. Surpassing the provincial level, the 'OV-Ontwikkelagenda 2040' (OV Bureau Groningen-Drenthe, 2022) is a policy document on the development plans of public transport in the regions Groningen and Drenthe. This document connects the various existing municipal and provincial mobility plans within the region regarding public transport. Accessibility of public transport itself as well as places is discussed in the document, as well as paying attention to hubs. The document 'Helemaal Nederland: te klein voor grote verschillen' (K6, 2020) provides an overview of the challenges the six most sparsely populated provinces deal with as well as strategic solutions. The purpose of this document is to provide input for national policies, and it zooms in on the topic amenities.

Two municipal documents have been analysed from the Municipality of Noordenveld. 'Omgevingsvisie Noordenveld 2030' (Gemeente Noordenveld, 2017) is a spatial vision and mainly delves into the themes of liveability and accessibility. This is looked upon from the municipality-wide perspective as well as zooming in towards the individual villages. This spatial vision fits into the national NOVI and the provincial spatial vision. The 'Gemeentelijk verkeers- and vervoersplan 2015-2025' (Gemeente Noordenveld, 2015) is the municipal mobility plan and describes the mobility strategies of the area and pays attention to public transport as well as accessibility and hubs. This municipal mobility plan fits into the provincial mobility plan.

In sum, policies on the national, provincial and municipal level in relation to liveability, accessibility, amenities and hub developments are primarily spatial visions and mobility plans. The municipal policies fit within the provincial policies and these fit into the national policies. The national policies which are not specifically about the rural context primarily focus on the urban context. A full overview of the policies used for this research can be found in appendix 1.

## 5. Findings of the case North-West Drenthe

In this chapter the general findings from both the interviews and policy analysis are presented for the North-West Drenthe case. The structure of this chapter is based on the links and relationship between certain themes that became emergent during the interviews and policy analysis.

### 5.1 Amenities for Liveability

Findings of both interviews and document analysis show the needs of communities in rural areas regarding amenities, depend on several factors. First of all, the needs depend on the demographic composition of the community; people in different phases of life have specific needs (Interviewee #1). For instance, children and families with children need schools for education, while elderly have a higher demand for health care amenities (Interviewee #5). The municipality of Noordenveld has an aging population, meaning there are many elderly people and not that many children and youth (Interviewee #8; Gemeente Noordenveld, 2017). According to K6 (2020) every place in the Netherlands will at some point have to deal with this demographic transition, but it starts in the more rural areas. According to Ministerie van Infrastructuur & Waterstaat (2023b), this is a result of young families leaving rural areas and going to cities. As a result, the support base for both amenities and public transport decreases in these rural areas. Besides demographic composition, the type of amenities needed in a village depend on its geographical location in relation to its surrounding area, interviewee #5 set out a couple of questions to be asked: *“What is actually there? Transport movements, but also from the local system of what do people want and how? How is a village set up?”* These are questions that people who investigate the liveability and the needs in terms of amenities of a village should ask themselves. Knowledge about this is needed in order to effectively plan for hub developments with the integration of amenities (Interviewee #5).

Generally speaking, the strongest need people have regarding amenities in their own village, are amenities where people can come together to meet each other (Interviewees #1, #2, #7). This is because many people want to meet people from their own community. They are not going to visit a community centre in another village to meet people from another village. Interviewee #7 highlighted this importance of a place where people can come together: *“A place to come together is important for every village. What it looks like, may be different for every village”*. Besides social amenities, interviewees #1, #3, #7 agreed that people need amenities for daily groceries, education and health care. These last two are in line with the amenities Provincie Drenthe (2022a) views as important for liveability in ‘Omgevingsvisie Drenthe 2022’. The Province of Drenthe (2022a) deems the accessibility of amenities for education, health care, culture and recreation as important for liveability.

Many amenities are not feasible to provide in a regular form, therefore Gemeente Noordenveld (2017) stimulates collaboration and clustering of amenities, for instance in the shape of a multi-functional accommodation (MFA) for flexible usage. The municipality especially wants to realize such places where education, day care and leisure intersect. These ambitions of the municipality are in line with the social agenda of Provincie Drenthe (2022a), which aims to make more collective use of common spaces and MFA's. Multiple interviewees see the relevance of such MFAs, for instance interviewee #2: *"Suppose you have these villages and there are some amenities, but they are not all centred. Then my idea is that we sweep everything together and put it in one place and in this way, you also create that people who actually only go somewhere for different reasons, also meet each other. So, they meet, but you also make sure that not everything closes down"*. Such MFAs can also provide an accommodation for mobile and temporal amenities in small villages, as proposed by interviewee #4: *"You have to make sure that you also reach people in the small villages, so to speak, and that you don't have to set up a library in 27 places, but you could, for example, choose to say. We can organize a mobile library and come once every two weeks, for two hours on an afternoon in the community centre."*

In sum, amenities that communities need most are places to come together and these amenities are crucial to have within their own village. Amenities for daily groceries, education and health care are important as well and need to be properly accessible. The exact needs and desires of a community depend on its demographic composition as well as its geographical location in relation to other towns. As provision of amenities in the regular form is often difficult in small villages, MFA's can provide a solution.

## 5.2 Achieving accessible amenities

Regarding accessibility, different elements and strategies are highlighted by policies and interviewees. Key terms which occur across all levels are 'proximity' and 'limiting barriers'. Regarding mode of transport, there also seems to be the consensus that walking, biking and public transport should be stimulated over car use. Hubs are seen as a means to achieve accessible amenities and are an intersection between transport and social amenities. Gemeente Noordenveld (2017, p. 8) sees the relevance of accessibility: *"In Noordenveld the traffic- and transport policy is targeted at maintaining and improving the (economic) accessibility"*.

The relevance of proximity is mentioned by policies from different scale levels and fields. On the national level, it was mentioned that proximity leads to more use of public transport, bike and walking as a result of having to cover shorter distances (Ministerie van Binnenlandse Zaken en Koningsrelaties, 2020). On the provincial level it was mentioned (Provincie Drenthe, 2022b, p. 5): *"The mobility question has always been 'How do I get from A to B?', while the question should actually be*

*'Why do I have to get to B and why can B not come to A?' ". This means that proximity should get a more prominent role, if possible, while unfortunately the opposite is often happening in rural areas (CROW, 2018, p. 7): "On the topic of liveability, the effects of scale enlargement are visible. On various terrains amenities disappear from proximity. As a result, the accessibility of shops, education, health care and jobs are under pressure. Public transport does often not match with the needs of the community. The topic transport poverty occurs". The Province of Drenthe (2022b, p. 5) had a clear vision on why proximity of amenities is important: "Also bringing amenities closer is a part of it, so perceived liveability improves, people have to travel less frequently and can make use of the bike more often". Besides proximity of amenities, 'limiting barriers' was frequently mentioned in both policy documents and interviews (#1): "Accessible amenities are very important, and you want to offer it as easily accessible as possible and for everyone. This is why we don't just look at the private car, but especially public transport. And if we talk about public transport, the biggest problem is always that it takes you from a place you don't want to be to a place you don't want to go". And Ministerie van Infrastructuur en Waterstaat (2023a, p. 32) wrote: "The key here is to combine different modes of transport and organise good hubs or transfer points, without putting barriers". These barriers can be caused by various reasons relating to (social) safety and lack of skills. Such as fear for driving, poor lighting at a bus stop, mental or physical disabilities and lack of digital skills (Planbureau voor de Leefomgeving, 2022a). This means the key is to make sure as many barriers as possible are tackled in order to make sure amenities become accessible.*

As could already be derived from the discussion above, bike and public transport are prioritised over car use across different policies. Even though the municipality accepts that the car has a dominant role in the rural municipality, Noordenveld municipality puts bike as the number one priority and bus as number two (Gemeente Noordenveld, 2015). This is in line with the ambitions of the province of Drenthe (Provincie Drenthe, 2022b). Besides the individual role of the bike and bus, integration between the two is also deemed important among different parties. As the OV-Bureau Groningen Drenthe (2022, p. 10) described: *"On transfer points (stations, hubs and transfer points) bike and public transport meet."* And interviewee #6B stated: *"A hub is according to us a place where you can transfer, a place where mobility modes connect"*. The Province of Drenthe (2022b, p. 5) went beyond this mobility and transfer focus and looked at the function of hubs as a destination in itself: *"By creating hubs in villages and neighbourhoods where people can make use of amenities, they have to travel less far than in the current situation"*. OV- Bureau Groningen Drenthe (2022) discussed how hubs should become more integrated into society by adding amenities to hubs, or by bringing hubs closer to communities. This is however something mobility experts are at the same time critical towards, as they find it desirable if busses can drive their routes within 27 minutes, so one bus can drive a return journey

within an hour. Taking detours adds time to the journey and is more expensive for both the transport authority as well as for the traveller (Interviewee #6A). Therefore interviewee #5 proposed to look critically at every situation to determine the needs and desires of the community and distinguish between mobility focussed hubs, community focussed hubs and combination hubs: *“It could be a development to give some hubs that more social function and the other just as a transfer point; speed, hop on, transfer and leave. In some situations, you need that and other situations something different”*. Some communities have stronger needs for amenities within the village, while others have stronger needs for fast connections to other places. By making distinctions between different types of hubs, it becomes easier to match the hub with the needs and desires of the community.

In sum, in order to achieve accessible amenities, hubs can be used to form a bridge between transport and amenities. In order for hubs to positively impact liveability, proximity as well as limiting barriers are important. In order to match with the needs and desires of the community, a distinction can be made between three hub types: mobility hubs, community hubs and combination hubs.

### 5.3 Pathways to successful integration of hubs with amenities

In the process of hub development many stakeholders are involved such as provinces, municipality, transportation authorities, property owners, local entrepreneurs, residents and other potential users (Interviewee #1). Due to this wide array of parties, different aspects are important during in the planning process; willingness, governmental parties taking responsibility, setting shared goals, achieving a high level of perceived safety and participation.

There are several conditions which are necessary in order to realize hubs integrated with amenities. As there are many different parties involved in the process, willingness to put effort into the project is required from the different parties and the governmental parties in particular, because these are the parties that have to create the possibilities (Interviewee #9). As interviewee #4 illustrated in an example: *“I think that has been an important factor that attitude ‘make an effort’ and a positive outlook on what is going to happen, I already had this attitude, but he made this attitude made this even stronger, that attitude like ‘we go for it and it will succeed’.*” Interviewee #4 also stressed the importance of good communication between stakeholders: *“You have to trigger each other to stay sharp. Communication is so important. It is so important that you talk to each other regularly”*. Besides willingness and positive energy, shared goals are also of utmost importance. Provincie Drenthe (2022a, p. 18) mentioned: *“An important requirement for effective collaboration are mutual ambitions.”* This is in line with the experiences of interviewee #4, who stressed the importance of discussing and exploring shared goals. According to interviewee #4 willingness is required from all parties, and from governmental parties it is required that they take the lead and responsibility. For rural regions in

particular, it is important that the national government recognizes the problems rural regions are facing and put liveability in rural areas higher on their agenda (K6, 2020). K6 (2020, p. 20) wrote the following about liveability in rural provinces: *"This exceeds the carrying capacity of the six provinces. To keep up with the primary requirements of a good life costs a lot more money in transition regions because they are sparsely populated"*. Interviewee #9 highlighted that it is important that the governments create the opportunities to overcome these issues. Besides, interviewee #5 indicated that in order for stakeholders to participate in hub developments, it is important to know who is responsible and takes the lead.

Regarding the hub itself, perceived safety is an important condition. Perceived safety adds to the spatial quality of the hub and is a requirement for people to come to the place. Because if people do not feel safe, they will avoid the place (Interviewee #2, #6B). According to interviewee #6A this feeling of safety is influenced by what the place looks like: *"If everything is quite clean, there is no graffiti and little litter, it already feels a lot safer because you have the feeling people take care of the place."* Interviewee #2 believed that having people physically present at the hub during the day helps to achieve safety. Gemeente Noordenveld (2017, p. 17) mentioned: *"Perceived safety increases when residents have been involved in the planning process."* This importance of participation is mentioned by multiple interviewees and for different reasons (Interviewee #1, #2, #4, #7, #10). Besides safety, participation is deemed important in order to make sure the hub matches with the needs and desires of its future users. As interviewee #10 mentioned: *"Because you want people to make use of the place we create, you need the residents, because they are our future users"*. Interviewee #7 highlighted that different groups of people have different needs and desires, so it is important to engage as many different people as possible.

Besides hub conditions, there are also several success factors that can add to the success of the hub, namely customization, social capital, an integrated approach and exchanging knowledge. Customization of hubs is important because needs and desires differ between different places and communities (Interviewee #7). As Interviewee #2 mentioned: *"The more it matches with the existing needs, the more successful it will be"*. This is in line with what was written in 'Hoofdlijnen Mobiliteitsvisie 2050' (Ministerie van Infrastructuur en Waterstaat, 2023a, p. 33): *"Whether the implementation of the hub concept succeeds, in the end gets determined by the potential user. That is why it is of utmost importance to know which requirements the user puts for the design of hubs. And they won't be the same in every situation, it has to be looked at individually for each design"*. This means that different people have different needs, however their needs can also be different on different locations; they can have different needs when a hub is in the village centre and when it is along a main road. With customization matching the needs and desires of the community, the following objective of Gemeente Noordenveld

(2017) can be aimed for *“Together we keep public amenities alive, based on needs and desires and capacities of the community”*. These ‘capacities of the community’ are also contributing to the success of a hub, mainly in the form of social capital. Interviewee #4 mentioned: *“The success depends on the entire local situation; is there an active neighbourhood club that wants something, are there shopkeeper who think hey that sounds interesting to me”*. Interviewee #5 thought that social capital does not just impact the success of hubs, but liveability in general: *“I think liveability has to do with the entire community, why something interesting occurs or not and whether it stays or not”*.

The importance of an integrated approach to tackle liveability issues in rural areas is highlighted by various experts. For instance, K6 (2020, p. 22) wrote: *“The regional challenges have a complex multidisciplinary character, and this requires integrated solutions. The goal is not to work in defined policy terrains, but to work and break through those boundaries”*. Interviewee #5 stressed the importance of visions in order to come to integrated solutions: *“You have to embed the plans in a bigger vision on rural liveability. What is rural liveability?”*. The NOVI is a national spatial vision which could serve such a purpose, however Planbureau voor de leefomgeving (2022b, p. 5) discovered some flaws: *“The NOVI has the ambition to tackle national issues with an integrated approach. However, there is a long route ahead as many goals are just copied from sectoral policies and there are insufficient links between the different fields”*.

Another factor contributing to the success of hubs in general, is knowledge exchange. There are various hub programs in place throughout the Netherlands and Europe and many are experimenting and innovating. Interviewee #5 stressed the value of participating in knowledge networks: *“It is such a big and broad topic where we are talking about, you cannot do everything yourself. But this way you can get a lot of input from others”*. The Province of Drenthe also participates in such networks and wrote the following (Provincie Drenthe, 2016, p. 31): *“We take part in networks and bring parties together to share knowledge and information and best practices”*. According to CROW (2018), especially municipalities have this need to develop their knowledge and exchange information.

In the process of integrating hubs with amenities, there are also some barriers to be distinguished: transport speed, commercial interest and sectoral budgets and policies. From the perspective of transport speed, bringing amenities to hubs is opposed to bringing hubs to amenities often more favourable transport wise, as rerouting busses to get hubs to amenities in a village can bring some issues in terms of transport speed (Interviewee #11). Transport speed is important as it is one of the factors that determines the attractiveness of making use of public transport as opposed to other modes (Interviewee #11). In terms of limiting costs of public transport, it is favourable that a bus route from beginning to end does not exceed 27 minutes, that way one bus can complete a return journey within an hour. If this is not the case, an extra bus is needed in order to make hourly bus schedules

work. (Interviewee #11). This makes integration between hubs and amenities more difficult in places where the most favourable bus routes in terms of efficiency lay far away from amenities (Interviewee #6A). Interviewee #6A however also stressed that it is always important to look at each place individually in order to explore the possibilities: *“I definitely do not think that you should always bring amenities to hubs instead of the other way around. It really depends on the place”*.

Bringing amenities to hubs can however also bring some commercial challenges. Hubs are in its core created to smoothen mobility transfers, this causes peak moments around the times the busses arrive and depart (Interviewee #5). Because of this, interviewee #6B said there is a need for entrepreneurs to innovate and think creatively in order to be profitable: *“In that sense it is more difficult, you need entrepreneurs that serve a broad market and not just the public transport traveller”*. Public transport brings some challenges for entrepreneurs, but it also brings security regarding location choice. Interviewee #11 mentioned: *“You can tell the amenities that for the next 10 or 20 years it is guaranteed that the bus will come. Choose this location because you are accessible for everyone. Sometimes we tend to forget that many people in the Netherlands have no access to a car. Of course, there are a lot of people who are too young to drive a car, but also 15-20% of adults do not have a driving licence. This means there is a big group in need of other forms of mobility and good accessibility”*.

Integration between different (spatial) functions is often made difficult due to sectoral policies and budgets from governments, requiring much time and effort. Interviewee #1 for instance illustrated this with an example from a project: *“They had a subsidy for what was happening on the square and not for the buildings around it which were also part of the project”*. Interviewee #2 stressed that the governmental rules that are set up to protect society can prevent from doing something that is actually serving society: *“Things are organised very sectoral. We have budgets for mobility, social budgets, culture. If you want to combine functions it gets complicated. But it shouldn't be the case that is we want something for society, that it cannot happen because of the rules we set up”*. In line with this, interviewee #1 mentioned that this is indeed a challenge: *“It takes a lot of time to get everything done administratively [...] That is the most difficult part. As they often say. The most friction comes from within”*.

On basis of the findings, Figure 8 below provides an overview of the conditions, success factors and barriers for integrating hubs with amenities for liveable rural areas.





Figure 8: Overview of hub amenity integration conditions, success factors and barriers.

#### 5.4 Potential effects of integrating hubs with amenities

After successful integration of hubs with amenities, there are several effects that can be expected as a result. Gemeente Noordenveld (2017) wrote in their spatial vision that it aims to reduce mobility as this leads to reduced CO2 reductions. Interviewee #6B argued: *“The goal of hubs is also to reduce mobility and the need for mobility”*. This reduced mobility is both a result of clustering and of proximity. Proximity is a factor contributing to liveability, as Provincie Drenthe (2022B, p. 5) mentioned: *“bringing amenities closer increases perceived liveability because people have to travel less and can do more by bike”*. Besides, clustering can lead to amenities profiting from each other’s proximity as it generates more clients and new users, this means further closure of amenities can be avoided (#2). This clustering does not only generate new users for amenities, but also for public transport: *“Integrating amenities at hubs can add value and seduce people to make use of public transport, because different things they need are linked to the place, making it attractive”* (Interviewee #6B). Interviewee #11 also saw the financial benefits of clustering in rural areas: *“Public transport in rural areas is not profitable in terms of costs, so you have to bundle bus lines effectively, je have to let it reenforce each other”*. Clustering of hubs and amenities can also contribute various desired social outcomes. As hub contribute to the accessibility of amenities, which is important for people in order to be able to participate in society: *“Participating in society by making use of accessible amenities in your environment”* (Interviewee #4). Interviewee #2 also believed that hubs can generate social capital as a result of human interaction: *“I think that we can create places where people can connect with each other and support each other. And combat loneliness and fulfil other social needs”*. Interviewee #4 used the metaphor of a water well to describe the potential of hubs as central meeting places in society: *“A long time ago it was the water*

*well which was the central point of the village where everyone would go to fulfil their need and at the same time meet each other. I really hope this same effect will happen with hubs”.*

In sum, multiple potential effects can be expected due to the integration and clustering of amenities at hubs: mobility can reduce, amenities can reinforce each other, new users can be generated, and social interaction can happen.

## 6. Findings of the exemplar villages

This chapter serves to present the findings from the secondary data analysis, interviews and policy analysis regarding the exemplar villages and corresponding hubs. Figure 9 below serves as a reference point and provides an overview of the existing hubs (Roden and Peize) and for the villages without hubs the community centre is chosen as central point in the village (Roderwolde and Nieuw-Roden). The 700-meter walkability buffer is drawn around each of the central points to give an idea of the walkability of the area.

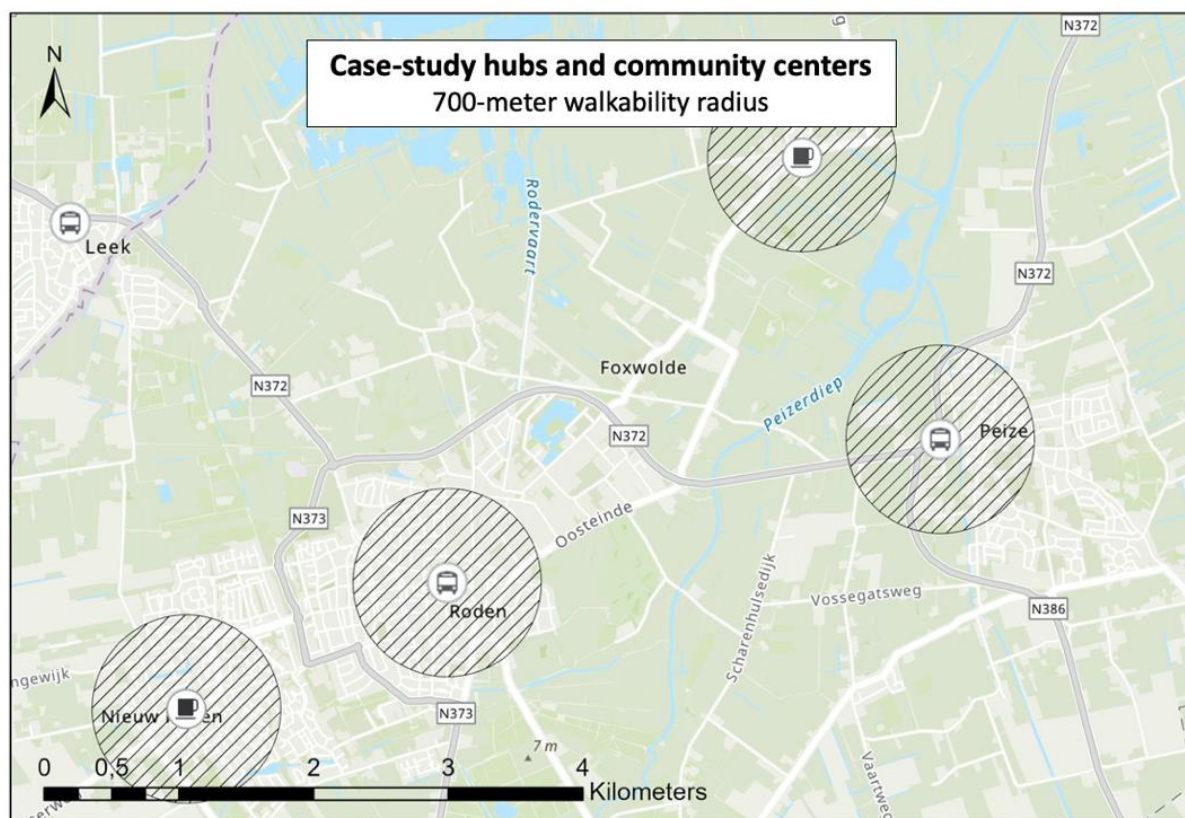


Figure 9: Walkability around hubs and community centres

### 6.1 Hub Roden

According to the 'Omgevingsvisie' of the Gemeente Noordenveld (2017), Roden is a complete main village with a variety of shops, diverse neighbourhoods, and a sufficient level of jobs and amenities to serve the region. This is in line with interviewee #3 who viewed Roden as the main village of the municipality of Noordenveld to serve its broader surrounding area. According to interviewee #4, many inhabitants of Roden commute to the city of Groningen for work (Interviewee #4), which is why there is a strong need from the community for good direct connections to the city of Groningen. As Roden has almost 15.000 inhabitants, the bus lines through Roden serve a large population, which is why

according to interviewee #11 it can be justified to let the bus drive through the village and make choices in favour of the residents of Roden as opposed to residents from smaller villages.

Hub Roden is located in the centre of the village and has been transformed to a place with public spaces made which make the hub an interesting and pleasant to stay (Interviewee #2, #3). Regarding amenities within walking distance from the hub, which is 700 meters as determined by Bertolini (1999), the location of hub Roden can be considered as strategic, as can be derived from figure 10. The hub serves a large part of the village, and a large share of amenities are located near the hub. Especially the village centre shopping streets with shops like bakeries, clothing stores and restaurants is close. But also, a pharmacy, town hall and multiple fitness centres lay within walking distance of the hub.

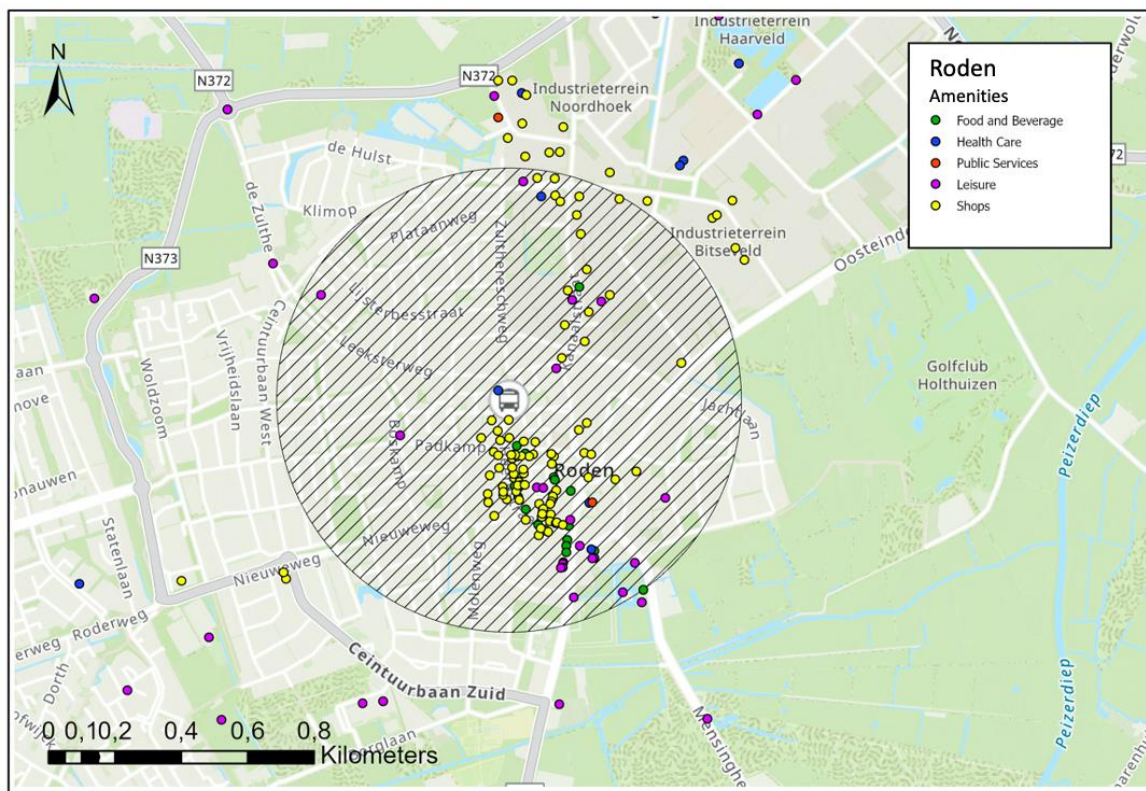


Figure 10: Amenities within 700 meters from hub Roden

It must be noted that the amenity categories pictured in this map, as well as the following maps contain some quite broad categories. The most relevant categories are ‘food and beverage’, ‘health care’, ‘public services’, ‘leisure’ and ‘shops’. The category ‘food and beverage’ contains many restaurants and cafes. Category ‘health care’ includes general practitioners, dentists, pharmacies and veterinaries. ‘Public services’ contains public amenities like schools, fire stations and town halls. ‘Leisure’ contains amenities like sport centres, museums and hotels. ‘Shops’ includes all types of shops, from retail to supermarkets, hairdressers and car dealers.

From a transport perspective, Hub Roden is viewed as successful by Interviewee #6A: *“I think that transport-wise it is a relatively good hub with many parking spots for bikes and it attracts people from a large surrounding area”*. There are two bus lines running through Roden and both make use of the hub ‘Roden Centrum’: bus line 4 and 83 (Qbuzz, 2022). Bus line 4 connects to Groningen and the other side of Roden. Bus line 83 connects to Leek and Assen. Besides, there is a reservation-based hub taxi available that can take you from the hub to every address in the area (Interviewee #1). Regarding frequency, bus line 4 runs between 5:30 till 1:00 and drives six times per hour during peak hours: 7:00-10:00 and 14:00-17:00 on weekdays (Qbuzz, 2022). On regular hours during weekdays (10:00-14:00 and 17:00-19:00) it drives four times per hour. Before 7:00 and after 19:00 it drives twice an hour. During weekends, bus line 4 drives twice an hour with the earliest bus at 6:30 on Saturdays and 8:00 on Sundays (Qbuzz, 2022). This can be considered a very high frequency, as it is twice the frequency of what the Province of Drenthe requires for HOV; bus rapid transport (Provincie Drenthe, 2022b). Bus line 83 runs between 6:30 and 1:00 on weekdays and departs every hour (Qbuzz, 2022). It has the same frequency on weekends, starting from 8:00 on Saturdays and 9:00 on Sundays. This is the regular and required frequency for basic bus lines in the Province of Drenthe (Provincie Drenthe, 2022b).

Hub Roden is currently being developed into a hub where transport and amenities intersect; the adjacent library is being reconstructed into a multi-functional accommodation to serve various needs of the community (Interviewee #3). The library was searching for its right to exist and sees collaborations with other parties as an opportunity to reinforce each other (Interviewee #3).

Overall, hub Roden is a place where there is a strong transport as well as amenities component, which is according to Interviewee #11 different from many hubs which are more dominant in terms of transport: *“That function of that hub in that place is very different, I think it’s good that there are other functions more dominant than the bus.”*

## 6.2 Hub Peize

After Roden, Peize is seen as a core village of the Municipality of Noordenveld as serves the surrounding area in terms of amenities (Interviewee #3). According to ‘Omgevingsvisie Noordenveld 2030’ the village is attractive for commuters who work in Groningen as well as for families (Gemeente Noordenveld, 2017). The community is committed to maintain the amenities in the village. It is seen as a village for commuters and well-off elderly (Interviewee #4).

Regarding transport, there is the same bus line 4 with the same frequency as in Roden. From Peize it runs to Groningen and Roden (Qbuzz, 2022). Besides bus line 4, there is bus line 109 to Assen and Zernike Campus Groningen. This bus runs once an hour and twice an hour during peak hours;



between 7:00 and 10:00 and 15:00 and 17:00 (Qbuzz, 2022). As with hub Roden, there is a reservation-based hub taxi available that can take you from the hub to every address in the area (Interviewee #1). Hub Peize is a true P+R hub as it is situated along the main road to Groningen and Roden on the side of the village. There is much space provided for bike parking, which is necessary as a large part of the village lays outside of the walkable radius. Within the walkable radius, relevant amenities include a supermarket, bakery, florist, restaurants and an information centre. Unfortunately, most amenities in Peize lay outside of the walkable radius from the hub, as can be derived from figure 11. New neighbourhood developments are planned for the area south of the 'Achteromweg' in the South of Peize, which far beyond the walkable radius of the hub. It must be noted that the light brown farming parcels are not to be confused with the light grey built-up area on the map.

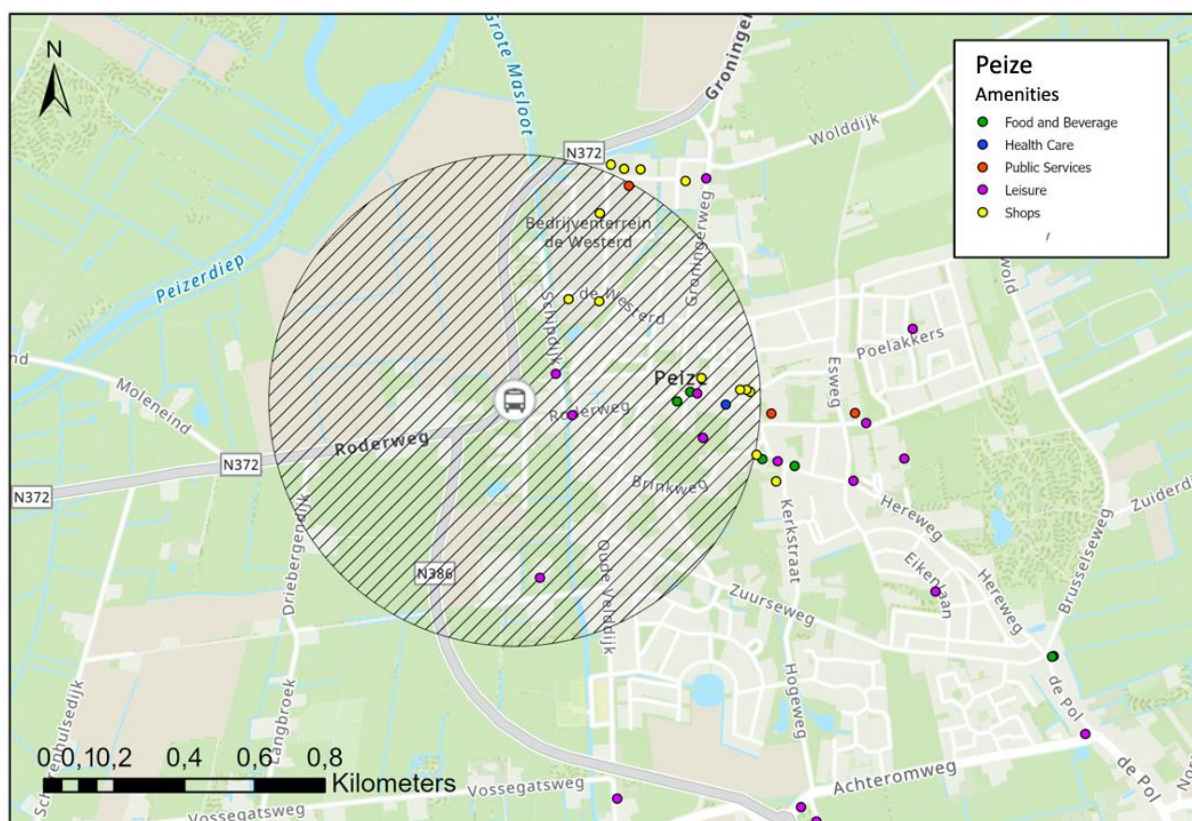


Figure 11: Amenities within 700 meters from hub Peize

Hub Peize was created after rerouting bus line 4; this bus line used to drive through the village twice an hour and twice around the village, as in current situation (Interviewee #11). The rerouting of the bus line caused protest in the village, as many people who lived on the opposite side of the village didn't want to see the bus leave the village (Interviewee #11). Having the bus drive around the village was however deemed necessary by transport experts; it would save a lot of travel time and that would make it possible to increase the frequency as well as shortening the travel time for people from Roden (Interviewee #11). This was considered the just thing to do as Roden has a lot more inhabitants and

thus bus travellers than Peize, also because Peize is on cycle distance (10 km) from Groningen and Roden is further away and thus more people opt for the bus as a mode of transport (Interviewee #11). According to interviewee #6A bus line 4 now works like a charm, even though it is a further bike ride for people who live on the opposite edge of the village.

### 6.3 Roderwolde

Roderwolde is a small village with only 290 inhabitants (CBS, 2021). There is however a very active village life, the residents of the village manage to keep alive their two cafes and a multi-functional accommodation with a primary school, community centre and gym (#9; Noordenveld, 2017). The community does not just consist of residents of Roderwolde, but the entire service area of the primary school, which also includes the nearby townships of Sandebuur, Matsloot and Foxwolde.

Regarding mobility, there is no regular public transport serving the area; the nearest bus stop is 2.5 kilometres away and the nearest hub 4.3 kilometres. This is further away than the 700 meters walkability radius as determined by Bertolini (1999). As with every place in Groningen and Drenthe, there is a reservation-based hub taxi available that can take you from the hub to every address in the area (Interviewee #1). People from the village however prefer to bike to get to other villages (#9). At the same time, as there are no shops in the village, most households possess two cars (#9). Residents who do not have access to a car usually depend on family members in order to get to amenities outside the village (#9).

The 'Omgevingsvisie Noordenveld 2030' writes about how the community of Roderwolde commits itself to maintain basic amenities alive (Gemeente Noordenveld, 2017). Interviewee #9 also mentioned how they are used to the situation as it is now: *"There is not necessarily a need for new amenities, but especially the need to keep what we have"*. Interviewee #9 also mentioned how MFA Roderwolde is actually already a social type of hub and highlights the importance of the social function of such places: *"You should not just make it functional. You have to make it social as well. That way it gets a lot more value"*. Figure 12 below shows how this community centre and MFA is located in the centre of the village an on walkable distance for everyone living within the village boundaries; the townships however lay outside the walkability radius.

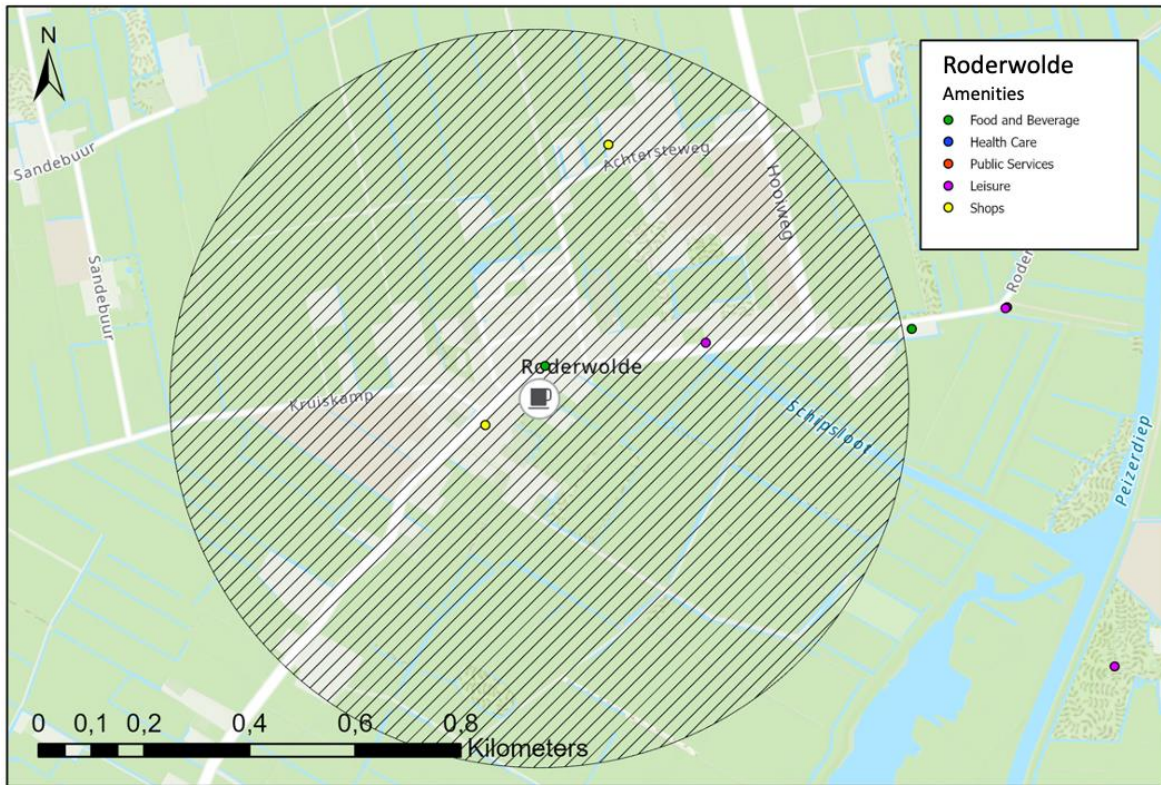


Figure 12: Amenities within 700 meters from community centre Roderwolde

#### 6.4 Nieuw-Roden

Nieuw-Roden is a village next to Roden and because of the growth of both villages, they have grown towards each other and as a result their built-up areas now fully connect.

Bus line 4 used to connect to Nieuw-Roden, but it had to be shortened for efficiency and financial viability and now does not serve the village anymore. The nearest bus stop is however 150 meters outside the borders of the village, which is 500 meters from the centre of the village. This means that within 700 meters from the village centre, two bus stops can be found. The first response of residents of this plan of shortening of the bus line was that they were against it. But this shortening allowed for higher frequencies and traveller numbers show that more people now use the bus than before (Interviewee #3). This shows that for the case of Nieuw-Roden, a high frequency and reliability of the bus service was of greater importance than the proximity of the bus stop. Nieuw-Roden is close to the village centre of Roden as well, the nearest hub is hub Roden which is 2.5 kilometres away.

Regarding amenities, Nieuw-Roden has a primary school, day care, community centre, supermarket, football club, three restaurants, a café and a couple of small shops (Figure 13). The number of shops along the main street has decreased over the past decades. The village centre of Nieuw-Roden is drained as a result of the proximity of Roden and the wider array of amenities there (Interviewee #1).



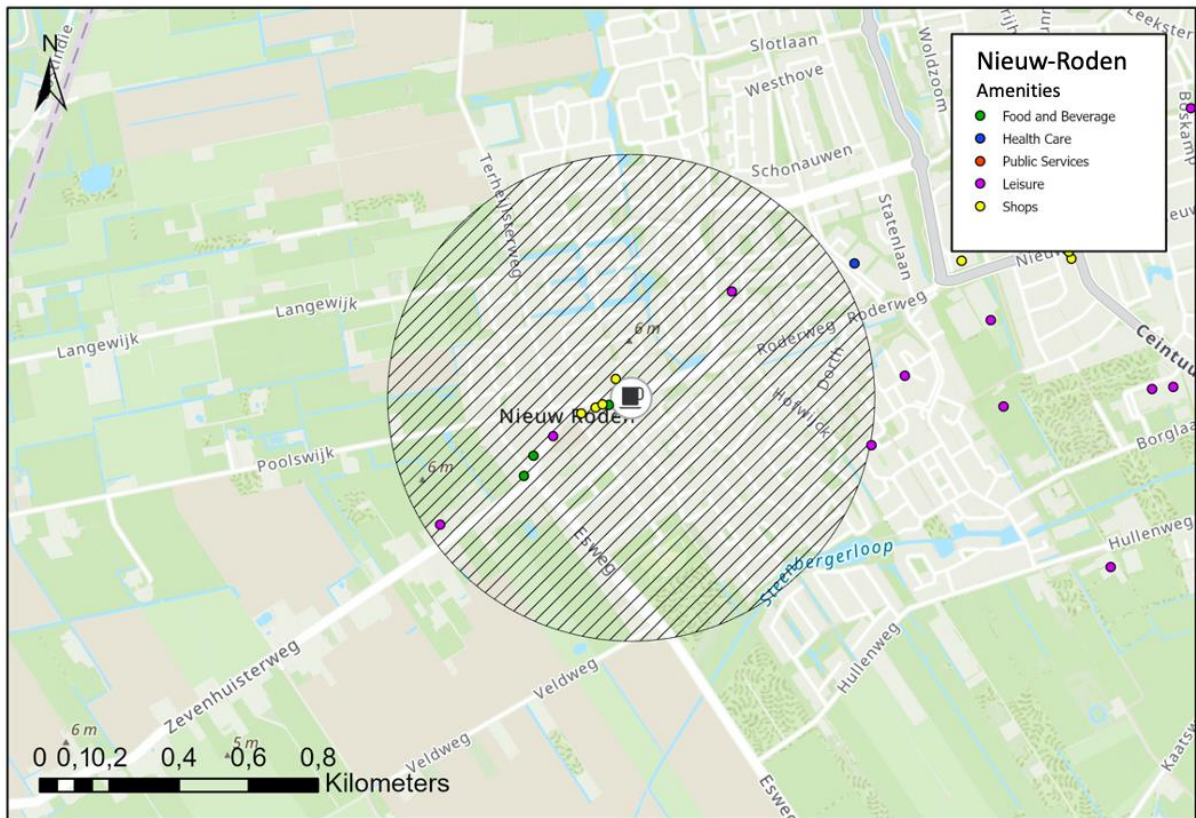


Figure 13: Amenities within 700 meters from community centre Nieuw-Roden

## 6.5 Comparing the villages

The studied exemplar villages in North-West Drenthe share some similarities, but there are also differences. Roden is viewed as the main village in the municipality of Noordenveld and serves the surrounding area in terms of amenities. Therefore, Roden can be classified as a destination area. But the village is also home to many commuters, making it a point of departure at the same time. Peize is also home to many commuters who frequently travel to Groningen, the villages share the same HOV bus line. As Roden is a larger village and houses more inhabitants than Peize, the choice has been made to let the bus drive through the village of Roden, but to go around Peize and only stop at the P+R hub at the edge of the village. This means Peize has seen some bus stops disappear, which also happened to Nieuw-Roden. The nearest bus stop for residents of Nieuw-Roden is now just outside the border of the village. Besides bus stops, Nieuw-Roden also saw amenities disappear from the village centre. This closure of amenities is something the residents of Roderwolde fight against. There is an active village life in Roderwolde and residents commit themselves to maintain the last remaining amenities and for the liveability of their village.

## 7. Analysis & Discussion

In this chapter the results presented in chapter 5 are analysed and connected to theories discussed in chapter 2. This is done based on the conceptual model (Figure 5). The structure of this chapter is based on the order of the sub-questions.

### 7.1 Amenities for liveability in rural areas

The findings of the interviews and document analysis on amenities for rural liveability for the case North-West Drenthe and the four villages confirm the importance of social interactions and amenities that provide space for such interactions. This is in line with the findings of Svendsen (2013) which stated that amenities where communities can interact and meet each other are considered most important of all. The interview results also showed that daily groceries, education and health care are the primary needs of residents in rural areas that need to be fulfilled with amenities. This is in line with findings from Noble et al. (2008) who found that stores for food, GP's, primary schools and post offices are considered most important. Post offices were not found in this research to be important amenities, but as Cabras and Bosworth (2014) wrote this can be due to differences in country and culture. Besides, over the past 15 years a lot has changed in mail writing due to digitalisation.

The interview results also showed the relevance of geographical location of a village in relation to other towns. This geographical location can be linked to theories on accessibility by Geurs and Wee (2004); if an amenity in a nearby town is very accessible, the need for the same amenity in someone's own village is low. This is in line with Langford and Higgs (2010) who found that accessibility is more important than actual presence an amenity within a village. In existing literature, proximity and LUTI were found to be the main concepts and strategies for accessibility in rural areas (Haugen, 2012). In line with this, interviews and documents show that proximity is highly valued by different experts and policies. LUTI has also been mentioned as an effective strategy for accessibility, however this is difficult to realise in existing villages as not many new developments take place. LUTI implies that there are spatial-economic developments taking place, but these dynamics can seldom be found in rural villages.

The outcomes also show the relevance of demographic composition and especially age having an impact on the type of amenities needed. This is a new factor that has not been distinguished in the literature reviewed.

Some of the above-mentioned aspects can be linked with the accessibility components by Geurs and Wee (2004): land-use-, transportation-, temporal- and individual. Type of amenity and proximity of amenities can be linked to land-use as described in the conceptual model (Figure 5). The demographic characteristics can be linked to the individual component.

## 7.2 Linking amenities and hub types

Due to variety in villages in terms of size, location and population, hubs may differ across different places. Findings from the interviews show it might be necessary to distinguish between mobility focussed, community focused and combination hubs. This allows for maintaining fast connections in places where it is deemed necessary and allows for clustering of amenities in places where it is possible and desired. This second type of hub (community focused hub) is in line with desires of Provincie Drenthe (2022b) who want to turn hubs into destinations by adding amenities to hubs and by doing so bring amenities closer to communities, so amenities become more accessible and in proximity. Rongen et al. (2022) made a hub typology consisting of four hub types: P+R, TOD, neighbourhood and rural hubs. Some of the three proposed hub types from the interviews (mobility, community and combination) overlap more clearly than others with the four hub types by Rongen et al. (2022). The P+R hub is for instance a clearly a mobility hub as it was set up with the intention to fasten transport speed. However, if amenities get added, it can be transformed into a combination hub. This is the case for the exemplar hub of Peize, which is a P+R hub at the edge of the village along a main road. The TOD hub however is in its core already set up as a combination hub as it has both a strong transport and land use component. However, as new developments rarely take place in (declining) rural areas, this hub type – as traditionally conceived in literature and practice – is not very relevant for rural areas. However, it might be possible to implement on a smaller scale in the more central rural towns if new developments do take place. The neighbourhood hub on the other side, has a less prominent transport component, but is in the centre of the community and thus has most potential for becoming a community hub. Roderwolde and Nieuw-Roden have no hubs at the moment, but interviewees see potential for community hubs in those places. The rural hub has potential to become a combination hub; mobility flows are already bundled there, so if amenities get clustered, they can reinforce each other. According to Rongen et al. (2022), this hub can increase liveability as a result of mobility that is generated due to presence of the hub, which leads to more usage of amenities surrounding the hub. This is in line with findings from the interviews which pointed out that the clustering of amenities at hubs would cause them to reinforce each other as well as those new users are generated.

Through the perspective of Bertolini (1999, 2005) and the node-place model, the most successful hub for liveability would be the combination hub as it has a balanced node and place function and is thus most accessible. The mobility focussed hub has a stronger node and the community focussed hub a stronger place and are therefore out of balance. Applying this node-place model to the exemplar villages, Roden is the most in balance and therefore most accessible. This is because Roden has a frequent bus connection with multiple directions served and is also easy to reach and provides parking for bike and car, which means it is a strong node. It also has a strong place function as there

are plenty of functions and amenities to be found within the 700 meters walking distance from the hub, as prescribed by Bertolini (1999). This 700 meters walking distance is however something to be critical towards, as there are groups like elderly or people with a physical impairment for whom these 700 meters is too far to walk. Therefore, the first few hundreds of meters from the hub are most important in hub-amenity integration in order to be inclusive. Zooming in to hub Roden, the hub is truly in the centre so especially many shops but also other amenities can be found in the first 300 meters of the hub. While in Peize, the amenities are clustered at the outer edge of the 700 meters buffer, which is simply not walkable for everyone.

All in all, this means that the different hub types function in a different manner and this can be explained by feedback mechanisms of the LUTI-cycle by Bertolini (2012) and as pictured in the conceptual model (Figure 5). This process works as follows; all the components have an impact on each other in a direct or indirect way. For instance, if the hub scores low in terms of transport, this has a direct impact on the accessibility of a hub, which impacts the surrounding land-use, this impacts the amenities present as well as those that potentially could be located at the hubs, and this impacts the transport dimension again. These four components all have an impact on the hub, meaning that they all must be of a certain strength and in balance in order for hubs to contribute to liveability in rural areas.

### 7.3 Needs and desires of communities in North-West Drenthe

The exemplar villages Roden, Peize, Roderwolde and Nieuw-Roden differ in terms of size, population and accessibility to amenities and public transport.

Especially the villages of Roden and Peize are home to people with needs to commute to the city of Groningen, meaning they have a desire for fast connections. For them, the desire for fast connections to make use of amenities elsewhere is stronger than the desire for amenities within their own village. This can be explained by theories of Bastiaansen and Breedijk (2022) who point out that it is not necessary to have all amenities available within a village itself, as long as they are properly accessible. In Roderwolde however, they have a strong desire to maintain the last remaining amenities as these two cafes, the community centre and the primary school are the last places where the community can come together. This is in line with Kennis voor Krimp (2017) who argued that the liveability of a village does not depend on the general availability of amenities, but it is important to at least have some as amenities serve a strong social function within the community. Regarding the people from the different communities, two groups can be distinguished: people who already lived there and people who moved there. People who moved to North-West Drenthe often used to live in the city of Groningen and still have part of their lives e.g., jobs, family and friends in the city. For those people it is their choice to live

in one of the villages, while for others it is the place where they are from. This difference in choice is important to keep in mind, as it can explain a part of their differing needs.

#### 7.4 Stakeholders and the planning process

There are various stakeholders involved in the process of integrating hubs at amenities like provinces, municipalities, property owners, transportation authorities, market parties and the community itself. In the interviews especially processes from the recent hub developments in Roden were discussed. By various interviewees it was highlighted that spontaneous and coincidental interactions lead to the start of collaborations. Social capital is the starting point for involvement of citizens and local businesses and boosts bottom-up initiatives. Besides, the positive energy and willingness to make things happen were mentioned by multiple interviewees. This collaborative and flexible process is in line with bottom-up processes as discussed by Hooghe and Marks (2003). On the spectrum of formal and informal interaction by Morand (1995), the informal interactions are most prominent in the process of hub-amenity integration as it rather takes the shape of free flows instead of following hierarchical structures.

The governmental responsibility of keeping rural areas accessible has been mentioned in the interviews as well, which aligns with what was mentioned by K6 (2020) as well as Martens (2017) 'right to accessibility'. This is why some interviewees believe that governmental parties should take the lead in the process of integrating hubs with amenities, which is a strategy that lays closer to a top-down approach according to Hooghe and marks (2003). As there are both bottom-up and top-down aspects visible in the process of integrating hubs with amenities, there is a triangulation between market, citizens and government. This is what Innes and Booher (2003) label as the power of governing. Taking the lead in the process of integrating hubs with amenities is something that can be visible in mobility, social and spatial policies. For the case of North-West Drenthe, it plays a prominent role in mobility policy and is also mentioned in spatial policies. These policies have an impact on transport and land-use and thus impact the hub in this way, as was also assumed in the conceptual model (figure 5).

#### 7.5 Conditions, success factors and barriers of integrating hubs with amenities

Integrating hubs with amenities comes with several conditions, success factors and barriers. Some of the conditions and success factors regarding the planning process were already discussed in chapter 7.4. Regarding conditions, these include willingness and shared goals from all parties, as well as the government taking responsibility. Besides those aspects, in nearly all interviews the importance of matching every hub was to the specific needs and desires of the community was mentioned. This can be explained by theories by Gielieng and Haartsen (2016) who found that liveability is about the extent

to which someone's physical and social environment matches with his needs and desires, which explains why needs and desires differ, and customization is necessary. Besides customization, a high level of perceived safety at the hub is seen as a condition by multiple interviewees. This is in line with Peek and van Hagen (2002) who stated that safety is the most important requirement for people to make use of public transport. Regarding success factors, social capital has already been mentioned in chapter 7.4. Next to this, customization is a success factor, and this means to cater for the needs and desires of the community as well as matching with the overall local situation. Another success factor is using an integrated approach, as this helps to fulfil multiple societal goals at once. Besides, exchanging knowledge can help for success as different organisations work on similar type of hub developments all around Europe and are discovering new things while experimenting.

Regarding barriers of implementing hubs at amenities, transport speed has been mentioned by multiple transport experts. They mention that rerouting busses through villages makes routes longer in time and distance and therefore also more costly, which is unattractive for both the bus operator as well as the customer. These factors time, distance and costs are in line with accessibility factors by Batty (2009), meaning that rerouting busses through villages can decrease accessibility due to an increase in travel distance, time and costs. Another barrier are sectoral policies and budgets from governments. As hubs are interdisciplinary projects with elements from the mobility, spatial and social domain, the governmental domains must collaborate and use an integrated approach. This is something that often proves to be difficult and especially budget wise. This finding has not been identified by existing literature and is therefore new. Another new barrier found is commercial interest for hub locations. Integrating amenities at hubs requires some interest from entrepreneurs. However, this poses a challenge for especially mobility-focussed hubs as P+R hubs as there is often not a lot of footfall from people other than travellers and those travellers come in timeslots corresponding to the bus schedule.

## 8. Conclusion

In this chapter answers are provided to the research questions, based on findings from this study. This chapter starts by answering the sub-questions, which is followed by answering the main research question. After this the limitations of this research, recommendations for planning practices, suggestions for further research and a reflection on the process are presented.

### 8.1 Sub questions

1. *Which amenities are, according to literature, necessary for liveability in rural areas?*

In order to establish which amenities are necessary for liveability in rural areas, it is important to define the concept liveability. Based on the literature review in chapter 2, liveability is about the extent to which someone's needs and desires regarding his environment match with reality. This means that what is important for liveability can differ per person and across cultures, places and life stages. Amenities which people need most are amenities for education, health care and daily groceries. However, accessibility of those amenities is deemed more important than actual presence of amenities within the village itself. Regardless of the primary function of an amenity, the most important amenities for liveability in rural areas are the places where communities can come together to meet each other. These amenities are important for people to have inside their own village.

2. *What is the relationship between amenities and different types of hubs?*

Different types of hubs serve different functions. Hub typologies can be made based on different aspects. First of all, a distinction can be made based on hub geographical location in relation to other towns. There are TOD hubs, P+R hubs, rural hubs and neighbourhood hubs. In the current situation, most amenities can be found around TOD hubs, while the latter three are most common in rural areas and thus it is important to upgrade them.

Besides, a distinction can be made based on hub function: hubs with a mobility focus, hubs with a community focus and combination hubs. The mobility hub primarily serves the traveller, and the community hub primarily serves its surrounding community in terms of amenities. The most successful hubs for liveability in rural areas are combination hubs as they are in balance in terms of node and place and this makes the hub accessible and therefore also amenities are accessible. The feedback mechanisms between transport, accessibility, land use and amenities as they enhance each other when they are all strong.

3. *What are the needs and desires regarding liveability of communities in North-West Drenthe?*

The needs and desires of communities regarding liveability differ from village to village. Some communities (Roden and Peize) consider fast connections to the city of Groningen as important. This desire comes from needs and desires to access jobs and amenities which serve a larger service area. Mobility hubs can help to achieve this. Other communities (Roderwolde) have seen many amenities disappear from their village and therefore have strong desires to maintain their last remaining amenities and especially the places where they can meet each other. This is important for communities because it is where social interactions among residents happen and thus the centre of life in the community. Community hubs can help to achieve this.

4. *Which stakeholders play a role in the development of hubs at amenities and how does the related planning process unfold?*

In the development process of integrating hubs at amenities, various governmental organisations, property owners, market parties, public transport organisations and citizen organizations are involved. Interactions primarily take place in an informal manner and in bottom-up processes. Nevertheless, stakeholders find it important that the governmental parties take the lead and responsibility. This starts with including the topic hub developments in policy documents, which is primarily expressed in spatial and mobility policies.

5. *What are barriers, success factors and conditions for implementing hubs with amenities in order to contribute to liveability?*

Barriers include transport speed, commercial interest and sectoral budgets and policies. Transport speed can be a barrier because mobility experts want to create a network that is as efficient as possible, for which transport speed is important. This can make it challenging to have a hub on a central place in the community, especially if detours are needed. Commercial interest can also be a challenge as a result of the hub location, this is especially the case for a hub in a location with little or irregular footfall, like a P+R hub. Sectoral budgets and policies are considered a barrier because it can make integration difficult as a result of multiple bureaucratic processes which take up time and energy. Success factors include customization, presence of social capital, an integrated approach and exchanging knowledge. Customization per hub is important to match with the local situation, social capital boosts involvement



from the community, an integrated approach can help to tackle multiple societal challenges at once and exchanging knowledge allows for learning from others. Conditions for implementing hubs with amenities are willingness to put effort into the project and shared goals from the participating parties, as well as matching with community needs and achieving a high level of perceived safety at the hub. Willingness and shared goals help to smoothen the planning process. It is important for hubs to match with the community needs and to achieve a high level of perceived safety because these factors determine whether people will actually make use of the hub.

## 8.2 Main research question

Based on the answers from the sub questions, the main research question can be answered: ***How can amenities be integrated with hubs in order to increase liveability in rural areas?***

On basis of this study, it can be concluded that in order to increase liveability in rural areas, amenities should be accessible, which is in line with the expectations as mentioned in chapter 1.4. This means that places can be reached with little or without having to overcome barriers. This can best be achieved through proximity and land-use transport interaction (LUTI). Integrating amenities at mobility hubs can be used as a strategy for both LUTI and proximity. Amenities which are most important for communities are above all places where the community can come together, as well as amenities for daily groceries, education and health care. Needs and desires differ across communities, and some add more value to maintaining amenities in their own village, while others find fast connections to other places more important. Besides there are differences per village in terms of geographical location in relation to other towns and demographic composition, which impacts needs and desires. Demographic composition is a factor discovered in this research and has not been found in the literature review. Therefore, customization per hub is necessary and this can be done through focussing on the mobility aspect of hubs, the community aspect of hubs or a combination. The most effective however is to have both the mobility and community aspect present at the hub. Having a strong transport, accessibility, land-use and amenity aspect present at the hub means they can enhance each other, as in the LUTI cycle. Regarding strategies to achieve this, informal interactions as well as bottom-up approaches are considered most relevant. However, guidance and clear responsibility from governmental parties is also deemed necessary and this starts with including hub-amenity integration in spatial and mobility policies.

Clustering of both amenities and public transport is an effect of successful integration of hubs with amenities and this comes with several effects. It leads to reduced mobility, amenities reinforcing each other, the generation of new users for both amenities and public transport and increased social interactions.

### 8.3 Strengths and limitations of the study

A strength of this research is that it connects multiple themes regarding liveability and that multiple methods are used to achieve this. There are however also several limitations to this conducted research, and most are a result of its focus or limited time span. The first limitation is that the focus of this research is on passenger hubs and not on parcel or passenger-parcel combination hubs. Regarding the secondary data analysis, the buffer used for the GIS analysis is a straight line from the centre point, meaning the actual walking distance to the outer edge of the buffer is always more and can be a lot more in some instances, which is a reason to look critical at these outcomes. Regarding the interviews, some potential interviewees could not be interviewed due to non-response or busy schedules, which meant that some perspectives are missing, and this could have influenced the outcomes. Especially the perspectives from residents from the villages Peize, Roden and Nieuw-Roden are missing as a result of village interest groups who did not want to take part in this study or gave a non-response. This had an impact on answering sub question 3 in particular. Because of busy schedules and the limited time frame of this research, the focus group discussion could unfortunately not take place. This meant that a moment to collectively reflect on the outcomes of this research was missing. However, the researcher tried to compensate for this by reflecting on the outcomes with her internship supervisor from the Hub Programme Groningen-Drenthe. Overall, a limitation of this research was the positionality of the researcher as this thesis was part of an internship at the Hub Programme Groningen-Drenthe. This meant that the researcher had a better and more in-depth understanding of the perspective of the Hub Programme opposed to perspectives from other parties. Besides, it can have impacted the interview outcomes as the researcher was not independent but tied to an organisation the interviewees have collaborated with.

### 8.4 Suggestions for further research

As this research focussed solely on passenger hubs, a recommendation for future research is to conduct further research on parcel and passenger-parcel combination hubs in rural areas. This can help to get a more complete understanding of hubs in rural areas. This is especially relevant because the flows of goods have increased over the past decades as a result of the increasing popularity of web shops. Therefore, it is important to not just look at the flows of people, but at also at how the flows of goods connect to those people.

As sectoral policies and budgets were found as a barrier in this research, research on integrated approaches covering multiple policy domains is recommended to get a more detailed understanding of

the governmental system and its challenges for hub developments. This can help to overcome barriers and to smoothen and fasten the integration of amenities with hubs.

This research took place in the context of North-West Drenthe and this is an area in proximity to the city of Groningen and without railway transport. It would be interesting to study other contexts such as hubs with railway stations or hubs in more desolated rural areas. This would help to get a better understanding of different types of hubs occurring in rural areas.

## 8.5 Recommendations for planning practice

Based on the answers to sub question 5, recommendations for the planning practice regarding the integration of hubs with amenities can be made. These recommendations are especially targeted at governmental parties working on hub developments.

### 1. *Integrated approach*

On hubs many different themes from various policy domains come together to contribute to overall liveability. The sectoral thinking of governmental institutions makes it difficult to implement hub developments as the topic overarches different departments. In order to make it easier to establish integrated projects like hub developments, an integrated approach is necessary and especially from governmental institutions on all levels of government.

### 2. *Customization based on needs and desires*

As needs and desires differ across villages and communities, it is important to customize every hub in order to match with the needs and desires of its potential users. Every situation is different, and possibilities depend on the transport system, social capital and commercial interest.

### 3. *Community hubs with multi-functional accommodations*

Places to meet are the most important amenities of all for village communities. Amenities can be difficult to sustain in rural areas, but multi-function accommodations can provide a solution. Housing multiple activities in one building can reduce costs as well as come with positive effects due to clustering: increased social interactions, amenities reinforcing each other and reduced mobility. Therefore, it is recommended in general to select locations of community hubs based on the location of amenities which function as meeting places.

## 8.6 Reflection

Like every other research, this thesis has its strengths and weaknesses. A strength of this research is that it connects multiple themes and challenges in rural areas by making use of different methods. A weakness is that for certain case study villages there is only little information regarding needs and desires of local communities.

Looking back on the process, I found it interesting to connect current challenges and themes occurring in rural areas. Due to the diversity in themes, I found it challenging to decide where to draw the line on what to include in my theoretical framework. The next challenge was to set up the conceptual model and this required some fine-tuning over time as it took a while before I was satisfied. Regarding my methodology, I had to adjust my plans over time as not everything went the way I wanted. Reaching out to professionals to recruit them as interviewees went easier than I expected, and I have improved my interview skills over time. Reaching out to residents and village interest groups was however more difficult. I had difficulties with finding contact information and when I did, I often got a non-response or got told they were too busy to participate. The original plan was to set up a focus group consisting of former interviewees, but unfortunately this was impossible to realise due to busy and colliding schedules. Instead of the focus group I organised a reflective interview and even though this was not what I had planned for, it has helped me to confirm my findings.

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## Appendices

### Appendix 1

Documents used for the document analysis

Name of the document	Organisation	Year of publication	Document type
Omgevingsvisie Noordenveld 2030	Gemeente Noordenveld	2017	Spatial vision
Gemeentelijk verkeers- en vervoersplan 2015-2025	Gemeente Noordenveld	2015	Policy document
OV-Ontwikkelagenda 2040	OV Bureau Groningen-Drenthe	2022	Policy document
Omgevingsvisie Drenthe 2022	Provincie Drenthe	2022	Spatial vision
Mobiliteitsprogramma mobiliteit op maat 2022-2026	Provincie Drenthe	2022	Policy document
Visie op Krimp en Leefbaarheid	Provincie Drenthe	2016	Vision document
Helemaal Nederland: te klein voor grote verschillen	K6	2020	Overview report of challenges and strategic plans
Hoofdpijnennotitie Mobiliteitsvisie 2050	Ministerie van Infrastructuur en Waterstaat	2023	Overarching policy document
De Ontwikkeling van de mobiliteit en de bereikbaarheid in stedelijk en ruraal Nederland	Ministerie van Infrastructuur en Waterstaat	2023	Research report
Inventarisatie bereikbaarheidsfilosofie in andere sectoren dan mobiliteit	Ministerie van Infrastructuur en Waterstaat	2023	Overview report
Nationale Omgevingsvisie	Ministerie van Binnenlandse Zaken en Koningsrelaties	2020	Spatial vision
Vitaal Platteland!	CROW	2018	Research report
Toegang voor iedereen?	Planbureau voor de Leefomgeving	2022	Research report
Monitor Nationale Omgevingsvisie 2022	Planbureau voor de Leefomgeving	2022	Mid-term evaluation report

## Appendix 2

### List of interviewees

<b>Interviewee</b>	<b>Organisation</b>	<b>Function</b>
#1	Hub Programma Groningen-Drenthe	Programme manager hub programme
#2	Hub Programma Groningen-Drenthe	Consultant hub programme
#3	Gemeente Noordenveld	Project manager spatial developments
#4	Biblionet Drenthe	Library manager
#5	Publiek Vervoer Groningen-Drenthe	Director
#6a	OV Bureau Groningen-Drenthe	Project and programme manager
#6b	OV Bureau Groningen-Drenthe	Policy advisor public transport developments
#7	Gemeente Noordenveld	Policy advisor inclusivity
#8	Welzijn Noordenveld	Director
#9	Dorpsbelangen Roderwolde	Board member
#10	Biblionet Drenthe	Project manager innovation
#11	OV Bureau Groningen-Drenthe	Consultant public transport

## Appendix 3

### Interview guide

#### Opening

Thank you for your willingness to participate and making time for this interview. First of all I want to ask if you have any objections against me recording this interview?

This interview is part of my master thesis for the Master Society, Sustainability and Planning at the University of Groningen. My research is about how hubs can be linked to amenities to increase liveability in rural areas and I do a case study on Roden, Peize, Roderwolde and Nieuw-Roden.

Do you have any questions after this introduction?

- Can you introduce yourself and the organisation you are working for?
- Are you familiar with the topic liveability? and accessible amenities? And how about hubs?
- Which amenities are according to you necessary for liveability?
  - Why?
  - How does this differ per person?
  - What are the differences between urban and rural areas?
- What do you see as the relationship between amenities and type of villages?
  - Why do you think there are differences between villages?
  - How does this become apparent in the villages Roden, Peize, Roderwolde and Nieuw-Roden?
- What are the needs and desires regarding liveability among communities in Peize, Roden, Roderwolde and Nieuw-Roden?
  - How do you see the needs and desires of residents on accessible amenities for these communities?
  - What do you see as the vulnerable groups; do their needs differ?
  - What do you do in your work to fulfill those needs and desires of communities?
  - How does this relate to the accessibility of hubs?
- In what manner are you involved in the developments regarding hubs?
  - What is the link with amenities in these developments?
  - Who have you worked together with on hubs?
  - How did this planning process unfold?
  - How would you describe the contact with those stakeholders?
- What do you see as the conditions for implementing hubs with amenities in order to contribute to liveability?
  - What would you do different if you would do it all over again?
  - What do you think are the barriers?
  - What do you think are the success factors?
- How do you think amenities can be integrated with hubs in order to increase liveability in rural areas?
  - What do you think this could bring the community in terms of liveability?

## Closing

- Is there anything I did not ask, but you expected me to ask?
- Do you have anything to add or any remaining questions?
- Are you interested in receiving the final version of my thesis?
- Do you know other experts that can possibly provide valuable input for my research?

I want to thank you for this interview. Everything you have said in this interview will be dealt with with care, your name will not be used in my thesis and the recording will be transcribed.

## Appendix 4

Code book for the policy analysis and interviews

\*= inductive code

Code	Code group	Description	Count
Accessibility	Liveability factors	The ease of reaching a destination	72
Amenities	Liveability factors	Places where people practice activities for their day-to-day life	36
Bike	Transport	Active mode of transport	24
Bottom-up	Hub development processes	Participative approach including local initiatives in hub developments	1
Car	Transport	A mode of transport	18
Clustering*	Amenity processes	Amenities moving closer to each other	19
Commercial interest*	Hub development barriers	Attractiveness for market parties	5
Customization*	Hub development success factors	Differentiation per individual hub	16
Dependent on others*	Transport	When people cannot independently use mobility modes to reach their destination	2
Depends on demographics *	Amenities for liveability	Demographic characteristics of a place impacting the needs and desires in terms of amenities	12
Depends on location*	Amenities for liveability	Geographical location in relation to other places impacting the needs and desires in terms of amenities	2
Disappearance*	Amenity processes	Closure of amenities	7
'Doelgroepenvervoer'*	Transport	Mode of transport for (primarily) people with a WMO indication	2
Education	Amenities for liveability	An activity practiced in schools	17
Exchanging knowledge*	Hub development success factors	Sharing ideas with similar parties and project groups in other places	4
Food	Amenities for liveability	A daily need, primarily fulfilled by supermarkets and shops	7
Government taking responsibility*	Hub development requirements	Governmental parties addressing liveability needs that should be fulfilled	7
Health care	Amenities for liveability	An activity that is mainly practiced by GP's, dentists and at hospitals	11
High frequency	Accessibility factors	A public transport schedule in which busses drive regularly	3
Inclusive*	Hub development success factors	Taking account of different needs and desires people have to make use of a space or place	8

Information/support*	Amenities for liveability	A place where people can get the assistance they need and ask their questions in order to participate in society	3
Innovation*	Hub development success factors	Implementing new ideas	7
Integration*	Hub development requirements	Combining different policy domains in order to create value for society	19
Limiting barriers*	Accessibility factors	Reducing factors which hold people back from going to a certain place	4
Market parties	Stakeholders	A non-governmental organization that needs to be profitable in order to sustain itself	2
Multi-functional accommodation*	Amenities for liveability	A place that fulfils multiple functions and can house multiple amenities	15
Municipality	Stakeholders	Area of authority on the smallest scale in the Netherlands	3
Needs and desires	Hub development requirements	Matching with the necessities and wishes of the community	16
Neighbourhood hub	Land-use	A hub that serves the neighbourhood	3
New users*	Hub amenity integration outcomes	People that did not make use of the service before the integration of hubs with amenities	2
Nieuw-Roden	Villages	A village in the municipality of Noordenveld, south-west of Roden	6
Other priorities*	Hub development barriers	Governmental parties put affairs other than hubs higher on their agendas	3
P+R hub	Land-use	Hub location with plenty of parking space along a main road	1
Participating in society*	Hub amenity integration outcomes	Being able to take part in daily life activities	23
Participation	Hub development requirements	Involving residents and future users in the hub development process	10
Peize	Villages	Village in the municipality of Noordenveld	15
Property owners	Stakeholders	Parties who own land or buildings at hub locations	4
Proximity	Accessibility factors	Close by someone's place of residence	17
Public transport	Transport	Collective form of transportation	37
'Publiek vervoer'	Stakeholders	Agency that carries out target group transport.	3
Reducing mobility	Hub amenity integration outcomes	Fewer moves or shorter distances covered	7

Reinforce each other*	Hub amenity integration outcomes	Services strengthening each other	2
Roden	Villages	The main village in the municipality of Noordenveld	18
Roderwolde	Villages	Small village in the municipality of Noordenveld	11
Rural hub	Land-use	A hub on a central location in a rural area which provides connections to larger towns	1
Safety*	Hub development requirements	(Subjective) safety people experience at the hub location	16
Sectoral system*	Hub development barriers	Physical or informational barriers between different government departments	18
Shared goals*	Hub development requirements	Parties working on hub developments sharing the same objectives (for society).	6
Shops	Amenities for liveability	A place where people can buy supplies for their daily lives	5
Small village	Villages		5
Social	Amenities for liveability	Places where people can come together to meet each other	15
Social capital*	Hub development success factors	Social relationships as well as capacities that come from the communities surrounding hub developments	7
Spatial quality*	Land-use	Experiential value of the hub location	12
Top-down	Hub development processes	Government approach following hierarchical structures	2
Transfer	Transport	Switching from one mobility mode to another or the same type	12
Transport companies	Stakeholders	Market parties who supply (public) transport	1
Transport speed	Hub development barriers	A priority of transport companies and reducing distance, costs and travel time	12
Users*	Stakeholders	People who are, will or are targeted to make use of hubs	3
Village interest group	Stakeholders	Citizen collective representing the desires of village residents	1
Willingness	Hub development requirements	Wanting to put effort and energy into hub development project	26



