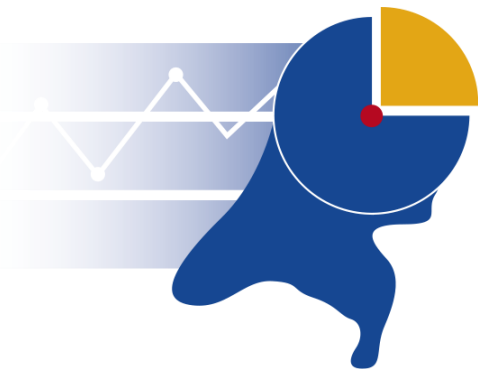


# The influence of services on the liveability in the province of Groningen

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university of  
groningen



**Sociaal  
Planbureau  
Groningen**

Master's thesis

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# 1. Abstract

The province of Groningen has to deal with population decline: ten of the twenty municipalities in this province are defined as 'topkrimpregio's'. For these regions a population decline of 16% in the year 2040 is expected, whereas elsewhere in The Netherlands an average population growth of 11% is expected in the same year. It is thought that services in the region disappear due to population growth, which in turn might have a negative effect on the development of the liveability in the region. To analyse these relations, a questionnaire from the Sociaal Planbureau Groningen was sent to the Groninger Panel. Chi-square tests and crosstabs were used to investigate the bivariate relation and a multinomial regression was used to investigate the relation in conjunction with other variables. Contrary to expectations, the amount of available services does not have any effect on the liveability. However, a recent disappearance of at least one service does hurt the liveability, especially for the lower educated people. On the long term, areas with population decline have more disappearances of services than areas that do not have to deal with this phenomenon. Furthermore, population decline seems to negatively influence the other determinants of liveability, instead of influencing the liveability directly. This implies that when population decline is unstoppable, the province of Groningen should focus on improvement of the direct influencers of the liveability to keep the region attractive to live in.

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## 3. Introduction

### 3.1 Background

A large proportion of the province of Groningen has to deal with the phenomenon of population decline. Ten of the twenty municipalities of the province are defined as regions with population decline, the so called ‘topkrimpregio’s’ by the ministry of Home Affairs and kingdom relations (2018). The regions that are defined as such are expected to have a population decline of 16% by the year 2040, compared to an average growth of 11% for the rest of the Netherlands. Population decline is widely known to have consequences for the regions dealing with it: mainly the young and highly educated people will leave (Provincie Groningen, 2015a), the regions subsequently deal with an ageing population and vacant, unsold houses. Furthermore, services such as shops, schools and sport clubs have increasing difficulties to maintain and more and more services disappear from villages. As a result of these problems the province of Groningen (2015) mentions on its website that the liveability of the municipalities dealing with these problems is in danger. Liveability is a very subjective term and is meant to capture the assessment of the living area by an individual (VROM, 2004), which can differ per individual based on his/her needs.

One of the factors that influence an individual’s perception of liveability is the accessibility to services (Namazi-rad et al., 2016; Gieling & Haartsen, 2016). However, as mentioned before, rural regions of the province of Groningen are dealing with the disappearance of services for a long time. In 1959 this trend was already noted and in 2009 the trend was still there (Gardenier et al., 2011). Therefore it is not surprising that the province of Groningen scores low on the level of services as compared to the rest of the country (Leidelmeijer et al., 2015). It is suggested by the province that population decline influences the liveability via the disappearance of services and other factors such as vacant houses in the neighbourhood. However, it is also argued that population decline is just one of the causes of the disappearance of services and that the role of it is very small (van Dam et al., 2006; Elshof et al., 2014). These different insights implicate that these relations are still unclear and investigation of these is therefore highly important.

The province has responded to declining liveability by creating a subsidy fund for the municipalities that are dealing with population decline (Provincie Groningen, n.d.). The province has accepted the fact that demographic decline is irreversible, therefore these subsidies are not meant to stop or reverse this decline, but instead to address the problems that come with it. The subsidies are meant for innovative projects from municipalities, companies or inhabitants that have ideas on how to keep up the liveability of an area, for example to minimize the disappearance of services (Provincie Groningen, 2013). This indicates that the province sees the loss of services as a threat of the liveability and tries to stop this development. Here, we analyse this linkage: does a loss of the amount of services indeed negatively influence the liveability, and does a low amount of available services indeed cause a decline in liveability? But since liveability is dependent on individuals’ needs/preferences

(VROM, 2004), it must also be investigated for what kind of people the disappearance of a service is worse compared to the other people.

### 3.2 Objective

The objective of this study is to get insight into the influence of services on the development of the liveability in the province of Groningen. Population decline is often mentioned to influence the liveability of a neighbourhood. Therefore, in part I of this thesis it will be investigated whether, and to what extent, population decline influences the availability/disappearance of services and the other determinants of liveability. In Part II the bivariate relation between the determinants of liveability and the development of the liveability will be discussed. Subsequently the role of services on the development of the liveability when other variables are also taken into account will be discussed. The fourth and final part discusses what kind of people are most affected by a recent disappearance of a service.

### 3.3 Research questions

#### **Main Research question:**

What is the influence of the availability/disappearance of services on the development of the liveability and what is the role of population decline in this?

#### **Sub research questions:**

Question 1a: Is there an association between population decline and the disappearance/availability of services?

Question 1b: Is there an association between population decline and the other determinants of liveability?

Question 2a: Is there an association between the development of the liveability and the availability/disappearance of services.

Question 2b: Is there an association between the development of the liveability and the other determinants of liveability (neighbourhood, job, house, social participation)

Question 3: How big is the role of the availability/disappearance services on the development of the liveability compared to the other determinants of liveability?

Question 4: Who is most affected by a recent disappearance of a service?

## 4. Theoretical framework

### 4.1. The liveability and its determinants

Liveability is a relatively new and unexplored term in the academic world but is often used by policymakers to estimate how individuals value the quality of their living environment (Namazi-rad et al., 2016). Liveability was defined by Leidelmeijer et al. (2008) as: “In a geographical context, liveability usually refers to the degree in which the physical and the social living environment fit individual requirements and desires” (Leidelmeijer et al., 2008). It should be noted that liveability is subjective and differs per person based on his/her needs. Therefore, personal characteristics have to be taken into account (Gardenier et al. 2011) (VROM, 2004). Several variables that influence liveability have been described (Gieling & Haartsen, 2016; Namazi-Rad et al., 2016; Sociaal Planbureau Groningen, 2016b). Gieling & Haartsen (2016) described seven of them: transport, services, job, house, neighbourhood, leisure and social participation (involvement in village life). Here, the main focus will be on the role of the determinant services on the development of the liveability, and in particular the effect of the amount of available services and the disappearances of services. However, the liveability is influenced by factors other than services as well, so these effects must be taken into account too. In this way we get to know the effect of the determinant ‘services’ on the development of the liveability in conjunction with the other determinants. For these analyses, the seven determinants described by Gieling & Haartsen (2016) were used.

### 4.2. Regional population decline

At sub-national level, peripheral regions of a country often experience population stagnation or decline due to internal migration to economic centres of the country (Galjaard et al., 2012). Regional population decline is present mostly in rural areas, and in the case of the Netherlands mostly in rural areas that are the furthest away from the economic centre (the west) of the country (Elshof, 2017; Haartsen & Venhorst, 2010). For several rural regions of the province of Groningen this is also the case. The province itself has mentioned on its website (n.d) that mainly the young and highly educated people leave the rural regions of the province and that these regions do not attract new people, resulting in a brain drain and a population decline.

Young people leave the region in search for jobs and education, which are often not present in the region itself. The province also states that many rural municipalities are doing their best to keep these young people in the region but that the intentions to leave the region for the city are increasing instead of decreasing. The attractiveness of the city of Groningen is too big to keep the young from migrating towards the city. Thus, the young people will leave the region while the old ones will stay, which leads to a relatively aged population in the region. This trend has been observed in the rural parts of the province of Groningen, where the population of the region is ageing and declining (van Dam et al., 2009). An aged population also implies that the fertility of these regions also declines, meaning that fewer children are born, increasing the average population age even further.

The intention to leave a region is higher in regions with population decline than regions without population decline (Weijer, 2011). Population decline changes the area in which it occurs, these changes are perceived by the people still living in the region, which might result in a decline of liveability (Elshof et al., 2014). For example because of the disappearance of services, but this can also be the result of other changes like vacant buildings. The experience of liveability decline could cause people to stop moving to these places or start people to move away from the place. Therefore population decline seems to be a self-reinforcing process. Population decline could influence the liveability of an area and most people see this as a negative development (Sociaal Planbureau Groningen, 2016a).

### 4.3. Implications of population decline for the amount of services

Policy-makers are worrying about population decline because of the fact that it has several implications for a region dealing with it. Population decline leads to negative effects on the level of services, for instance their closure or disappearance (ACSSDPA, 2009 in Galjaard et al. 2012; Haartsen & Venhorst, 2010). Combined with other negative trends caused by population decline, this can lead to a decrease of the liveability of an area. A certain population number is needed for service provision, because the lower the population number, the higher the costs per capita to maintain a certain service (Beer & Keane, 2000; Mckenzie, 1994). This can lead up to the point at which a service withdrawal occurs because the costs per capita exceeds the returns. This could be a problem for the area if no alternative services are accessible (Gardenier et al., 2011). In 2009, Gardenier et al. (2011) investigated the liveability in the north of the province of Groningen. This research was carried out 50 years after a similar research was carried out. The research done in 1959 came up with the term 'bedreigd bestaan' (endangered existence) for the region because the results of the research were mostly negative. In 1959 it was concluded that the North of the province of Groningen faces population decline due to the migration of mainly the young and a decline of the job market, which led to disappearance of services in the region. The survival of small villages was therefore in danger. However, these results were from 1959 and therefore the aim of the research that was carried out in 2009 was to investigate whether these problems still existed for the region and what the influence of the disappearance of services was on the liveability of the region. Gardenier et al. (2011) concluded that the north of the province of Groningen is still facing population decline due to the emigration of people aged 18-25. The most important reasons to leave the region are job and education. The region is also still facing the disappearance of services. The Sociaal Cultureel Planbureau (2017) has also found that regions with population decline face more decline of the amount of services than other regions.

However, the role of population decline in the disappearance of services is not completely clear, since it is also stated that this effect is pretty small compared to other factors (van Dam et al., 2006; van Dam et al., 2009; Elshof et al., 2014). Van Dam et al. (2006) reported that the disappearance of services is not only due to demographic decline. Services also disappear due to changed consumer demands, up-scaling of services (leading to reduced presence of services in general) and increased mobility of people. When people are more mobile, services further away are also accessible, leading to a lower demand for services in the region. Thus, van Dam



et al. (2006) concluded that the effect of population decline on disappearance of services is very small compared to other factors. This conclusion is further supported by van Dam et al. (2009) and Elshof et al. (2014). However, van Dam et al. (2006) do notice that the availability of services is lower in areas with population decline, and Elshof et al. (2014) state that population decline can accelerate the disappearance of services. Thus, our first hypothesis is that services are less available in areas with population decline compared with areas that do not have to deal with this (hypothesis 1a). Furthermore, we hypothesize that population decline leads to disappearance of services, although this effect might be small compared to other factors (hypothesis 1b).

#### 4.4. Implications of population decline for other determinants

Population decline also has an impact on the neighbourhood. Regions with population decline have higher vacancy rates than average (Planbureau voor de Leefomgeving, 2008). Elshof et al. (2014) and Planbureau voor de Leefomgeving (2008) mention that when services close buildings are left abandoned. The abandoned buildings could become eye-sores for people, which could lead to a lower assessment of the neighbourhood. Thus, people in areas with population decline are expected to be less satisfied with their neighbourhood than people in non-shrinkage areas (hypothesis 2a).

The same thing holds for houses, which get left abandoned when people leave the area due to population decline. The maintenance of these abandoned buildings is often not maintained and consequently these vacant buildings are more difficult to sell, worsening the consequences for the liveability due to the decay of the buildings (Planbureau voor de leefomgeving, 2008). Population decline is also believed to be a cause of decreasing housing values (Glaeser and Gyourko, 2005) which causes people to stop investing in their homes, leading to declining quality of houses which could lower people's satisfaction with their homes. Therefore we hypothesize that in areas with population decline people are less satisfied with their house than people not living in those areas (hypothesis 2b).

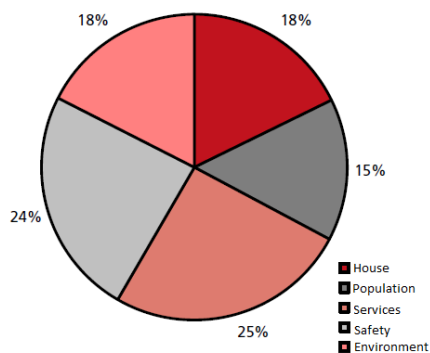
In the Netherlands, regions with population decline have less employment opportunities per person than regions without (CBS, 2015). An example: In 2004 the east of the province of Groningen, which is an area with population decline, had 39 jobs per 100 people aged 15-74, the average of the Netherlands is 61 per 100. So people in regions with population decline are expected to be less satisfied with the local job market compared to people living in regions without population decline (hypothesis 2c).

Social interaction is also a determinant that could be affected by population decline. Population decline could accelerate the process of the loss of services and meeting places (van Dam et al. 2006). The disappearing of services hurts social capital in two ways. Services which have a meeting place as its primary function could disappear more rapidly in regions with population decline because of this decline (Elshof & Bailey, 2015). Besides, services which do not have a meeting place as its primary function could still hurt social interaction in a neighbourhood. For example, a service like a primary school could also serve as a meeting place for parents. So while the primary function of this service is not a meeting place, a meeting place is still lost when the school has to be closed. This could hurt the social capital

of the neighbourhood, especially in the long term. Therefore we hypothesize that social participation of people is lower in areas with population decline.

#### 4.5. Linking services with liveability

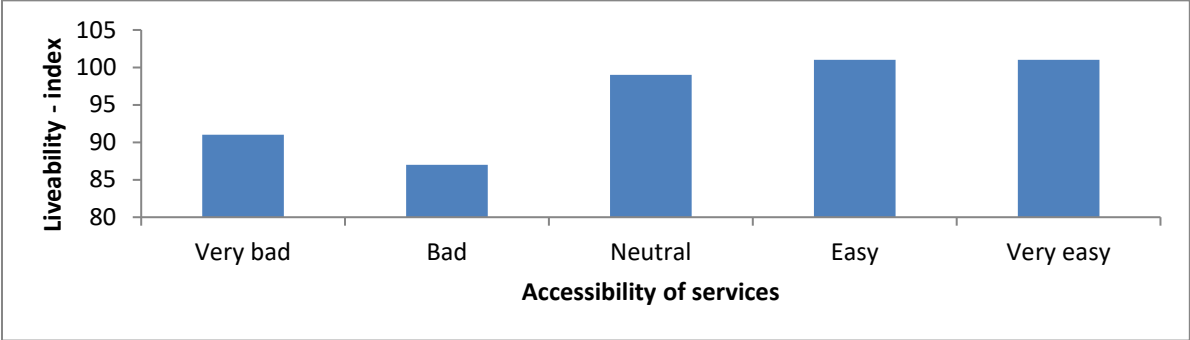
Services influence liveability (Namazi-rad et al., 2016; Leidelmeijer et al., 2008; Gieling & Haartsen, 2016; de Haan et al., 2013). In the Netherlands, the ‘leefbarometer’ is used to measure liveability (Leidelmeijer et al., 2008; Leidelmeijer et al., 2015), but in this study the format used by Gieling & Haartsen (2016) will be used. Although this format differs slightly from the ‘leefbarometer’, both studies mostly include the same variables like house, services, neighbourhood/environment, safety, and social participation. The way in which the variables are categorized and used as main determinants are different. For example: neighbourhood safety is used as a main determinant in the ‘leefbarometer’ (Leidelmeijer et al., 2008) whereas it is included in Gieling and Haartsen (2016) under the determinant neighbourhood. Furthermore, the determinants in Leidelmeijer et al. (2008) consist of much more variables whereas the determinants in Gieling and Haartsen (2016) consist of fewer variables and are therefore less complicated. Because the survey used in this study limits the amount of data, the format from Leidelmeijer et al. (2008) cannot be used. Almost all variables that are used by Gieling & Haartsen (2016) can be obtained via our data source as well.



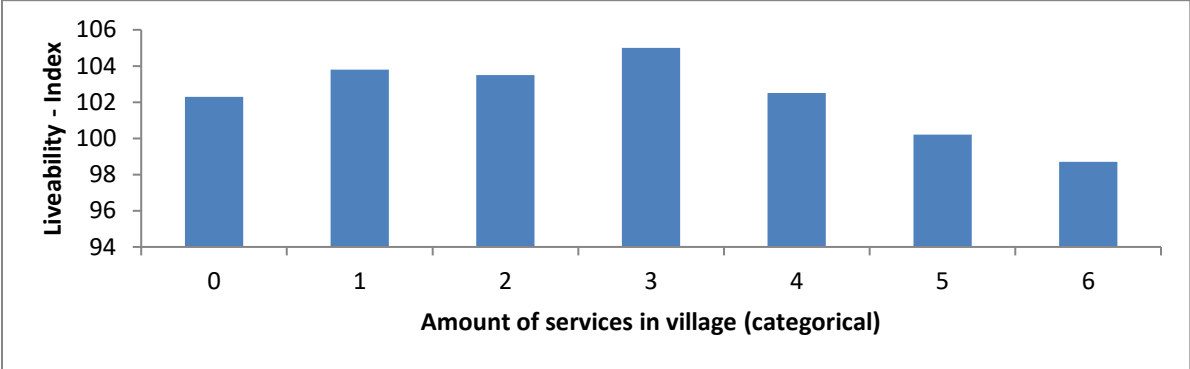
**Figure 4.1: The influence of the different determinants of liveability** (Leidelmeijer et al., 2008).

Leidelmeijer et al. (2008) concludes that the determinant services influences liveability the most, which shows its importance (Figure 4.1). De Haan et al. (2013) describe the importance of services for a region in order to be liveable. They state that the proximity, availability and mainly the accessibility of services to residents have an influence on the citizens’ life and thereby on the perceived liveability. Langford and Higgs (2010) agree with this, stating that people’s satisfaction with services has an impact on the perceived liveability and that mainly the accessibility of services is important. So, it is not necessary for a service to be present in a village itself, as long as it is accessible for the people living there. Gardenier et al. (2011) drew the same conclusion, based on a research that was carried out in the North of the province of Groningen and investigated to what extent certain variables influence the liveability. Surveys were sent to people in the province and to gain some additional qualitative insights meetings with villagers and experts were arranged. One of their conclusions was that the availability of a service does not seem to be the most important thing for an area to be liveable. This is because services are not necessary in a village itself, as long as they are

accessible enough elsewhere in the area., which makes mobility a very important factor (Figures 4.2 and 4.3).



**Figure 4.3: An area is liveable as long as services are perceived as accessible.** Liveability-index compared to the perceived accessibility of services (Gardenier et al., 2011).



**Figure 4.4: The amount of services in the region does not highly influence the liveability.** The liveability-index is related to the amount of services present in a village (Gardenier et al., 2011).

The accessibility of services seems to be much more important for the liveability than the amount of services available (Figures 4.2 & 4.3). This conclusion was different from the research done in 1959, where the conclusion was that the lack of services in a village itself will have a negative effect on the liveability. However, times have changed since 1959. People are more mobile, which made services in other villages become accessible. More than four services available in the area seem to hurt the liveability. This can be explained by the fact that the amount of services is often higher in large villages and cities than in smaller rural villages and areas. In general the liveability is lower in areas with higher population more on this in 4.8. So, it is no longer required to have a service in the village itself, but the accessibility of a service nearby is a necessity in order for an area to be liveable (Gardenier et al. (2011). Because accessibility of services is believed to be more important than availability we hypothesize that the amount of available services is not important for the liveability (hypothesis 3a).

The disappearance of a service however, does seem to have an influence on the liveability. The closure of primary schools, public transportation links, community centers, and other public sector services have been related to a loss of quality of neighbourhoods (Kearns and Mason, 2007). Weijer (2011) showed that people from villages with a relatively high rate of closure of services have higher intentions of leaving the village. The perception of losing a

service or having to miss a service one is used to has more influence on the liveability than not having that service available at all (Weijer, 2011). The papers of Egelund & Laustsen (2006) and Mckenzie (1994) agree with this and state that a closure of a service is often perceived by people as the ‘death of a village’ and thus, has big consequences on the liveability. Therefore the expectation is that a disappearance of a service negatively impacts the liveability (hypothesis 3b).

Christiaanse & Haartsen (2017) did a case study on a disappearance of a grocery store in a village and they showed that a loss of a service leads to negative reactions from the population even if an alternative is accessible. The negative reactions are because the service has a symbolic meaning for the population. This indicates a difference between functional and symbolic function. Functional meaning is when a user depends on the service because of its primary function, which in this case is grocery shopping. Only 30% of the respondents indicated that they feel dependent on the grocery store. But almost all respondents rated closure as being negative for the area. It turned out that the grocery store had a symbolic meaning to the people of the village. This is explained by Christiaanse & Haartsen (2017, pp. 328) as follows: “...symbolic value can be accumulated based on social, economic or cultural significance of a facility for a community. These ‘symbolic values’ of a setting based on personal and shared beliefs are often attributed to place identity“. The grocery store could for example be a place to meet, or just be important for the image/status of the village. So having to miss a service could not only be because of its functional meaning but also because of its symbolic meaning.

Elshof & Bailey (2015) agree that disappearance of services leads to concerns among the population. Moreover, a loss of a service may lead to a communal response: people do not accept the disappearance of a service. In that case people in the village could start to come together to try and keep the service in the area, or they could set up an initiative to get an alternative to the service in the area. About this reaction of people Elshof & Bailey (2015) write (pp. 90): “Communal responses were often beneficial to individual and communal social capital in the short term because they brought villagers together”. So, in the short term the expectation is that this could lead to an improved liveability (hypothesis 3c).

#### 4.6. Types of services

Throughout the literature about liveability and services the same sort of services are constantly mentioned as being important for the liveability (van Dam et al., 2006; Gardenier et al., 2011; Gieling & Haartsen, 2016; Leidelmeijer et al., 2008). Those services are services that provide daily groceries, health care, education, public transport and a place to meet. Most studies measured these in the same way. In the research of Gardenier et al. (2011) on the liveability of the North of the province of Groningen the following services were used to measure their influence on liveability: School (education), grocery store (daily groceries), doctor (health care), community centre (meeting place) and the presence of public transport. In some other studies, services providing leisure like sport clubs, cinemas and swimming pools are also included (Leidelmeijer et al., 2008).

Leidelmeijer et al. (2008) did a national research on the liveability in the Netherlands. The proximity of services that provide a place to meet (community center) have a positive effect on liveability. The services that are most important are daily services, Leidelmeijer et al. (2008) used grocery stores and ATM for this, which both contribute positively to the liveability of an area. An ATM was also the service that was mentioned most when asked which service was missing in the neighbourhood. This could increasingly become a problem, because the amount of ATM's is decreasing in recent years (NOS, 2017) and an expected decline of a further 2000 ATM's is expected during this year. The town council fraction of the city of Groningen 'Stad en Ommeland' has already expressed its concerns about the declining number of ATM's in villages in the province of Groningen (RTV Noord, 2018). ATM is not used in the other studies on liveability, but the conclusion from Leidelmeijer et al. (2008) seems to indicate that an ATM is indeed important for the liveability. Therefore ATM will also be included in this study.

In the article of Haartsen & van Wissen (2012, pp. 494) the importance of a service such as a school is mentioned: "... primary schools are a central service in the everyday lives of parents and young children". Furthermore they analysed the consequences of population decline for primary schools. They mention that declining numbers of students lead to financial and staffing problems for schools, which might in some cases lead to closure of the school. This can have huge implications for the region because it can mean a loss of a new generation in a village. This indicates that schools are very important for the liveability of younger people and people with children. The declining 'krimpregio's' of the Netherlands, which ten of the twenty municipalities from this study are part of, especially are facing the problem of reducing numbers of primary school aged children (Haartsen & van Wissen, 2012).

Services providing health care are also very important for the liveability in an area and there seems to be a positive relation between liveability and health care. "People who live in the world's most liveable cities often have access to good health-care services, including doctors, public and private hospitals, specialist clinics and over-the-counter drugs" (Easton et al., 2016, pp. 156).

#### 4.7. Linking the other determinants with liveability

Gielsing and Haartsen (2016) used seven determinants to assess the liveability of an area, of which neighbourhood is one. In a regression model they found that the satisfaction with the neighbourhood is the factor that impacted the liveability of a village the most. A high neighbourhood satisfaction significantly improved the liveability. The neighbourhood determinant was included as the mean value of the satisfaction of the following items: Neighbourhood safety, attractiveness, cleanliness, green space, maintenance & friendliness. The same composition of the determinant will be used in this study. Analogous to Gielsing & Haartsen (2016), we expect the relation between neighbourhood assessment and the liveability to be positive (hypothesis 4a). Furthermore, neighbourhood was the biggest predictor of liveability in Gielsing and Haartsen (2016); therefore the expectation is that it will be the biggest predictor in this study as well.

According to the Sociaal Planbureau Groningen (2016d), job is an important aspect of liveability. Many people in the province of Groningen are worried about the amount of jobs in the area, especially people in shrinkage regions. The supply of jobs and the accessibility of jobs in the living area are of great importance for the liveability of a neighbourhood (Sociaal Planbureau Groningen, 2016d). Therefore the expectation is a positive relation between job satisfaction and the development of the liveability (hypothesis 4b).

A positive satisfaction of one's house also enhances the liveability according to Haarhoff & Beattie (2017). Housing satisfaction can be changed by people themselves because people can change their homes to their own likings. The relation between house satisfaction and the development of liveability is expected to be positive (hypothesis 4c).

The main topic of the study of Gieling & Haartsen (2016) is the influence of the involvement in village life on the liveability. The relation that is investigated in the article is the relationship between perceived liveability and participation in village life. Their main result was that that being more active in village life results in a more negative perception of the liveability, because when people invest more time in social life, they experience more feelings of disappointment when they realize that other residents are not as active in village social life as they are. The causality was not tested the other way around. Similar to Gieling & Haartsen (2016), a negative relation with the development of the liveability is expected (hypothesis 4d).

#### 4.8. Personal and area characteristics that determine liveability assessment

In 2004 the ministry of Housing, Spatial Planning and the Environment (VROM) made a report on the liveability of neighbourhoods in the Netherlands. In this report, the influence of different sorts of personal characteristics was taken into account as well, because these can alter one's assessment of the liveability. Many personal characteristics determine how one sees his/her neighbourhood. The personal characteristics that had the largest effect on the liveability were whether a person owns or hires a house, the type of neighbourhood (rural/urban) and the age of the person. Another characteristic that influences the liveability is gender. According to a report of the social and culture institute of Zeeland (2011) women are more positive about the liveability than men are, but no explanation is given for this. Secondly, the age of someone might also influence one's assessment of the liveability. Research of the VROM (2004) showed that young people have higher chances of negatively assessing the liveability than older people do (figure 2.5).

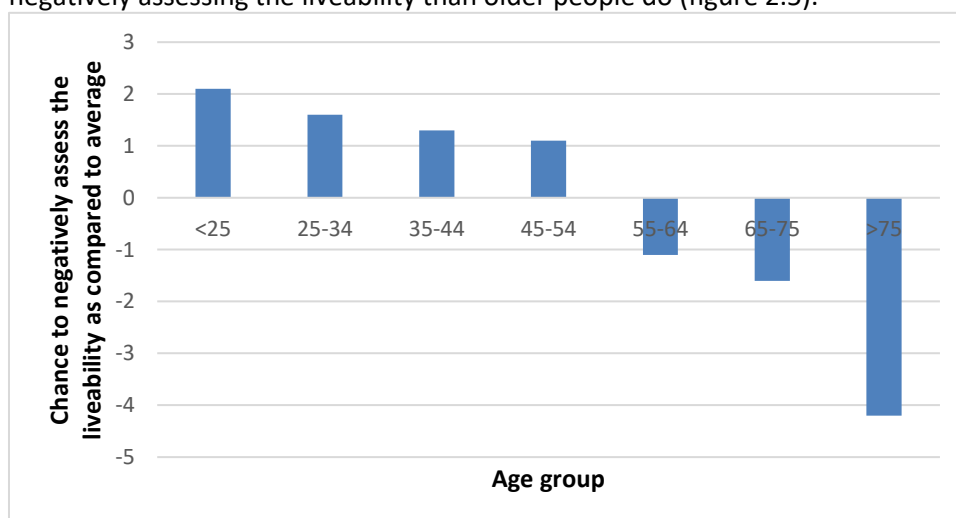


Figure 4.5: Influence of age on assessment of liveability

The numbers on the x-axis in figure 4.5 represent the chance to negatively assess the liveability as compared to average. In the figure we can see that younger people have higher chances of rating the liveability as negative (up to 2.1 times higher) while older people have lower chances (up to 4.2 times lower) and thus are often more positive about the liveability. There seems to be a linear positive relation between age and liveability. The older one gets the more positive one is about the liveability. A possible reason of this is that older people have higher incomes and more often live in rural regions, which both have a positive influence on the liveability.

Another personal characteristic that is important is whether a person owns or hires a house. Home-owners are much more positive about the liveability (VROM, 2004). The chance to be negative about the liveability is 2.8 times higher when renting a house as compared to owning a house. This seems logical because the percentage of rental houses is higher in cities (Central Statistics Office, 2016), where the liveability is lower (Gardenier et al., 2011). Besides, people who rent a house often have a lower income. Having a lower income increases the chance of being negative about the liveability (Gardenier et al, 2011).

People who are single or live alone often are more lonely (Sikma, 2011; Elbers, 2013). Elbers (2013) explains that this mostly is due to the fact that the social network of people who have a relationship and live together is bigger than for those who do not live together. Furthermore, people who live together on average have a higher income. Therefore it seems logical that people who live together rate the liveability higher on average.

As mentioned before, a higher income often means a higher assessment of the liveability. Gardenier et al. (2011) found that there is a positive relation between social economic status (SES, both education and income) and liveability. Regarding education The Economist (2016) found that the level of education is linked with liveability. Most highly ranked liveable cities had good education opportunities while lower ranked cities on liveability had lower education opportunities. This could well be because of the fact that people with a higher SES have more opportunities and means to increase their live situation and thus their liveability. Furthermore people with higher incomes often live in better neighbourhoods.

Furthermore there is a difference in assessing the neighbourhood between rural and urban types of neighbourhoods. People living in urban areas are more negative about the liveability than people living in rural areas. According to Gardenier et al. (2011) this due to more social interaction in smaller villages. Furthermore it is likely to assume that nuisance is greater in cities than in rural villages.

As a result of the drilling of gas parts of the province of Groningen are coping with earthquakes (RTV Noord, n,d). Previous research done by the Sociaal Planbureau Groningen (2016c) shows that living in an earthquake area affects the satisfaction of the living area. People living in an earthquake area see more decline of the liveability than people living in the other parts of the province. Furthermore, people living in earthquake areas rate the liveability a little bit lower: 7.4 as compared to 7.6 on average for the whole province. Another interesting finding of the Sociaal Planbureau Groningen (2016c) is that the intentions

of people living in earthquake areas to migrate from the region are higher than the rest of the province. When asked why people want to leave they indicate earthquakes is the most mentioned reason to leave.

#### 4.9. Disappearance of services worse for people with lower radius of travel

Accessibility is more important for the liveability than availability (Gardenier et al. 2011) and one of the biggest changes in the previous fifty years is the increased mobility of people. People's radius of travel has increased and people do not longer count on the services in their own village (Gardenier et al. 2011). The radius of travel seems to be an important factor that determines if a loss of service is a problem for the liveability of people. Therefore it is expected that a disappearance of a service is worse for people with a lower radius of travel because they have fewer alternatives that are accessible to them (hypothesis 6). The social and culture institute of Zealand (2011) has also found that people with a lower mobility rate the liveability much lower. One of the reasons of this is that they have lower means of taking part in social life and can visit less services and activities.

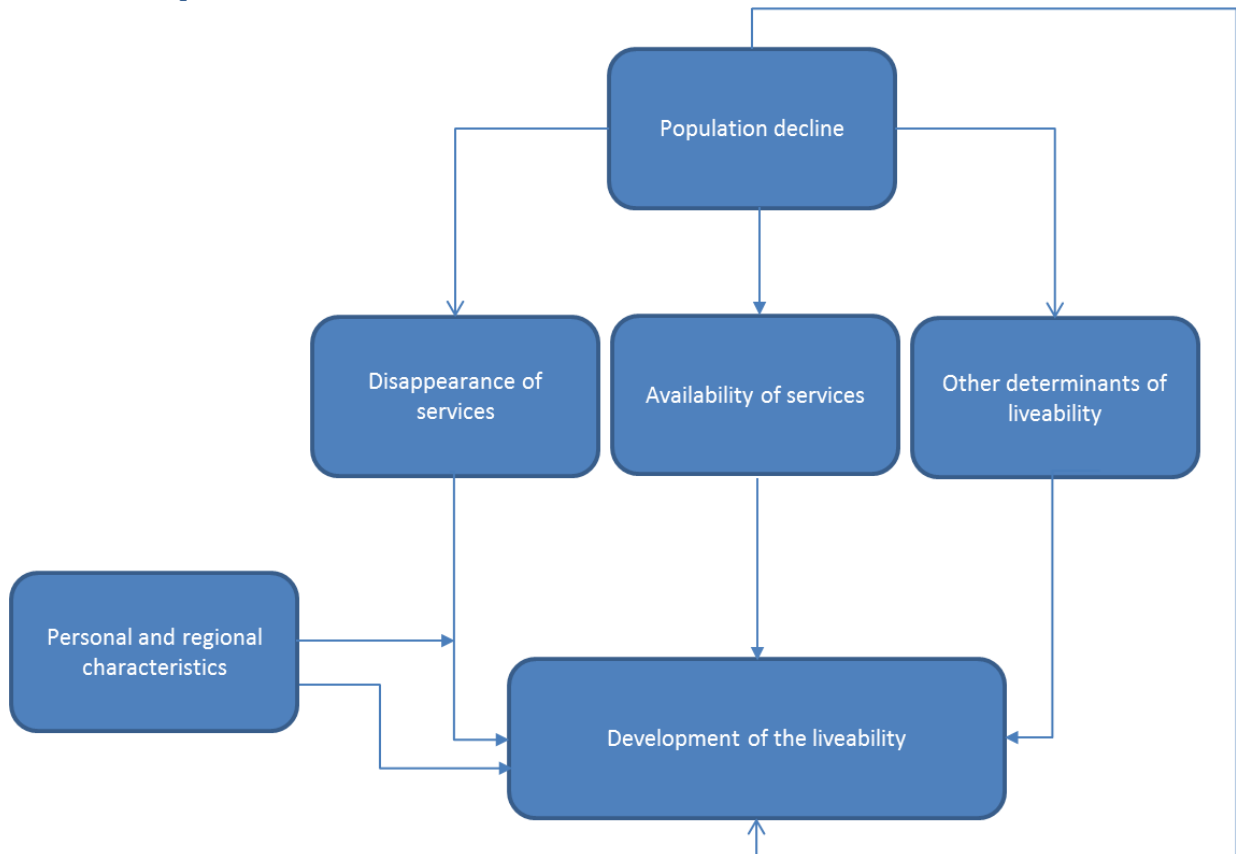
The Planbureau voor de Leefomgeving (2013) explains that the radius of travel of older people is lower than that of younger people. This means that older people will have more demand for services in general because they cannot use services further away because of their lower mobility as compared to younger people. Because of ageing and thus an increasing amount and proportion of older people it is expected that the demand for services will increase in years to come (van Dam et al., 2006 & Planbureau voor de Leefomgeving, 2013). So a potential closure of a service could potentially be worse for older people because they are less mobile and therefore find less services accessible (hypothesis 6a).

In the national household travel survey done by the Federal Highway Administration of the U.S. Department of Transportation (2014) the conclusion is made that mobility and social economic status (SES, education and income) are linked. The following citation is one of the main conclusions of the article: "Households in poverty are limited to a shorter radius of travel compared to higher income households". Since people with a lower SES have fewer opportunities to travel the expectation is that a loss of a service is worse for people with a lower SES (hypotheses 6b and 6c). This will be tested via education and income.

Fewer services are accessible in areas with population decline (van Dam et al., 2006). When a service closes in a region where the service density is already low, the impact of such a loss is relatively higher than in regions without population decline. So the expectation is that a recent disappearance of a service is worse in areas with population decline (hypothesis 6d).



## 4.10. Conceptual model



**Figure 4.6: The conceptual model of the research**

The conceptual model visualizes the aim of the research. The conceptual model will be explained per sub question. The first sub research question concerns the influence of population decline on the determinants of liveability. The arrows from the box 'population decline' on the first row to the three boxes on the second row represent this this research question. The second part of the research is about relation between the determinants of liveability and the development of the liveability. The arrows from the boxes on the second row to the 'development of the liveability' box show this part of the research. The third part is about the role of services on the development of the liveability in conjunction with the other variables. All boxes that have arrows leading to the 'development of the liveability' box except the arrow from 'personal and regional characteristics' to the arrow between 'disappearance of services' and 'development of the liveability' show this part of the research. The part that was excluded in the third part is because it is analysed in a separate part of the research. The final part is concerns the fact for whom it is worse when a service disappears.

## 4.11. Overview of all hypotheses

Hypothesis 1a: The availability of services will be lower in regions with population decline

Hypothesis 1b: Regions with population decline have more closures of services, although the effect is likely to be small, since other factors have a larger effect on closure of services.

Hypothesis 2: Population decline has a negative effect on:

2a: Neighbourhood satisfaction.

2b: Job satisfaction.

2c: Housing satisfaction.

2d: Social participation (both own and others).

Hypothesis 3a: Accessibility of services is believed to be more important than availability, so the amount of available services is not important for the liveability.

Hypothesis 3b: The loss of a service negatively impacts the development of the liveability due to the feeling of loss.

Hypothesis 3c: Disappearance of services lead also to improvement of the liveability in the short term, via a communal response to keep the service in the area.

Hypothesis 4: The relation between the development of the liveability and:

4a: Neighbourhood is positive.

4b: Job is positive.

4c: Housing is positive.

4d: Own social participation is negative.

Hypothesis 5: In the conjunction with other variables in the regression model:

5a: The amount of available services holds no relation with the development of the liveability.

5b: The disappearance of services will have a negative impact on the liveability.

5c: Neighbourhood will be best predictor of the development of the liveability.

Hypothesis 6: A recent disappearance of a service is worse for people who are less mobile so I expect that it is worse:

6a: For older people than for younger people.

6b: For people with lower incomes.

6c: For people with lower education.

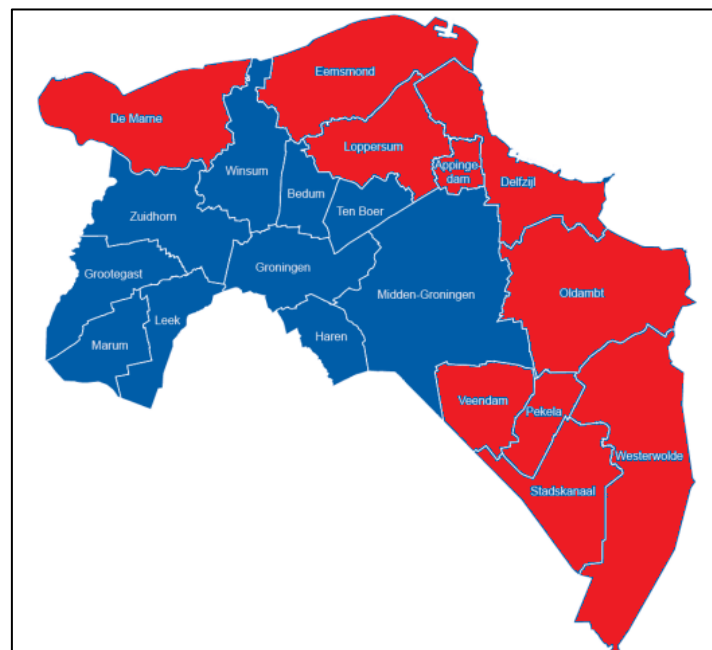
6d: Disappearance of a service is worse in areas with population decline because there are fewer services accessible for people living in those areas.

## 5. Methodology

### 5.1. Research design

This research has done quantitative, statistical research where the survey ‘onderzoek leefbaarheid Groningen’ is used (see appendix one). This survey is carried out by the Sociaal Planbureau Groningen to the ‘Groninger Panel’ (section 5.5). Questions in the survey about liveability concern how the population of Groningen experiences the liveability of their neighbourhood and how people look at the future of their neighbourhood. This survey was meant to give insight to what extent certain factors influence the experience of the liveability of the neighbourhood. All elements that influence liveability (as described by Gielings & Haartsen, 2016) are included in the survey.

The survey was distributed among members living in the province of Groningen, this is the research area. For the first part of the research a distinction between areas with population decline and areas without population decline was made at the municipal level, based on the definitions given by the ministry of Home Affairs and kingdom relations. The ministry calls regions with population decline the ‘topkrimpregio’s’. These regions will have an expected population decline of 16% by 2040 and included ten of the twenty municipalities in the province of Groningen: De Marne, Eemshoofd, Loppersum, Appingedam, Delfzijl, Oldambt, Veendam, Pekela, Stadskanaal and Westerwolde. The remaining ten provinces are not defined as official regions with population decline and include Grootegast, Marum, Leek, Zuidhorn, Winsum, Groningen, Bedum, Ten Boer, Midden-Groningen and Haren (figure 3.1.) In figure 3.1 below the distinction between regions with and regions without population decline is given.



**Figure 3.1: The province of Groningen consists of twenty municipalities, of which ten have to deal with population decline.** In red, the municipalities defined as ‘topkrimpregio’s’ are shown. The other municipalities are shown in blue (Dutch ministry of Home Affairs and Kingdom relations, 2018).

## 5.2. Operationalization of concepts

**Liveability:** The choice has been made focus on the development of the liveability. This research does involve the overall rating of the liveability because in areas where services disappear, the rating of the liveability could be higher due to other factors. In this case, we investigate what the effect of the disappearance of services is on the development of the liveability. When services disappear, do people feel that the liveability declines? In the survey a question directly asks the respondents if the liveability has declined, stayed the same, or improved over the last year. This is done on a five level ordinal scale ranging from ‘greatly decreased’ to ‘greatly increased’. There is also an extra option ‘I don’t know’.

**Population decline:** To discriminate between municipalities that do and do not have to deal with population decline, the definitions made by the Dutch Ministry of Home Affairs and Kingdom relations are used (section 3.1). This decision has been made because this research focuses on the implications for the region and not for a village itself. If the villages in the outlying regions do not have the problems with population decline the people in those areas can still encounter the problems of population decline because they use services in a larger village nearby. Besides, the availability of services in other places/villages, as long as they are accessible, can have an impact on the liveability. In the data file a binary variable indicates whether the respondent lives in a municipality with population decline ‘Yes’ or ‘No’.

**Services (Availability/disappearance):** For the determinant services the decision has been made to use a subjective measure for this, namely via a question in the survey. It could also have been measured via real data but the choice has been made to use a question in the survey. Hence, the true perception of people whether a service has been disappeared or not is measured. This variable is not area restricted and purely looks at an individual level. This is also useful, because when a certain respondent perceives a loss of a service, whereas his neighbour might not. So, we measure here whether someone perceives a loss of a service and whether this person also perceives a decline in the liveability.

Six categories of services seem to be important when measuring the liveability (described in section 4.6): services providing a place to meet (community centre), daily groceries (ATM, grocery store), health care (doctor), education (primary school), public transport (bus stop/train station) and leisure (café, sports club). These sum up to a total of eight services, these services are included in the survey. The respondents can choose multiple answers regarding the availability of a service. The first option is ‘Yes’. In case if a service is not available in the neighbourhood village the respondent can choose among multiple options, indicating if the service has recently disappeared (within two years), a longer time ago (longer than two years ago), or that it has not been present at all. These answers can make clear if the disappearance of a service is worse for the liveability if it has been disappeared in the recent past, a longer time ago or that it has not been there at all. Furthermore respondents can fill in ‘I don’t know’.

Leisure and transport are independent determinants in Gieling & Haartsen (2016). However because of the way in which these are asked in the survey the choice has been made to include these two variables under the determinant services. Café and sports club represent the leisure

variable and bus stop/train station represent the transport variable. However, bus stop/train station is included as its own variable as well.

**Neighbourhood:** Operationalization of neighbourhood is done by calculating an average score on different parts of how respondents assess their neighbourhood. The following criteria based on Gieling & Haartsen (2016) are used for neighbourhood assessment: Neighbourhood safety, attractiveness, maintenance, friendliness & amount of green space. In the survey, all these questions include the options 'Very happy', 'Happy', 'Neutral', 'Unhappy' and 'Very unhappy'. Some options also include 'I don't know', namely the maintenance, green space and attractiveness questions.

**Job:** The variable job is included in this study as how satisfied the respondents are, in general, about the amount of work in the area. Question 18 in the survey asks the respondent about how happy the respondent is about the amount of work in the area. The respondents can answer the question with 'Very happy', 'Happy', 'Neutral', 'Unhappy', 'Very unhappy' and 'I don't know'.

**House:** In the survey the respondents can rate their happiness about their current home on a scale of 1-10.

**Social participation:** Question 10 from the survey will be used to analyse the social participation. This question asks respondents to what extent they agree with the following statements: Statement one: 'I'm actively involved in what happens in my village/neighbourhood.' Statement two: 'I live in a village/neighbourhood where many citizens are actively involved.' The answers are on a five level scale ranging from 'I strongly agree' to 'I strongly disagree'. Both variables will be included.

**Gender:** Male/Female.

**Age:** Birthdates are available for each respondent, and their ages were categorized based on data from the Sociaal Planbureau Groningen: young (18-34), middle (35-64) and old (65+).

**Home ownership:** The panel data include information whether the respondent lives in a rent or bought house.

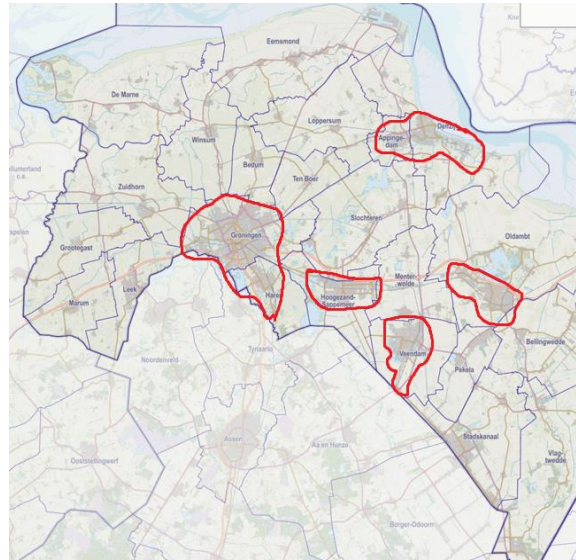
**State of cohabiting:** State of cohabiting is also known from the respondents. This category has two options: yes and no.

**Income:** The panel data gives us information about respondent's incomes. Low (€0-2000 p.m.), middle (€2000-3000 p.m.) and high income (€3000 p.m.) are used as categories.

**Education:** The level of education is also known for the respondents. Low (No education & VMBO), middle (HAVO/VWO & MBO) and high (HBO & university degree) education are used as categories.

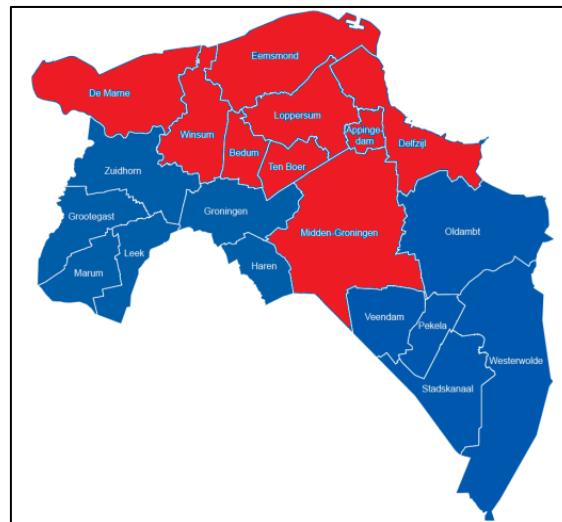
**Rural/urban:** This operationalization is based on zip code level. With population decline municipal level has been used because this could have consequences for a larger area than just a village. But with rural/urban zip code information is used because this living in those areas

means you have to do with the characteristics of those areas. Postal codes belonging to Groningen, Haren, Winschoten, Veendam, Hoogezand, Sappemeer and Foxhol are defined as urban. All other postal codes in the province are defined as rural areas. Definition based on data from the Sociaal Planbureau Groningen. The urban regions are circled in red in figure 3.2 below.



**Figure 3.2: The urban areas of the province of Groningen.**

**Earthquake area:** In research by TU Delft and CMO STAMM (in Sociaal Planbureau Groningen, 2016c) the following municipalities are defined as municipalities with earthquakes: Appingedam, Bedum, Ten Boer, Winsum, Loppersum, Eemsum, De Marne, Midden-Groningen en Delfzijl (figure 3.3).



**Figure 3.3: Municipalities defined as earthquake area marked in red.**

**Bus stop/Train station:** Availability yes/no based on people’s own perception of availability.

In table 3.1 below, an overview of the operationalization of all concepts is given. The first column represents the concept/variable at hand. The second column gives an explanation on

how that variable is operationalized. The third column shows the categories that the variable consists of in the survey or analysis.

**Table 3.1: Operationalization of concepts**

Variable	Operationalization	Categories in survey
<b>Population decline</b>	Definition ministry	Yes No
<b>Development of the liveability</b>	Subjective	Greatly declined Decline Stayed the same Improved Greatly improved I don't know
<b>Services</b>	School Doctor Grocery store Community Centre ATM Bus stop/train station Café Sports club	Yes No, disappeared within 2 years No, disappeared longer than 2 years ago No, never been present I don't know
<b>Neighbourhood</b>	Average score of neighbourhood: - Attractiveness - Friendliness - Maintenance - Amount of green space - Safety	Very unhappy Unhappy Neutral Happy Very happy Some options: I don't know
<b>Job</b>	Happy amount of work in the area in general.	Very unhappy Unhappy Neutral Happy Very happy
<b>House</b>	Satisfaction with house	Scale 1-10
<b>Social participation</b>	- Active social participation - Other citizens active social participation	Very inactive Inactive Neutral Active Very active
<b>Gender</b>	Male Female	
<b>Age</b>	Age categories: 18-34 35-64 65+	
<b>Home ownership</b>	Rent Buy	

<b>State of cohabiting</b>	Cohabiting Not cohabiting	
<b>Income</b>	Low income Middle income High income	€0-2000 per month €2000-3000 per month €3000+ per month
<b>Education</b>	Low education Middle education High education	No education – VMBO HAVO/VWO – MBO HBO - University
<b>Rural/Urban</b>	On zip code level: Rural Urban	
<b>Earthquake area</b>	As defined by TU Delft & CMO STAMM (in Sociaal Planbureau Groningen, 2016c)	Appingedam, Bedum, Slochteren, Loppersum, Ten Boer, Winsum, Eemsum, De Marne en Delfzijl.
<b>Bus stop/train station</b>	Yes No	

### 5.3. Methods

The first sub research question is answered with chi-square tests and crosstabs. The specific determinant service is crossed with population decline and if the chi square is significant it means that there is a significant difference between the areas with and without population decline and a specific determinant of liveability. In this way the question can be answered per determinant.

For the second sub-research question crosstabs with chi-squares are used as well. But this time the determinant is crossed with the development of the liveability.

The third sub question is answered with a multinomial logistic regression model. The independent variable in this model is the development of the liveability. The middle category (stayed the same) will be the reference category. In this way there can be evaluated which variables have an effect on the decline and on the improvement of the liveability. This model includes the determinants of liveability (including services, neighbourhood, job, house and social participation), personal characteristics (including gender, age, home ownership, state of cohabiting, income and education) and area characteristics (rural/urban, population decline, earthquake area).

The fourth and final question will be answered via interaction variables in a multinomial regression. The interactions will first be added independently to see which have a significant effect. If more than one interaction turns out to be significant, a final model is estimated with all the interactions. The interactions that are tested are: income, education, age and population decline.

### 5.4. Ethical considerations

A random but representative sample of the population is made by each municipality of the province and the people who are in the sample are asked to become a member of the



Groninger Panel (Sociaal Planbureau, 2017). When accepting to be participating in the panel people have to fill in certain personal characteristics. The Sociaal Planbureau Groningen has no commercial purposes and personal data and answers are confidentially treated. This research guarantees anonymity of panelists. Therefore, there will never be reference to a single person or indications given that can lead to a single person. Participation in surveys from the Sociaal Planbureau Groningen is completely voluntary for panelists. Panelists can unsubscribe from the Groninger Panel at any time they want.

### 5.5. Data quality

To get data the survey 'liveability' from the Sociaal Planbureau is used (appendix 1). This survey is send to the 'Groninger Panel'. This panel consists of around 4.700 people from the province of Groningen aged 18 and over. The Groninger panel should be representative for the whole province because the Sociaal Planbureau used Cendris for the selection of people to become member of the panel (Sociaal Planbureau Groningen, 2017). Cendris manages all addresses in the Netherlands and made a sample of 15.000 people from the province of Groningen, which should be representative for the province as a whole. All of those people were invited to become part of the Groninger Panel. Therefore the panel consists of all sorts of people: From old to young people, lower/higher educated, men/women and people with a low/high income. The amount of people that became member of the panel was 1750 (11%). From then on the Sociaal Planbureau Groningen invited more members via samples from each municipality, these samples were also stratified. Being part of the panel is completely voluntary and panelists can unsubscribe at any moment in time. To prevent large dropouts the Sociaal Planbureau Groningen investigates every two years if new members have to be invited to the panel. At time of closing the survey at the 16<sup>th</sup> of May 2018 the response rate was 47%. From the 4772 panelists this means a total of 2218 have filled in the survey. There are also 163 incomplete questionnaires. Due to a bug in the software these data could not be downloaded and analysed if some of these respondents are worth including. This should not be too big of a problem because of the fact that 2218 completed surveys should be enough for the purposes of this study.

### 5.6. Data preparation

**Development of the liveability:** Only eight respondents out of the 2218 indicated that the liveability declined greatly. Since this number is too low to use for the regression and analyses, the 'very' options have not been used but recoded to be part of either 'decreased' or 'increased'. Furthermore, since 'I don't know' does not indicate any perception of the development of the liveability, this category has been deleted before analysis as well. So, the development of the liveability has been recoded to three categories ('decreased', 'stayed the same' or 'increased') instead of the original six.

**Services:** For all services the 'I don't know' option was removed because this answer cannot be related to either availability or disappearance of services. Furthermore, both availability and disappearance of services have to be defined. Availability is recoded to the amount of services that are available in the area (area in this case means a person's own neighbourhood, which is subject to one's perception) according to the respondent. Because not all categories

had enough cases for analysis the variable is recoded to three categories. The categories are: ‘0-2’ ‘3-5’ ‘6-8’. Disappearance will be operationalized as ‘at least one service disappeared’ and ‘no service disappeared’ because in many cases not more than one disappearance took place.

**Neighbourhood:** For the neighbourhood determinant an average score was made from the corresponding survey questions. Since not many respondents used the ‘very bad’ option this category is recoded into three options: ‘unhappy’, ‘neutral’ and ‘happy’.

**House:** The distribution of the determinant house was not very usable for analysis. There were not many people who gave low marks and most respondents rated their home between five and ten with eight and nine being very popular. Therefore this determinant was recoded into the following categories: ‘Insufficient’ (which contains the marks 1-5), ‘sufficient’, (containing all respondents who gave a 6 or a 7) and ‘good’ (with answers ranging from 8 to 10).

**Job and social participation:** The job and social participation variables were also recoded to have three categories due to low amount of frequencies in the ‘very’ options.

**Other data preparations:** People living in zip-code areas from population decline municipalities were coded as ‘1’ and the ones with zip-codes from the municipalities without population decline were coded as ‘0’. The rural/urban variable could also be made from the zip code-data; the division is based on data from the Sociaal Planbureau Groningen.

**Table 3.2: Frequencies of variables and recoding of categories for the analysis**

Variable	Original categorization	Frequency	Recoded categorization	Frequency
<b>Development of the liveability</b>	1: Greatly decreased	42 (1.9%)	1,2: Decreased	446 (20.4%)
	2: Decreased	404 (1.6%)	3: Stayed the same	1527 (70%)
	3: Stayed the same	1527 (68.8%)	4,5: Increased	209 (9.4%)
	4: Increased	201 (9.1%)		
	5: Greatly increased	8 (0.4%)		
	6: I don’t know	36 (1.6%)		
<b>Services</b>	Per service	See appendix 2	All services into one variable	
			Availability: Amount of services in categories: 0-2 3-5 6-8	187 (8.4%) 470 (21.2%) 1561 (70.4%)
			Recent disappearance: No service	2013 (90.8%)

			disappeared At least one service disappeared'	205 (9.2%)
			Disappearance longer ago No service disappeared	1734 (78.2%)
			At least one service disappeared	484 (21.8%)
<b>Neighbourhood</b>	Per question: 1: Very unhappy 2: Unhappy 3: Neutral 4: Happy 5: Very happy 6: I don't know	See appendix three	Average score of questions. Three categories: 1,2: Unhappy 3: Neutral 4,5: Happy	60 (2.7%) 596 (26.9%) 1562 (70.4%)
<b>Job</b>	1: Very unhappy 2: Unhappy 3: Neutral 4: Happy 5: Very happy 6: I don't know	128 (5.8%) 457 (20.6%) 747 (33.7%) 458 (21.1%) 54 (2.4%) 364 (16.4%)	1,2: Unhappy 3: Neutral 4,5: Happy	585 (31.6%) 747 (40.3%) 522 (28.2%)
<b>House</b>	1 2 3 4 5 6 7 8 9 10	5 (0.2%) 5 (0.2%) 16 (0.7%) 15 (0.7%) 40 (1.8%) 103 (4.6%) 336 (15.1%) 874 (39.4%) 619 (27.9%) 205 (9.2%)	1-5: Insufficient 6-7: Sufficient 8-10: Good	81 (3.7%) 439 (19.8%) 1698 (76.6%)
<b>Social participation</b>	Own: 1: Very inactive 2: Inactive 3: Neutral 4: Active 5: Very active  Others: 1: Very inactive 2: Inactive 3: Neutral 4: Active 5: Very active	108 (4.9%) 534 (24.1%) 929 (41.9%) 521 (23.5%) 126 (5.7%)  51 (2.3%) 378 (17%) 1070 (48.2%) 649 (29.3%) 70 (3.2%)	Own: 1,2: Inactive 3: Neutral 4,5: Active Other: 1,2: Inactive 3: Neutral 4,5: Active	642 (28.9%) 929 (41.9%) 647 (29.2%) 429 (19.3%) 1070 (48.2%) 719 (32.4%)
<b>Gender</b>	Male Female	1212 (54.6%) 1006 (45.4%)		

<b>Age</b>	18-34 35-65 65+	457 (20.5%) 1089 (48.7%) 690 (30.9%)		
<b>Home ownership</b>	Rent Buy	256 (11.5%) 1962 (88.5%)		
<b>State of cohabiting</b>	Cohabiting Not cohabiting	424 (19.4%) 1766 (80.6%)		
<b>Income</b>	Low income Middle income High income	524 (30.1%) 524 (30.1%) 692 (39.8%)		
<b>Education</b>	1: No education 2: Primary education 3: LBO 4: VMBO 5: HAVO/VWO 6: MBO 7: HBO 8: University	8 (0.4%) 22 (1%) 138 (6.2%) 312 (14.1%) 148 (6.7%) 441 (19.9%) 823 (25.8%) 326 (14.7%)	1,2,3,4: Low education 5,6: Middle education 7,8: High education	480 (21.6%) 589 (26.6%) 1149 (51.8%)
<b>Population decline</b>	Yes No	1000 (45.1%) 1218 (54.9%)		
<b>Rural/urban</b>	Rural Urban	1183 (52.6%) 1065 (47.2%)		
<b>Earthquake area</b>	Yes No	804 (35.6%) 1452 (64.4%)		
<b>Bus stop/train station</b>	Yes No	2020 (91.7%) 183 (8.3%)		

# 6. Results

## 6.1. Influence of population decline on determinants of liveability

First, the differences of the availability/disappearance of services and the other determinants of liveability between regions with and regions without population decline will be analysed. As shown in table 6.1, the 2218 respondents are almost equally distributed over municipalities with and without population decline.

**Table 6.1: The distribution of respondents among the two research areas.**

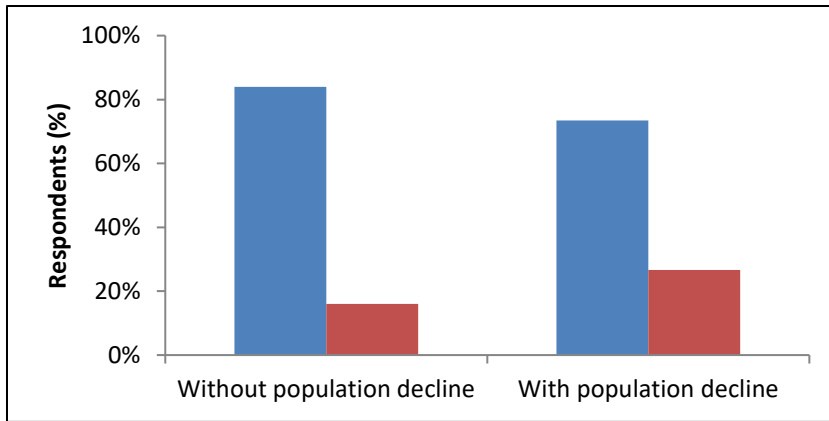
Municipality with population decline	Frequency	Percentage
No	1000	45.1%
Yes	1218	54.9%
Total	2218	100%

Crosstabs with chi-square tests have been applied to analyse the association between population decline and each of the determinants of liveability. For these chi-square tests, the null-hypotheses are always defined as having no significant difference in the assessment of the selected liveability determinant between municipalities with and without population decline. When the test turns out to be significant ( $P < 0.05$ ), it means that there is an association. Crosstabs are then used to analyse what trend can be seen. At the end of this section an overview of the chi-square tests is given in table 6.2. The full crosstab results can be found in appendix four.

### 6.1.1. Services

The amount of available services in municipalities with population decline differs significantly from the amount of available services in municipalities without population decline (Chi-square: 0.001): municipalities with population decline have fewer amounts of services available. The average amount of available services for municipalities without population decline is 6.5, which is lower for municipalities with population decline: 6.06.

The amount of recently (less than two years ago) disappeared services does not significantly differ between regions with and regions without population decline (Chi-square: 0.054). However, the amount of disappearances of services longer ago (more than two years) does differ significantly between regions with and regions without population decline (Chi-square: 0.000). People from municipalities with population decline experience more closure of services in the long term than people that do not live in municipalities with population decline (figure 6.1).

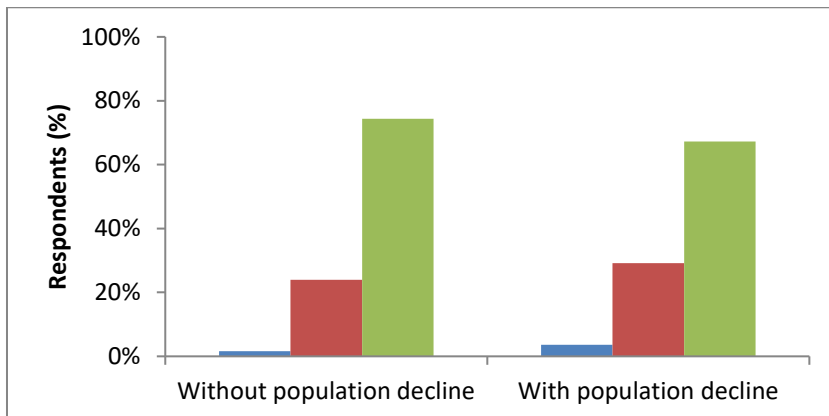


**Figure 6.1: In an area with population decline, people experience more disappearance of services in the long term compared to areas without population decline.** Blue: percentage respondents that did not experience any loss of services on the long term. Red: percentage respondents that experienced loss of one or more services on the long term.

### 6.1.2. Other determinants of liveability

#### Neighbourhood

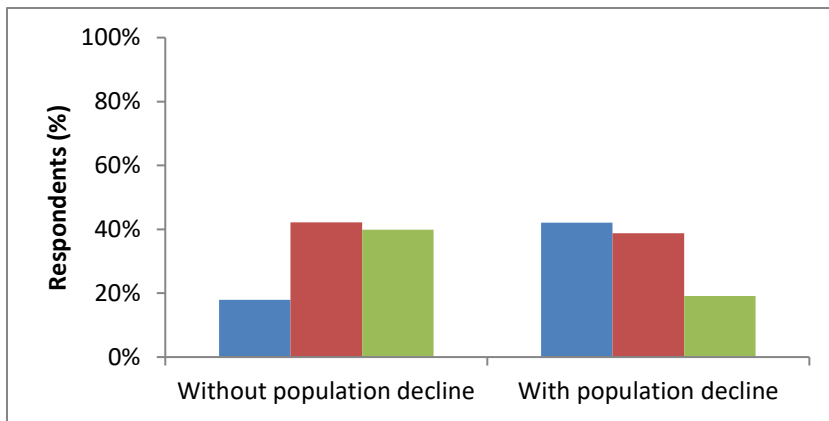
People living in municipalities with population decline assess their neighbourhood on average significantly (Chi-square 0.000) lower than people living in municipalities without population decline. The percentages in the unhappy (3.6% versus 1.6%) and neutral categories (29.2% versus 24%) are higher in municipalities with population decline, whereas the percentage for the people that are at least happy is higher for non-shrinkage areas (74.4% versus 67.2%).



**Figure 6.2: People in non-shrinkage areas assess their neighbourhood on average better than people in areas with population decline.** Blue: percentage respondents that are unhappy with their neighbourhood. Red: percentage respondents that are neither happy, nor unhappy with their neighbourhood. Green: percentage respondents that are happy with their neighbourhood. In figures 6.3 and 6.4 the same colour coding is used.

#### Job

People living in areas with population decline are significantly (Chi-square: 0.000) more negative about the amount of work in the area. 42.1% of people in municipalities with population decline are unhappy about the amount of work that is available in the area, but in municipalities without population decline this is 17.9%. Furthermore, people in non-shrinkage areas are more often happy with the amount of work available in the area than people in shrinkage areas (39.9% as compared to 19.1%).



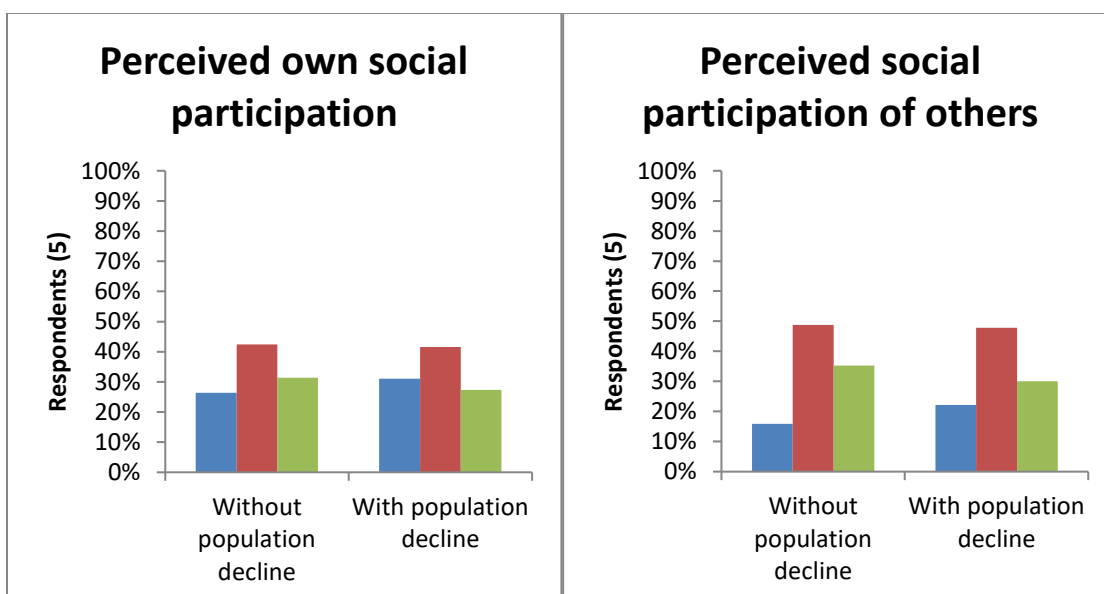
**Figure 6.3: People in areas with population decline are less happy about the amount of work available compared to people in non-shrinkage areas.** The colour coding here is identical to that of figure 6.2.

### House

There is no significant difference in house satisfaction between areas with and without population decline (chi-square 0.182). Literature expects that people in shrinkage areas invest less in their home, although this difference is not found here. However, these expectations might still be true, for instance when a lower investment does not alter people's satisfaction with their homes.

### Social participation

People living in areas with population decline are significantly (chi-square 0.027) less active in village life than people living in areas without. A clear trend is visible, the category 'inactive' has higher percentages in municipalities with population decline (31% as compared to 26.4%) whereas the category 'active' shows higher percentages in municipalities without (31.4% as compared to 27.3%). The neutral category shows nearly the same percentages in both regions. The perceived social participation of others also significantly differs (Chi-square: 0.000) between the two research areas. People living in municipalities with demographic decline rate the social participation of others lower than people who do not live in those areas.



**Figure 6.4 & 6.5: Both the social participation and the perceived social participation are rated less by people from municipalities with demographic decline than by people that do not live in these areas. The colour coding is equal to what is used in figure 6.2.**

**Table 6.2: The relations between population decline and the different determinants of liveability.**

Variable	Result for areas with population decline (chi-square)
Services	Availability: Lower (0.001) Disappearance: -Recent: no relation (0.817) -Longer ago: More disappearances (0.000)
Neighbourhood	Lower satisfaction (0.000)
Job	Lower satisfaction (0.000)
House	No relation (0.182)
Social participation	Own: Less active (0.027) Others: Less active (0.000)

## 6.2. Influence of determinants of liveability on the development of the liveability

In this section the relation between the development of the liveability and the determinants of liveability will be pointed out. First the effect of the availability/disappearance of services on the development of the liveability is discussed and subsequently the other determinants are analysed. As in section 6.1, chi-square tests are used with a confidence level of 5%. In general, more people in the province of Groningen experience decline than improvement of liveability (table 6.3). The full crosstab results of this section can be found in appendix five.

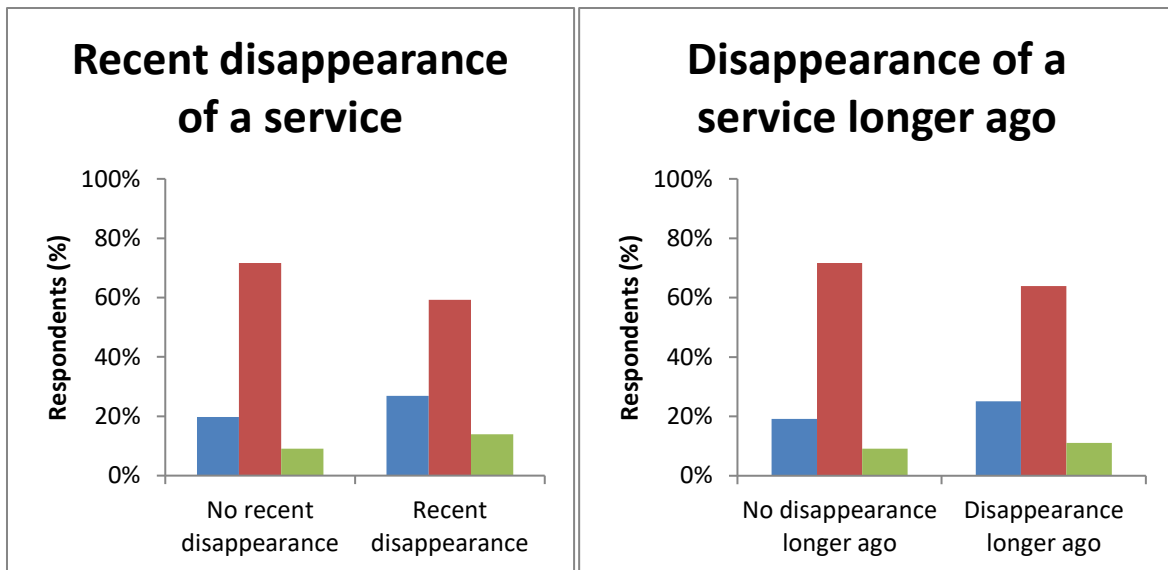
**Table 6.3: The distribution of the development of the liveability.**

Development of the liveability	Frequency	Percentage
Declined	446	20.4%
Stayed the same	1527	70%
Improved	209	9.6%

### 6.2.1. Role of services on liveability

The available amount of services and the development of the liveability are not associated with each other (Chi-square: 0.081). However, an association between the disappearance of services, both recent and longer ago, and the development of the liveability was found. Recent disappearance of at least one service (<2 years) has an association with the development of the liveability (Chi-square: 0.002) and leads to more people experiencing a change of the liveability. The 'stayed the same' category becomes smaller (71.7% to 59.2%) and both the declined (19.8% to 26.9%) and improvement (9.1% to 13.9%) groups become larger. For the disappearance of at least one service longer than two years ago, also an association was found (Chi-square: 0.004). Also in this case more people experience a change of the liveability, both positively and negatively, but the effect is less pronounced (figure 6.5).



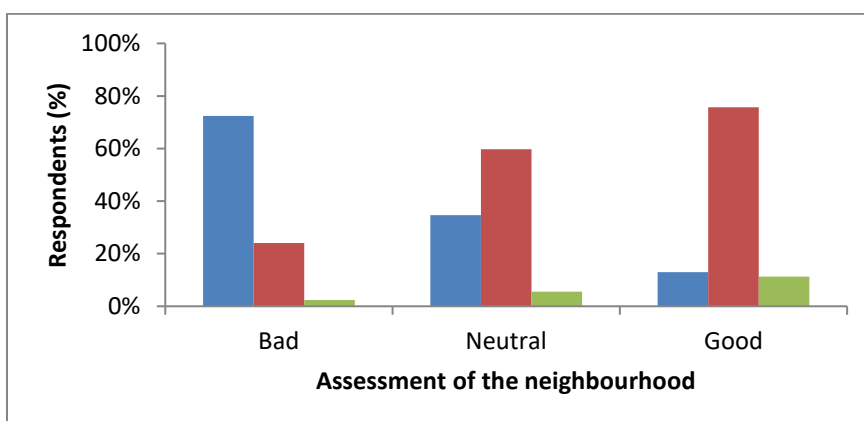


**Figure 6.5: A recent disappearance of a service increases the percentage of people experiencing a change in livability, both positively and negatively.** Blue: The livability became worse. Red: The livability stayed the same. Green: The livability improved. This colour coding is also used in figure 6.6.

### 6.2.2. Role of other determinants on livability

#### Neighbourhood

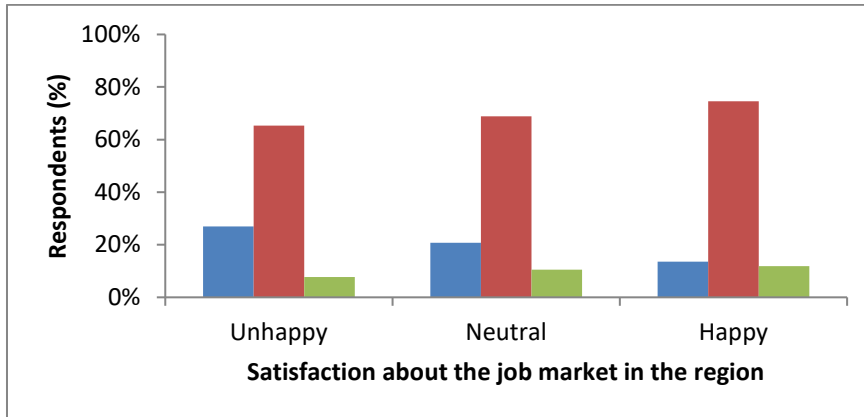
The determinant neighbourhood seems to be an important predictor of the livability because there is a very strong relation with the development of the livability (Chi-square: 0.000). A large proportion of people who assess their neighbourhood (very) bad see their livability declining (72.4% compared to 20.4% average) and hardly any of these people see improvement of the livability (3.4% compared to 9.6% average). People that are neutral about their neighbourhood see more decline and less improvement of the livability, but this effect is less pronounced than people who rate their neighbourhood as 'bad'. People that rate their neighbourhood (very) good on average see less decline of the livability (13% compared to 20.4% average) and see more improvement than average (11.3% compared to 9.6%).



**Figure 6.6: The assessment of the neighbourhood predicts the development of the livability pretty well.** The assessment of the neighbourhood (Bad, Neutral or Good) is compared to the development of the livability. The worse the neighbourhood is assessed, the more the livability declines and the less it improves. The colour coding is equal to that of figure 6.5.

## Job

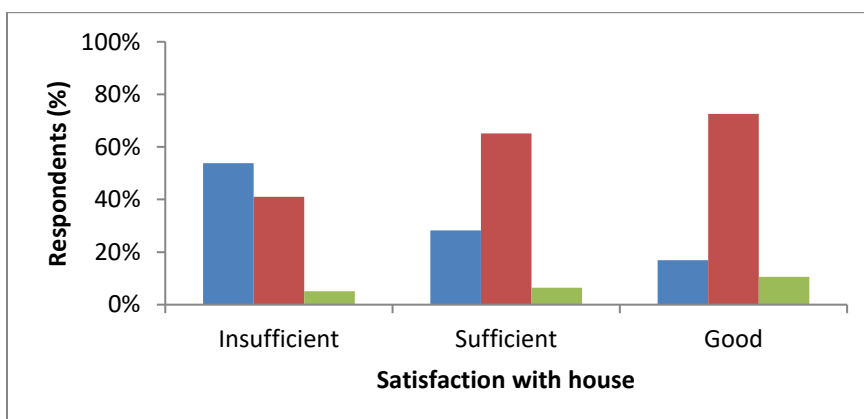
There is a significant association between job satisfaction and the development of the liveability (Chi-square: 0.000). The happier people are about the job market in the region, the lower the chance that the liveability declines and the higher the chance that it improves (figure 6.7).



**Figure 6.7: The more satisfied people are about the job market in the region, the better the development of the liveability is.** The colour coding is identical to that in figure 6.5.

## House

There is also a significant association between satisfaction with house satisfaction and the development of the liveability (Chi-square: 0.000). People who rate their house satisfaction as insufficient perceive a decline of the liveability more often (53.8%) than people who rate their home as sufficient (28.3%) or good (16.9%). Furthermore, people who are more positive about their house have higher chances of perceiving an improvement of liveability (insufficient 5%, sufficient 7%, good 11%).



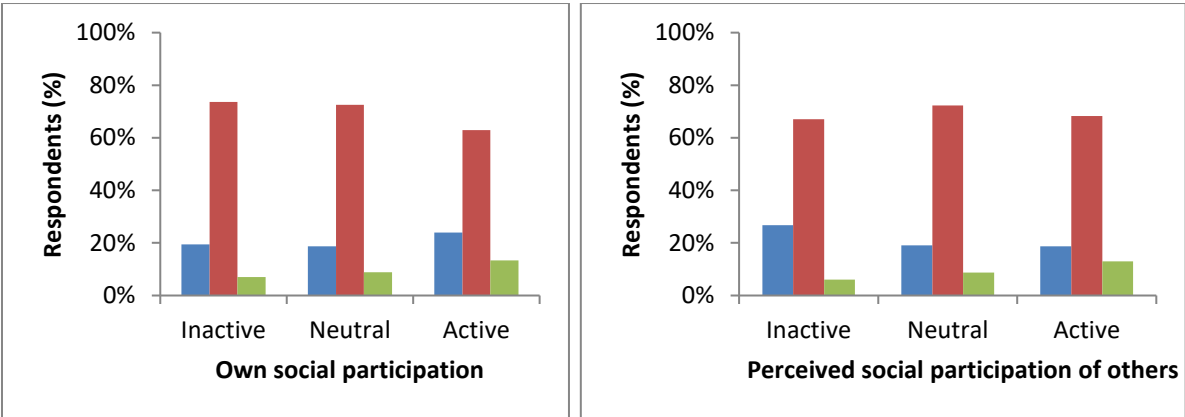
**Figure 6.8: The less satisfied people are about their housing, the more the liveability declines and higher the chance is that the liveability improves.** The colour coding is identical to that in figure 6.5.

## Social participation

Both the own social participation and the perceived participation of others are significantly associated with the development of the liveability (both Chi-squares: 0.000). When people are more active the average percentages for both the declined (23.9% versus 20.4%) and the improved (13.3% versus 9.6%) categories rise (figure 6.9). So, people who are more active

have a more pronounced opinion. More pronounced means that less peoples liveability stayed the same and they perceive both more improvement as decline of liveability. When people are less active the opposite trend is visible: their opinion is less pronounced.

When a person perceives others to be inactive they have a higher than average chance to see decline of the liveability (26.7% compared to 20.4% average). When they find others active they have higher chances of seeing the liveability improving (13% vs 9.6% average). So there is a positive relation between the perceived social participation of others and the development of the liveability.



**Figure 6.9 & 6.10: Both the own social participation and the perceived social participation of others are significantly associated with the development of the liveability.** The more socially active people are, the more pronounced their opinion is about the development of the liveability. When people see others being socially active, the liveability is more likely to improve. On the other hand, when people see others being socially inactive, the liveability is more likely to decline. The colour coding is identical to that in figure 6.5.

All determinants of liveability have a significant bivariate relationship with the development of the liveability (table 6.4). This implies that all determinants must be added in the regression model. Only the amount of available services did not have a significant relation, but because this is one of our independent variables it will still be included in our regression model.

**Table 6.4: All the determinants of the liveability are significantly related to the development of liveability.**

Variable	Result (chi-square)
Services	Availability: No relation (0.081)  Disappearance: -Recent: Both more improvement and decline of liveability (0.002) -Longer ago: Both more improvement and decline of liveability (0.004)
Neighbourhood	Positive relation (0.000)
Job	Positive relation (0.000)
House	Positive relation (0.000)
Social participation	Own: Both more decline and improvement of liveability when active; Less decline and improvement when inactive (0.000) Others: Positive relation (0.000)

### 6.3. Role of services in regression model

In the previous section only the bivariate relation between each individual determinants and the development of the liveability was analysed, but not in the case when all variables come into play. In this section this is analysed when all variables come into play. This is done by estimating a multinomial logistic regression using two different models. The first model concerns the whole province of Groningen. Most literature about the disappearance of services mainly concerns rural areas. It also seems logical to assume that a disappearance of a service is far more likely to negatively impact the liveability in rural areas because usually there are services enough in urban areas and the disappearance of one service would make less impact in those areas. Therefore, another model is estimated with only respondents from rural areas. In table 6.6 this is model two. Both models contain the determinants of liveability (services, neighbourhood, job, house and social participation) and control variables. These include personal characteristics (age, gender, income, education, cohabiting state and home ownership) and regional characteristics (rural/urban (for the first model only), population decline, earthquake area and the availability of a bus stop/train station). For the dependent variable 'Stayed the same' is the reference category. In the next sections the results are discussed, for decline in the first section and improved in the second section. The results are fully explained for the first model one, which includes both rural and urban regions of the province. At the end of each section the differences with model two (only rural) are briefly explained.

### 6.3.1. Decline of liveability

In table 6.6 below the odds ratios, for decline of the liveability as compared to no change of liveability are shown.

**Table 6.6: Results of the multinomial regression for decline of liveability.** Numbers all in odds ratio's (exp(B)).

		Decline of the liveability (ref: stayed the same)	
		Model one (urban+rural)	Model two (rural)
Recent disappearance of a service (ref: No)	Yes	1.957 *	2.211 *
Disappearance of a service longer ago (ref: No)	Yes	1.201	1.274
Amount of available services (ref: 6-8)	0-2	1.430	1.432
	3-5	1.326	1.064
Neighbourhood (ref: Good)	Bad	10.327 *	8.335 *
	Neutral	3.040 *	2.812 *
Job (ref: Happy)	Unhappy	1.616 *	1.236
	Neutral	1.641 *	1.254
House (ref: Good)	Insufficient	2.817 *	2.620 *
	Sufficient	1.528 *	1.702 *
Own social participation (ref: Active)	Inactive	0.441 *	0.427 *
	Neutral	0.628 *	0.664 *
Social participation of others (ref: Active)	Inactive	1.135	1.326
	Neutral	0.881	0.912
Gender (ref: Female)	Male	1.114	1.221
Age (ref: 65+)	18-34	0.688	1.431
	35-64	1.280	1.270
Income (ref: High)	Low	1.278	1.379
	Middle	1.149	1.254
Education (ref: High)	Low	0.734	0.645
	Middle	0.830	0.827
Home ownership (ref: Buy)	Rent	1.167	1.302
State of cohabiting (ref: Not cohabiting)	Cohabiting	1.102	0.809
Population decline (ref: No)	Yes	1.083	1.096
Rural/urban (ref: Urban)	Rural	0.654 *	(Excluded)
Earthquake area (ref: No)	Yes	1.115	1.075
Bus stop/train station (ref: No)	Yes	1.099	1.058
*P < 0.05		R <sup>2</sup> : 0.169	R <sup>2</sup> : 0.163

In the previous chapter all determinants of liveability held a significant relation with the development of the liveability, when they were not controlled for by other variables. Only the availability of services did not have a significant association with the development of the liveability. In conjunction with other variables a recent disappearance of at least one service still holds a significant relation with decline of the liveability. However, in conjunction with other variables not all determinants hold a significant relationship with the decline of the liveability (table 6.6). The amount of available services, as well as a disappearance of at least one service longer ago hold no significant relation with a decline of liveability. People in the province of Groningen who recently experienced a disappearance of a service have 1.957 times or 95.7% higher odds of perceiving a decline of liveability over perceiving no change of liveability than people who did not recently experience a disappearance of a service.

Besides services, the most important predictor of perceiving a decline of liveability as compared to seeing no change in liveability is the assessment of the neighbourhood. Someone who rates the neighbourhood as 'bad' has 10.327 times the odds of perceiving a decline of liveability over no change of the liveability as compared to someone who rates the neighbourhood as 'good'. While the odds are 3.040 times higher for someone who rates the neighbourhood as 'neutral' as compared to someone who rated it as 'good'. The satisfaction with the amount of work available also holds a significant positive relationship with perceiving a decline of liveability over perceiving no change of liveability: both the odds to perceive a decline in liveability are around 1.6 times higher for someone being 'unhappy' or being 'neutral' about the amount of jobs available in the area as compared to being 'happy'. The satisfaction with one's house also holds a significant relation with seeing a decline of liveability. Someone who rates his/her house as 'insufficient' has 2.817 times the odds of seeing the liveability declining over no change of liveability as compared to someone who rates their house as 'good'. The amount of social participation holds a significant negative relation with a decline of the liveability. The less active a person is in social participation the lower the odds are that he/she perceives a decline of liveability as compared to perceiving no change of liveability (0.441 times the odds for inactive, 0.628 for neutral versus active). Lastly, the last significant relationship that is found regarding a decline of the liveability is the difference between rural and urban areas. People in rural areas have 0.654 times the odds of perceiving a decline over no change of liveability as compared to urban people.

In the second model, using only data from rural areas, regarding services the only change is that a recent disappearance of a service gives slightly higher odds of perceiving a decline of liveability over no change of liveability. Regarding the other determinants of liveability, the determinant job is not significant anymore, for both categories. The odds to experience a decline of liveability as compared to no change for the determinant neighbourhood are a bit lower while the odds for house and social participation are nearly the same.

### 6.3.2. Improvement of liveability

**Table 6.7: Results of the multinomial regression for improvement of liveability.** Numbers all in odds ratio's (exp(B)).

		Improvement of liveability (ref: stayed the same)	
		Model one (urban+rural)	Model two (rural)
Recent disappearance of a service (ref: No)	Yes	1.399	1.647
Disappearance of a service longer ago (ref: No)	Yes	1.251	1.379
Amount of available services (ref: 6-8)	0-2	0.747	0.673
	3-5	0.935	0.992
Neighbourhood (ref: Good)	Bad	0.828	1.179
	Neutral	0.800	0.971
Job (ref: Happy)	Unhappy	0.858	0.745
	Neutral	1.129	0.951
House (ref: Good)	Insufficient	0.935	0.607
	Sufficient	0.734	0.553
Own social participation (ref: Active)	Inactive	0.602	0.660
	Neutral	0.523 *	0.581 *
Social participation of others (ref: Active)	Inactive	0.722	0.722
	Neutral	0.875	0.918
Gender (ref: Female)	Male	0.905	0.925
Age (ref: 65+)	18-34	0.439	0.667
	35-64	1.009	0.940
Income (ref: High)	Low	0.836	0.929
	Middle	0.598 *	0.621
Education (ref: High)	Low	1.052	0.993
	Middle	1.185	1.137
Home ownership (ref: Buy)	Rent	1.707	1.356
State of cohabiting (ref: Not cohabiting)	Cohabiting	0.961	1.042
Population decline (ref: No)	Yes	1.309	1.204
Rural/urban (ref: Urban)	Rural	1.145	(Excluded)
Earthquake area (ref: No)	Yes	0.812	0.739
Bus stop/train station (ref: No)	Yes	0.685	0.540
*P < 0.05		R <sup>2</sup> : 0.169	R <sup>2</sup> : 0.163

Regarding a perceived improvement of the liveability fewer variables hold a significant relation with the development of the liveability. Regarding services, both the availability and the disappearance, are not significantly related to the improvement of the liveability. The only variables that play a significant role with the improvement of the liveability are income and social participation. Middle incomes have significantly lower odds (0.598 times) of perceiving an improvement over no change of liveability as compared to high incomes. People claiming

they are 'neutral' in social participation have lower odds (0.524 time) of perceiving an improvement of the liveability as compared to people who consider themselves as socially active. No significant relation was found between people being socially inactive and improvement of the liveability. In the model that only includes rural areas only the 'neutral' category of social participation holds a significant relation with improvement of the liveability. People who indicate that they are neutral in social participation have lower odds (0.581 times) of perceiving an improvement of liveability over no change in liveability as compared to people who are active.

#### 6.4. Disappearance of a service is worse for people with lower education in rural areas

People with a lower SES (social-economic status) and older people have a lower mobility, which in turn leads to a lower radius of travel (lower mobility). For these people less services are accessible to them, because they cannot reach services further away, whereas more mobile people can. Regions with population decline also have fewer amounts of services available and therefore have fewer services accessible. Thus, a disappearance of a service could potentially be worse in these regions. The model has been re-estimated using the interaction terms. The interaction effects (income, education, age and population decline) are all independently added to the basic regression model used in section 6.3 to check the effect of each interaction separately. Interactions effects are only checked for recent disappearance of services, because only that variable holds a significant relation with the development of the liveability in the basic regression model (table 6.6). We focus primarily on the results for a decline in liveability for the same reason. If more than one interaction turns out to be significant all the significant interactions will be added in a final model. The results of the variables other than the interaction terms come from the model with the interaction with education, because this interaction turned out to be the only significant interaction (table 6.8). However, for practical reasons the interactions besides education are also displayed in table 6.8.



**Table 6.8: Results of the multinomial regression with interaction variables for decline of liveability.**  
Numbers all in odds ratio's (exp(B)).

		Decline of liveability (ref: stayed the same)	
		Model one (urban+rural)	Model two (rural)
Recent disappearance of a service (ref: No)	Yes	1.112	1.742
Disappearance of a service longer ago (ref: No)	Yes	1.252	1.327
Amount of available services (ref: 6-8)	0-2	1.350	1.376
	3-5	1.323	1.056
Neighbourhood (ref: Good)	Bad	10.779 *	8.832 *
	Neutral	3.082 *	2.817 *
Job (ref: Happy)	Unhappy	1.646 *	1.239
	Neutral	1.643 *	1.250
House (ref: Good)	Insufficient	2.823 *	2.714 *
	Sufficient	1.547 *	1.744 *
Own social participation (ref: Active)	Inactive	0.447 *	0.436 *
	Neutral	0.645 *	0.630 *
Social participation of others (ref: Active)	Inactive	1.123	1.321
	Neutral	0.865	0.902
Gender (ref: Female)	Male	1.099	1.213
Age (ref: 65+)	18-34	0.675	1.381
	35-64	1.269	1.266
Income (ref: High)	Low	1.267	1.400
	Middle	1.132	1.241
Education (ref: High)	Low	1.966	1.162
	Middle	0.688	0.351
Home ownership (ref: Buy)	Rent	1.186	1.342
State of cohabiting (ref: Not cohabiting)	Cohabiting	1.126	1.290
Population decline (ref: No)	Yes	0.921	1.105
Rural/urban (ref: Urban)	Rural	0.653 *	(Excluded)
Earthquake area (ref: No)	Yes	1.105	0.942
Bus stop/train station (ref: No)	Yes	1.099	1.066
Recent disappearance*Education (ref: Yes*High)	Yes*Low	3.056 *	1.976
	Yes*Middle	1.225	0.386
Recent disappearance*Income (ref: Yes*High)	Yes*Low	0.824	0.738
	Yes*Middle	0.538	1.562
Recent disappearance*Age (ref: Yes*65+)	Yes*18-34	0.994	1.368
	Yes*35-64	0.948	1.989
Recent disappearance*Pop. decline (ref: Yes*No)	Yes*Yes	0.615	0.660
*P < 0.05		R <sup>2</sup> : 0.175	R <sup>2</sup> : 0.171

Of all the interactions tested only the recent disappearance of a service-education holds a significant relation with perceiving a decline of liveability. People with a low education have 3.056 times the odds of perceiving a decline of liveability when a service recently disappears as compared to people with a high education. Middle education does not significantly differ from high education. So a recent disappearance of a service is worse for people with a lower education. None of the interactions had a significant effect on the improvement of the liveability.

Comparing the models with and without the interaction the same variables hold a significant relation with the development of the liveability, except from services. Also the coefficients do not change much when the interaction is added, indicating that the model is robust. One notable change on the decline of liveability is that the recent disappearance of a service variable by itself is no longer significant in the model where the interaction is included. This indicates even more that a recent disappearance of a service does not hurt the liveability as bad for everyone and that it mostly hurts the liveability of the lower educated. The model with the interaction is does not significantly better predict the liveability than the model without the interaction (Log likelihood model without interaction: 2011.642 – Log likelihood model with interaction 2003.922 = 7.72 with a corresponding P-value of 0.10239).

Comparing the results that only include rural areas, both the interaction and the standalone variable of recent disappearance of a service are not significant anymore. This indicates that a recent disappearance of a service is worse for people in urban areas than for people in rural areas.

## 7. Conclusions

### Part one: Population decline and the determinants of liveability

First the bivariate relation between population decline and the determinants of liveability was analysed. Van Dam et al. (2006) state that the availability of services is lower in regions with population decline, which is in line with the results found here (section 6.1.1). Therefore hypothesis 1a can be accepted.

Population decline might lead to the disappearance of services, as stated in literature (Mckenzie (1994), ACSSDPA (2009) in Galjaard et al., (2012) & Haartsen & Venhorst (2010)). But based on the results obtained here, this is only partially true. For the disappearance of services longer than two years ago, the relation with population decline is significant: regions with population decline have more disappearances of services in the long term. Recent disappearances of services (<2 years) do not differ between municipalities with and without population decline in the province of Groningen. Therefore hypothesis 1b is rejected for recent disappearances of services and accepted for disappearances of services longer ago.

With the other determinants of liveability that are used in this study (Neighbourhood, job, house and social participation) only house satisfaction does not have a significant relation with population decline. For neighbourhood, job and social participation it can be stated that more people are negative about these things in regions with population decline. So, hypotheses 2a, 2b and 2d can be accepted, while hypothesis 2c must be rejected (table 7.1).

An explanation for the lower assessment of the neighbourhood in municipalities with population decline could be that regions with population decline have higher vacancy rates than other regions (Planbureau voor de Leefomgeving, 2008). The abandoned buildings can become eye-sores, lowering people's assessment of the neighbourhood.

Regarding the job market, the results of this study are in line with the conclusions from CBS (2015), who concluded that areas with demographic decline have fewer jobs available per person than other areas.

Due to population decline people are less inclined to invest in their homes (Glaeser and Gyourko, 2005). As a result of this the quality of homes will decline, which might lead to lower satisfaction about housing in areas with population decline. However, here house satisfaction does not significantly differ between declining and non-declining areas. Although this is not in line with the conclusions from Glaeser and Gyourko (2005), they could still be true. People might invest less in their homes without losing their satisfaction with it.

In areas with population decline, meeting places disappear more often (Elshof & Bailey, 2015). So we expected a lower social participation in these regions. Both own and others social participation of people turned out to be lower in shrinkage regions (section 6.1.2).

**Table 7.1: Hypotheses belonging to part one**

Hypothesis	Accept/reject
1a: Availability of services lower in regions with population decline	Accept
1b: Regions with population decline have more closures of services	Recent (<2 years): Reject Longer ago (>2 years): Accept
2a: Neighbourhood satisfaction lower in regions with population decline	Accept
2b: Job satisfaction lower in regions with population decline	Accept
2c: House satisfaction lower in regions with population decline	Reject
2d: Social participation (both own and others) lower in regions with population decline	Accept

### Part two: The determinants of liveability and the development of liveability

Subsequently we investigated the bivariate relation between the determinants of liveability and the development of liveability. The availability of services does not hold a significant relation with the development of liveability, most likely because accessibility is more important than availability. So hypothesis 3a can be accepted (table 7.2).

Disappearance of one or more services, both recently (< 2 years) and longer ago (> 2 years) hold a significant relation with the development of the liveability. When at least one service disappears, both recently and longer ago, people in Groningen perceive on average more decline as well as improvement of liveability. The decline could be explained by a feeling of loss, which is thought to be worse for the liveability than not having had that service at all (Weijer, 2012; Egelund & Laustsen (2006) & McKenzie (1994)). Furthermore, in most cases a service also has, besides a functional meaning, a symbolic meaning for the people in the neighbourhood (Christiaanse & Haartsen, 2017). This symbolic meaning could be a side function (for instance a primary school as a meeting place for parents) or the fact that a grocery store could give the village a certain amount of status. The improvement could be explained by the reaction of the people in that village, who come together to set up an initiative to keep the service in the area (Elshof & Bailey, 2015). That in turn leads to an increased social capital of people, which leads to an improved liveability. Thus, hypothesis 3b is accepted and the present study also contributes with a new finding to the existing literature (table 7.2).

The other determinants of liveability all hold a significant relation with the development of the liveability. Neighbourhood, job and house all hold a significant positive relation with the development of the liveability: when the satisfaction/assessment of those determinants is higher/better the chance to see improvement of liveability is also higher. For each of these determinants this is in line with previous research (Gieling & Haartsen, 2016; The Sociaal Planbureau Groningen, 2016d; Haarhoff & Beattie, 2017). This implies that hypotheses 4a, 4b and 4c can be accepted (table 7.2).

Social participation has a more complex relation with the development of the liveability. With perceived social participation of others there is a positive relation (similar to what was found for the other determinants), but people who are socially less active perceive both less decline as less improvement of liveability. When people are socially more active they perceive both more decline and more improvement of liveability. However, Gieling & Haartsen (2017) found that more social participation leads to a decline of liveability. Therefore hypothesis 4d can be partially accepted since the relation is not only negative, but both negative and positive.

**Table 7.2: Hypotheses belonging to part two.**

Hypothesis	Accept/Reject	Remarks
3a: Amount of available services is not important for the liveability.	Accept	
3b: Loss of a service negatively impacts the liveability.	Accept	Also found an improvement of the liveability when services disappear.
4a: Relation neighbourhood – development liveability is positive.	Accept	
4b: Relation job – development liveability is positive.	Accept	
4c: Relation house– development liveability is positive.	Accept	
4d: Relation social participation – development liveability is negative.	Partly accept	Relation in two ways, not only negative. Thus also more improvement of liveability when more active.  The perceived social participation of others holds a positive relation with the development of the liveability.

### Part three: Basic regression model: Role of services

Via a multinomial logistic regression model that included both the determinants of liveability and control variables, we addressed the question how big the role of availability/disappearance of services is on the liveability, compared to the other determinants. The availability of services does not play a role on the development of the liveability, confirming hypothesis 5a. The same holds for the disappearance of a service longer than 2 years ago, but a recent disappearance of at least one service holds a significant relation with the liveability: the odds are two times as big to perceive a decline of liveability over perceiving no change when at least one service disappears. So, hypothesis 5b must be

rejected for long-term disappearances, but can be accepted for more recent disappearances of services.

However, services do not play the most important role in perceiving a decline of liveability. The most important determinant is neighbourhood, which confirms hypothesis 5c. Furthermore, a lower satisfaction about housing and the amount of available jobs in the area also increase the odds of perceiving a decline in liveability. A higher level of social participation increases the odds of perceiving a decline. The only control variable that holds a significant relation is rural versus urban: people living in rural areas have lower odds of perceiving a decline of liveability. Using a model that only includes rural areas, a recent disappearance of a service gives slightly higher odds of perceiving a decline in liveability, so a disappearance has relatively more impact in rural areas. Job satisfaction is not significant anymore; being unsatisfied with the amount of jobs in a rural area does not hurt the liveability. It might be that people in rural areas accept the fact that little jobs are available in the area and that they are used to it, thereby not changing the liveability. Services play no role in the improvement of liveability in rural areas, only social participation and income hold a significant relation and give lower odds of perceiving an improvement over perceiving no change.

**Table 7.3: Hypotheses belonging to part three**

Hypothesis	Accept/Reject	Remarks
5a: Amount of available services hold no relation with the development of the liveability	Accept	
Hypothesis 5b: In conjunction with other variables the disappearance of services will still have a negative impact on the liveability.	Accept and reject	Accept for short term disappearances (<2 years); a bit worse for rural areas  Reject for disappearances longer ago (>2 years).
Hypothesis 5c: Neighbourhood will be the best predictor for the development of the liveability.	Accept	

#### Part four: Regression model with interaction

A recent disappearance of a service gives higher odds of perceiving a decline of liveability for lower educated people as compared to higher educated. Middle education does not significantly differ from high education. So a recent disappearance of a service is worse for lower educated, which confirms hypothesis 6c, although this relation is not significant anymore when analysing only rural areas. However, a recent disappearance of a service is neither worse for older people than for younger ones, nor for people with lower incomes compared to higher incomes. Also in areas with population decline, a disappearance of a service does not have a higher impact than in non-shrinkage areas. Therefore hypotheses 6a, 6b and 6d must be rejected.

**Table 7.4: Hypotheses belonging to part four**

Hypothesis	Accept/Reject	Remarks
6a: A recent disappearance of a service is worse for older people than for younger people.	Reject	
6b: A recent disappearance of a service is worse for people with lower incomes.	Reject	
6c: A recent disappearance of a service is worse for people with lower education.	Accept	Only significant for model one (rural+ urban). Not for model two (only rural).
6d: A recent disappearance of a service is worse in areas with population decline.	Reject	

## 8. Discussion

The first intention of this study was to analyse the impact of the disappearance/availability of each service individually on the development of the liveability. Due to low frequencies of disappearances per service this was not possible, so the plan was changed to analysing the effect of the frequency of the amount of services that disappeared on the development of the liveability. However, low numbers of more than one disappearance made this analysis impossible as well. Therefore the impact of the disappearance of at least one service as opposed to no disappearance of a service was studied.

The population decline was operationalized on municipality level, thereby losing the effects for smaller areas like villages, which might have biased the results obtained here. For people who are not very mobile, the availability of services in the village itself can be really important. This implies that no conclusions can be drawn for population decline on local level, but only on regional level. Furthermore, the mobility was not measured directly, but it was estimated via income and education levels. This estimation might not have been entirely accurate, biasing the results even more. Also, the decision was made to use the development of the liveability as independent variable, but it could also have been possible to use the liveability on its own. In that way conclusions can be drawn about the liveability itself instead of its changes.

Regarding the first part of the study, the causality between the significantly associated determinants of liveability and areas with and without population decline cannot be named. Chi-square tests only test for an association with, and not causality between variables. Therefore it cannot be concluded that population decline is the cause of the lower assessment of the determinants of liveability, but only that population decline is associated with lower assessment of these determinants. This also holds for the second part of the study: people might perceive more closure of services because they are more negative about the liveability, but it could also be the other way around.

We focus on the determinant services, the other determinants of liveability have not been analysed thoroughly. The neighbourhood has the biggest impact on the development of the liveability, so this is an interesting point to focus on in future research. Also, the results of this study concern the province of Groningen only, and therefore these results cannot be generalized for other regions because of the demographic and areal characteristics of the province. So in other parts of the Netherlands other results might be found.

Most determinants of liveability have an association with population decline and with the development of the liveability. So consequences of population decline should be avoided. Closures of services in the region should be prevented wherever this is possible, because it hurts the liveability of people, mainly of the lower educated. Not only because of the direct function of the service itself, but also because of the symbolic meaning of the service. A possible way would be via subsidizing services in areas to prevent them from closing up. A decline of the liveability can be prevented best by making sure that people are satisfied about the local job market, their housing, the social participation, but mostly the neighbourhood. A



low assessment of all these determinants give higher odds of perceiving a decline of liveability. However, these determinants can only prevent decline of the liveability. No determinant was found that significant higher odds of perceiving an improvement of liveability, which makes this still a difficult task for the province of Groningen.

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## 10. Appendices

### Appendix one: Survey liveability

## Leefbaarheid in Groningen

Fijn dat u mee wilt doen aan het onderzoek '**Leefbaarheid in Groningen**'. De volgende vraag staat centraal: "Hoe kijkt u aan tegen de leefbaarheid in uw dorp of wijk?"

In deze vragenlijst gaan we in op verschillende onderwerpen rondom leefbaarheid zoals uw tevredenheid met de woonomgeving, uw sociale contacten en hoe belangrijk of onbelangrijk u het vindt dat er bepaalde voorzieningen in de buurt zijn en blijven. Met uw bijdrage brengen we dit keer in beeld hoe het Groninger Panel aankijkt tegen de leefbaarheid in Groningen.

Deze vragenlijst wordt ook in Drenthe en Fryslân voorgelegd aan bewoners van deze provincies. Zo krijgen we een beeld van de leefbaarheid in de drie noordelijke provincies en de overeenkomsten en verschillen daar tussen.

Voor de zomer dit jaar zullen de eerste resultaten met u worden gedeeld. Daarnaast wordt deze gedeeld met de Provincie en alle Groninger gemeenten als input voor het maken van beleid.

Leest u rustig de vragen en geef het antwoord dat het eerst bij u opkomt. Het invullen van de vragenlijst duurt ongeveer 15 minuten (wellicht duurt het invullen wat langer).

Alvast hartelijk dank voor het meedoen!

### LEEFBAARHEID ALGEMEEN

We beginnen met een aantal algemene vragen over de leefbaarheid in uw woonomgeving. Met woonomgeving bedoelen we het dorp of de wijk waarin u woont. Woont u in een buitengebied, neem dan telkens het gebied in gedachten dat u als woonomgeving ervaart.

**1. Hoe tevreden of ontevreden bent u met de leefbaarheid in uw dorp of wijk?**

Eén antwoord mogelijk

Geeft u alstublieft een rapportcijfer tussen de 1 en 10. Het cijfer 1 staat voor de laagste waardering en het cijfer 10 voor de hoogste waardering.

1—2—3—4—5—6—7—8—9—10

**2. Vindt u dat de leefbaarheid in uw dorp of wijk de afgelopen 12 maanden vooruit is gegaan, gelijk is gebleven of achteruit is gegaan?**

Eén antwoord mogelijk

- Erg vooruit
- Vooruit
- Gelijk gebleven
- Achteruit
- Erg achteruit
- Weet ik niet

**3. Waaraan merkt u dat de leefbaarheid in uw dorp of wijk vooruit/achteruit/of gelijk is gebleven?**

[open vraag] **TEKSTVAK, niet verplicht**

## **Woonomgeving, sociale contacten en de woning**

**4. Kunt u voor de volgende uitspraken over uw dorp of wijk aangeven in hoeverre u het hiermee eens of oneens bent?**

**Eén antwoord per stelling mogelijk**

In mijn dorp of wijk:

- a. is het aantrekkelijk wonen
- b. staan veel woningen en gebouwen leeg
- c. staan veel huizen te koop
- d. worden huizen die te koop staan snel verkocht
- e. worden veel nieuwe huizen gebouwd
- f. is er is braakliggende grond door de sloop van gebouwen
- g. zijn de fiets- en wandelpaden goed onderhouden
- h. zijn er veel vervallen huizen en/of gebouwen
- i. is er voldoende groen
- j. zijn de perken en plantsoenen goed onderhouden

- Helemaal mee eens
- Mee eens
- Neutraal
- Mee oneens
- Helemaal mee oneens
- Weet ik niet

**5. Hoe tevreden of ontevreden bent u in het algemeen over uw sociale contacten in uw dorp of wijk?**

**Eén antwoord mogelijk**

Geef u alstublieft een rapportcijfer tussen de 1 en 10. Het cijfer 1 staat voor de laagste waardering en het cijfer 10 voor de hoogste waardering.

*1—2—3—4—5—6—7—8—9—10*

**6. Kunt u voor de volgende uitspraken aangeven in hoeverre u het hiermee eens of oneens bent?**

**Per stelling één antwoord mogelijk.**

- a. Mensen gaan op een prettige manier met elkaar om
- b. Ik woon in een gezellig(e) dorp/wijk met veel saamhorigheid
- c. Het is vervelend om in dit dorp/deze wijk te wonen
- d. Ik voel mij veilig in mijn dorp/wijk
- e. Ik voel me wel eens eenzaam in dit dorp/deze wijk
- f. De mensen kennen elkaar nauwelijks in dit dorp/deze wijk
- g. Ik voel me thuis in dit dorp/deze wijk

- h. Ik heb veel contact met mijn directe burens
- i. Ik heb geen behoefte aan contact met mijn buurtgenoten

- Helemaal mee eens
- Mee eens
- Neutraal
- Mee oneens
- Helemaal mee oneens

**7. Hoe tevreden of ontevreden bent u in het algemeen over de woning/woonruimte waar u momenteel woont?**

Eén antwoord mogelijk

Geeft u alstublieft een rapportcijfer tussen de 1 en 10. Het cijfer 1 staat voor de laagste waardering en het cijfer 10 voor de hoogste waardering.

1—2—3—4—5—6—7—8—9—10

**8. Kunt u van de volgende kenmerken van uw woning/woonruimte aangeven hoe tevreden of ontevreden u hierover bent?**

Per stelling één antwoord mogelijk.

- a. De toegankelijkheid tot snel internet in uw woning
- b. De mogelijkheid om in uw woning lang zelfstandig thuis te blijven wonen
- c. De staat van onderhoud van uw woning
- d. De aantrekkelijkheid van uw woning
- e. De waardeontwikkeling van uw woning
- f. De energiezuinigheid van uw woning

- Helemaal mee eens
- Mee eens
- Neutraal
- Mee oneens
- Helemaal mee oneens
- Weet niet / niet van toepassing

## Inzet en verbondenheid

De volgende vragen gaan over de inzet voor de leefbaarheid en de mate waarin u zich wel of niet verbonden voelt met uw dorp of wijk.

**9. Wie zou zich, volgens u, vooral moeten inzetten voor de leefbaarheid in uw dorp/wijk?**

Meerdere antwoorden mogelijk

- a. Ikzelf
- b. Iedere burger
- c. Vereniging die belangen behartigt voor uw dorp of wijk
- d. Mijn gemeente
- e. De provincie Groningen/Friesland/Drenthe
- f. De Nederlandse regering
- g. Anders, namelijk: [open tekstvak]



h. Weet ik niet

10. **Kunt u aangeven in welke mate u het eens of oneens bent met de onderstaande stellingen?**

Eén antwoord mogelijk

- a. Ik ben actief betrokken bij wat er in mijn dorp of wijk gebeurt
- b. Ik woon in een dorp of wijk waar veel buurtbewoners actief betrokken zijn

- Helemaal mee eens
- Mee eens
- Neutraal
- Mee oneens
- Helemaal mee oneens

11. **In welke mate voelt u zich wel of niet verbonden met:**

Per antwoordcategorie één antwoord mogelijk.

- a. Uw dorp of wijk
- b. Uw gemeente
- c. Uw provincie
- d. Nederland
- e. Europa

- Erg verbonden
- Verbonden
- Neutraal
- Niet verbonden
- Helemaal niet verbonden

## Voorzieningen

De volgende vragen gaan over voorzieningen in uw dorp of wijk.

12. **Hoe tevreden of ontevreden bent u in het algemeen over de voorzieningen in uw dorp of wijk?**

Eén antwoord mogelijk

Geeft u alstublieft een rapportcijfer tussen de 1 en 10. Het cijfer 1 staat voor de laagste waardering en het cijfer 10 voor de hoogste waardering.

1—2—3—4—5—6—7—8—9—10

13. **Hoe belangrijk of onbelangrijk vindt u de aanwezigheid van de volgende voorzieningen in uw dorp of wijk?**

Per voorziening is één antwoord mogelijk.

- a. Supermarkt
- b. Basisschool
- c. Huisarts
- d. Dorpshuis / Buurthuis / Wijkcentrum
- e. Bushalte of treinstation

- f. Pinautomaat
- g. Café
- h. Sportvereniging/sportschool
- i. Kerk/gebedshuis

- Zeer belangrijk
- belangrijk
- Neutraal
- Onbelangrijk
- Zeer onbelangrijk

**14. Zijn de volgende voorzieningen momenteel in uw dorp of wijk aanwezig?**

Per voorziening is één antwoord mogelijk.

- a. Supermarkt
- b. Basisschool
- c. Huisarts
- d. Dorpshuis/Buurthuis/Wijkcentrum
- e. Bushalte of treinstation
- f. Pinautomaat
- g. Café
- h. Sportvereniging/sportschool
- i. Kerk/gebedshuis

- Ja
- Nee, korter dan 2 jaar geleden gesloten
- Nee, langer dan 2 jaar geleden gesloten
- Nee, is er in de tijd dat ik er woon nooit geweest
- Ik weet het niet

**15. Stel, deze voorzieningen dreigen te verdwijnen uit uw dorp of wijk. Kunt u per voorziening aangeven wat uw reactie zou zijn? U kunt meerdere antwoorden aankruisen**

[checkbox (matrix waarbij meerdere antwoorden mogelijk zijn Multi-responsevraag] Per voorziening is één antwoord mogelijk.

- a. Supermarkt
- b. Basisschool
- c. Huisarts
- d. Dorpshuis/Buurthuis/Wijkcentrum
- e. Bushalte of treinstation
- f. Pinautomaat
- g. Café
- h. Sportvereniging/sportschool
- i. Kerk/gebedshuis

- ik zou niets doen
- Ik ga een alternatief zoeken
- Ik ga zelf actie ondernemen/een initiatief starten om het te behouden

- Ik sluit me aan bij acties/initiatieven om het te behouden
- Ik ga verhuizen vanwege het gemis van deze voorziening
- Anders, namelijk ...[open vraag]

**16. Welke van de onderstaande plaatsen zijn belangrijk als ontmoetingsplek binnen uw dorp of wijk? U mag meerdere antwoorden aanvinken**

Meerdere antwoorden mogelijk

- Dat weet ik niet
- Supermarkt
- Basisschool
- Huisarts
- Dorpshuis/Buurthuis/Wijkcentrum
- Bushalte of treinstation
- Pinautomaat
- Café
- Sportvereniging/sportschool
- Kerk/gebedshuis
- Speeltuin
- Bij iemand thuis
- Op straat
- Andere ontmoetingsplek, namelijk.....[open antwoordcategorie]

## Werk of studie

**17. Hoe tevreden of ontevreden bent u met de hoeveelheid beschikbaar werk in het algemeen in uw regio?**

Eén antwoord mogelijk

1 helemaal niet tevreden – 2 niet tevreden – 3 neutraal – 4 tevreden – 5 heel tevreden – 6 weet ik niet

**18. Hoe tevreden of ontevreden bent u met de hoeveelheid beschikbaar werk voor u in uw regio?**

Eén antwoord mogelijk

**ROUTING:** als 'ik ben met pensioen' dan volgende 2 vragen overslaan.

1 helemaal niet tevreden – 2 niet tevreden – 3 neutraal – 4 tevreden – 5 heel tevreden – 6 weet ik niet – 7 niet van toepassing – 8 ik ben met pensioen

**19. Hoe lang reist u gemiddeld van uw woning naar uw werk- of studieplek? Het betreft hier het aantal minuten dat u aan een enkele reis besteedt**

Eén antwoord mogelijk

- ik werk thuis
- 1 – 14 minuten
- 15 – 29 minuten

- d. 30 – 44 minuten
- e. 45 – 59 minuten
- f. 60 minuten of langer
- g. niet van toepassing

**20. Hoe lang zou u per dag maximaal willen reizen van of naar uw werk of studie?** Het betreft hier het aantal minuten dat u aan een enkele reis besteedt

- a. minder dan 15 minuten
- b. 15 – 29 minuten
- c. 30 – 44 minuten
- d. 45 – 59 minuten
- e. 60 minuten of langer
- f. niet van toepassing

## Verhuizen

In dit blok stellen we u een aantal vragen over verhuizen, of u in de afgelopen jaren bent verhuisd en of verhuisplannen heeft.

Allereerst zijn we benieuwd hoe lang u in uw huidige woonplaats woont.

**21. Hoe lang woont u in uw huidige woonplaats?** Indien u hier korter dan een jaar woont, vul dan 0 jaar in.

... jaar[open antwoordcategorie]

**22. Bent u in de afgelopen 5 jaar verhuisd?**

Eén antwoord mogelijk ROUTING: Als 'nee' dan door naar 30

- a. Ja
- b. Nee

**23. Wat is de afstand over de weg tussen uw vorige en uw huidige woning?**

... kilometer[open antwoordcategorie] + escape 'minder dan een kilometer'

**24. Wat waren voor u de belangrijkste reden(en) om te verhuizen? U kunt maximaal 3 antwoorden aangeven.**

Drie antwoorden mogelijk

- a. Vanwege persoonlijke omstandigheden (huwelijk, samenwonen, scheiding etc.)
- b. Vanwege studie
- c. Vanwege werk
- d. Ik wilde dichterbij familie, vrienden of kennissen wonen
- e. Vanwege gezondheid (wilde kleinere woning, gelijkvloerse woning, woning zonder tuin)
- f. Ik wilde dichterbij zorgvoorzieningen gaan wonen
- g. Ik wilde dichterbij sport-, culturele voorzieningen en/of winkels gaan wonen
- h. Ik was niet tevreden met mijn woning (grootte, kwaliteit, type)
- i. Ik was niet tevreden met mijn woonomgeving
- j. Ik wilde een huis kopen
- k. Ik wilde weg uit de regio waar ik voorheen woonde
- l. [Ik wilde weg vanwege de aardbevingen] *alleen in Groningen*

m. Andere reden, namelijk ... [open antwoordcategorie]

**25. Bent u van plan om binnen 2 jaar te verhuizen?**

Eén antwoord mogelijk ROUTING: bij 'ja' vr 33 overslaan, bij 'nee' door naar 33, bij 'misschien' beide vragen (32 en 33) laten doen

- a. Ja
- b. Misschien
- c. Nee

**26. Wat zijn voor u de belangrijkste redenen om (misschien) te gaan verhuizen? U kunt maximaal 3 antwoorden aangeven.**

Maximaal drie antwoorden mogelijk

- a. Vanwege persoonlijke omstandigheden (huwelijk, samenwonen, scheiding etc.)
- b. Vanwege studie
- c. Vanwege werk
- d. Ik wil dichterbij familie, vrienden of kennissen wonen
- e. Vanwege gezondheid (wil kleinere woning, gelijkvloerse woning, woning zonder tuin)
- f. Ik wil dichterbij zorgvoorzieningen gaan wonen
- g. Ik wil dichterbij sport-, culturele voorzieningen en/of winkels gaan wonen
- h. Ik ben niet tevreden met mijn huidige woning (grootte, kwaliteit, type)
- i. Ik ben niet tevreden met mijn huidige woonomgeving
- j. Ik wil een huis kopen
- k. Ik wil weg uit Groningen/Drenthe/Friesland (Eigen provincie invoegen)
- l. Ik wil weg uit het Noorden
- m. [Ik wil weg vanwege de aardbevingen] *alleen in Groningen*
- n. Andere reden, namelijk ... [open antwoordcategorie]

**27. Wat zijn voor u de belangrijkste redenen dat u graag wilt blijven wonen op uw huidige woonplek? U kunt maximaal 3 antwoorden aangeven.**

Maximaal drie antwoorden mogelijk

- a. Ik ben tevreden met mijn huidige woning
- b. Ik ben tevreden met mijn huidige woonomgeving
- c. Ik ben tevreden met de sfeer in de buurt
- d. De nabijheid van familie of vrienden
- e. De nabijheid van voorzieningen
- f. Ik wil nog bij mijn ouders blijven wonen
- g. Ik wil dichtbij mijn werk of studieplaats blijven wonen
- h. De huizenmarkt is momenteel ongunstig
- i. Ik wil graag in [Groningen/Drenthe/Friesland] blijven wonen *Eigen provincie invoegen*
- j. Ik wil graag in het Noorden blijven wonen
- k. Andere reden, namelijk ... [open antwoordcategorie]

## Toekomst

De laatste vragen gaan over hoe u de toekomst van uw dorp of wijk ziet.

**28. Hoe ziet u de toekomst van uw dorp of wijk?**

Eén antwoord mogelijk

- a. Ik zie de toekomst vooral zonnig tegemoet
- b. Ik kijk er neutraal tegen aan
- c. Ik maak me vooral zorgen

**29. Wilt u uw antwoord toelichten?**

[OPEN TEKSTVAK] niet verplicht

**30. Wat is er volgens u nodig om uw dorp of wijk in de toekomst leefbaar te houden/maken?**

[OPEN TEKSTVAK] niet verplicht

Tot slot, heeft u verder nog opmerkingen over de onderwerpen die in deze vragenlijst aan bod zijn gekomen?

[open vraag] TEKSTVAK

**Appendix two: Frequencies original categorization per service**

Is the following service available in your area?		Frequency
<b>Grocery Store</b>	Yes	1652 (74.5%)
	No, disappeared <2 years	8 (0.4%)
	No, disappeared >2 years	188 (8.5%)
	No, never been present	369 (16.6%)
	I don't know	1 (0%)
<b>School</b>	Yes	1911 (86.2%)
	No, disappeared <2 years	42 (1.9%)
	No, disappeared >2 years	93 (4.2%)
	No, never been present	131 (5.9%)
	I don't know	41 (1.8%)
<b>Doctor</b>	Yes	1657 (74.7%)
	No, disappeared <2 years	11 (0.5%)
	No, disappeared >2 years	64 (2.9%)
	No, never been present	453 (20.4%)
	I don't know	33 (1.5%)
<b>Community Center</b>	Yes	1804 (81.3%)
	No, disappeared <2 years	21 (0.9%)
	No, disappeared >2 years	34 (1.5%)
	No, never been present	211 (9.5%)
	I don't know	148 (6.7%)
<b>ATM</b>	Yes	1456 (65.6%)
	No, disappeared <2 years	60 (2.7%)
	No, disappeared >2 years	183 (8.3%)
	No, never been present	486 (21.9%)
	I don't know	33 (1.5%)

<b>Bus stop/Train station</b>	Yes	2020 (91.1%)
	No, disappeared <2 years	29 (1.3%)
	No, disappeared >2 years	45 (2%)
	No, never been present	109 (4.9%)
	I don't know	15 (0.7%)
<b>Café</b>	Yes	1573 (70.9%)
	No, disappeared <2 years	65 (2.9%)
	No, disappeared >2 years	185 (8.3%)
	No, never been present	319 (14.4%)
	I don't know	76 (3.4%)
<b>Sports club</b>	Yes	1813 (81.7%)
	No, disappeared <2 years	10 (0.5%)
	No, disappeared >2 years	31 (1.4%)
	No, never been present	250 (11.3%)
	I don't know	114 (5.1%)

### Appendix three: Frequencies original categorization of the questions that form the neighbourhood determinant

It is attractive to live in my neighbourhood	Frequency
Totally agree	530 (23.9%)
Agree	1305 (58.8%)
Neutral	281 (12.7%)
Disagree	78 (3.5%)
Totally disagree	22 (1%)
I don't know	2 (0.1%)

In my neighbourhood the people are friendly	Frequency
Totally agree	243 (11%)
Agree	1419 (64%)
Neutral	469 (21.1%)
Disagree	79 (3.6%)
Totally disagree	8 (0.4%)

In my neighbourhood there is enough green space	Frequency
Totally agree	423 (19.1%)
Agree	1240 (55.9%)
Neutral	301 (13.6%)
Disagree	191 (8.6%)
Totally disagree	58 (2.6%)
I don't know	5 (0.2%)

The maintenance in my neighbourhood is good	Frequency
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Totally agree	158 (7.1%)
Agree	931 (42%)
Neutral	605 (27.3%)
Disagree	329 (14.8%)
Totally disagree	169 (7.6%)
I don't know	26 (1.2%)

I feel safe in my neighbourhood	Frequency
Totally agree	442 (19.9%)
Agree	1420 (64%)
Neutral	249 (11.2%)
Disagree	88 (4%)
Totally disagree	19 (0.9%)

My neighbourhood is clean	Frequency
Totally agree	95 (4.3%)
Agree	909 (41%)
Neutral	598 (27%)
Disagree	386 (17.4%)
Totally disagree	197 (8.9%)
I don't know	33 (1.5%)

#### Appendix four: Crosstabs population decline – Determinants of liveability

Amount of available services	Population decline		Chi: 0.001
	No	Yes	Total
0-2	65 (6.5%)	122 (10%)	187 (8.4%)
3-5	193 (19.3%)	277 (22.7%)	470 (21.2%)
6-8	742 (74.2%)	818 (67.2%)	1561 (70.4%)

Recent disappearance of at least one service	Population decline		Chi: 0.054
	No	Yes	Total
No disappearance	906 (90.6%)	1107 (90.94%)	2013 (90.8%)
At least one disappearance	94 (9.4%)	111 (9.1%)	205 (9.2%)

Disappearance of at least one service longer ago	Population decline		Chi: 0.000
	No	Yes	Total
No disappearance	840 (84%)	894 (73.4%)	1734 (78.2%)
At least one disappearance	160 (16%)	324 (26.6%)	484 (21.8%)



Average assesment of the neighbourhood	Population decline		Chi: 0.000
	No	Yes	Total
Unhappy	16 (1.6%)	44 (3.6%)	60 (2.7%)
Neutral	240 (24%)	356 (29.2%)	596 (26.9%)
Happy	744 (74.4%)	818 (67.2%)	1562 (70.4%)

Happy with amount of work	Population decline		Chi: 0.000
	No	Yes	Total
Unhappy	145 (17.9%)	440 (42.1%)	585 (31.6%)
Neutral	341 (42.2%)	406 (38.8%)	747 (40.3%)
Happy	322 (39.9%)	200 (19.1%)	522 (28.2%)

Satisfaction with house	Population decline		Chi: 0.182
	No	Yes	Total
Insufficient	29 (2.9%)	52 (4.3%)	81 (3.7%)
Sufficient	193 (19.3%)	246 (20.2%)	439 (19.8%)
Good	778 (77.8%)	920 (75.5%)	1698 (76.6%)

Own social participation	Population decline		Chi: 0.027
	No	Yes	Total
Inactive	264 (26.4%)	378 (31%)	642 (28.9%)
Neutral	422 (42.2%)	507 (41.6%)	929 (41.9%)
Active	314 (31.4%)	333 (27.3%)	647 (29.2%)

Perceived social participation of others	Population decline		Chi: 0.000
	No	Yes	Total
Inactive	159 (15.9%)	270 (22.2%)	429 (19.3%)
Neutral	488 (48.8%)	582 (47.8%)	1070 (48.2%)
Active	353 (35.3%)	366 (30%)	719 (32.4%)

#### Appendix five: Crosstabs determinants of liveability – Development of liveability

Development of the liveability	Amount of available services			Chi:0.081
	0-2	3-5	6-8	Total
Declined	50 (27.2%)	102 (22.1%)	294 (19.1%)	446 (20.4%)
Stayed the same	116 (63%)	313 (67.7%)	1098 (71.5%)	1527 (70%)
Improved	18 (9.8%)	47 (10.2%)	144 (9.4%)	209 (9.6%)

Development of the liveability	At least one service disappeared <2 years		Chi: 0.002
	No	Yes	Total
Declined	392 (19.8%)	54 (26.9%)	446 (20.4%)
Stayed the same	1408 (71.1%)	119 (59.2%)	1527 (70%)

Improved	181 (9.1%)	28 (13.9%)	209 (9.6%)
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Development of the liveability	At least one service disappeared >2 years		Chi: 0.004
	No	Yes	Total
Declined	326 (19.1%)	120 (25.1%)	446 (20.4%)
Stayed the same	1221 (71.7%)	306 (63.9%)	1527 (70%)
Improved	156 (9.2%)	53 (11.1%)	209 (9.6%)

Development of the liveability	Average neighbourhood assessment			Chi: 0.000
	(Very) bad	Neutral	(Very) good	Total
Declined	42 (72.4%)	205 (34.7%)	199 (13%)	446 (20.4%)
Stayed the same	14 (24.1%)	352 (59.7%)	1161 (75.7%)	1527 (70%)
Improved	2 (3.4%)	33 (5.6%)	174 (11.3%)	209 (9.6%)

Development of the liveability	Satisfaction with the amount of work in general in the area			Chi: 0.000
	(Very) unhappy	Neutral	(Very) happy	Total
Declined	155 (27%)	152 (20.7%)	70 (13.6%)	446 (20.4%)
Stayed the same	375 (65.3%)	507 (68.9%)	385 (74.6%)	1527 (70%)
Improved	44 (7.7%)	77 (10.5%)	61 (11.8%)	209 (9.6%)

Development of the liveability	Satisfaction with own house			Chi: 0.000
	Insufficient	Sufficient	Good	Total
Declined	42 (53.8%)	122 (28.3%)	282 (16.9%)	446 (20.4%)
Stayed the same	32 (41%)	281 (65.2%)	1214 (72.6%)	1527 (70%)
Improved	4 (5.1%)	28 (6.5%)	177 (10.6%)	209 (9.6%)

Development of the liveability	Own social participation			Chi: 0.000
	(Very) inactive	Neutral	(Very) active	Total
Declined	122 (19.4%)	171 (18.7%)	282 (23.9%)	446 (20.4%)
Stayed the same	462 (73.6%)	281 (72.5%)	1214 (62.9%)	1527 (70%)
Improved	44 (7%)	80 (8.8%)	85 (13.3%)	209 (9.6%)

Development of the liveability	Perceived social participation of others			Chi: 0.000
	(Very) inactive	Neutral	(Very) active	Total
Declined	113 (26.7%)	200 (19.1%)	133 (18.7%)	446 (20.4%)
Stayed the same	284 (67.1%)	758 (72.3%)	485 (68.3%)	1527 (70%)
Improved	26 (6.1%)	91 (8.7%)	92 (13%)	209 (9.6%)