Liveability in shrinking cities
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Definitive research proposal

Lab: Housing Management
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Cover images:
Top left: Bunker Emmastrasse in Gelsenkirchen before intervention
Top right: Bunker Emmastrasse in Gelsenkirchen after intervention
Mid left: Bochumerstraede in Gelsenkirchen before renovation of the pedestrian area
Mid right: Bochumerstraede in Gelsenkirchen after renovation of the pedestrian area
Bottom left: Retail property in Heerlen before intervention
Bottom right: Impression of the retail property in Heerlen after intervention

Cover images of Gelsenkirchen are retrieved on 06-06-2015 from http://www.stadterneuerung-gelsenkirchen.de/Projektgebiete/Suedost/Galerie/

Cover images of Heerlen are retrieved from "Heerlense binnenstad op weg" 2010)
Preface

Demographics are changing and shrinkage is experienced in more and more cities worldwide. Since shrinkage is not that widespread in the Netherlands, it is expected that shrinkage will occur in a growing number of cities in the Netherlands. Often, when thinking about shrinking cities, these cities are pictured as ‘ghost cities’. This picture often involves abandoned streets and buildings. Whilst vacancy is common in shrinking cities, these cities are far from abandoned.

This report is the proposal to research how the liveability can be maintained in shrinking cities. This research is a specialisation in the Housing Management laboratory from the master Real Estate and Housing at the faculty of Architecture of the Delft University of Technology. This research proposal is more or less a contract between the student and the supervisors with the flexibility to adjust the proposal based on new insights that occur during the research.

Based on this research proposal, I am looking forward to conduct the research the coming semester.

Isabeau Dieleman, 05-06-2015
Summary

Worldwide, demographics and economy are changing. Due to the changing demographics and economy, more and more cities are experiencing shrinkage. Changing demographics and changing economy are the two main causes for shrinkage. The effects of shrinkage are, however, more complex. Shrinkage affects the urban hardware, i.e. the tangible, the urban software, i.e. the way inhabitants of a city interact with each other and the urban mindware, i.e. the image of a city.

Effects on the urban hardware are vacancy of buildings, decay of buildings and the public space and low job opportunities. Effects on urban software are changes of the socio-economic structure and weakening of the social network. Effects on urban mindware are concerned with the negative image of shrinkage and the discouraged local empowerment.

In the Netherlands there is a negative trend concerning the liveability scores in shrinking cities. This negative trend is due to hardware elements such as availability of amenities and software elements such as population composition and an increased number of violent crimes.

To increase or maintain the liveability in shrinking cities, municipalities often utilise the possibilities of urban regeneration. Urban regeneration is used to improve the urban hardware, software and mindware of a city that has been exposed to change by use of a complete and integrated vision for the city and the subsequent actions.

In both the Netherlands and Germany, mining cities are experiencing shrinkage. This shrinkage is mainly due to the closing of the mines. In the Netherlands, Heerlen is a shrinking mining city and in Germany, Gelsenkirchen is an example of a mining city that is experiencing shrinkage.

It is clear that there are strategies developed in order to maintain or improve the liveability in both cities. Measures that are taken to maintain the liveability in Gelsenkirchen include improvement of the physical environment but also improving education possibilities is one of the priorities in Gelsenkirchen. Besides these measures, resident involvement is important and stimulated by creating funds which can be used for projects initiated by residents. In Heerlen, measures focus on the physical environment as well. Infrastructure is improved and the housing stock is addressed. Furthermore, the IBA (International Building Exhibition) in Parkstad Limburg focuses on involving all parties that might benefit from the urban renewal.
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1. Introduction

1.1. Scientific relevance
In Europe, an increasing number of cities is experiencing shrinkage and it is expected that even more cities will experience shrinkage in the future because of the expected population decline. Even though more cities are experiencing shrinkage, urban renewal and urban regeneration policies are in most cases still focused on growth. When a city is shrinking, the urban task changes and therefore the urban regeneration strategy has to change as well. Currently, shrinking cities are experimenting to determine the appropriate approach since shrinkage is a relatively new challenge in the Netherlands. This research will contribute to the decision making of municipalities regarding an appropriate strategy to cope with shrinkage.

1.2. Societal relevance
When cities are shrinking, the living environment is changing as well. Because an increasing amount of cities is going to experience shrinkage, an increasing amount of the population will encounter shrinkage. Because of the emergence of the participation society, more people will be involved finding ways to cope with shrinkage. Furthermore, since shrinkage is effecting the living environment, residents of shrinking areas benefit from a well-established strategy to maintain the liveability of their surroundings.

1.3. Personal motivation
More and more cities are experiencing shrinkage. When thinking about shrinking cities, most people think about ghost towns where there is a lot of vacancy and decay such as not well maintained facades or public space. However, this is not necessarily true. Many cities are trying to counter shrinkage by taking various measures to attract people to their city. While this sounds as a good thing, it might not be. The demographics are changing and it is believed that eventually the population in the western world will shrink as a whole. This means that if one city is countering shrinkage, another city encounters even more shrinkage. Therefore municipalities should not attempt to counter shrinkage but cope with shrinkage. Many cities, especially in Germany and the UK, accepted the fact that they are shrinking and are coping with the effects of shrinkage. The reason for the choice of this research topic is that some cities in the Netherlands are experiencing shrinkage already and many cities in the Netherlands are expected to experience shrinkage in the future and it is interesting to know what strategies other cities are employing to cope with shrinkage and what the effects of these efforts are so this information can be used by municipalities in the Netherlands.

1.4. Problem analysis
Shrinkage is an increasingly common phenomenon in cities across Europe. Shrinkage can occur on different levels such as on the level of a country, a region or a city. Because the effects of shrinkage and the perception of these effects play an important role when considering shrinkage, this research considers shrinkage on the city level. There are several causes for shrinkage, for instance, a death surplus or decreased job opportunities. When the effects of shrinkage become visible, when there are vacant houses or vacant retail properties, the liveability in shrinking cities might decrease. When the liveability in a city decreases, it is likely that more households move away and the shrinking rate increases. Besides the visible effects, there are other effects of shrinkage. Tax income of a municipality decreases and the willingness to invest decreases as well.
There is a drop in house prices and less people are willing to settle in the city. Often, vacant properties will deteriorate which might lead to decreased liveability as well. A lot of research on shrinking cities is concerned with the possibilities to counter shrinkage. Countering shrinkage is however not the best option since attracting more residents to one city will cause for another city to shrink. Therefore, maintaining the liveability for the remaining residents and by doing that, creating an equilibrium in the number of households is a more appropriate strategy. Whilst it is clear that maintaining or improving the liveability for the remaining residents of a city is a more appropriate strategy, it is not yet known what policies have a positive effect on the liveability. Further information on the problem analysis can be found in chapter 2.

1.5. Research questions

Main research question
Which measures taken by both the municipality and private parties influence the liveability in shrinking cities in a positive way?

Detailed research questions
- Which measures are taken by the municipalities and private parties in Gelsenkirchen in Germany and in Heerlen in the Netherlands?
- What are the effects of the measures on the liveability in Gelsenkirchen and Heerlen?
- Why do the implemented measures have that effect on the liveability in Gelsenkirchen and Heerlen?
- What measures taken by the municipalities and private parties in Gelsenkirchen that are effective in maintaining the liveability are not taken in Heerlen?
- Could the measures that are taken in Gelsenkirchen and are not taken in Heerlen be effective in Heerlen in maintaining the liveability in that area?

1.6. Objective and intended result

The objective of this research is to analyse which measures that are taken by municipalities of and private parties in shrinking cities contribute to the preservation or improvement of the liveability in a city. The result of this research will be a report which indicates which measures are taken by the different parties and what the effect on the liveability of those measures was and why these measures had a certain effect. Because the final report will indicate why certain measures had a certain effect, the report can be used by municipalities and private parties to make well informed choices on which measures they might implement to maintain or improve the liveability in their city. The reasons why the effects are achieved are important to mention since the reasons for the effects are location specific and without knowing why a measure had a certain effect it is impossible to indicate if a measure could be effective in another city.
1.7. Research design

1.7.1. Research methods

The two cases, Heerlen and Gelsenkirchen, will be studied in literature, policy documents and reports and by interviewing alderman, housing associations and ‘Stadtteilbüros’. Literature, policy documents and reports will provide information on the measures that have been taken to improve the liveability in both cities. To assess the effect of the measures that are taken, official evaluation reports will be used and this information will be complemented by more up to date information obtained through interviews with alderman, housing associations and ‘Stadtteilbüros’. The opinion of residents on the measures will be obtained through surveys. Furthermore, the case areas will be visited for observations to obtain information that complements information from the reports and policy documents.

1.7.2. Phasing

The phasing in Figure 1 shows the steps to be taken to complete the research. First, it is analysed which measures are taken in Gelsenkirchen and which measures are taken in Heerlen. Second, the effect of the measures is analysed followed by the reason for these effects. Then the difference in the measures taken is studied to see if there are measures taken in Gelsenkirchen that are not taken in Heerlen in order to analyse whether those measures could have a positive effect on the liveability in Heerlen.

Figure 1. Phasing of this graduation research (own illustration).

1.8. Readers guide

Chapter two of this report will go deeper into the theory of shrinking cities by explaining the causes and effects of shrinkage in the first paragraph, liveability in shrinking cities in the second paragraph followed by an explanation of urban regeneration in the third paragraph and the background on shrinking cities in Germany and the Netherlands where a closer look is taken at Gelsenkirchen and Heerlen. The last paragraph of chapter two will focus on the indicators that will be used to evaluate the policies in both cities. Chapter three will outline the provisional table of contents for the final report with a description of the expected content per chapter. In the last chapter the planning for this research will be outlined.
2. Theoretical framework

2.1. Causes and effects of shrinkage

For many years, more and more cities are experiencing shrinkage. Often, shrinkage is defined as an experience of a significant decline in population. However, as described by Mulder (2010) shrinkage becomes visible when there is a high vacancy rate of dwellings, shops, offices and factories. Vacancy is caused by a decline in the demand for housing in an area and therefore a decline in households. If shrinkage is defined as a decline in the population, the effects of shrinkage do not necessarily become visible, since then shrinkage can also occur because the size of the households is shrinking (Mulder, 2008). Therefore, one could say that shrinkage should be defined as a decline in the number of households and not as a decline in the population. Unfortunately, most research on shrinking cities focuses on a decline in population.

There are various causes for shrinkage. One cause is a decrease in job opportunities which leads to a negative migratory balance. A second cause is a low fertility rate or a death surplus. Besides these relatively clear causes for shrinkage, former industrial cities also have to cope with environmental conditions that are suboptimal which might reinforce shrinkage. These causes have several effects. These effects occur in the hardware, software and mindware of a city (Hospers, 2013, 2014). Hospers (2013, 2014) explains urban hardware as the “visible, tangible and countable” elements of a city such as infrastructure but also the local economy. The software of a city refers to the norms and values of inhabitants and the way the inhabitants act and interact. Urban mindware relates to the image of the city.

Urban hardware effects that are commonly regarded to when discussing shrinkage are, amongst others, vacancy of all types of real estate, decay of real estate and the public space, high unemployment rates, little job opportunities and low willingness to invest. However, shrinkage also affects the urban software of a city. According to Hospers (2013) the young and talented tend to move away in case of shrinkage thus leaving the elderly and underprivileged behind. This leads to a change in the socio-demographic structure of a shrinking city. This does not only lead to less creativity and entrepreneurship but it also weakens social networks and therefore the community morale.

Lastly, shrinkage affects the urban mindware since shrinkage has a negative image and when the residents of a shrinking city are aware of this negative image, they might feel inferior to people living in ‘successful’ cities and this discourages local empowerment.

2.2. Liveability in shrinking cities

There are some studies conducted in which either the liveability in shrinking cities or the quality of life in shrinking areas was researched (Delken, 2008; Hollander, 2011; Leidelmeijer & Marlet, 2011). At first, it seems that there is little difference between those studies since they are all concerned with the question of how pleasant it is to live in a certain area. However, there is a difference between liveability and quality of life. The main difference in these definitions is the person-surroundings relation (Leidelmeijer & van Kamp, 2003). Quality of life has the person as object and uses the perspective of the surroundings, in other words, the extent to which the surroundings contribute to the degree to which characteristics of life fit someone’s needs and wishes. Liveability concerns the surroundings and uses the perspective of people, liveability is about
whether the living environment meets the conditions that are set by the residents and if so, to what extent these conditions are met. In shrinking cities, the perception of people plays an important role because people, especially the out-migration of people and the reasons to move out, ensure the continuation of shrinkage. By creating a positive perception on the living environment, out-migration can be prevented. Therefore, this research will focus on liveability.

While the conclusion in most studies is that liveability problems do not occur in shrinking cities, the data behind these studies suggests differently. When looking at the data that is used in the research of Hollander (2011), it becomes clear that there are large differences in the perceived liveability in the different shrinking cities. For example, in Cleveland the amount of occupied housing units decreased with 9.1% and the score for the quality of the neighbourhoods was reduced with 6%. However, when looking at for example Minneapolis, the amount of occupied housing units decreased with 7.4% while the score for the quality of the neighbourhoods increased with 7.1%.

Leidelmeijer and Marlet (2011) studied the liveability in shrinking areas in the Netherlands. They noticed there is a negative trend concerning liveability scores in shrinking areas when comparing the development of the liveability score in shrinking areas to the average liveability score in the Netherlands as can be seen in Figure 2.

The negative trend concerning liveability scores is due to elements concerning the hardware and the software. Elements concerning mindware are not included in the research.

The hardware elements that influence the negative trend are, according to Leidelmeijer and Marlet (2011), the availability of utilities (especially banking offices and supermarkets) and employment rates, at least until 2008. Since 2008 there is a relative reduction of unemployment in the shrinking areas which contributed to the improvement of the liveability score.

The software elements that contribute to the negative trend of the liveability score are crime and population composition, the latter of which is especially noticeable in the residential centres of shrinking areas that have shown a relatively large decline of the population. In the population, the share of higher educated people decreased and the share of non-western immigrants increased. While it is argued that the share of higher
educated people decreased, the data source for this argument is limited and the sample is relatively small. Therefore the truth might be different. The increase of non-western immigrants is especially noticed in residential centres with a sharp declining population. However, it is not known whether the increase of non-western immigrants is because there are more immigrants in the whole of the Netherlands or because of out-migration of the indigenous population. The other aspect, crime, is directly related to safety. While the safety in shrinking cities is fine, there are more violent crimes in shrinking cities. Leidelmeijer and Marlet (2011) also state there are indications that other circumstances should be included in the signalling of shrinkage related problems. The scale at which certain indicators are important differs for shrinking areas and dynamics, the fact that an area is shrinking, especially the willingness to invest, is important as well. It is also plausible that the ‘normally’ positive correlation between the amount of elderly in an area and the liveability will come to a turning point in shrinking areas where a high amount of elderly will lead to problems concerning the liveability, especially when the high amount of elderly is combined with low incomes. One of the problems could be that the social network and the financial support base for utilities comes under pressure. While the dominance of elderly in shrinking areas is not yet noticed it is not unlikely that this dominance will arise and that this will lead to problems concerning liveability.

From the above it becomes clear there are signs that the liveability in shrinking cities is worsening. However, there is no unambiguous evidence on this subject. Whilst there is no unambiguous evidence that the liveability is worsening, it is important to maintain or improve the liveability in shrinking cities since a proper liveability will have positive effects on these cities. Also, as Leidelmeijer and Marlet (2011) indicate, liveability is a problem of the future since there are no problems noticeable yet but there is a visible trend that shrinkage can lead to problems concerning liveability when interventions do not take place.

The various causes and effects of shrinkage and the influence on the liveability of these elements are all related to each other which causes for the relationship between these elements to become complex. To obtain a better idea of the relation between the elements, these relations are shown in the scheme in Figure 3.

According to Großmann, Bontje, Haase, and Mykhnenko (2013) the question that is frequently asked is how to counter specific problems such as decay. However, they pose more general questions such as “how to keep a city liveable, maintaining the quality of life for the remaining residents?” since this will broaden the attention and this will uncover phenomena and drivers of shrinkage that are possibly overlooked on a local level.
Figure 3. Conceptual model of shrinkage (based on Hospers & Reverda, 2014; edited from Linau, 1995; Leidelmeijer & Marlet, 2011)
2.3. **Urban regeneration**

Often when coping with shrinkage, urban regeneration and by that, urban renewal is an important factor. Urban renewal can be seen as a “forerunner of urban regeneration and subsequently one of the components of urban regeneration” (Stouten, 2010, p. 11). Urban renewal is mostly concerned with improving and modernising of the housing stock in degraded areas. Urban regeneration is a much broader concept which can be defined as a “comprehensive and integrated vision and action which leads to the resolution of urban problems and which seeks to bring about a lasting improvement in the economic, physical, social and environmental condition of an area that has been subject to change” (Roberts & Sykes, 2005, p. 17). The urban relates to cities and towns (Tallon, 2013). Since all urban areas are unique because of the complex interplay between elements of urban hardware (i.e. the economic, physical and environmental), urban software (i.e. the social) and urban mindware, urban regeneration should be based on an analysis of the urban area and its condition and “aim to adapt the physical fabric, social structures, economic bases and environmental condition of an area” simultaneously (Roberts & Sykes, 2005, p. 18). Besides integration of the aspects of adaption, participation and co-operation of all stakeholders with a genuine interest in the regeneration of the area is desired so that consensus on the regeneration is ensured (Roberts & Sykes, 2005). Other important aspects in the process of urban regeneration are setting clear objectives that are, where possible, quantified and the monitoring of the progress towards reaching these objectives. Also, the changing nature of urban areas and the influence of internal and external forces that influence the urban area should not be forgotten. Furthermore, it should be accepted that because of the changing nature, policies and programmes of implementation might need to be altered in line with these changes (Roberts & Sykes, 2005).

Whilst the definition of urban regeneration states that the action and vision that are developed and implemented are comprehensive and integrated, reality often suggests otherwise. Especially in shrinking cities where municipalities often pick some small projects and hope that these will affect other parts of the city. Furthermore, it is debatable whether urban regeneration programmes in shrinking cities include an integrated vision on the physical, social, economic and environmental aspects of the city. As will be seen in both cases, there are some projects that focus on more than one aspect but many projects only deal with one aspect of a city. Because projects are focused on one aspect, multiple projects are needed to obtain the integration of all aspects. In order to ensure the integration of the aspects of a city through multiple projects, municipalities often write a vision which states where the city should be in a certain amount of years. The vision is a framework that sets the conditions in order to achieve the vision. A vision could be to have a qualitative, diverse and lively city centre. The projects that will be executed are selected based on their contribution to achieving the vision. A qualitative city centre for instance, can be achieved by renovating facades and improving the public space. But then again, these projects only focus on the city’s hardware and only on the physical aspect of the urban hardware and not on the other aspects of a city. Therefore, effort has to be made to come to an integrated approach of improving the city.
2.4. Shrinking cities in the Netherlands and Germany

European cities that are experiencing shrinkage for a long period of time are mining cities. Closing of the mines led to unemployment and people migrated to places where they could find work. In the Netherlands, Heerlen is an example of a mining city that is experiencing shrinkage (Figure 4 and Figure 5). It is one of the cities in the Netherlands that experiences shrinkage most and the largest shrinking city that is involved in a regional approach to cope with shrinkage.

Figure 4. Shrinkage in Parkstad Limburg (RIGO, 2011)

Figure 5. Vacancy in Heerlen (Bontje, 2009)
In Germany, mining cities are experiencing shrinkage as well. One of the areas where this is the case, is the Ruhr area (Figure 6). The Ruhr area has a well-developed background of policy measures to cope with shrinkage and increase the liveability (Figure 7 and Figure 8). In the Ruhr area, Gelsenkirchen is one of the cities that is experiencing shrinkage and has a shrinking rate that is comparable to Heerlen. The shrinking rate is important since this determines the visibility of the effects and the necessity for measures.
2.4.1. Gelsenkirchen

In 1989 the Internationale Bauausstellung (international building exhibition) Emscher Park was created with the goal to renew the ecological and urban structure of the northern Ruhr area (Urban, 2008). The IBA effected five main themes being: restructuring of the Emscher system, industrial monuments, housing and urban development and social initiatives, labour and qualification.

The restructuring of the Emscher system concerned the water and sewerage system. With the theme housing and urban development a project was employed to extend the number of dwellings in Schüngelberg, a garden city in Gelsenkirchen where 300 dwellings were built between 1897 and 1919 to house mineworkers of coal mine Hugo (Beierlozer & Boll, 1999).

In 2007 Gelsenkirchen published a document on the regeneration of the city. In that document it is stated that the themes integrated district development, living and regional cooperation will become more important. Also Gelsenkirchen wanted the regeneration to be based on small area analyses (Feldmann et al., 2007).

Feldmann et al. (2007) indicated the following goals for the city of Gelsenkirchen:

- Urban and ecological revaluation of the long-term in order to preserve neighbourhoods and residential properties as well as the stabilisation of the inner cities older neighbourhoods.
- Demand driven quality improvements in the housing stock combined with new built houses in contemporary residential areas. Selectively dismantling old stock, unsustainable stock is required. This has to be connected to the improvement of the living environment quality.
- Adjustment of the social, cultural and technical infrastructure to the changing needs.
- Temporary use of areas which can be used in a new perspective.
- Stimulate local economy through consultancy networks, start-ups and qualification and training activities.
- Social integration activities for families, elderly, children and teenagers, improved education.
- Therefore, interdisciplinary local offices will be set-up that can activate and stimulate participation of residents, owners and retailers.

In Gelsenkirchen, urban regeneration is organised per district as can be seen in Figure 9 and Figure 10. Many districts have the same problems thus the same action fields. Problems that occur in most districts are the outdated housing stock, the emergence of brownfields because of closure of the industries, obsolete churches, poor educational quality and a high share of immigrants (Feldmann et al., 2007).

Feldmann et al. (2007) identified the following action fields concerned with these problems:

- Promoting the use of state housing support for maintenance and upgrading of the housing stock.
- A housing and garden program as a means for the improvement of the urban landscape.
- Educational and ecological redevelopment of school playgrounds.
- Strengthen the educational quality to improve the transition to higher quality schools.
- Supporting the cohabitation of different cultures, creation of networks in the neighbourhoods.
- Stabilisation and revaluation of the local supply of amenities.
- Establishment of a district bureau as advisory board for project development and for connecting actors.
- Establish and strengthen civic groups. Building a cooperation structure.

Often, the brownfields that resulted from the closing of the industries, are redeveloped into a park. One of these parks is the Nordsternpark (Figure 7 and Figure 8). Another common action is the establishment of a ‘Quartiersfonds’ a fund that enables the strengthening of voluntary involvement and the financing of smaller, social oriented activities.

The districts Bismark/Schalke-Nord and Südost are part of the social city program (Feldmann et al., 2007). The main goal of the social city program is to improve the social environment ("Evaluation der Programmumsetzung 2002 - 2009," 2010). The improvement of the social environment is done through several projects. There have been projects that focused on the construction of green areas, projects based on improving schoolyards so that they would be more educational and ecological and there have been urban projects e.g. redeveloping facades and renovating dwellings ("Evaluation der Programmumsetzung 2002 - 2009," 2010).
Figure 9. Potential development areas in Gelsenkirchen (Feldmann et al., 2007)
Figure 10. Urban regeneration areas in Gelsenkirchen ("Aktuelle Gebiete der Stadterneuerung," 2013).
2.4.2. Heerlen

Heerlen is part of Parkstad Limburg, a region consisting of eight municipalities. Together with the municipalities of Kerkrade, Landgraaf, Brunssum, Voerendaal, Simpelveld, Nuth en Onderbanken, Heerlen developed a regional approach to cope with shrinkage. Since 2014, Parkstad Limburg has its own IBA, IBA Parkstad Limburg after the example of several German IBAs. In 2014 everyone, i.e. residents, entrepreneurs, social institutions, architects, urbanists, governments, businesses, schools, universities, school children, students and associations, were invited to submit a project for IBA Parkstad. From the 292 projects that were submitted, five main subjects were derived that will motivate a creative process in which there is room for experiments, innovation and developments ("Werkwijze," n.d.). In Heerlen, several projects have been carried out to improve the liveability in the city. Projects include restauration of monuments, new housing developments and landscape projects ("Factsheet IBA Parkstad," n.d.).

Before IBA Parkstad started, the municipality of Heerlen initiated several projects herself. One of those projects is the renewal of the city centre since 2005. The routing in the city centre has been adjusted and all main streets will be redeveloped to improve their character. The redevelopments of the streets will mostly be implementing more green. Also, the train station of Heerlen will be redeveloped since this is the entrance to the city. Furthermore, the retail supply will be widened because Heerlen wants to be a “koopstad” ("Heerlense binnenstad op weg," 2010).

Besides investments in the city, there will also be invested in nature. One of those projects is the Caumerbeek. This creek used to meander through Heerlen but in the 1970s a large part of the creek was hidden. By uncovering the creek, not only the recreational possibilities will improve but the water quality will be improved as well ("Caumerbeek," 2014).

Furthermore, poor quality housing, often post-war buildings, were demolished and replaced with new housing with a lower density. Also the amount of new built houses per year is reduced (Weijers & de Niet, 2015).

2.5. Indicators

In the Netherlands there is the Leefbaarometer to assess the liveability of urban areas. In Germany however, there is no such tool. To be able to compare the liveability in the Netherlands and in Germany, indicators need to be used that are available in both countries. The indicators used for the Leefbaarometer are grouped in three main dimensions being the dimensions physical, social and safety and nuisance. These main dimensions consist of sub-dimensions and the sub-dimensions consist of indicators that are used to determine the score of a sub-dimension (Leidelmeijer, Marlet, van Iersel, van Woerkens, & van der Rijden, 2008). In the Leefbaarometer there are 49 indicators but because of the availability of indicators in both countries, a selection is made of the indicators that will be used in this research. These indicators can be found in Table 1. Besides the indicators to be used, it is also mentioned whether an indicator is available in both countries and if not, how this indicator will be obtained. It is possible that this table is not complete. If, during this research, the need for other indicators arises, those indicators will be included in this research.
<table>
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<th>Indicators</th>
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<th>Obtain</th>
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<td>Quality of the public space</td>
<td>No</td>
<td>Observations will provide an indication of the quality of the public space. Furthermore, surveys amongst residents will give insight in this indicator.</td>
<td></td>
</tr>
</tbody>
</table>
3. Contents of the final report

1. Introduction
   1.1. Problem statement
   1.2. Research questions
   1.3. Objective
   1.4. Scientific and societal relevance
   1.5. Research design
      1.5.1. Research methods
      1.5.2. Phasing
   1.6. Readers guide

2. Problem analysis

3. Research findings
   3.1. Gelsenkirchen
      3.1.1. Measures taken
      This chapter will describe the measures that are taken in Gelsenkirchen to improve the liveability.
      3.1.2. Effect of the measures
      The effect of the measures that are described in the previous chapter will be discussed in this chapter.
   3.2. Heerlen
      3.2.1. Measures taken
      3.2.2. Effect of the measures
   3.3. Difference in measures taken
      This chapter will describe what measures are taken in Gelsenkirchen that are not taken in Heerlen.
   3.4. Effectiveness of measures from Gelsenkirchen in Heerlen
      This chapter will describe whether the measures from chapter 3.3. might be effective in Heerlen and why.

4. Conclusion

5. Recommendations

6. Literature

Appendices
4. Planning

Figure 11 shows the planning for this research. It indicates which activity takes place in a certain week.

![Figure 11. Planning](image-url)
5. Literature


